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Biomedtech Nation: Taiwan, Ethics, Stem Cells and Other Biologicals

Author

Liu, Jennifer An-Hwa

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BIOMEDTECH NATION: TAIWAN, ETHICS, STEM CELLS AND OTHER BIOLOGICALS

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JENNIFER AN-HWA LIU

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Biomedtech Nation: Taiwan, Ethics, Stem Cells and Other Biologicals

Jennifer An-Hwa Liu

Abstract

Stem cell research is a globalizing science that travels in conjunction with varied bioethical ideas, discourses, and instruments. This dissertation takes stem cell research and bioethics as anthropological objects and examines them as social phenomena. Although science and bioethics have shown themselves to be capable of universalization, they take on different meanings and practices in situated local settings. This dissertation investigates how stem cell and related sciences and ethics travel in Taiwan.

For scientists and others involved in stem cell research and policy-making in Taiwan, being Taiwanese is an ethical project in many ways. This ethicality includes personal and institutional components configured in relation to transnational experiences and broad projects of constituting a modern and ethical contemporary Taiwan. Using specific examples from policy-making and biomaterial collecting, I suggest that the work of bioethics is often that of enabling research to proceed by offering ethical legitimation and multi-level risk mitigation. In spite of portrayals of Asia as a site of unfettered biomedical science I find, paradoxically, that research freedom is provided through regulation. Throughout, I show how stem cell science and bioethics serve within broad projects of democracy and nation building, while simultaneously shaping notions of biogenomic belonging.

Stem cell science is a modern global form; yet it serves deeply social and often nationalistic visions of the role of biotechnology, and its adoption and interactions are uneven and situated. Here, I show how stem cell research represents a deliberate conjoining of biotechnology and national development that mobilizes both individualist and collectivist ethics and creates specific biological inclusions and exclusions.

This dissertation is based on fourteen months of ethnographic research conducted in Taiwan. These include a one-month preliminary stay in the summer of 2004, a year of research from September 2005 to September 2006, and a month-long follow-up trip during the summer of 2007. Principal research methods are participant-observation, semi-structured interviews, and archival data collection. Findings are also informed by comparative visits to mainland China and Hong Kong, and a year as a Fellow with the California Institute for Regenerative Medicine.

Table of Contents

INTRODUCTION

> *The development of cell lines that may produce almost every tissue of the human body is an unprecedented scientific breakthrough. It is not too unrealistic to say that this research has the potential to revolutionize the practice of medicine and improve the quality and length of life.*
> *(Harold Varmus in Christopher Thomas Scott 2006:1)*

> *Stem cell technologies… demonstrate how biological properties are increasingly not only being "discovered", but are here being created, in ways that reveal specific national and economic priorities, moral and civic values, and technoscientific institutional cultures.*
> *(Sarah Franklin 2005:61)*

> *Taiwan holds several key advantages for developing its biotechnology and pharmaceutical industries, including its human resources, R&D capabilities, venture capital, and flexible manufacturing skills. After many years of effort to improve agricultural production and studies of Asia-specific diseases and Chinese herbal medicines, Taiwan has been able to accumulate ample experience in certain niches of biotechnology and pharmaceutical research.* *(Taiwan Yearbook 2003:146)*

This dissertation is a study of emergent and traveling biomedical technologies and the ethical formations that emerge and travel alongside them. Specifically, it takes stem cell science, related biotechnologies, and their ethics as its objects, and examines how these operate in Taiwan. It explores the social significance of stem cell research (SCR) in Taiwan at a particular time. More broadly, it explores the relationship between "science" and "society" and thus the sociality that inheres in science – without resorting to reductive or static notions of either society or science. Like many discourses of globalization, modernization, modernity and development, science often is seen to travel along these same circuits, as a singular form that is mobile and that travels from an originary Western center and into the peripheries that occupy the remainder of the globe. In these travels, discourses of modernity and of science increasingly formulate themselves in the language of ethics. And the language of bioethics, specifically, often constitutes itself in similar notions of universal travel, effectively obscuring its roots in a specific Euro-American strand of moral philosophy. This study examines the science of regenerative medicine, its corresponding sociality, and its specific ethics as they are taken up, discussed, and thought about in Taiwan. What begins as a straightforward question of science and bioethics reveals itself, however, as inextricably intertwined with various other, and often unanticipated, thematic strands of nation-building, identity, modernity, and freedom.

The Zhuang-Grifo collaboration

On October 14th of 2003 the American news media buzzed with a stream of stories about a research team from Sun Yat-sen University in Guangzhou, China. This team had announced that they had successfully impregnated a thirty year old woman with embryos obtained through nuclear transfer. Specifically, this involved the removal of the nucleus of the woman’s fertilized egg and its insertion into the enucleated egg from another woman. This procedure was performed on five women, one of whom became pregnant with three embryos, none of which survived. This case created controversy for three main reasons, all of which hinge on conceptualizations of the ethical. First, the technique of cell nuclear transfer is a technique useful in cloning, and although in this case the nuclear DNA used was from a fertilized egg, it was considered by some to come precariously close to human cloning. Secondly, since the nuclear DNA came from a fertilized egg, and the mitochondrial DNA came from yet another person, this procedure, were it to produce a viable human, would effectively create an individual with three genetic parents. Finally, as the research came out of a collaboration between American and Chinese researchers, the Americans were accused of exporting controversial science in order to skirt the more restrictive ethical guidelines in the United States.

Dr. James Grifo, a reproductive endocrinologist at New York University, developed the technique used in this experiment. He and colleague Dr. John Zhang did not conduct the research in China, but handed over their research plan to the researchers at Sun Yat-sen University, led by Dr. Zhuang Guanglun. “We didn’t perform the research, but we gave them the tools so they could do it,” said Grifo (Grady 2003). Grifo and Zhang are named as co-authors in the research paper. They apparently gave away their research plan because new FDA legislation passed in 2001 put an effective end to this kind of nuclear transfer research in the United States. It has since been made illegal in China.[1]

The story that follows in this dissertation arose first out of a general interest in new biomedical technologies and how they generate new ways of thinking about people, social forms and ethical problems. In light of stories, like the one above, about transnational technology transfer – or "ethical outsourcing" – in relation to the relatively restrictive funding legislation pertaining to human embryonic stem cell research (hESCR) in the United States (US), I began to hear expressed concern from scientists and the media that the US was in danger of falling behind in the scientific race to stem cell based therapies. East Asia in general, and China in particular, quickly emerged out of these discourses as a prime site for advancement in the stem cell race, because, as I heard numerous times in various phrasings, "they don't care about ethics."

Informed by an anthropological sensibility that is both suspect of universalizing tropes and insists that cultural forms and norms must be examined in their specific contexts, these orientalizing (Said 1978) discourses inspired me to undertake an ethnographic examination of stem cell research (SCR) and its related ethics-making in the Asian context of Taiwan. This is not an exhaustive account of stem cell research, of Taiwan, nor even of stem cell research in Taiwan. It is a self-consciously partial account that shows how SCR and biomedical technologies more generally are simultaneously operative in multiple social fields with multiple interests and stakes. In this context, it is an inquiry about how science travels in relation to ethical and other social concerns and problems.

The significance of stem cells

Stem cell research in general, but more specifically human embryonic stem cell research (hESCR), has been generative of substantial public debate in multiple sites. In principle, stem cells are defined by two main characteristics, the ability to self-renew and the flexible potential to develop into differentiated tissues. Stem cells from the early embryo (blastomere), in addition to the capacity for prolonged self-renewal (immortalization)[2] (Scott 2006:61), can differentiate into multiple tissue lineages, a trait defined as pluripotency. These dual potentials of immortalization and pluripotency suggest that human stem cells, and human embryonic stem cells more specifically, can give rise to all or most tissues of the human body thus providing the potential means to regenerate various organs and systems. Stem cell research is viewed as holding significant potential for regenerative and transplantation medicine, developmental biology, and drug discovery.

The apparent tremendous potential of stem cell therapeutics is countered by ethical, religious, and political concerns based principally on objections to destroying human embryos for research purposes, the role of cloning techniques used in the science, and concerns of high technology medicine, disability rights, and social justice more generally (although these last issues are quite muted in comparison with the first two).

In the US, stem cell research has become a prominent political issue. In August of 2001 US President George W. Bush announced that federal funding of hESCR would be limited to existing hES cell lines, "where," he said, "the life and death decision has already been made."[3] The establishment of these "presidential lines" of hESCs did not, however, provide adequate material support for the scientific advancement of hESCR as the lines proved to be problematic. The quantity of the presidential lines, researchers and advocates for hESCR argued, was simply too limited to provide adequate genetic diversity, and furthermore, many of the lines were shown to have xeno-contamination or other problems. The ban on federal funding of most new practices of hESCR led to a widespread conflation of a funding ban with a research ban, such as in the following statement from the Committee on Oversight and Government Reform:

> Addressing this problem (of animal and viral contamination), scientists at Johns Hopkins recently announced the discovery of a method for developing uninfected stem cell lines on feeder cells from adult humans. [11] Scientists cannot work with new cell lines developed with this method, however, because President Bush’s policy prohibits the use of lines developed after April (sic) 2001.[4]

Bush's ban did not affect the legality of deriving or using new hESC lines, but only its federal funding.[5] Nonetheless, government support for scientific research has a long and important history in the US; namely, US biological science in general and health care in particular has been heavily supported – even driven – by funding from various government agencies including the National Institutes of Health (NIH), the National Science Foundation (NSF), and the Department of Energy (DOE). In this environment, a lack of significant federal capitalization for what many see to be a promising field of new biomedical research prompted fears that life-saving technologies would be delayed and that the US would fall behind in the international race for scientific progress.

Fiscal and ethical concerns about stem cell research (and biotechnology more generally) have given rise to new enactments of public governance. Such moves exist both in terms of what and how science can be conducted, but also in concomitant formations of particular kinds of publics are that are to be considered. In an innovative form of governance, a group of SCR supporters brought a ballot initiative for public funding of science directly to the voters. California's Proposition 71 was approved by a strong margin and this public vote resulted in the formation of a new state agency, the California Institute for Regenerative Medicine (CIRM), and a commitment of US$3 billion in state funds to support stem cell research in California. In the divisive and contentious political climate of 2004, with the controversial US invasion of Iraq, a vote for stem cell research was seen by many voters as a vote against President Bush and his conservative politics more generally, as well as a progressive move to support science. CIRM has public consultation and participation written into its governing protocols, and has created the Independent Citizens Oversight Committee (ICOC), which is charged with providing independent public representation in all aspects of CIRM governance.[6]

This explicit move to include public participation in governing science is reflected well in the UK, where the HFEA (Human Fertilisation and Embryology Authority) and other government bodies have made an explicit attempt to provide a comprehensive and forward looking structure of governance for new biomedical technologies (see Franklin and Roberts 2006). This has, as Cori Hayden (2007) suggests, resulted in the concomitant production of a particular kind of public that has to be continually consulted. Hayden's work more generally points to how emergent modes of governance, developed under frames of the ethical, create particular kinds of publics in the name of representing these publics. In both the US and the UK, stem cell research governance at least ostensibly includes a broad consideration of multiple interest groups seen to have stakes in the science practices, knowledge produced, and capital spent and potentially recuperated and generated. Thus stem cell research can be seen as potentially productive of novel therapies, but also of novel forms of life and governance, and novel configurations of various collectives. In stem cell science, Robert Merton's statement that "Science is public, not private, knowledge" (1968) has been made explicit.

It is precisely because this science of SCR is so deeply and variously generative that it merits study from multiple perspectives. As it has rapidly become a significant source of transnational collaboration, international competition, and nationalist pride, it is a rich site to study transnational science and ethics. Stem cell research can thus be viewed as an historically specific site of production – of science, healing technologies, ethics, social debates, subjects, collectives, social formations, new forms of capital and of life, among others. Scholars of science and anthropology have shown how new medical technologies produce different anxieties, meanings and practices in different social contexts. Margaret Lock (2002), for instance, shows how organ transplantation takes on radically different meanings in Japan, due to different conceptualizations of death in general, and brain death in particular. Paul Rabinow (1999) shows how DNA came to be viewed in a nationalistic frame among researchers in France. Sharon Traweek (1988) shows how physics, even in deeply international collaborations can take on nationalistic meanings, and Joan Fujimura's (1996) work among geneticists in Japan demonstrates the different meanings associated with the research, particularly in terms of its spiritual and nationalistic valences. This dissertation contributes to thinking about the relationship between biotechnology and culture; more specifically, it attends to what Adele Clarke has called the "remarkable silences…around…cultural differences vis-à-vis biomedicalization and bioethics" (2002). Ethical and scientific discourses on biotechnology are largely shaped by historical Western dominance in the fields. Empirical work on science, ethics, and their interactions in transnational and non-Western settings clarifies both how science is a social project and how realms of the social are configured in relation to science, a phenomenon and theoretical orientation that Sheila Jasanoff (2004) refers to as "co-production."

Stephen Collier and Aihwa Ong point to the global quality of stem cell research in their work on global assemblages. Its apparatus is transnational, if not exactly global, and is linked with global, if concentrated, flows of capital. It is also global in its potentially transformative capacity for bearing upon human life as biological life (Collier and Ong 2005:4). The shifting and contingent emergence of stem cell research is played out in its transnational networks and potentially global effects but also in local settings and particular ways. This study examines how stem cell technologies and their intertwined ethics are inflected by situated cultural, geo-political, personal, and political-economic factors. It is a study of the complex constellation of ethical, political, institutional, economic, and affective components that comprise and occupy the terrain of stem cell research.

Taiwan: the site

Several factors make Taiwan a rich site to study SCR. A central part of East Asia's economic "miracle" Taiwan emerged as one of the four "tiger economies" or "Four Mini-Dragons" (Tu 2001:113) marked by rapid industrialization and economic growth, and high manufacturing output.[7] Currently in a softer economy, Taiwan, though still known as a producer of relatively inexpensive plastics and other goods, has become a substantial global source in the design and manufacture of high-technology products, especially semiconductors and flat screen monitors. This transition is advertised domestically on billboards and multiple other media outlets by the slogan "Made *very well* in Taiwan!" underscoring the conscious effort on the part of the government and industry to represent Taiwan as a modern, high-quality source of innovation and technology. Like other "tiger economy" states, Taiwan is heavily invested in developing itself as an important player in the biomedical sciences and technologies, as is evident in a government project to develop Taiwan as "Biomedtech Island" with the stated goal to make Taiwan an East Asian hub for biotechnology and therapeutics. Biomedtech Island, like Singapore's Biopolis project and South Korea's heavy investment in SCR, points to both the therapeutic and economic potential that biomedical technology is seen to hold.[8]

Taiwan, as a newly democratic state, provides a rich site to explore the relationship between science and politics. Following more than forty years of Nationalist martial law, full electoral democracy was instituted in 1996 in Taiwan. More recently, a series of political and economic scandals implicating the first family of then President Chen Shui-bian resulted in repeated calls for his resignation in the declared interest of this democracy itself. In January of 2008, cabinet elections overwhelmingly supported the opposition Kuomintang (KMT) party, and in March, the KMT presidential candidate, Ma Yin-jeou won by a significant margin. In December of 2008, former President Chen was indicted on corruption charges.

Taiwan can be viewed as both an emergent democracy and an emergent player in the global field of biomedical science. As such it is a rich site to investigate relations between democracy and science, and it adds to both conceptual and empirical analyses of biopolitics, citizenship, nation-building, transnational science, identity, and bioethics. Also, new figures of the individual and new kinds of publics emerge. These need to be considered and, for instance, consulted and surveyed in the emergent realm of the politics of life itself (Rose 2007, Franklin 2000) since as one commentator told me, "democracy demands it."

Prior to its democratization, Taiwan's history is one of multiple occupations. Briefly, its modern history includes 17th century Dutch and Spanish settlements, followed closely by a large influx of Minnan and Hakka mainly from southern China's Fujian and Guangdong regions. In 1945, international treaties ended fifty years of Japanese rule and ceded Taiwan to Chiang Kai Shek's Nationalist (KMT) party. The Nationalists, fleeing the Communists on the mainland and claiming to be the true representatives of China, ruled Taiwan by martial law until 1987 when a period of democratic transition and reform began. US troops joined the Nationalists and stayed until 1979. Currently, although Taiwan operates as an autonomous state, it is claimed by the People's Republic of China (PRC) as a province of China.

Most Taiwanese, however, resists China's claim, and President Chen won his elections on a platform that sought to make Taiwan explicitly independent from China. Missile strikes prior to the 2000 election made by China across the Taiwan Strait were sent as reminders of China's military power and their claim over Taiwan. This action, however, served only to increase the popularity of Chen's independence platform. More pressingly, cross-strait relations with mainland China's government are internationally viewed as a political hotspot, with potentially global consequences. China's government thus often labels Taiwan a "renegade province" and claims Taiwan through its "one China" policy which has the effect of limiting Taiwan's international affiliations. Thus Taiwan, though operating as an autonomous state, nonetheless is both claimed and limited by the policies of the PRC.[9]

Still, Taiwan does not lend itself to facile postcolonial analysis. Although colonized in a strict sense while under Japanese occupation (1895-1945), it resists the bulk of postcolonial literature that presupposes a western colonizer (but see Ching 2001). Similarly, while under subsequent KMT Nationalist rule, it was arguably colonized, as some might suggest it is today by the PRC. These are profoundly important periods and factors in Taiwan's recent political history with deep implications for contemporary

Taiwanese identities, international relations, economics, and language, among others. However, Taiwanese face many directions, domestically to a troubled democracy and waning economy, and internationally toward China, other Asian countries, toward the West, and also toward those countries willing to officially recognize Taiwan as an autonomous state.

Bioethics

This is, in part, a story of bioethics "in the making." As a particular form of bioscience is taken up and invested with meaning and money in Taiwan, I ask how ethical policy is made, taken up, and given meaning. The language of modernity is increasingly being expressed in terms of ethics. Rarely, however, in dominant discourses of science, are the realm, meaning, and function of ethical framings called into question. Bioethics, as the form into which ethical reflection is often codified within discussions and practices of biological science and medicine, is increasingly subject to critique as anthropologists, among others, have begun to take bioethics itself, its assumptions and functions, as an object of inquiry. Focusing on bioethics as a kind of politics or a political object, Nikolas Rose writes of a "bioethical encirclement of biomedical science and clinical practice" (2007:30), and Cori Hayden makes explicit how "bioethics has become central to the ways in which bioscience's authority is itself 'authorized' or 'legitimated'." (2007:733). Hayden (2007) further shows how bioethical instruments serve to enroll actors in particular ways, and Waldby and Mitchell (2006) apply this observation to the role of bioethics in enabling capitalistic circulations of human biological materials.

Kaushik Sunder Rajan (2007) takes this particular critique a bit further and suggests that bioethics plays a constitutive role in these circulations but also assists a new mode of global capitalism based upon human biological resources. This allows for the emergence of new forms of exploitation, subjectivity, and citizenship, as well as the constitution of, for instance, a population of biomedical human test subjects from the global south. Lawrence Cohen (1999, 2005) shows how a particular form of bioethical reasoning is used to justify the sale of human kidneys, rhetorically (and at times juridically) producing a population of "operable" poor subjects whose organs are available as life-saving commodities for richer and often transnational subjects.

Critiques from the bioethical "peripheries" have come to challenge the global applicability of a bioethics rooted in a Western humanist ethical tradition and premised on the autonomous individual. Alora and Lumitao (2001) in their edited volume, Beyond a Western Bioethics, suggest that many of the dominant bioethical assumptions and principles simply do not translate in the Philippines, where the roles of context and relationship are more significant to ethical decision-making than predetermined principles. The most developed literature seeking to situate and "provincialize" (Chakrabarty 2000) a Western bioethics and to engage the question of the possibility of a global bioethics emerges from Confucian perspectives. I am not interested in participating in a polemic that positions e.g. a Confucian bioethics in opposition to a Western bioethics, nor in recreating the debates between universalism and relativism in an ethical frame. In any case, being Taiwanese is not to be conflated with being Confucian, as I discuss in chapter five. Rather, I ask how ideas about bioethics are involved in varied projects of identity-making, state-making, exchange relations, and government.

Despite expressed concerns of producing policy that is appropriate to Taiwan, and the explicit inclusion of specific actors including Buddhist and Confucian representatives, at the level of policy, many of these perspectives are obscured. As bioethics operates in transnational and international spaces it becomes, like human rights, a universalizing discourse. Vincanne Adams (1998b) has shown how universal human rights discourse presupposes a singular figure of the individual and thereby fails to account for non-Western configurations. A singular human rights discourse, as such, cannot account for the collective subjectivities of suffering Tibetans who are asked to translate themselves into a different kind of ontological subjectivity in order to make appeals within a human rights frame. Similarly, empirical accounts of policy-making and people thinking about SCR contribute to considerations of whether and how a global bioethics might be possible. It also enables us to see more clearly what bioethics is, what it does, and how science and society are reciprocally configured.

This study was initially imagined as an investigation of cross-cultural science and bioethics, foregrounding questions of how, for instance, non-Western ethical traditions might inform policies in stem cell research. In the field, however, it became a different kind of anthropological project informed less by ideas of cultural difference and more by questions of what bioethics is and does. While questions and discourses of competing ethical systems and cultural difference emerge, particularly in the philosophical literature, I suggest that in both practice and policy these become subordinated in a sphere dominated by international discourses and standards. What is the space of bioethics and what kinds of terrain does it create and map itself upon – at local, national and global registers? How do its methods, rationalities, and discourses travel in transnational movements? In examining discussions of ethics in relation to bioscience and medicine in Taiwan it becomes apparent that bioethics is engaged in multiple negotiations and imaginaries in which different things and interests are at stake. Bioethics, as an institutionalized field, presents itself as a terrain of conflict and negotiation upon which authorized experts and certain kinds of stakeholders are engaged in questions of what "the good" is and "what ought to be done."

While dominant bioethical discourse suggests itself to be operating in the interest of abstract and universalizable notions of "the good" and how to constitute and determine right action, I suggest, rather, that bioethics does not operate in a field of abstract truth and universal reason but that it inheres a specific rationality that presupposes a way of knowing that makes the world in a particular way. Bioethics operates with various interests at stake and is engaged in multiple projects at various scales from the individual to the global.

Science and politics

Thomas Merton, writing on the relationship between science and democracy in the 1930s suggested that the principles and ethics of good science and good governance are similar, and that free societies and good science appear to be inextricably linked (1973a). In Merton's frame, discourses around science and society took physics as its central object, while such contemporary discourses principally focus on the biological sciences in which human bodies and subjectivities are increasingly seen to be explicitly at stake. As biomedical technology comes to permeate and be permeated by increasingly intimate spaces of subjectivities, imaginations, and bodies, a new public implication is seen to emerge in science (Thompson 2005), and new regulatory regimes arise to address socio-political questions that concomitantly emerge.

Even in mid-20th century Euro-America, however, the conceptual separation between science and politics was troubled. Events of World War II, and specifically Nazi science and the bombings of Hiroshima and Nagasaki, served to both reinforce and challenge the idea that basic science was (ontologically) and ought to be (politically) outside of politics. The excesses of Nazi science, along with Lysenkoism, were used to bolster claims that science was corrupted when used in the interests of politics rather than those of a transcendental truth. The horrors of post-bombing Hiroshima and Nagasaki, however, complicated the role of the scientist and fed heated debates on whether the practice of "pure" basic research was outside of politics. This debate is well illustrated in the respective post-Hiroshima positions taken by physicists J. Robert Oppenheimer and Edward Teller. Oppenheimer implicates the physicist and seems to question the conventional separation between basic research and technical application that relegates the former to the realm of science and the latter to politics:

> Despite the vision and the far-seeing wisdom of our wartime heads of state, the physicists felt a peculiarly intimate responsibility for suggesting, for supporting, and in the end, in large measure, for achieving the realization of atomic weapons. Nor can we forget that these weapons, as they were in fact used, dramatized so mercilessly the inhumanity and evil of modern war. In some sort of crude sense which no vulgarity, no humor, no overstatement can quite extinguish, the physicists have known sin; and this is a knowledge which they cannot lose.
>
> (Oppenheimer 1955:88 in Bynum and Porter 2005:470)

In contrast, Teller iterates a more conventional position that science is about truth, and its application is about politics, and the two spheres are and should remain quite separate:

> The scientist is not responsible for the laws of nature, but it is a scientist's job to find out how these laws operate. It is the scientist's job to find ways in which these laws can serve the human will. However, it is not the scientist's job to determine whether a hydrogen bomb should be used. This responsibility rests with the American people and their chosen representative.
>
> (Teller, in Bynum and Porter 2005:470)[10]

The physicist is thus positioned as a seeker of truth innocent of the applications of such truth. In the contemporary world of biomedical technology, however, scientists are increasingly asked to be accountable for their practices that are seen to push against our received senses of what it means to be human and what it might mean to be ethical.

Merton suggests that democracy, understood as good government, supports good science guided by his set of four norms: communalism, universalism, disinterestedness, and organized skepticism (Merton 1973b). Neither democracy nor science, however, exists as a singular set of ideas and practices.[11] Indeed science is not defined by a singular method (Shapin 2007) but by various methods, instituted by varied practitioners, with differing sets of standards, measurements, instruments, etc., according to multiple non-determinative factors, including type of science and place. Taiwan, as a newly democratic state, offers a unique place to study a specific configuration of emergent forms – of science, politics and ethics.

Theoretical orientation: medical anthropology and STS

Drawing on richly interdisciplinary approaches, science and technology studies (STS) has focused attention on the production of scientific knowledge and has reframed science practice as social practice. As a field, STS has interrogated how scientists practice science, how knowledge is produced (e.g. in the lab, clinic, or academy), and how that resultant knowledge is operative in relations of power. Power is conceptualized differently by varied theorists. A Foucaultian power relies on the exercise of freedom and is constituted relationally and discursively. A Latourian power relies on the robustness or length of networks. Political-economic approaches often view power as embedded in institutional and inter-group structures and relations. Still others conceptualize power as necessarily oppressive and in this regard as resembling what Foucault considered to be states of domination. In all of these, however, the mobilization of interests and knowledges are central practices to the construction of power relations. Attending to how gender, race, ethnicity, class, nation, and other categories of difference are produced (or often effaced) in accounts of science and ethics raises questions of how multiple interests inhere in technoscience.

Most such inquiries have focused on the scientists or practitioners, and within modern industrial societies. I ground my study using what I view as the rich complementarities between science and technology studies (STS) and medical anthropological approaches. Medical anthropology has long been concerned with knowledge production and practice in general; as such it can contribute to the larger inquiries on science practice and knowledge production from an anthropological perspective. Medicine, as both a field and a practice, is increasingly involved in biotechnological endeavors, and therefore it engages science and the laboratory in new ways. Medical anthropology also refocuses the inquiry from the level of "science," in an institutional sense, to the level of the human (and non-human) agents who interact in the machinations of science; in a specifically medical context, this requires, for instance, taking account of the patient and practitioners as subjects, especially as the clinician's knowledge relies increasingly on laboratory productions. More specifically, however, medical anthropology is uniquely situated to investigate science in a trans-cultural context, that is, how science is practiced in different cultural contexts and how science travels and interacts with varied systems of knowledge and healing practices. Such a perspective serves to enhance STS as a field, and offers critical commentary on science in the cross-cultural context of, for instance, development programs and biotechnology. This study provides empirical data on trans-cultural and transnational biotechnology, bioethics, and social contexts.

I take as a premise that science is social, and that contemporary modes of sociality are informed and shaped by scientific technologies. Technologies within the biosciences are especially demonstrative of this recursive relationship, especially in the degree to which they invoke considerations of the body, life, death, and personhood. Sharp (2000), Waldby and Mitchell (2006) and Sunder Rajan (2007) among others, point to the fragmentation and commodification of the human body that is characteristic of modernity in general and of bio-medical technology in particular. And Donna Haraway, using the immune system as a site of heteroglossic discursive production, shows how bioscientific concepts have organized new ways of envisioning the body which have "destabilized the symbolic privilege of the hierarchical, localized, organic body"(1991:211). Rather, the human body is remade as hybrid, cybernetic, and fragmented. These authors remind us that reconfigurations of the body and the shifting of boundaries that they entail comprise a rich analytical terrain. Social studies of technoscientific practice have sought to make visible the intransitive relationship between the science and the social by showing how the social infuses scientific practice. Furthermore, transnational studies have shown how science is inflected by context dependent meanings. Rabinow (1999) shows how the meaning of genomic practice takes on specifically French notions of brotherliness and beneficence in the French context. Traweek (1988) and Fujimura (2000) show how the practice of science manifests differently in Western and Eastern contexts, and how they concomitantly evoke different ideas about what the science itself means, while Lock (2001) and Pigg (2001) show that such technoscientific knowledges and practices are taken up in quite different ways that are deeply context driven.

Critiques of science also emerge from postcolonial and feminist perspectives. While Western science in general, and biomedicine in particular, have been shown to be powerfully universalizing, these critiques pose epistemological, ontological, and political challenges to globalizing science. Although science represents itself as a universal form of truth, these studies suggest that it often does not travel well in other socio-cultural and geopolitical realms, where it may be viewed, rather, as a (neo)colonialist enterprise (e.g. Nandy 1998, Visvanathan 1997, Marglin 1990). However, science may be appropriated toward liberatory ends as well, even in postcolonial contexts, complicating the view that science traveling to the postcolonies must represent Western dominance (Adams 1998a).

This project is situated at the intersection between anthropology and STS. I suggest that anthropology is uniquely situated to contribute significantly to STS methodologically and in accounts of traveling science and technology. I also suggest that perspectives from STS both build upon and enrich theoretical and empirical anthropology. By studying science in transnational contexts we can come to understand better the ways in which science is political (as well as how the political is deeply influenced by science and technology) and how it articulates with concerns of proper governance. By attending to how technoscience – as practice, discourse, epistemology, ethics, etc – is taken up, resisted, manipulated, and transformed in contexts of significant cultural difference, we can come to understand its epistemological terrain, and a transnational and cross-cultural attention to its contexts will help to elucidate its relationships and their stakes.

Methods

In their ethnography on the social life of preimplantation genetic diagnosis (PGD), Sarah Franklin and Celia Roberts describe ethnographic methods as,

> Whereby researchers immerse themselves in a range of different contexts to collect data about a particular object of inquiry, 'following it around' to build up a kind of hyperstack of definitions, images, representations, testimonies, descriptions, and conversations. (2006:xix)

Similarly, I follow the sometimes controversial discourses, people, and institutions involved in stem cell research and bioethics. I met with scientists, clinicians, lawyers, ethicists, philosophers, students, religious leaders, among others, and I attended numerous conferences, meetings, hearings, and talks. I attended weekly laboratory meetings and stem cell science classes at one research site, and I attended bioethics classes at a university, all the while interviewing many different types of people involved in stem cell science and policy-making. I also read stacks of papers and made friends and talked with them about their ideas on various aspects of Taiwan's sciences, medical system, politics, identity, and everyday life. In this way of "following it around," I developed my "hyperstack" of information on which this dissertation is based. Though my research is focused on and in Taiwan, the field of SCR and its networks are international and transnational and thus this is not an ethnography that can be strictly spatialized in Taiwan. The scientific and technical practices travel across boundaries. So too do many of the practitioners, experts, discourses, publications, policies, relationships at multiple scales, and the material objects and human biological materials themselves.

My research is not a specific search for the right answers to the challenging questions that biotechnologies present. It follows, rather, Franklin and Roberts' recognition that,

> Within social science, these methods and results are not, as in science or medicine, orientated toward identifying the best, or most robust, "answer" to a particular question. In fact, the reverse is true: precisely by suspending the presumption that we can even know what a 'right' answer would be, social scientists often seek to reveal the formative processes by which both questions and answers acquire specific patterns and shapes. (2006:10)

Ethnography and its related method of participant-observation call for a deep immersion in the study area. Based historically in studies of "less-developed cultures" it sought to provide a holistic and complete account of the lives of others on their own terms. The ethnographic premise is that this kind of displacement on the part of the researcher leads in turn to a suspension of her own cultural assumptions, and therefore provides the ability to consider the "other" on their own terms, in their own places. This orientation comes out of specific anthropological legacies of studying in remote and often colonized regions, with a particular emphasis to understand so-called "primitive" societies.

Contemporary studies increasingly attempt to shed this bias and to turn the anthropological gaze on our own practices and assumptions and to examine our own rationalities (Latour 1993). Such phrasing, of course, presupposes who the anthropologists are and where they come from, and this presupposition is increasingly challenged by so-called "native" anthropologists (who are implicitly non-Western). Nonetheless, I suggest that there is something to be said for the disruption that displacement gives to the anthropologist's sense of herself, her assumptions, and her objects (and subjects) of inquiry. The everyday challenges of living among people with different cultural practices and languages, with differences in the minute details of communication and of habitus and dispositions (Bourdieu 1977), of living in a place with unfamiliar weather, insects, stories, smells, and such, helps to make clear one's own assumptions and dispositions such that even one's own body can come to seem unfamiliar. Indeed it makes the familiar strange, and over time, the strange familiar.

This dissertation is based on fourteen months of field research in Taiwan. Most of the research was conducted between September 2005 and September 2006 while I lived in Taipei, the capital city. However, my stay also included a preliminary month-long visit in the summer of 2004 during which I lived in Taoyuan county, and a follow-up month-long stay in the summer of 2007, during which I was based principally in Taipei, but spent time also in Pingtung. During the research year, I was a visiting junior fellow at Academia Sinica. This post gave me access to the Institute's academic resources and a broad field of international scholars. Although my office and affiliation was in the Institute of Modern History, I spent much of my time on location at the Genomic Research Center, the Zoology Institute, and the Institute for Biomedical Sciences. Most of my data comes from research centers, medical institutions, and universities located in the northern part of Taiwan, and specifically Taipei and Taoyuan counties. Although I traveled throughout the island and interviewed people from most of the major regions, most of my research took place in or near Taipei. Regional differences matter in Taiwan, as elsewhere, and the different areas of the island are described in very different terms. Grossly generalizing, the north and especially Taipei is described as more developed, cosmopolitan, wealthier, and as politically more blue leaning (that is they tend somewhat to favor the Kuomintang party). The southern and eastern parts of the island, in contrast, are characterized as more agricultural, more traditional, poorer, and as forming the main base of support for the politically green Democratic Peoples Party. Green does not refer here to an environmentalist approach to politics, rather blue and green are the colors chosen to represent the different political parties or leanings. In broad terms, the blue side supports a status-quo or even more engaged relationship with China, while the green side leans more toward a separatist or independence stance.

I use pseudonyms throughout except when referring to people as they appear in print sources, or, on rare occasions where their identity and/or their position are otherwise referenced and germane. I am aware of the ongoing debate as to whether the long-standing anthropological practice of using pseudonyms for informants is more ethical or whether it simply enables the ethnographer to be less responsible with their pens (or laptops) (Scheper-Hughes 2000). Nonetheless, here I take the practice as the more responsible way to proceed, and in this vein I often omit identifying details as well.

Chapter preview

Chapter one sets the stage for the rest of the dissertation, examining the socio-political terrain upon which ideas of science and modernity move in contemporary Taiwan. I consider how biotechnological science is constituted as a project of nation-building that operates, in part, by repatriating overseas experts, and I examine these experts' motivations and reactions in returning to Taiwan. This is not a passive reception of traveling knowledge but, rather, a deliberate incorporation of biotechnology into projects of national development. Different ideas and priorities are evoked in relation to projects of both science and modernity and this chapter closes with an examination of alternate narratives that draw upon notions of individualism and self-determination that challenge the specific expertise of scientific experts.

Chapter two takes bioethics as its object. It attends to the origins of bioethics as a field, and then considers critiques of it as a global form of ethics and governance. It is, however, a global form that articulates situated Taiwanese notions of ethics from other realms that alternately impinge upon or bolster scientific research. I consider the literature from Confucian and Buddhist perspectives and place it in relation to human embryo debates and Taiwan's stem cell policy-making. In examining bioethics in practice, I suggest that it operates principally as a mode of governance that serves to facilitate science and to mitigate risk at multiple levels, but that ultimately it serves to delimit a rather narrow configuration of the ethical.

In chapter three, I consider scientific collaboration in terms of its material objects and specifically human biological materials. In Taiwan, human embryonic stem cell research is limited, in part, by a scarcity of research embryos. Here, taking three examples of biological banking in Taiwan, I consider how the specific socio-polity configures a set of relationships in which biological donations are often hard to come by for research purposes. However, through these examples of umbilical cord blood banking, a bone marrow data bank, and a national biobank project, I suggest that a singular characterization is not possible. In fact, each of these projects foregrounds different kinds of moves and priorities that are illustrative of the varied interests that are mobilized in Taiwan's fast changing environment. In what Warwick Anderson (2000) has called "the new transactional order emerging in science," a gift-commodity distinction is superceded as the ethical, the market, and biological sciences become increasingly entangled, each with the other.

Chapter four expands upon the previous chapter and examines the enhanced ethical considerations that are mobilized in relation to the collection of biological materials from Taiwan's Aborigines. These Aborigines, thought to be among the "purest" populations in the world, have long been subjects of interest to science. Now, contemporary studies often focus on unique genetics as explanatory models for various health problems which, I suggest, serve to obfuscate longer and enduring histories of social marginalization. Furthermore, concerns about biological commodification arise as at least two Taiwanese Aboriginal cell lines are available for purchase through a US laboratory supply company. Recent years have shown a proliferation of global and local organizations that seek to protect indigenous peoples from perceived exploitative relationships in which they serve as biological and economic resources. Through this lens, I consider the bioethical instruments of informed consent, benefit-sharing, and altruism to suggest that such approaches within the field of bioethics will largely continue to fail to assuage the concerns of indigenous and non-indigenous peoples alike.

In chapter five, I conjoin two projects from within Taiwanese bioscience. Prompted by the announcement from a human embryonic stem cell scientist that the goal of his research plan is to develop hES cell lines with the "genetic characteristics of the

Taiwanese," I examine a scientific argument that seeks to establish a unique genetic identity for the Taiwanese. While contemporary scholarship suggests that identity is a contingent and shifting abstraction, here, genomic science is being used to claim a material and historical basis for a unique Taiwanese identity. Appeals to genomic science to know the truth about identity render identity as an irreducible material essence, erasing the myriad social, historical, political, cultural, and affective components of identity formation. I suggest that such identity claims are made in a relational frame that relies upon particular ideas about categories of self and other, sameness and difference, purity and hybridity. In discursive and laboratory spaces, ideas about purity become increasingly polyvalent, and are mobilized in new ways in making both identities and stem cells.

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[1] New York Times, 10/14/03, Section A, Pg. 1.; National Public Radio, All Things Considered, 10/17/03; ABC World News Tonight with Peter Jennings, 10/14/03; The Guardian Home Pages, 10/14/04, Pg. 3. An additional concern was raised that the embryos had three genetic parents, see The Daily Telegraph (London), 10/14/03.

[2] "*Immortalization* refers simply to the ability to be cultured indefinitely" (Levine and Enquist 2007:33, italics in original). See page 34 for a more detailed definition and description of cell immortalization.

[3] http://www.whitehouse.gov/news/releases/2001/08/20010809-2.html (August 9, 2001).

[4] http://oversight.house.gov/features/politics_and_science/example_stem_cells.html

[5] These funding restrictions did, however, have the broader and significant institutional effect of disallowing non-federally funded research to take place in laboratories that received federal funding, thus effectively barring much hESC research from existing laboratory facilities.

[6] The nature of the oversight that this committee provides, whether or not its members are in fact representative of the California publics in general, and other such questions as to whether the ICOC includes the California publics "well" (Strathern in Hayden 2007) is beyond the scope of this project, but see Chris Ganchoff (2007) and Ruha Benjamin (2008).

[7] The four "tiger economies" are South Korea, Hong Kong, Singapore, and Taiwan.

[8] For more on South Korea and Singapore state relations with biomedical technologies, please see Aihwa Ong (in press) and Charis Thompson (in press).

[9] Since the inauguration of President Ma the PRC and Taiwan have begun to foster more cooperative relations. Some have met such rapprochement with resistance as evidenced by large scale protests such as that held when Chen Yunlin, chair of China's Association for Relations Across the Taiwan Strait, visited Taipei in November 2008.

[10] This quotation is misattributed in this volume to Oppenheimer, probably following an earlier such misattribution in Wolpert and Richards, 1988. It is worth noting that Teller changed his perspective toward the end of his life.

[11] I follow Stacey Leigh Pigg here that we must be cautious to not depict science, or other ways of knowing, as static unitary fields:

> knowledge is more dynamic than that: If we merely envision different knowledge systems bumping into each other, or supplanting one another, we risk oversimplifying the already synchretic, hybrid, polyglot conditions with which most people contend. (Pigg 2001:483).

CHAPTER ONE

The role of experts: scientists, modernities, and a nation

> From the opening of the twentieth century to its close, the politics of national development and economic growth was a politics of techno-science, which claimed to bring the expertise of modern engineering, technology, and social science to improve the defects of nature, to transform peasant agriculture, to repair the ills of society, and to fix the economy. (Mitchell 2002:15)

In The Rule of Experts Timothy Mitchell tracks encounters in the postcolonial, developmental Egyptian state with modern forms of expertise. Taiwanese experts are not fixing nature or peasant agriculture specifically, but they are concerned with societal ills, economic stability and growth, and with making a modern nation. More importantly, these problems are viewed as fixable through modern, and often specifically Western, forms of techno-scientific expertise.[1] In this chapter, I track how ideas about modernity and science move in relation to biomedical research and how scientists take up, and are taken up by, mobilized and implicated, in these movements. I suggest that these scientists constitute themselves as subjects in a project of making a modern state and nation, and I show how their expertise is viewed, mobilized, and simultaneously challenged in these projects. I examine transnational scientists' own motivations in coming to, or returning to, Taiwan to practice their crafts. Then I examine how scientific expertise is linked to ideas about modernity in general, and how such ideas manifest in Taiwan in specific relation to its contemporary geopolitical situation. Even as Taiwan looks west towards a technoscientific modernity, relations with China figure significantly and at multiple scales, from everyday living to global politics.

In the final section, I suggest that modern techno-politics comes to be challenged in particular ways as it comes into tension with an alternate vision of modernity marked by enhanced valuations of self-determination and individual rights. Aihwa Ong identifies the leading roles that scientists, doctors and engineers have long played in Asian government, and the concomitant uses of science "as both metaphor and technique for solving the myriad problems of welfare, growth, and political legitimacy. The role of scientific knowledge in the success of postcolonial nations begets a powerful emotional resonance especially among the educated elite" (Ong in press). Indeed, in Taiwan, such visions of scientific modernity are dominant, especially among the elite. Nonetheless, competing discourses of modernity transect these formulations of the role of the technoscientific state and its experts. Some seek to indigenize knowledge and expertise while others resist hegemonic constructions of expertise itself. At the close of this chapter, I address an emergent narrative of modernity based on notions of individualism and freedom that I suggest comes to constitute a counter-discourse that positions scientific authority as an outmoded form, linked with traditional, paternalistic, or oppressive relations.

This counter-discourse draws upon a figure of the liberated and self-determining individual of modern democratic politics, challenging the authority of scientific expertise and pointing to the polyvalence of the concepts of expertise, modernity, science, and proper governance. In these competing discourses of Taiwanese modernity scientific authority is viewed, on the one hand, as both productive and constitutive of modernity, while on the other, it is positioned as antithetical to a variant and individuated form of what it means to be modern. Both sides mobilize different forms of expert knowledge and different constitutive modern rationalities; where one refers to scientific authority, the other draws upon principles of rights-based law and democratic governance.

Traveling scientists

Being a Taiwanese scientist is, for many, an ethical project. It draws upon ideas of place-making, identity-making, familial and group continuity and responsibility, and projects of making a particular kind of healthy, modern, free and enduring nation-state. In *Science as a Vocation*, Weber reminds us that science cannot answer to our fundamental questions of meaning and ethics:

> Tolstoi has given us the simplest answer, with the words: 'Science is meaningless because it gives no answer to our question, the only question important for us: "What shall we do and how shall we live?"' That science does not give us an answer to this is indisputable. The only question that remains is the sense in which science gives 'no' answer, and whether or not science might yet be of some use to the one who puts the question correctly. (Weber 1946:143)

However, for these Taiwanese scientists, I suggest that science does, in fact, hold an answer to the questions of what we should do, and how it may yet be of use. This is not in an epistemological sense but in a practical sense. In different stories that various scientists told me, practicing science as an ethical project draws upon varied themes of duty to people, nation, and place. Many made significant personal sacrifices in an effort to contribute to what they consider to be a greater project of making a better, and enduring, Taiwan.

Dr. Tu is a bright and thoughtful young scientist with his own lab in one of Taiwan's premier stem cell programs. He received his graduate training abroad and was doing well working at a US lab when he and his wife made the decision to return to Taiwan. I asked Dr. Tu why they decided to return and his response captures the sense of place and duty that is a common theme among many returning scientists.

> Maybe this will sound a little bit naïve, but originally I came back to Taiwan because I had this idea that it's my duty. That maybe I can help Taiwan, this country, a little bit on stem cell research. This was really the most important issue. Also, my family was still in Taiwan, but at that time that was not so important to me because I could have stayed in the States with my wife and child, and my career was going well there. My child was born in the US. My wife and I, we were concerned that maybe we would be giving up a great opportunity by coming back to Taiwan.
>
> But I still believe we need to have a new generation, a new type of leader for this country. So it's good for us, even if it means that maybe we'll go through a lot (of personal difficulty).
>
> When I was in the US, I had a friend from Russia, and we talked about this kind of thing. I would say that if I couldn't make things work well in the US, then I could always go back to Taiwan. And he told me, as a Russian, he only has this chance in the States because there's no way that he could get support in Russia… because funding support is very minor; it's not good there. So he had no choice. For him, pursuing a scientific career, he could only stay in the States.
>
> I always felt that I had a country that I could go back to. So this means, although we had a good situation in the States, that there's a place that I trust and could return to. This is very important.
>
> My kids, they'll probably get their education in the States. But here, they have a tradition, a connection to Taiwan. And one day if they want to come back, I hope this place will be good enough for them to come back to. So who is going to do that? Our generation is the keeper.
>
> So sure, I can do well in America. But if everyone doesn't want to contribute a little bit, to help, then eventually, well, it might be like Russia… and then one day there's no chance that there's another place where we can go back. (interview excerpt 7/07)

For Dr. Tu, returning to Taiwan involved a consideration of multiple factors including a sense of duty oriented toward making and preserving a homeland for his children, making a place worthy of return for them and their peers. In this way, developing a strong national science is a patriotic act helping to ensure a strong nation with a secure place in the world. Patriotism, in this case enacted through science, comes to constitute ethical action.

Similarly, Dr. Chen, a physician, returned to Taiwan after decades of living in the US. After the shock of losing two close friends suddenly to cancer and encountering a health scare of his own, he felt compelled to return to do something for his home country and its people. Around this same time he met with a European doctor who had spent much of his life in Taiwan promoting medical care as the president of a Christian Hospital. Dr. Chen says that he felt embarrassed that this man who had no blood ties to Taiwan had spent so much time and effort to help the Taiwanese while he himself had spent so little. Dr. Chen returned with the idea that he could make a difference and he is invested in improving patient care and enhancing medical ethics and education. His appeal to blood ties can be read in terms of an imagined community in the Andersonian sense, but it also draws on a long-standing traditional Chinese cultural value for, and narratives of, continuity based upon blood relations and modes of factoring descent (Fan Fa-Ti 2004, Dikötter 1997, Chow 1994).

Such narratives as these, full with a sense of duty, responsibility and belonging, are common among returning scientists and professionals. John Yu, the head of both Academia Sinica's stem cell program and the Taiwanese Society for Stem Cell Research, says for example "they need my expertise here" (Cyranoski 2003:672). Alice Yu, his wife and the head of Academia Sinica's Genomic Research Program, were recruited in part by a simple fax sent by a colleague stating that "Taiwan is not a perfect place, so it really needs you" (Hsieh 2007). Here, and for many others, returning to Taiwan is an ethical act of conscience and duty. By emphasizing the ethical I do not refer to a specific conceptualization of what ethics might be. Rather, I draw upon broad and enduring ideas that seek to address questions of how one should conduct oneself, how one should live one's life, and what is good and right; these scientists, I suggest, constitute themselves as ethical subjects in relation to notions of family, people, nation and country.

Repatriating expertise

The active repatriation of overseas Taiwanese can be viewed as part of a larger push to promote Taiwanese scientific industries. Taiwan's success in information, integrated circuit, and semiconductor technologies has positioned it as a contender in the world of scientific innovation and technology sector markets. More recently, agencies of the central government have made a concerted push to promote biotechnology in Taiwan. A 2005 initiative sought to develop the island's biotech sector, positioning Taiwan as "Biomedtech Island." A news article from the Ministry of Economic Affairs reports:

> **Biomedical Technology Island Plan to spur investments of NTD 40 billion over 5 years**
>
> APRIL 20 2005
>
> The Executive Yuan Science and Technology Advisory Group, in coordination with Academia Sinica, the National Science Council, the Department of Health, the MOEA, and the National Health Research Institutes, has formulated the Biomedical Technology Island Plan. In addition to cutting National Health Insurance expenses by NTD 10 billion annually, this plan is also projected to stimulate NTD 40 billion in public and private investment over the next five years.

> The Biomedical Technology Island Plan will be comprised of three main projects: the National Health Information Infrastructure, Taiwan Biobank (a database of disease and genetic information) and a clinical research system.
>
> The Science and Technology Advisory Group says that Taiwan has many strengths that make it ideal for the development of biomedical technology. For instance, Taiwan has eighteen centers for medical studies, and, from 2002 to 2004, international medical organizations conducted 337 clinical studies in Taiwan.
>
> In addition to being a great location for the establishment of Asia Pacific clinical research centers, Taiwan's world-class information technology hardware manufacturers have the ability to build the advanced IT equipment and instruments for biomedical applications. Taiwan has already attracted major global players in this area. IBM for one operates a biological information technology research center in Taiwan.
>
> Also, Taiwan's National Health Insurance system, which has been in operation for ten years now, is an excellent source of information for the establishment of medical and health information databases.
>
> (Ministry of Economic Affairs 2005)

Such promotion and push to develop biomedical technology requires various forms of specific expertise. And while Taiwan has, as the story above suggests, a developed educational structure from which to draw skilled talent domestically, it nonetheless relies upon the repatriation of various overseas experts. An article in the prominent science journal *Nature* states that, "a new economy with a strong biotechnology component is the Taiwanese government's ambitious vision for the future – one which it is backing with serious investment" (Cyranoski 2003). But this same article also characterizes this biotech push in Taiwan as "desperately short of personnel," a sentiment that is reflected in various reports of a predicted future shortage of qualified biotech scientists. It is also substantiated in reports from several of my informants who were motivated in part to return to Taiwan because they were offered better working conditions than in their previous positions. One scientist came to Taiwan because his mentor in Australia died leaving him working in a lab with a director who was unsupportive of his work. In Taiwan, he is now a PI with his own lab at a prestigious research center. Several stem cell researchers have similar stories to tell. While there are certainly other trade-offs, in Taiwan they are able to have their own laboratories and to pursue more closely their own research interests.

This kind of opportunity corresponds with a general push to recruit overseas Taiwanese. A Taiwanese magazine recently printed the following headlines:

> **Taiwan’s Expatriate Scientists Return**
>
> **Biotechnology’s Golden Age Unfolds**
> Top scholars returning from abroad are
> contributing skills honed over their
> lifetimes to make the biotechnology
> sector Taiwan’s next “miracle.”
> (Hsieh 2007)

The article details the deliberate recruitment efforts through personal contacts made by high-level (including Nobel laureate) scientists encouraging their still overseas counterparts to come home and help their country. Despite the return and recruitment of many scientists there remains a sense in stem cell circles that more are needed with specific stem cell expertise. One researcher told me that he may not stay in Taiwan, but was considering working in Singapore because he thought the work environment may be better, saying of Taiwan's stem cell research, "we have some very good researchers, but we just don't have the critical mass" necessary to really grow the field. A different researcher suggested that a serious problem was that several of the leaders in the field were not actually trained as stem cell scientists and thus lacked specific expertise. Thus, the recruitment of scientists to Taiwan with specific expertise remains an important task for SCR there.

It is impossible to disarticulate Taiwanese biotechnology generally from considerations of global capital. While many of the returning scientists, clinicians, and other experts expressed a general concern with Taiwan's economic stability, for most, personal finance is not expressed as a primary factor. In fact, many experience a salary reduction to return home, although this is often attenuated by various other perks such as housing, a hired driver, etc., that are sometimes provided as part of the worker's contract. A scientist who was hired as the president of a public university, for instance, received only approximately one third of his US salary, but his contract also included housing, a driver, national health insurance for himself and his wife, and a housekeeper. As I suggested earlier, additional benefits often include a high level of social capital, more freedom to pursue one's own research platform, a higher level of professional status, the sense of contributing something meaningful to one's homeland, and a return to family and home. A returned scientist's wife told me also that, in their return, she had a sense that her husband regained access to a part of himself. Her husband had grown up in Taiwan, and then emigrated to the US for graduate school. After living in the US for almost 40 years, he returned to Taiwan.

> You know, I think that he was able to nourish a part of himself, his Chinese side. Because in a way it's his home and it's his native language. So he gets to speak Chinese, and in this way he has access to another side of himself. And he can think like a Chinese, and relate to people like that, and so it's like he becomes a complete person here, with both his American side and his Chinese side. (11/07 field notes)

Her narrative suggests a kind of comfort in the return, a sense of affecting a different relationship within oneself in relation to place, language, cultural factors, and relations.

Even within her account of deeply personal motivations and sentiments for the return, however, she also points to a deeply felt desire on the part of her husband to do something for Taiwan, to help in a meaningful way.

Modernities

These scientific narratives both draw upon and contribute to notions of Taiwanese modernity. They construct Taiwan as in need of improvement through particular forms of expertise, domestic and imported. I take modernity as a concept, a variable set of practices and discourse, an imaginary that is taken up and performed in culturally situated and historically particular ways. But it is also an imaginary that is engaged with, whether in alliance with or in opposition to a concept of a global modernity, constructed as emerging from the West and diffusing around the world. Such a totalizing view of modernity relegates other forms of modernity as deferred and inferior instantiations of a Western form. Modernity is a temporality that also inheres often a spatiality inscribed as the "West versus the rest." This spatial rendering of modernity has been challenged by scholars from many disciplines seeking to disrupt the idea of a singular and Western modernity. Under the pluralized rubric of “alternative” or “other” modernities, studies in transnational modernities decompose singular conceptualizations of modernity, and ideas of modernity as necessarily Western (cf. Adams 1998b, Pigg 1996, Rofel 1999, Harootunian 2004). We might say that modernity is an idea about what is new, and how knowledge is rendered as knowable; it is a kind of semantic and imaginary space. While the idea of a diffusionist modernity, originating in the West is correctly challenged, empirical work suggests that Weber’s (1946) observation that capitalism and science seem to be powerfully universalizing remains salient.

For Foucault, part of the modern project is to transform the present “by grasping it in what it is” (1984:41). Foucault's concepts of biopower and governmentality are useful in exploring how "life itself" comes to inhere in modern modes of government, in which life becomes an object of political, ethical, subjective, and relational stakes. He suggests that modern power relies, in part, on modes of subjectivation (*modes d’assujetissement)* (Foucault 1994). These modes operate such that the modern subject is made in relation to forms of knowledge that inculcate "proper" behaviors. Thus the subject is constituted as a subject of knowledge, as a subject acting on others, and as a moral agent (Foucault 1994:262).

Although Foucault was writing in a specifically European context, these shifts in modes of governance are visible in Taiwan as well. From Japanese imperial rule (1895-1945), to the Nationalists' rule by martial law (1945-1987), to today's democratic rule, varied Foucaultian modes are operative. Even under Japanese occupation, for instance, Taiwanese Aborigines were inculcated with a marginalized sense of being Japanese. Leo T.S. Ching recounts how under *kominka*, "the imperialization of subject peoples," they were allowed "not to live as Japanese, but to die as Japanese" as they fought in military struggle alongside their Japanese occupiers (2001:4). And under Chiang Kai Shek's Nationalist rule, the violent suppression of the 1947 "228 Incident" in which approximately 18,000 to 28,000 Taiwanese were executed, was juxtaposed with enhanced campaigns of economic and public health promotion that sought to uplift the island's population as a whole.[2] In 1995 Taiwan introduced its system of National Health

Insurance and now, with enhanced support for broadly applicable biomedical technologies in general, biopower and government work together to inculcate new ways of thinking about the body and the population as sites of government (as well as resources for biotech development). Biopower in particular represents an attempt to apprehend how a particular politico-historical emergence in which the body and the population, as biological objects, come to be at stake. These returning scientists (and other scholars) who were raised in Taiwan, but educated at least partially in the West are thus subjectivated in multiple ways and they occupy, I suggest, the cusp of contested spaces of Taiwanese modernity.

Taiwanese elite modernity

Whereas Rofel (1999) tells stories of instabilities and discontinuities of Chinese "other" modernities, in Taiwan's elite circles, I see more continuity than discontinuity, and more stability than instability in relation to conventional narratives of what it means to be modern. This may well be because the viewpoint that I study is precisely that of the elite, those who are in the business of producing particular knowledges close to centers of institutional and state power. As I discuss below, there are ruptures and contestations. As the view from below and from the outskirts is generally beyond the scope of this study, I am less concerned with what is explicitly called modernity in Taiwan, and more concerned with how almost generic – but still variable – ideas about modern forms are taken up in local imaginations, and in political and scientific discourse and practice.

In spite of my emphasis on the presence of continuities and stabilities, I do not suggest that Taiwanese imaginations of, and yearnings for, modernity are simply enactments of that modernity constructed in the framework of "the West versus the rest." Indeed it tells a different story altogether; one in which the West figures prominently, but that nonetheless reminds us that the West is only part of the formulation, only one direction that Taiwan faces in its quest to be modern. Further, the transnational flows activated in Taiwanese elite modernities do not suggest a homogeneous world; these flows themselves are multi-directional and contain multiple meanings, sentiments, and actors. Flows of expert knowledge from west to east may suggest a more conventional conceptualization of modernity as a form emanating from the West, but labor, capital, knowledge, and military threats, among others, flow in and from multiple directions at once and point to the various and shifting flows of material and symbolic goods, meanings, and people.

These traveling scientists return often in hopes of performing a therapeutic function for the people and the country; it is, in part, a therapeutics of the nation. While some of these visions and actions are quite straightforward, others take on more nuanced considerations of Taiwan's particular geopolitical situation. The sentiments expressed by Dr. Tu and Dr. Chen are consistent with those of many biological scientists who return to Taiwan as part of a deliberate effort to build the island's biotech industry. In this vision, by repatriating expertise in the form of returning scientists, these scientists could form the core of this emergent economic sector in Taiwan which in turn could be supported by extant scientific educational and technical infrastructures. At this level, Taiwan's interests are quite apparent since, like many other Asian states, they are seeking to become an influential presence in an emergent and promising economic and scientific niche, while simultaneously taking care of the population by acting upon, for instance, specifically "Asian" diseases.

Flexible bio-citizenship

Bio-citizenship in the social science literature is broadly defined as the relationship of individuals to the state in terms of their biologies (Petryna 2002, Rose and Novas 2005). Adriana Petryna (2002) working in post-Soviet Ukraine writes about the relations between the state and its citizens in the aftermath of the Chernobyl disaster. There, a newly democratic state legitimates itself, in part, by providing compensation for the damaged biology of its citizens. Citizens concomitantly rely on their disease conditions and their scientific and bureaucratic knowledge of it in order to make claims on the state, in the circumstances of a harsh transition to a market economy. These social practices by which citizens make claims on the state, in the name of their radiation induced biological damage, is what Petryna calls “a biological citizenship” (2002:5). Suffering becomes part of a political repertoire that citizens use to make claims on the state[3], and life itself, understood in a biological sense, and knowledge about it, becomes a central concern for the government of a population in the aftermath of a techno-scientific disaster.

Rose and Novas (2005) have a somewhat different conceptualization of biological citizenship. They use it to distinguish contemporary forms of citizenship from earlier forms that were strongly tied to the nation-state, and also define the concept more broadly:

> ...we use the term ‘biological citizenship’ descriptively, to encompass all those citizenship projects that have linked their conceptions of citizens to

> beliefs about the biological existence of human beings, as individuals, as families and lineages, as communities, as populations and races, and as a species. (2005:440).

Rose and Novas suggest that contemporary forms of biological citizenship differ from earlier, more racialized and nationalized forms which often relied on ideas about race, blood, and lineage (cf. Poole 1997, Briggs and Mantini-Briggs 2003). Newer distinctions seem to be made at the molecular level. These authors track the proliferations of new forms of "bio-citizenship"[4] involving specificities of social actions around claims, knowledges, and affiliations regarding shared biologically based presents and imagined futures. In tracking what is new about contemporary biological citizenship, they attend to many enactments of the biological, including: biosocial affiliations and activism; state funded public health and education programs; public understandings and engagements with science; direct-to-consumer marketing of pharmaceutical products and information; and state projects in which the genetic code of the population is used as a source of disease knowledge and profit wherein citizens are collectivized as sources of "biovalue" (Waldby 2002).[5]

Here, I seek to broaden the concept of bio-citizenship and to link it with Aihwa Ong's (1999) flexible citizenship. In the technoscientific knowledge sector of global capitalism, bio-citizenship might also be viewed in terms of those workers who are uniquely qualified to participate meaningfully in bioscientific production. As discussed above, Taiwan is actively recruiting workers in the biotechnology industry, and predicts a significant labor shortage in the near future. In this context, citizenship rights are likely to be both claimed and conferred on the basis of an individual's biological *knowledge* perhaps more than their biology itself. In this way, I think it possible to couple productively bio-citizenship with flexible citizenship.

> I use the term flexible citizenship to refer especially to the strategies and effects of mobile managers, technocrats, and professionals seeking to both circumvent *and* benefit from different nation-state regimes by selecting different sites for investments, work, and family relocation. (Ong 1999:112)

As Ong further notes, immigration policies often are shaped to limit the entry of unskilled laborers and to attract those with varying forms of productive capital. Many of the scientists involved in Taiwanese stem cell research are such flexible citizens who mobilize themselves, their families, investments, knowledges, etc. in transnational and mobile affiliations. The active recruitment of bioscience leaders in Taiwan points to an emergent articulation of bio-citizenship and flexible citizenship.

Any citizenship project requires exclusionary practices and in Taiwan the active recruitment of scientific workers can be contrasted with the more muted acceptance (or in many cases denial) of the so-called foreign brides. This naming practice itself is contested as it arguably inheres an exclusionary element; these women are, in fact, a speaker argues, "a bride for only one night, but a wife for much longer." Various programs are in place to acculturate these "foreign brides," including mandarin language classes. Media and lay sources often refer to the "foreign bride *problem*," pointing to the large numbers of women (estimated at over 250,000) from less developed countries who immigrate and marry Taiwanese men. These women are subjected to routinized immigration procedures and must check in at regular intervals with government officials. They are often denied a pathway to citizenship, thus granting them very little traction in parental or domestic disputes if the marital relationship fails. The increasing "foreign bride population" is conceptualized as a problem for numerous reasons including xenophobic concerns of linguistic and cultural influences as well as the potential for trafficking of these women under the guise of marriage. Eugenic discourses also pertain, but with an unexpected twist as most of the concerns expressed have to do not with foreign women but with the likely prospect that formerly unmarriageable Taiwanese men will now be producing Taiwanese offspring. I use this example to illustrate that these immigrant women, usually of relatively low capital (in economic, social and symbolic senses, Bourdieu 1977) do not enjoy the benefits of what I am here calling flexible bio-citizenship. In contrast, traveling scientists returning to Taiwan to practice their scientific craft are seen as simultaneously contributing to the crafting of a modern nation based on their bioscientific expertise. And foreign experts with bioscientific capital are recruited and welcomed and do not face the exclusionary and disciplinary regimes of immigration selection and monitoring to which "foreign brides" and others are subjected.

Many accounts of these returning scientists lose the narratives of home and longing that Ong suggests are often present among flexible citizens, but here I try to recuperate at least some sense of the motivations for return that often accompany a desire to do good for one's homeland. Many of the Taiwanese scientists maintain homes in both Taiwan and in the West, or at least maintain the West as a possible place of return. Some spoke of spouses who were less happy to be in Taiwan, others spoke of better career prospects abroad, and several of frustration with aspects of scientific governance in Taiwan suggesting, in exasperated tones, that it would simply be easier to practice in western settings. These flexible scientists can indeed be seen as supportive of “nation building projects at home” (Ong 1999:9), but they can also be seen as involved in a project of work on oneself to produce cultural, symbolic, and economic capital – at both homes. Many studies have been conducted on the transnational or globalized subject, especially on how new immigrants to the West negotiate, to name a few, racial, ethnic, gendered, and economic boundaries. Less has been written on how the emigrants reconfigure their identities when they return home.

Flexible scientists

These experts, trained abroad who then return home, are "flexible scientists." I use the term flexible in a broad sense; anyone outside of their native territory (and sometimes within) experiences a number of translational practices and shifts in attitude and comportment. Certainly they are flexible in that they travel, cross borders, and occupy different territories and therefore different and variable subject positions. I suggest that they are also flexible because they combine different kinds of knowledges and sensibilities acquired from different places. They are scientists (and therefore ostensibly participants in a quest for global truth) practicing in the fevered political context of Taiwan's biotech project who, therefore, represent new kinds of actors who participate in the making of new visions of what if means to be Taiwanese.

Ong writes on "the flexible practices, strategies, and disciplines associated with transnational capitalism" (1999:19). She tracks transnational Chinese subjects, some as they celebrate new flexibility and mobility and others as they suffer under the structural limits that impede the possibility of such flexibility. She suggests that "flexible citizenship is shaped within the mutually reinforcing dynamics of discipline and escape" (Ong 1999:19). My concern here, however, is with practices, discourses, and meanings of return as well. That is, why do these foreign-trained Taiwanese scientists come home and what kinds of transnational, scientific, and ethical subjects do they become in these border crossings?

I return to Dr. Tu, a stem cell biologist specializing in human embryonic stem cell research which is the most globally controversial field of stem cell research. While working in the West, he used numerous human embryos in his work on stem cell line derivation and developmental biology research. Since returning to Taiwan a few years ago, however, he has not used a single human embryo in his laboratory. Several structural reasons factor into this. When he was hired in his current institution and given his own laboratory, there was not an established Institutional Review Board (IRB) to handle projects of human embryo research. So, he has spent the last several years, in part, helping to establish a review board with what he considers to be appropriate standards and expertise. Secondly, it is simply much more difficult to procure human embryos for research in Taiwan, in part because of the strained relationship between physicians and patients. These structural elements are significant and he has spent substantial time and effort both institutionalizing a new kind of IRB and contributing to the process of making regulations about stem cell research in Taiwan. But he is also troubled by a deep questioning that is not about ethics at the level of policy. It is ethical and epistemological; it is about what he, himself, ought to do, and how he might know.

> As I told you before, I welcome all this (policy) regulation and this discussion. Because I sincerely understand. I am facing problems which I can't answer myself, and I think this will help me. It's my journey, in my life. I don't know why I'm working in this area (of hESCR). When I was young I was attracted to the science itself. But when you work in this field, it's very different than in other fields, when as a human being you are working on human beings – maybe. Okay. And you have all this moral argument, this debate in your own mind. And this part is *very*

> special. And it's this way for all your life, until maybe one time you truly understand. (Tu 7/07)

While Dr. Tu intends to conduct research on human embryos, and he is adamant that destroying a research embryo is not equivalent to murder, he is deeply sensitive to the special status of the human embryo and to the debates that it evokes in relation to hESCR. He believes deeply in the promise of stem cell research, but he is aware that the research object on his bench is a problematic one and that his own knowledge and his own sense about its ontological and ethical status may be subject to change. I do not suggest here that Dr. Tu's ethical sensibilities are necessarily directly a result of his western experiences; I suspect he has always been a deep and sensitive thinker. But his deep concern with the specific problems of using human embryos may derive, in part, from his familiarity with heated Western debates on the issue.

Those scientists working in the US, UK, Canada, and Australia, for instance, are inculcated with ways of thinking about the ethical, personal and institutional, in relation to stem cell research that they bring back with them when they return home. So when, in 2007, the draft of Taiwan's stem cell regulations looks quite a lot like its Western counterparts, this may not be a result of simple ethical borrowing at a pragmatic level (although this is a part of it); rather, it may well reflect those ethical perspectives taken up by these traveling subjects and their regulatory visions may be regarded as part of their transnational accumulation of expertise. And if Taiwan's regulations appear also to be a mixture of policies drawn from varied sources, it is in part because many of those with influence in making these regulations are themselves flexible subjects who draw on different regimes of the ethical and its apparent truths.

Emily Martin (1994) suggests that flexibility is a primary and desirable symbolic mode in contemporary discussions of immune systems function, and a significant part of stem cell science similarly values flexibility. Specifically, embryonic stem cells are granted special status because of their apparently flexible futures; that is, they may theoretically become any kind of bodily cell. Unlike immune systems theory, however, and unlike the flexible futures of some stem cells, the flexibility of these scientists is of a different sort. They constitute themselves as flexible subjects, who can travel in multiple sites from the boardroom to the clinic to the laboratory, and across national borders, and who are subjectivated differently in these sites. They are, in this sense, flexible subjects because they take up at any time multiple kinds of subjectivities informed by multiple experiences, knowledges, and translational practices.

Cross-strait tensions and beyond

The promotion of Taiwan's biomedical technology sector can be viewed as part of its active participation in a global marketplace and scientific competition. It is also a field of play, however, on which more subtle interactions regularly occur that point to Taiwan's unique status internationally, and especially to the way in which its relationships with various states and international organizations are impacted by the One-China policy. Theorists of globalization often point to the fragile contemporary condition of the nation-state and position it as under threat from transnational processes and organizations (Appadurai 1996, Sassen 1996, Tambini 2001). Katie Willis and her co-authors suggest that these authors position the challenge to the sovereignty of the nation-state as "coming 'from above' in the form of global governance organizations… and supranational institutions" (2004:1). For Taiwan, however, it is precisely the exclusion from, or marginalization within, such global organizations or international affiliations that presents the major threat to the nation-state. The US, for instance, operates the American Institute of Taiwan (AIT) which functions rather like an embassy, but is explicitly not one. Accordingly, AIT's representatives, that is, those agents working for the US Department of State in Taiwan declare routinely that, "the United States does not have diplomatic relations with Taiwan." This policy, and its acceptance by much of the international community, limits both Taiwan's autonomy and its traction in many international spaces, and it forms a backdrop of variable intensity in peoples' consciousness, actions, plans and everyday lives.

Dr. John Yu, Director of Academia Sinica's Stem Cell Program and President of the Taiwan Society for Stem Cell Research, is also a member of the International Society for Stem Cell Research (ISSCR) Program Committee and co-author of "The ISSCR Guidelines for Human Embryonic Stem Cell Research." A senior biologist told me that he was very grateful that Dr. Yu already had an established and important relationship with the ISSCR, so that this way Taiwan's membership in the ISSCR was secure. He further suggested that had the PRC been a member of the ISSCR first, they may have tried to block Taiwan's membership in the organization. It would seem that at least some of the other members of the ISSCR are sensitive to this tension between the PRC and Taiwan; I was told the following account of an ISSCR meeting:

> One of the members told the Chinese representative that he should submit to the committee the regulations of stem cell research in China. Then he looked at John Yu and told him he should do the same for Taiwan. He went on to say that for the purposes of the ethical committee they would

> treat Taiwan and China as separate. And since John Yu is higher up in the committee, the Chinese representative could not say anything!
> (field notes 7/8/07)

It would seem that John Yu's role in the ISSCR has secured an independent stance for Taiwan, at least in this international committee. It is significant that this discussion takes place in the shadow of continued denials of Taiwan's request to obtain observer status with the WHO (World Health Organization). Taiwan has repeatedly appealed to the World Health Assembly branch of the WHO to grant Taiwan "observer" status as a "health entity." Such language deliberately skirts the political issue of whether or not Taiwan is its own country, but even such apparently modest calls for inclusion have been portrayed as in the interest of advancing recognition of Taiwan as sovereign and have been rejected on these grounds. Taiwan's exclusion from the WHO, an organization with a stated goal of health maximization for all is viewed with deep resentment by many Taiwanese.

Daniel Tsai, a physician and medical ethicist, has argued that this exclusion of Taiwan violates the WHO mission, and he asks his readers to consider the following three questions:

> (1) Which beings qualify as members of the primary moral community?
> (2) Under what conditions are participants in a cooperative framework obligated to include individuals who can participate effectively?
> (3) To what extent is there an obligation to ensure that the nature of one of the world's most fundamental frameworks for cooperation renders it more rather than less inclusive? (Tsai 2003:504)

He further suggests that a serious consideration of these questions leads to the inclusion of Taiwan in the WHO as a morally necessary action given the WHO's status as a global moral community dedicated to improving global health. Tsai thus distinguishes the

WHO as a moral community rather than a technical one. In this manner, he seeks to differentiate the politics of health from the politics of the state and thereby positions the inclusion debate as fundamentally a moral issue. He thus repositions a debate about sovereignty into a biopolitical frame in which the lives and health of the Taiwanese population are seen to be at stake.

The Severe Acute Respiratory Syndrome (SARS) outbreaks in Taiwan in 2003 offer empirical support for his case. My friend Lynn[6] is a Taiwanese graduate student working in international relations. She recounted to me that during the SARS outbreaks, money from the WHO was distributed through the Chinese government, with Taiwan considered as its province and therefore under its jurisdiction. But, possibly because the PRC considers Taiwan to be a "runaway province," they were slow and parsimonious in allocating funds to Taiwan to combat SARS. This delay resulted in many unnecessary deaths, a point that Tsai echoes:

> The outbreak of the SARS (severe acute respiratory syndrome) epidemic that followed in May–July 2003 eventually proved that more lives could have been saved if Taiwan had not been excluded from the WHO.
> (Tsai 2004:30)

And Lynn further tells me that the SARS outbreak clarified to the Taiwanese people the vulnerability caused by their exclusion from the WHO and other international health organizations. In this way, PRC policies are viewed by many Taiwanese as a proximate cause for the deaths of several of their fellow citizens.

Avian influenza (bird flu) outbreaks, and their transnational threats, have further irritated Taiwanese sentiment at their exclusion from the WHO. In March of 2005, the WHO listed China as an area with confirmed cases of bird flu, and as a consequence Taiwan (considered as a territory of China) was also shown on the map as an affected area. This was in spite of the fact that Taiwan has not, at the time of this writing, had any cases of bird flu. Under protest from the Taiwanese government, and with the support of members of the US Congress, the WHO changed its map and listed Taiwan as unaffected. The concerns were not only about health directly, as an editorial arguing for WHO inclusion elaborates,

> [Taiwan] would have been listed as a bird flu-infected area, dealing a serious blow to the tourism, trade and animal foods industries… It would also have damaged Taiwan's international image and intensified pressure on the nation's health authorities and the psychological pressure on the general public. This highlights the difference in interests between the two sides of the Taiwan Strait. (Taipei Times 2006:8)

Thus exclusion from the WHO is not viewed as only a symbolic political maneuver on the part of the PRC, but one with direct economic and life and death stakes. By making a biopolitical argument for inclusion with the explicit stakes of the health and survival of the population, Taiwanese can argue on moral grounds for the inclusion of Taiwan in the WHO's global community concerned with the health of all, while simultaneously making China's exclusion appear as petty political maneuvering that ignores the very lives of those whom it seeks to claim as its citizens. Stem cell research, and biomedical research and practice more generally, operate under this frame of biopolitics, nation-building, and cross-strait tensions.

Attempts to clarify and codify the relationship between the PRC and Taiwan occur at many scales on both sides of the Strait. Two months into my fieldwork, I attended a conference in Shanghai on medical- and bio-ethics. Fresh into my research, and still naïve about how my report might be interpreted, I gave a preliminary talk on my research. For a portion of the talk, I presented a brief sketch of my interpretation of how a project to make stem cells that were genetically Taiwanese conjoined with another scientific argument that claims a uniquely Taiwanese genetics (see chapter five). This part of the presentation was not well received, as some of the senior mainland Chinese scholars sought to undermine the argument and asked why I was not talking about, for instance, a unique Beijingese or Shanghainese genetics, as these would be equivalent categories. I explained as best as I could that I was not specifically making an argument for genetic uniqueness, but simply presenting an analysis of the case as I had heard it. The announcer said, "well, it seems that you have said something very politically incorrect," thanked me for my talk, and moved on. My interpreter, a late-20's university student from Shanghai expressed surprise at their reaction and suggested to me that this was a generational response, and not something people of her age would be sensitive about. Finally, although the conference organizers had originally offered to pay for my room fees at the university hotel, upon checkout I learned that they had called the hotel specifically to revoke this offer. I assume it is due to my unpopular mention of Taiwanese genetics.

Later, in August of 2006, I attended the Eighth World Congress of the International Association of Bioethics in Beijing. While my badge listed my affiliation as UC Berkeley - UCSF, United States, I noticed with some surprise that the badges of my friends from Taiwan's National Central University had their affiliations listed as "Central University, Chinese Taipei." In a separate interview, a senior biologist complained of this practice and said it was common at meetings held in China for Taiwanese participants to have the "National" dropped from their university names, and to have no mention of Taiwan since their cities are claimed as Chinese. He, however, resists:

> They invited me to a conference in Hong Kong and I agreed to go. But then when I received the preliminary materials, they listed me as coming from "Chinese Taipei." So I refused to go. But they really wanted me to come so the organizers changed the nametags to just list the city names of everyone.
>
> I once had a conversation with a scientist in China, and he had made a proposal that in international conferences in China they just list the city names only. And I think this is a very good idea. But this guy…is not that popular with the government there. (field notes 7/07)

This contested naming practice, nonetheless, continues to be employed and to bolster the One China policy that claims Taiwan as a part of China. The World Trade Organization (WTO), for instance, of which Taiwan has been a member since 2001, in a 2007 press release entitled, "The Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu offers CHF62,000 to the WTO development programme," makes no reference in its text to Taiwan, but only to "Chinese Taipei." This is a naming practice, and a political position that many Taiwanese continue to resist.

Importing expertise, importing modernity

Taiwan's relationship with China figures prominently into everyday Taiwanese existence from macro-scale political movements to small shifts in conceptualizations of individual identity. A graduate student working in one of the stem cell laboratories I visited told me adamantly that while she had once thought of herself as Chinese, now, "I am Taiwanese. It is a matter of dignity!" And a language teacher of mine told me that she had always considered herself to be Chinese until she visited the mainland and, disliking it there, realized herself as specifically Taiwanese. Taiwan's outward gaze is multi-directional and the West figures importantly as well. Here, I suggest that experience and training in the West are linked with the production of expertise and serve an authenticating function in notions of both scientific and ethical expertise. As part of the deliberate movement to repatriate expert scientists, many high level scientists returned to Taiwan as discussed above. Although there are now several Taiwan-educated and trained scientists and scholars, most of the high level posts are still occupied by those with significant western exposure. I suggest that this exposure is often seen to represent a kind of authentic modernity and a superior way of knowing that is consistent with prevalent ideas about modernity.

Taiwan's modernity is thus depicted, by both Western and Taiwanese experts, as a somewhat deficient or deferred modernity (Rofel 1999), and therefore as in need of expert intervention. Many of the physicians, scientists, and scholars with whom I interacted commented on the need for improvements. Such comments were often offered in the context of an expressed recognition that Taiwan is deficient in certain areas of expertise. These kinds of representations are buttressed by both native and foreigner comments. Just after my arrival in Taipei I attended a talk given by a Caucasian member of the American Chamber of Commerce there. He spoke of living in Taiwan and advising businesses and government agencies on how to improve their performances, and said, "yeah, they really need our help here." Positioning himself as an authority on more than business, he offered us the following advice, "when you're walking on the sidewalk, just don't look up because you never know what's going to come down." He continued with a story of how once, when he looked up, a drip fell into his eye and he subsequently suffered a terrible eye infection. This story, and his attitude in telling it, implicitly positioned Taiwan as underdeveloped, with tropical moisture containing abundant and varied danger threatening at all times. This buttressed the claim that their business and governmental acumen were also underdeveloped. Western expertise is both granted and assumed, and even in my own research people often suggested, especially regarding bioethics, "maybe you can help us with this!"

In one of my early interviews, a stem cell scientist said, "you are interested in ethics. There are problems with medical ethics in Taiwan," and he further suggested that there are no limits on the number of embryos that can be implanted in an IVF cycle (though this was subsequently addressed in a reproductive medicine bill passed in March, 2007). When I told him that it would appear that most research embryos are "left-over" from IVF, he says with a short laugh, "that's what we think, but go to any newspaper and you'll see ads for egg selling."[7] Another professor told me a story of a university hospital that served as a site for a transnational pharmaceutical company clinical trial, but because there was not informed consent protocol in place, the hospital simply obtained employer consent. "That's why companies want to come to Taiwan to do clinical testing, because you can do anything here - things that can't be done in the US. That's why everyone wants to come to Taiwan."

Dr. Lin is a very prominent clinician and hESCR researcher. In contrast to Dr. Tu, the hESCR researcher I discuss earlier, Dr. Lin was schooled in Taiwan and has always done his research there. So, while he has had significant success as an hESCR researcher in Taiwan, he is considered, at least by many at the more elite labs, to be a bit controversial. The following is a small but representative sampling of some comments that were made to me about Dr. Lin:

> Well, he is controversial because of the number of embryos he uses to establish his cell lines. (SC scientist 10/05)
>
> But doesn't his practice of using embryos from his patients violate international standards that say that physicians should not be the same as the researcher who derives the cell line? (bioethicist 11/05)
>
> Also, he talks about putting human nuclei into rabbit oocytes. That's disgusting! (research assistant 10/05)

In fact, none of Dr. Lin's actual practices violate generally accepted international standards for stem cell research and embryo use, nor Taiwanese regulations at the time. In fact, in mid-2008, the UK approved the chimeric production of animal eggs with human nuclei for embryonic stem cell research. It is somewhat irregular that Dr. Lin is both the physician obtaining donated embryos from his patients and working on them in the laboratory, but this is a detail that could be explained away by Dr. Lin giving the embryos over to his research assistant or Co-PI. Dr. Lin clearly conceptualizes his research as being in the interest of Taiwan's biomedical technology more generally. I present these reactions as an example of the different subject positions that are occupied by different kinds of scientists – some of which are made in relation to experiences in the West.

It is not only on issues of medical or research ethics that apparent deficiencies in Taiwan are reported. The educational system, political corruption, the clinician-patient relationship, journalistic practices, and certain laboratory employment practices all come under critical evaluation in various discussions. I heard many complaints among scientists that progress in stem cell science was hindered by a lack of centralization of both expertise and research funds. While many universities and private laboratories exist, there is relatively little collaboration between them. In this way, many scientists and technicians end up reproducing similar projects. Several of the repatriated scientists advocate for a more centralized network of stem cell biologists. They depict the current scenario as one of numerous satellite labs, each working on similar projects to develop, for instance, new hESC lines. Each group then has to learn and reinvent their own expertise for doing such derivations. These scientists argue instead for a cooperative system that exploits the specific expertise of different scientists, using those with extensive experience in stem cell line derivation for that stage of the work, then allocating other scientists to their realm of specific expertise, in a specialty-focused type of production. If the nation is what is seen to be at stake, as it is for many of these repatriate scientists, then a collaborative, centralized, and efficient system that uses each individual scientist or team for its specific area of expertise is apparently in order. The development of the Taiwanese Society for Stem Cell Research (TSSCR) is a step toward the enactment of this vision to promote SCR as a whole in Taiwan and was instigated principally by some of these returning scientists.

Having visited South Korea in August of 2005, a member of the TSSCR administration expressed to me how impressed he was with their support and administration of SCR. An excerpt from my field notes recounts the two main aspects that he addresses:

> The first aspect is regulatory. The South Koreans set up their bioethics protocol (Bioethics and Biosafety Act) and passed it through their congress already. He is impressed with their efficiency, noting that in Taiwan, politics are difficult and things can get held up in congress for a long time. “Taiwan has its own politics. Congress can stall.” He adds that the Department of Health (DOH), for instance, should not wait for congress to act, that “regulation can happen at many levels” and that DOH

> should at least issue its own guidelines. Funding is, of course, another level.
>
> Second, he talks about the Koreans' success in terms of institutional structure. There, the labs cooperate – a model of division of labor, in which the processes are segmented and the experts in (e.g.) SCNT (somatic cell nuclear transfer) do that, those expert in other parts of the procedure do their specialty. In this way, waste and inefficiency are reduced. So, the Koreans enjoy not only global success, but a relatively high rate of successful cell line production per embryos used, while in Taiwan the rate is low – because of a lack of specialization. The clinician, for instance, who harvests the egg will then go on to try to derive the stem cell line, trying to do the whole thing himself, rather than parsing the process out to specialists who would enhance the likelihood of a successful outcome. There needs to be this kind of centralized cooperation in Taiwan, he says, if it wants to be competitive – but also if it wants to be ethical. He sees the unnecessary use of embryos in this manner as part of the ethical issues. Each medical university has a stem cell lab he says, but each is too small to do anything substantial on its own. He calls them "xiao chi dian," like the small eating places everywhere throughout Taipei.
> (field notes 9/28/05)

These comments were made, of course, just prior to the famous Hwang scandal in which some of Dr. Hwang Woo Suk's (2004, 2005) research results were shown to have been fabricated and many research eggs procured from his research assistants under questionable circumstances. The reputation of South Korean stem cell science has since been tarnished, and the reported efficiency rate of cell line derivation retracted. Nonetheless, I use this excerpt to illustrate this scientist's critiques of Taiwanese stem cell science, and his analysis of what might be done to improve the situation.

A specific example illustrates the need for enhanced collaboration, communication, and centralization more generally. Some scientists have been working to establish a primate facility in Taiwan, but now one of the project's advocates is frustrated and considering abandoning the project. Taiwanese companies, he says, are spending US$200 million per year to do studies in US primate labs, and "therefore Taiwan should have its own primate center." This is, of course, an expensive proposition. Meanwhile, he recently learned that thirty monkeys had been obtained after much difficulty and expense a few years ago by the Taiwanese government. The project for which they were originally obtained ultimately never came to fruition, and these monkeys were schedule to be "sacrificed" when this scientist learned about their existence in Taiwan. He became very upset, called an emergency meeting with the Executive Yuan (branch of government) to preserve the monkeys. He says, in frustration, "This is just the case here! You know, where the left hand doesn't know what the right hand is doing! Sometimes I think I should just go back to the US; it would be so much easier!"

Among these returnees, there is a general acknowledgement that Taiwan has problems that need fixing. Many perceive that it is through repatriating these mixed experts – Taiwanese with western experience – that improvements and solutions might be found. In addition to a real sense of frustration, I read these kinds of representations of domestic deficiency in two main ways. They are on the one hand representative of a general cultural tendency toward modesty in which self-deprecation is taught and bragging is sanctioned against. On the other hand it may be indicative of a perceived inferiority – the result of a long-standing political sense of existing in the shadows of both the PRC and the West, the one representing an oppressive dominating threat, and the other progress, modernity and freedom (although postcolonial critiques exist).

The Western foreigner holds a special position in Taiwan. Taipei, the capital city, is well known for being (Western) foreigner-friendly as visitors and travel guides will attest. This welcome is not limited to the streets or the nightclubs, but is extended as well to the scientific community. Although subject to ambivalent perceptions, Western expertise is generally welcomed and respected, and accountability to international communities is taken seriously, as it is seen to reflect on Taiwan's image in the world. A senior biologist responsible for reporting on Taiwan's stem cell research guidelines to an international group recounted the following:

> Before I went to that meeting overseas, I asked the (Taiwanese) officials, "tell me realistically when the guidelines might go through so that I can report to (the committee)." You know, it's one thing to give optimistic timelines internally and then to postpone, but when reporting to the (international committee), I must report accurately. I must protect my own country. (interview excerpt 7/07)

This excerpt gives a sense of the relatively flexible accountability that may be used domestically, while emphasizing that accountability to external or foreign bodies is seen to be stricter, more important and more consequential.

This kind of external pressure is also used internally. I was told that Neal Lane (a prominent figure in US public policy and a technology advisor in Taiwan) was planning to come to Taiwan and if necessary would tell the Department of Health (DOH) members that it was crucial that they establish formal regulations for stem cell research promptly. When I asked why this would have more influence on the DOH than having someone very high up in Taiwan, John Yu for instance, tell them the same thing, this scientist replied that, "sometimes you have to use a foreigner to say something. If a professional from abroad says something, it can be very useful."

At a laboratory visit, one of the Principal Investigators told me that this was a particularly busy time for them because they were undergoing their departmental institutional review. He continued with an ironic tone, "by an outsider, of course," and went on to tell me that the audit was being conducted by someone from the US, "where else," and would determine the next year's funding. When I asked why they don't use someone from Taiwan, he defers, but says of course they use someone from the US that they know. Here, the foreign expert is granted automatic credibility and the Taiwanese scientists and administrators mobilize network relations across national borders. The expert identity constructed for these returning scientists is flexible; they are both native and Western, but apparently at times not quite Western enough to be the final authority on how things ought to be done.

Experts in Taiwan's scientific fields come together to envision and to enact a Taiwanese future that is modern, ethical, capitalized, free, and scientific. These scientists try to make a new way of being Taiwanese that is modern as shaped by adherence to international ethical standards of research practice, by scientific excellence, and by participation in transnational flows of knowledge and capital, but also one that is simultaneously shaped by a sense of connection, duty, and responsibility. Even as I suggest that these traveling scientists, along with traveling science and ethical discourses, are shaped by considerations of relative Western geopolitical supremacy, I do not consider these subjectivities, practices, and attitudes to be made as some inferior form of Western ways of doing and being. Rather, as Taiwan negotiates its own modernity, it is not an inferior imitation of a Western modernity, but one made in relation to multiple other nations and an increasingly developed sense of a particular history, self-determination, and negotiations of what it might mean to be both Taiwanese and modern.

Expertise in question

As I begin to explain above, there is not a stable discourse on what it means to be a Taiwanese scientist. Nor, predictably, is there a stable discourse on how to constitute a proper Taiwanese modernity. Taiwanese experts trained in the West are often granted significant positions and cultural capital. Nonetheless, Western exposure and/or expertise is multi-valent, and adjacent narratives of local modernity-making through individual and national self-determination serve as challenges to transnational and scientific experts and expertise. Taiwan continues to change rapidly and Taiwan's people are increasingly influenced by self-conscious movements of nation-building and identity-making. In some circles, such narratives of self-determination are gaining traction, and expertise and authority, especially in their imported forms, are increasingly subject to questioning. One of my earliest fieldwork realizations was that freedom is a trope for contemporary Taiwanese expressions of modern identity that simultaneously serves as a marker of difference in relation to mainland Chinese governance. Countless times I was told, "We are a free country" or "Taiwan is a very free country." On a few occasions, such comments would be followed up with a pause or a sigh and then, more quietly, "perhaps too free."

Even the President at the time, Chen Shui-bian, in the face of corruption scandals endured repeated calls for his resignation. A legal scholar tells me:

> Because the people have been emancipated! Now there is no unchallengeable authority in Taiwan. Even the President! He is everyday criticized, under fire! (interview excerpt 7/07)

He laughs, then continues,

> So, you can imagine, it's hard for the scientists to claim so high an authority as before. (interview excerpt 7/07)

Scientific expertise begins to come under increased scrutiny, as do claims to expertise more generally. Taiwan's democracy is taken seriously. Some suggest that it was undermined by corruption scandals under Chen's presidency. However, it was arguably bolstered by a populist campaign that sought to raise donations of NT$100 (approximately US$3) from one million people, whereupon they were to stage a protest in front of the presidential office, calling for President Chen's resignation. Protests in front of government offices in Taipei are common, criticizing both domestic and international policies. I remember vividly one midday protest as I walked toward National Taiwan University's prestigious hospital wherein marchers chanted, some with bullhorns, in mandarin for a free Tibet, while carrying signs demanding the same in both Chinese and English. I suggest that this mode of government, this freedom, not only serves as an important distinction made in contrast to mainland China, it also serves as an important marker of Taiwanese modernity. Taiwanese publics, then, freed from both martial law and colonial rule (although still subjects of the One-China policy), become the authors of their own futures. They periodically challenge the rule of experts, require substantiation of claims to expertise, and insist on public accountability on the part of their authorities. For those engaged most closely with constituting a new kind of Taiwanese public consciousness, foreign expertise has no special traction. As a returning physician told me:

> During the economic boom there were a lot of returning experts. They came back with great confidence, confident almost pompous. I came back in 1998. Now, though, US training almost seems to be a liability. People often talk about this like a kind of imperialism. (Dr. Wen 12/05)

Earlier in this chapter, I introduce Dr. Tu and Dr. Lin and I point to the stratifications that emerge domestically as scientists return, wherein those with western training are generally seen to be, and I suggest feel themselves to be, at a higher level of both scientific and ethical practice. In these emergent counter-narratives, those assumptions begin to give way to a valorization of that which might be considered to be more authentically Taiwanese – "made *very well* in Taiwan" – instead of in the field viewed by some as that of global imperialism. Many begin to voice support for those whose knowledge is domestically produced:

> Usually science is learned in a western country… but now our scientists can compete with western countries… we should support them.
> (Dr. An 5/10/06)

These kinds of counter-narratives of self-determination arise also in some of the policy discussions around stem cell research. How does one balance conformity with international standards, and the wisdom that might come from other countries with a sense of making something that is appropriate to Taiwan? In stem cell policy-making, one scientist succinctly captures this tension.

> There is also a lot of discussion on this. If there are international guidelines, then what will be our own guidelines? Will they be very close to international ones or do we need to make our own special guidelines.
> (Dr. Tu 7/07)

There is a dual sensibility continuously at play in multiple fields, at once a kind of insecurity and a looking to the West for guidance and expertise and simultaneously a commitment to a form of self-determination.

As Gyan Prakash (1999) shows, the roles of science in its relation to modernity and a nation are powerful and multiple. Science comes to signify simultaneously progress and freedom but also an appeal to a form of presumed universal reason that is seen as emanating from the West, and is thus challenged by local understandings of truth. He shows India's modernity as a hybrid and dual production in which Western ideas are indigenized and fused with local cultural ideas and practices to create a unique scientific modernity. Taiwan faces a similar, though still specific, tension in its constitution as a modern nation.

As part of a new and democratic movement toward the inclusion and representation of Taiwan's diverse publics, a team led by a sociologist conducted a series of surveys on public attitudes toward the proposed Taiwan Biobank. The biobank project, to which I return in chapter three, has been the subject of much public distrust and criticism. Initially, a pilot study was planned without public consultation. A new kind of public concern and an insistence on disclosure of the details for the biobank brought it out of the cloister of expert knowledge and into the arena of public discussion and resistance. The progress of the biobank project has been dramatically stalled due to public concerns over the uses to which the materials and information will be put, privacy and beneficiary concerns. This articulates with what seems to be increasingly informed publics insisting on their inclusion in projects of science and the state. Using the biobank as an example, a researcher explains:

> It is not just a problem of the scientists of course. This is a problem with our structure, our society. Because, roughly speaking, before democratization Taiwan was dominated by a small group. And this small group couldn't get their so-called legitimation through the consent of the people, so they got it through a sort of economic prosperity. So they tried to make the impression on the population that they are excellent. So you can see that this is not a democratic government, but they tried to impress the people that this government is led by experts, either by economic or by technocratic experts. So they say that they have always taken the right strategy to promote the welfare of the people, and they have emphasized economics… and before democratization, the researchers, the scientists, were accorded very high social esteem, so they just did what they wanted to do as long as they didn't get involved in political controversies… That said, times have changed. (Dr. Hsu 7/07)

A public insistence on greater accountability on the part of their leaders and various kinds of experts aligns more generally with a decline in the unquestioned acceptance of authority. This shift is exemplified in the reported decline of the clinician-patient relationship.

Physician-patient relations

"The relationship between the physicians and the patients is often not one of cooperation in Taiwan," a PhD student in stem cell biology told me, demonstrating his point by making two fists and pressing them against each other, like heads butting. He continues,

> The physicians ask permission and they have the patients sign a paper, but it's not clear and it doesn't often communicate what it has to do with the patients…
>
> The problem is that this (stem cell research) should all be in the public domain, and for the advancement of the public sphere. But in Taiwan, the clinicians want to be famous and they want all the credit and benefit to themselves. (interview excerpt 3/06)

And another stem cell researcher, complaining of the difficulty in obtaining human research embryos, attributes this also to the poor quality of the MD-patient relationship.

> I don't know why we have this problem. Maybe it's because of our cultural background or maybe because the physicians in Taiwan didn't do things in the proper way, so they lost the trust of the public. And then this makes a bad emotional cycle because the patients don't trust, and so then the doctors, maybe they don't tell the patient and then just do something anyway. Maybe. I don't know. I don't know who. (Tu 8/06)

As Taiwanese publics begin to demand greater accountability and consideration on the part of their political, scientific, and medical authorities, the figure of the individual emerges in a new form as well. This new Taiwanese individual (at least in one version) is the autonomous, rights-bearing subject, who acts as their own final authority.

> And people get more consciousness of self-autonomy and individualization. We are the own masters of our own destiny. And we don't want to get determined by anyone else. If you do something that might influence me, you should talk with me – in advance! … The new phase is: "You are the expert. But I am cultivated, I am educated – and I

> am sick of it!" … There is no more outside authority – except myself.
> This is the true individualism. (Dr. Hsu 7/07)

This attitude of self-determination and the self as the final authority exists not only as a political stance but also as an attitude and personal sentiment. It is not only for those who would oppose the experts, for it is a sentiment to which Dr. Tu, the hESC researcher, is also subject. In relation to the use of human embryos in his research he supports the formalization of guidelines in Taiwan, but they do not provide real answers.

> I'm not God. I'm a human being. So no, I have no guidelines to follow. Except my own guidelines. In a country that has regulations at least you have the regulations as your final and lowest standard, and to defend yourself – to say that the law allows me to do this. But at the moral level it doesn't work as well... So I have ethically justified things for myself. What I, myself, feel about this research. (Dr. Tu 7/07)

Ultimately guidelines can only offer him some legal protection, but it remains for him, individually, to judge whether or not his work constitutes right, or justifiable, action. Individualism here, not only legitimates the move toward self-determination, but also to a call to be responsible to and for oneself.

Much of the literature on Asian, and especially Chinese, cultures and ethics has addressed itself to the apparently dominant role of the group and the continual subordination of the interests of the individual to those of the group. In Taiwan, this is a time of rising political consciousness and democratization in which individualism conjoins with the creation of new kinds of collectives and new kinds of accountabilities. Some scholars trace the contemporary figure of the individual as it emerges in Taiwan to economic shifts. Moskowitz, writing on the economic leap that occurred in the mid-1980s, suggests,

> For the first time in Taiwan's history almost everyone in the country considered themselves to be middle class. This happened at such a

> frenzied pace, and stories of economic success and failure came with such a seeming randomness, that many began to think that luck was more important than traditional values of hard work and perseverance (Weller 1996). In this setting, living for the pleasures of the moment seemed like a rational choice. A new generation raised in affluence embraced this ethos of individualistic cynicism and, with new exposure to uncensored western mass media in the 1990s, fostered the birth of an age in which self orientation (*ziwo, zijue*) came to represent liberation rather than selfishness for the first time in Taiwan's history. (Moskowitz 2008:328-9)

Thus economic affluence, combined with the apparent capriciousness of the markets and foreign media exposure come together to foster a new ethos of individualism. The more self-indulgent, self-focused forms may indeed represent a new figure of the individual in Taiwan.

Some narratives of individualism, however, draw upon a longer historical counter-narrative to suggest that it is not that the individual *per se* in Taiwan is so new, but rather a self-conscious and political acknowledgement of individual rights and self-determination. A very common Taiwanese (*Minnanhua*)[8] proverb, *Li tao chia ya ya, sui lang gou xi mia*[9], translates roughly to mean that the sun is so hot that everyone must just take care of themselves. It is, my informant explains, a proverb that emerges from an agricultural society in which everyone has to work. Everyone has to feel the heat of the sun, to do one's own job, as no one else will do it for them.

> The new Taiwanese consciousness is maybe very similar to American immigrant consciousness. Because many democratic leaders say that all our ancestors are immigrants. We are economic refugees, or we are political refugees. So our ancestors came to this island not for anybody else but for their own welfare. So you could say that when we try to look at the social phenomenon that these people are very very self-interested or selfish. Because you never felt a collective bond, because you have to take care of yourself, because no one will take care of you. (Dr. Hsu 7/07)

Thus, according to this narrative, it is not the individual as one who is responsible for oneself (or one's group) that is new here; what is new is, rather, a self-conscious project to make the individual as a political subject of rights. On the one hand, there exists an appeal to a dominant discourse of a traditional Chinese cultural focus on family and collectivity with its paternalistic tendencies, while on the other hand there emerges a new focus on the individual. And this individual, I suggest, strongly resembles the rights-bearing autonomous subject of liberal democracies.

Some, however, resist this move to a radical "American-style" political and self-focused individualism. One such critic suggests that in their focus on protecting individual interests from the powers of the state, these "human rights extremists" go too far in their individualist bias. This critic is appreciative of these groups in that they have brought important issues into public discussion, but now, he says, rather than taking such an oppositional stance they need to take a more productive approach, an approach that offers guidance on how to move forward together and to account for interconnections. On the perspectives of the "extreme human rights" activists, and how to move forward in this time of changing political and biological knowledge, he asks:

> So how do we keep our human dignity with the new times?… We now face a paradigm shift. This is the most ambitious shift and the most dangerous shift since the industrial revolution, so it's time to think about these issues. We've been thinking now, well, the individual bias is really a problematic matter. The individual based ideology – it represents the foundation for liberty. And it's a most important guidance to property rights. Now, you know, we share genes together. And we share genes with other primates, and animals. And there's not much consideration for this, and they have no sense of community. It should be an important matter for us to be more humble, to face the challenges that lie at the center. (Dr. Zhang 7/07)

A radical individualism underpins enlightenment ideals of liberty, and a liberal notion of rights provides the foundation, as Dr. Zhang suggests, for claims to property. Against the atomization that he sees resulting from a radical rights-based approach to Taiwanese politics, his is a call to recognize that individuals still exist in a shared community, in graduated realms of relation that even extend beyond the human species. A recognition of the continuity between all species that genomic science suggests through shared sequences of DNA is not unique to Taiwan. Fujimura (1996) has shown, for instance, how such ideas about genetic continuity between species also resonate with Japanese forms of animism.

Genetic knowledges are, however, polyvalent and as I suggest in chapter five they can equally be used to buttress claims to discontinuity. This highlights, in part, what makes Taiwan so interesting. That science can be used to substantiate different and even competing claims is suggestive of the sociality that inheres in science, and brings me to some of the central questions raised in this chapter: what do stem cell science and scientists do in Taiwan? How are they involved or invoked in making a nation and making an identity? By examining varied discourses about the science, ethics, and people thinking, we may see how science and society intertwine at multiple levels. Taiwan is a fast changing place that in many ways is, I suggest, in a state of being "in-between." Even as I write this, Taiwan is in deep flux, as the inauguration of a new president and cabinet signal enhanced ties with mainland China. In this emergent political climate, I expect that many of the stronger views on Taiwanese independence, and some of the heated momentum of that movement, may shift and diminish. In many aspects, this is a time of rapid transition in modes of governance, subjectivation, and scientific and economic production. As such, new ways of being and doing emerge and come together in formations that make visible both small shifts and enduring continuities in traveling practices, discourses, and people, as they are involved in multiple ways of making a modern, but ever changing, Taiwan.

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[1] I follow Mitchell's (2002) use of technopolitics to refer to how forms of expert techno-scientific knowledge come to be seen and used to constitute a particular kind of modernity and government.

[2] The 228 Incident began on February 28, 1947 reportedly with the beating by authorities of a woman who was selling untaxed cigarettes. This sparked large-scale riots which, under Chiang Kai Shek's orders were quelled by military troops. Official documents are in the process of being declassified and death estimates are between 18,000 and 28,000 with additional tens of thousands who were imprisoned. The 228 incident is only recently being taught in Taiwanese school history books (Gluck 2007).

[3] It is interesting to consider here, how the bureaucratic categories of suffering may shape the experience of suffering itself.

[4] On biosocial groupings, they suggest forms of affiliation and action that they suggest might be termed, “informational bio-citizenship”, “rights bio-citizenship”, and “digital bio-citizenship” (2005:442).

[5] The deCode project on the Icelandic population, and the Swedish project by UmanGenomics are good examples of this (Rose 2007).

[6] Many Taiwanese, and I suggest most under the age of 40, have English names that they have taken and commonly use in addition to their given names.

[7] Such advertisements are common around US universities as well.

[8] *Minnanhua*, also called *Taiyu or Taiwanhua*, and translated as "Taiwanese" refers to the spoken language of the Minnan ethnic majority in Taiwan. Mandarin (*guoyu* or *zhongguohua*) is the official language of Taiwan.

[9] *Minnanhua* is not a written language, and does not have a codified Romanization system. This is an approximate transliteration based in the Hanyu pinyin system.

CHAPTER TWO

Traveling and Scalar Bioethics

The origins of bioethics are a matter of some dispute. For British philosopher John Harris, it finds its roots in two distinct sources, medical ethics which he characterizes as principally concerned with matters of professional etiquette, and moral philosophy (Harris 2001). Others draw upon a longer history of ethics as a branch of philosophy and bioethics dating back to ancient considerations of life and death, health and sickness. Some with more contemporary leanings point to modern abuses of science and medicine and locate the origins of bioethics around the excesses of Nazi science and the Nuremburg trials or other experimental horror stories such as the US Public Health Service Tuskegee syphilis study, to track the development of the human research subject and patient as particular kinds of subjects in need of protections. Roger Cooter traces the first appearance of the word "bioethics" in print to Van Renselaer Potter in 1970 (though the OED suggests 1971), and suggests further that it was taken up independently in the 1971 naming of the Kennedy Center for Reproductive Medicine and Bioethics (Cooter 2004, in Rose 2007:264n.28).

What do we mean by bioethics? The Oxford English Dictionary (OED) defines it as the "the discipline dealing with ethical questions that arise as a result of advances in medicine and biology." For Harris, "bioethics investigates ethical issues arising in the life sciences (medicine, health care, genetics, biology, research, etc.) by applying the principles and methods of moral philosophy to these problems" (2001:4). Harris suggests that the contemporary practice of bioethics, however, has lost its philosophical grounding as its task becomes increasingly one of creating consensus and making declarations and regulations. Nikolas Rose similarly suggests that bioethics has moved away from its philosophical roots and "has mutated from a sub-branch of philosophy to a burgeoning body of professional expertise" (2007:30). The professionalization of the field, in turn, is linked with a set of practices and purposes that extend well beyond that of ethical reflection and deliberation. Somewhat more lateral definitions and critiques of bioethics emerge in the social science literatures. Cori Hayden refers to "bioethics –the practice, the discourse, and the institutional arena" (2007:733) highlighting the varied modes in which bioethics operates, each of which operates in different, if overlapping, domains with varied scales, interests, and stakes. For Waldby and Mitchell (2005), bioethics acts as the lubricant for the circulation of human body parts in the machinery of exploitative relations of global capitalism. And for Veena Das, bioethics is "seen as the application of a set of codified norms to the practice of medicine" (1999:99). Das, along with Churchill (1999), Rose (2007), Harris (2001) and many others point to the narrow focus of those issues that are considered to be bioethical problems and call for a consideration within bioethics of justice and larger social processes that impinge on the health of large groups of people around the world.[1] At issue centrally in these critiques is the question of how bioethics determines its focus, defining some issues as problems for bioethics while necessarily leaving others out.

Critiques of bioethics have also asked why principlism, centered around the four principles of respect for autonomy, beneficence, non-maleficence and justice, and exemplified in Beauchamps and Childress' seminal volume, *The Principles of Biomedical*

Ethics (1994) is the best approach. Beauchamps and Childress have responded to some of these critiques by presenting their principlism as a non-exclusive approach, one that can be consistent with, for instance, a virtue-based approach to ethics (Beauchamps 2001). Still, others have suggested varied methodological and philosophical approaches including feminist ethics of care and love-based approaches among others. Anthropologists and sociologists have called for grounded empirical approaches that take seriously the lived and relational character of bioethical dilemmas and that account for bioethics itself as being culturally situated (Kleinman 1995, Muller 1994).

More recently, as bioscience is increasingly practiced on a global stage and in transnational circuits of exchange, collaboration and cooperation, bioethics is implicated in a process of standardization. Harris refers to this shift as the "globalization of bioethics,"

> The globalization of bioethics may be thought of as the phenomenon according to which the ethical agenda is increasingly set, not by religious, cultural, and indeed ethical traditions, not by competition in the marketplace of ideas, nor by community leaders, exceptional sages, or 'saints', nor indeed moral philosophers; but rather in a new an unprecedented way. This agenda is now set by national and international ethics committees, or committees with ethical agendas, and by the conventions, protocols, reports, or conclusions which they produce, and which are disseminated either by the press and media interest which they arouse. One feature of this phenomenon is the increasing *institutionalization* of bioethics; but the phenomenon to which I refer owes more, I believe, to the world stage on which bioethical issues are now played out and to the increasing consciousness of a world audience of the ethical pronouncements made by national governments and international organizations. (Harris 2001:5)

Harris suggests that this shift in the bioethical agenda has the effect of masking the philosophical arguments that form the foundation for bioethical deliberation and judgment. I suggest further that this institutionalization has the effect of limiting both the scope of what counts as being within the purview of bioethics as well as the depth of the philosophical or deliberative discussions therein. Others find a more substantial critique of bioethics in its global travels in the cultural assumptions that it makes. A recognition emerges that bioethics, in its predominant contemporary instantiation, comes out of a western philosophical tradition, and is infused with Euro-American cultural values that may be neither universal nor universalizable.

A growing literature addresses questions of ethical pluralism, and increasingly, questions the global applicability of bioethics in a world in which cultural difference is taken seriously.[2] One of the most developed literatures on non-Western bioethics is on Confucian approaches in bioethics (c.f. Qiu 2003, Lee 2002, Tao 2002). Where some Taiwan-based scholars suggest that Confucianism is inherently deficient in that it lacks a distinct notion of individual rights (Ip 2003) others suggest that it provides a foundation for a global bioethics (Lee 2002). Below, I examine some of this literature and place it in relation to stem cell and related research programs in Taiwan. I consider how stem cell policy-making takes place and how different interests and bioethical perspectives are considered in this process. Finally, I suggest that by attending to what bioethics does as it acts in the world we might come to understand what it can do, and how we might think about it, without resorting to facile claims of either relativism or absolutism. In this chapter, I consider Confucian and other bioethical approaches that are relevant in Taiwan and Taiwanese policy-making, and I suggest that bioethics works here at multiple scales, but principally in the interest of enabling science to proceed through ethical legitimation and risk mitigation. In so doing, however, it confines itself to a relatively narrow constitution of the realm of the ethical. In the next chapter, I examine emergent affiliations, subjects, and collectives made in relation to markets, human biologicals, and bioethics as they hang together in new ways and new projects.

This chapter is organized in two principal sections. In the first section, using mainly philosophical examples but also empirical ones from Confucian and Buddhist perspectives, I examine the important question of ethical pluralism and cultural specificity in relation to stem cell research and bioethical policy. In the second section, drawing mainly upon empirical examples from Taiwan, I examine the varied roles of bioethics in practice, and I show how it operates at multiple scales in relation to stem cell research, from that of the individual to that of the international or even global.

Confucian bioethics

In Taiwan stem cell policy debates, Confucian approaches are considered and included. A prominent Confucian philosopher and ethicist is included, and consulted, in nearly all policy-making meetings. He and his colleagues have produced numerous reports, some on specifically Confucian perspectives, others on applied ethics more generally as they relate to stem cell research. Although the question of whether or not a particular research practice or policy was in accordance with Confucian values was never directly addressed in any of the meetings I attended, the perspective of these players is taken seriously. Their presence at meetings is seen to confer a certain legitimacy on the inclusive process of deliberation, and more significantly, at least one group that received government funding to consult and advise on stem cell policy was staffed by a Confucian professor and senior level PhD student, as well as other scholars well-trained in Confucian philosophy.

A significant literature on Confucian moral philosophy is emerging that both complements and challenges the global applicability of institutionalized bioethics in its current form. I do not presume to present here a definitive account of Confucian moral philosophy or Confucian bioethics as there is neither a singular view on what constitutes Confucianism nor proper interpretations therein. The discussion on Confucian bioethics is a cross-strait one and beyond, and it is important to note that while Confucianism is a significant factor in Taiwan's cultural history, being Confucian should not be conflated with being Taiwanese. Contemporary Taiwanese identity is played out on contentious and shifting terrain, and Taiwanese, Confucian, and Chinese, are not identities that can be unproblematically overlaid upon each other. Nevertheless, Confucian cultural values and ideas are present in the social sphere and Confucian scholars are important players in Taiwan's bioethical policy-making.

Confucian scholar Lee Shui-Chuen addresses various critiques of bioethics and considers whether or not a global bioethics might be possible. Lee suggests that Engelhardt's (1996) distinction between moral friends and moral strangers allows for cultural difference, and that his principle of permission suggests a procedural foundation for bioethics (Lee 2002:179). Lee further suggests that Beauchamp and Childress (1994) seek to found a global bioethics on "commonly accepted and acceptable middle principles" (Lee 2002:179), and he tracks how they are critiqued for assuming a universal principlism grounded in four principles, with a particular critique of autonomy as being a culturally specific, and therefore not universalizable, value. Drawing from these perspectives, and considering the critiques to which they have been subject, Lee argues that a Confucian approach can be employed to defend a "minimal common bioethics" (2002:179) that is nonetheless content-full and respectful of difference.[3]

Daniel Fu Chang Tsai (1999) suggests that Confucian traditional medical ethics are consistent with a principlist framework. Tsai makes a comparative analysis between the dominant principles of contemporary mainstream bioethics and those of what he calls "ancient Chinese medical ethics" (ACME), that draw from ancient Chinese texts on the proper conduct of the physician, and Sun Szu-miao's seventh century influential monograph, On the Absolute Sincerity of Great Physicians. Situating ancient Chinese medical ethics as essentially Confucian with Buddhist and Taoist influences, Tsai suggests that the four principles of contemporary bioethics as outlined by Beauchamps and Childress (i.e. respect for autonomy, beneficence, non-maleficence, and justice) are identifiable in ancient Chinese medical ethics. He says:

> Beneficence and non-maleficence have always been the keynotes of ACME since humaneness (*jen*) is the central theme of Confucianism on which ACME was founded. Ancient Chinese medical ethics is also familiar with the concept of *yi* (righteousness), equal treatment towards persons and extended help to the worst-off; therefore, it fulfills the concept of justice. Regarding the principle of autonomy, ACME requires physicians to respect their patients as ends but not means by a sincere, decorous, devoted, absorbed and selfless attitude towards medical practice; it further requires them to value all life with a respectful attitude. However, respecting a patient's autonomous choice was not mentioned explicitly. (Tsai 1999:320)

Noting a cultural emphasis on filial piety, family values, and a concern for the common good, Tsai suggests that individual autonomous decision-making is often subordinated to such considerations of the familial choice-making or social values. He concludes, therefore, that while respect for autonomy exists, it occupies a somewhat different space within an ACME framework. That is, whereas he identifies Western contemporary bioethics as fundamentally taking an autonomy-oriented approach, he suggests that a traditional Chinese approach would take as its highest principle that of beneficence. Such a reorientation of bioethics' fundamental principles takes one approach to the question of how one might do a global bioethics. That is, rather than challenging the four principles as themselves products of a specific worldview, Tsai suggests that while these principles may themselves appear in another major and non-western ethical system, they do not arrange themselves in the same manner. A beneficence-oriented medical ethics places the focus of ethical action on the physician or on the relationships that the physician is engaged in rather than on the autonomous individual of medical treatment or research.

In contrast to the sometimes orientalizing view that points to the erasure or subordination of the individual in Chinese traditional cultural values and practices, and consistent with Tsai's depiction, the individual figures prominently in Confucian moral philosophy. This individual exists as the principal site of ethical work; it is the site for the ethical project of a work on the self, a cultivation of the self as an ethical person. As philosopher Julia Tao writes,

> Confucian practical humanism teaches that human beings are what they make of themselves through moral learning in the social context.
>
> Confucian moral philosophy, in fact attaches great moral autonomy to the individual self because of its belief that the individual in an active self capable of achieving a state of humanity (*jen*) and developing virtues through learning and experience. (Tao 2002:166-7)

Similarly, Lee Shui-Chuen specifies that this is an individual with free will when he writes that, "autonomy of the will must be part and parcel of our moral experience" (2002:183). This is not, however, the individual of radical autonomy since as philosopher Edwin Hui suggests,

> A person is never seen as an isolated individual but is always conceived of as a part of a network of relations… the entire Confucian program for self-cultivation is to emphasize the social nature of man (and thus) a person is always a person-in-relations. (Hui 2003:34)

In this Confucian ethical frame, the individual is at the center of the ethical project, and ethical obligation is configured in graduated spheres of relation. Lee Shui-Chuen articulates Confucian ethics as originating from the "doctrine of universal respect for all lives (expressed in) a hierarchical order with the moral person at the core" (1999:2). He presents a graduated ethics that is inherently relational and in which each level carries a different degree of obligation; the individual is at the center and gradations extend outward:

> According to Confucianism, our concern for others spreads out in circles as is required of substantial care. We care first for members of our families, then our friends, then other fellows of our race and then for all people in the world. In fact, this concern goes even further: we care for everything with life, for our land, for Heaven and Earth, or for the whole universe. (Lee 2002:186)

Where Lee uses the fundamental interconnectedness between all humans to emphasize our mutual responsibility, others use the model of gradation to argue against a comprehensive welfare program. Ruiping Fan, for instance (a student of Engelhardt), citing the Confucian slogans of "love with distinction" and "care by gradation" (2003:64), argues,

> Although the Confucian virtue of r*en* requires extending love from one's family members to all others outside the family, it does not hold that one should love everyone equally or similarly. To the contrary, Confucianism always requires that there ought to be a clear and definite order, distinction, and differentiation in the application of love. (Fan 2003:64)

It is this gradation that, in part, distinguishes Confucianism from other schools of ancient Chinese philosophy, including Moism, in which Mo Ti (or *Mozi*) advocated a love-based philosophy (*jian ai*) of equal love for all.

Whereas principlist approaches to bioethics are generally based on the foundational four principles specified by Beauchamp and Childress and are generally perceived to be equally applicable in every circumstance, in contrast, a Confucian approach is rather context-driven and flexible. Or rather, to the extent that it is principlist, Confucian principles, and/or their modes of application, are quite different. Thus whereas the individual of bioethics exists as fundamentally autonomous and rights-bearing, the Confucian individual exists in a network of graduated relations which may serve to differentially determine right action in different circumstances. In this way, Confucianism appears relatively unconcerned with the application of abstract principles in a concrete sense, and rather, a value for flexibility appears to be fundamental.

A Confucian ethics determines the ground of moral action, but not an enduring answer that can be applied in all circumstances since right action depends to some degree on the specific situation and relationships at stake. For Lee Shui-Chuen, the "moral mind" constitutes the foundational ground of Confucian morality and comes from the sensitivity to the suffering of others. This moral mind, "though it prescribes what is moral and what is not, it leaves the particular action or decision to the situation that arouses our moral consciousness" (2002:186). Similarly, Daniel Fu-Chang Tsai, pointing to the Confucian concept of *chuan*, or flexibility, suggests that the doctrine is to "remain resilient in applying moral rules so as to achieve what is most appropriate in every particular situation and to satisfy the standard of *yi*," (Tsai 2005:638) which is differentially translated as righteousness, appropriateness, and/or justice. And Julia Tao quotes Confucius himself as having said, "I have no preoccupation about the permissible and the impermissible" (in Tao 2002:167). It would seem, therefore, that ethics in a Confucian frame is not about making specific rules for governing but of cultivating subjects that can make appropriate and specific moral judgments.

Embryo perspectives

In this section I consider how policy on human embryo research is made in Taiwan and how it is informed by different views and interests. Again, I emphasize that while Confucian perspectives inform much of the debate, implicitly and explicitly, many other perspectives are important in Taiwan including those of Buddhists and Christians, and various other groups. Research using human embryos has generated relatively little public debate in Taiwan. Whereas in the US it is a highly contentious political issue that overlays upon divisive abortion politics, in Taiwan, it has not been taken up in the public sphere as a deeply important issue.

> This is not so controversial here. The status of the human embryo. The common view, the consensus is the that human embryo should not be treated as its own person. It is almost a commonly accepted fact. In genetics, abortion, reproduction laws, it's all the same – this consensus. Of course it should be protected… We are quite liberal in this. Of course the human embryo has a special status. Just not the same as real people. (Law Professor 7/07)

For the law professor quoted above, the relative lack of controversy surrounding the question of human embryo research is the main factor that distinguishes Taiwan stem cell related policy debates from those of other countries. Abortion was legalized in Taiwan in 1985, although even before that it was easily obtainable (Moskowitz 2001). Although abortion also remains relatively unpoliticized in Taiwan, Moskowitz points to Confucian lineage concerns and Buddhist proscriptions on killing that inflect Taiwanese understandings and experiences of abortion,

> Traditional and current Confucian thought stresses that to injure oneself is to harm the property of one's parents and ancestors. This responsibility to protect one's body extends to a fetus. Thus, in killing a fetus one is perceived to sever familial ties, to fail in one's duty to procreate, and to mutilate familial flesh, which is an unfilial act. (2001:25-6)

He further describes the Buddhist prohibition on killing and the Buddhist belief that the fetus is already ensouled. Debates on the destruction of the embryo for research are informed by these perspectives as well as international debates.[4]

Daniel Fu-Chang Tsai uses the Confucian "love of gradation" to suggest that the use of human embryos in stem cell research is justifiable. Noting that our "moral obligations to do good to other living organisms, persons, and our families are different," he argues for a gradualist position regarding hESCR suggesting finally that "the moral obligation we have toward persons is clearer and stronger than that which we have toward human embryos. Embryo research is justifiable if it brings enormous welfare to human persons that cannot be otherwise achieved" (2005:635).

A Confucian morality, as explained by Lee Shui-Chuen, originates with the "unbearable mind of the sufferings of others," that is, an innate sense of sympathy toward all living things. Lee's Confucian bioethics includes the "doctrine of universal respect for all lives and a hierarchical order with the moral person at the core" (1999:2). In an earlier quotation, I show how he presents a graduated ethics that is inherently relational and in which each level carries a different degree of obligation. Like Tsai, Lee presents a graduated obligation toward the human embryo. This obligation increases as development proceeds and as the embryo or fetus is increasingly granted moral standing by being viewed as a member of a moral community. This points again to the relational character of Confucian morality. Thus, for Lee, a pre-implantation embryo cannot be conferred moral personhood, although its potentiality is morally relevant. Lee makes no moral distinction between using "surplus" IVF embryos and creating embryos for research purposes, but does suggest that as sentience begins to develop with the emergence of the primitive streak (day fourteen after fertilization) we enter morally difficult terrain. Prior to 14 days, however, in the absence of alternatives and the presence of compelling potential benefit, use of such embryos is permissible. The "love of gradation" provides a foundation for graduated inclusion and exclusion in various social collectives, and here, the human embryo, because it is positioned as an object of lesser moral responsibility, is available for research in its potential contribution to a larger social good.

Whereas Lee and Tsai use a Confucian model of gradation and a gradualist approach in which the moral status of the embryo and fetus increase as they develop, a Buddhist position tends to view all life as equal. In Taiwan, Buddhist opposition to human embryo research has remained relatively subdued. One scientist interprets this in terms of reincarnation beliefs, "so sure it's life, but so what. It will be reincarnated!" Taiwanese Buddhist Master Shih Chao-hwei, however, explains that "the human embryo, regardless of whether or not it is a human being, constitutes life. Therefore its destruction is a violation of the Buddhist proscription on killing." With this argument, Master Shih bypasses the contentious question of whether or not the embryo is a human being and raises as equivalent the problem of animal research. The proscription on killing is based on the foundational Buddhist principle that "all sentient beings are equal."

What at first might seem to be a conflation of sentience and life is explained in the Master's account of gamogenesis (sexual reproduction),

> In normal gamogenesis… the "embryo-being-to-be"… will see its parents…having sexual intercourse. At this time, the "embryo-being-to-be" will have the desire of getting closer… Having the desire for sexual intercourse, the "embryo-being-to-be" will only see the desired person and get closer to its parents. (Shih 2004:11-12)

The "embryo-being-to-be" thus is represented as having desire, some element of volition, and according to the full passage, is active in choosing its sex/gender and is explicitly granted consciousness and a will to live. It is made human before it biologically exists.

> The consciousness of the "embryo-being-to-be" takes on new life and continues to live… From the moment the sperm and egg fuse, till the seventh day afterwards, the being is at the stage of "kalala"…, kalala is the first place where the mind consciousness dwells. That is, at the moment that the sperm and egg met, the mind consciousness entered. This is the "starting point" of a new life. (Shih 2004:12)

The apparent conflation of sentience and life is thus shown to be tenable within this Buddhist framing of embryonic development. The 14-day rule, based upon sensory development, is rendered irrelevant. Nonetheless, Master Shih is clear that at the level of policy, a prohibition on human embryo use for research purposes may be untenable, and rather than retreating into a realm of contemplative idealism, she advocates for an engaged Buddhism – "an action philosophy." She presents an engaged Buddhism as a work in progress, helping to move society along a continuum toward increased ethical awareness and policies. For now, and with the hope that hESCR might reduce human suffering, she advocates a middle path of engaged tolerance, ″we encourage and support ES cell research, but strictly hold to the principle of non-maleficence to research sources" (2004:17).

While Buddhist and Confucianist approaches configure the embryo differently, those scholars and theologians presented here suggest that their perspectives are reconcilable with hESCR.[5] While the Buddhist concept of life beginning even prior to the production of the embryo should produce the opposite effect, decrying the use of embryos, Master Shih's response is one of acknowledging and engaging with the current realities. "Buddhism emphasizes that regardless of whether an embryo is s human being or not, as long as it is already a life, using it constitutes the immoral act of killing" (Shih 2004:1). But hers is an ethics in the world and engaged with making a "relatively best" choice given competing interests and the potential of stem cell research to alleviate many kinds of suffering.

Confucian scholar Edwin Hui, on abortion, writes, "Chinese holistic personhood suggests that the personhood of the fetus could very well have been established by the materno-fetal relation" (2003:41). Thus the fetus, and by extension the embryo, does not inhere a specific status; its ontological status, and therefore its ethical status, is determined in its relationality. These examples bolster the point that the embryo does not have its own pre-given ontological status, but is invested with different values and obligations in different framings. This point is supported by varied Western ethnographic examples as well. Charis Thompson (2005) shows that even in the pronatalist environment of IVF (in-vitro fertilization) in the US, ex-vivo embryos do not inhere specific moral or ontological status, but rather track back and forth between realms of the sacred and of the profane. Similarly, Elizabeth Roberts (2007), in her research on IVF in Ecuador, shows how despite (Catholic) representations of each embryo as sacred, many are routinely disposed of as waste. And Stefan Sperling (2004) shows how German bioethical policy prohibits the use of domestic embryos in research, but nonetheless allows for the importation of hESC lines produced elsewhere, suggesting that it is the border that matters and not the embryo *per se*.

Bioethics in practice

While Buddhist and Confucianist representatives, alongside various other constituents, are called upon to participate actively in deliberations about stem cell policy, their views are often not clearly visible in the policy documents that are produced. An enduring tension exists in discussions of SCR policy-making in Taiwan between conforming to international standards and making something that it specifically appropriate to Taiwan. Confucian scholars are consulted and invited to participate but, as Harris (2001) anticipates, a disconnect is produced between ethical principles, their consequences, and the consensus required in order to establish ethical policies, such that, for instance, Confucian concerns and perspectives are not articulated in policy documents. A stem cell scientist, noting the apparent lack of Buddhist opposition to hESCR worried that this lack may be the result of poor representation rather than a real lack of opposition:

> Some Buddhists say there's no problem. But the issue is, have we really asked all the major Buddhist leaders? So we don't really know. If I had time, I'd want to do it. I'd visit them one by one, and I could explain the details to them. As a scientist, I think we know (the science) better than others… But I'm not in a position to judge if it's right or wrong.
> (interview excerpt 7/07)

His narrative points to the question of adequate representation as he worries that those Buddhists who have attended the public meetings and have not expressed deep reservations about hESCR may be acting unwittingly as *de facto* representatives of all

Buddhists in Taiwan. This quotation also suggests the effective division of labor that occurs in biomedical scientific production in which ethical expertise is separated from scientific expertise. This division operates counter to the Confucian sensibility that suggests that the ethical is not centered on rules, but on the constitution of a subject that can discern right action in any circumstance that is constituted as a moral or ethical situation. In this way, bioethics in practice, even in an explicitly pluralistic and inclusive realm, shows itself to be limited in its scope and therefore to be working toward particular goals. I suggest these goals are made visible in Taiwan's processes of SCR-related policy-making, and that they reflect concerns about risk mitigation at multiple levels, including that of the state, the science, the group and the individual.

Bioethics and the state: after the Hwang scandal

Aihwa Ong tells the story of Singapore's deliberate, organized, and funded drive to promote itself as a permissive space for bioscience in its successful effort to create Singapore as an Asian hub for biotech and to attract foreign scientists. The initial excitement over creating a space for "essentially unregulated research unfettered by the debates and ethical concerns that limits research elsewhere" (Ong 2005:342), gave way when it came to human embryo research. Here, consultations with religious groups and the study of others' guidelines were conducted such that Singaporean hESCR effectively conforms to "global or American standards" (Ong 2005:342). Interest in bioethical regulation also grew after a scandal in which a British scientist whose recruitment to Singapore was seen to be a national success was found to have been conducting research on over a hundred Asian patients without their consent (Ong 2005:350). In controversial practices of science, bioethics in general, and bioethical regulations and guidelines specifically, often serve to facilitate rather than impede scientific progress.[6]

In 2005, Hwang Woo Suk, South Korea's premier stem cell scientist and a world leader in the field, was shown to have participated in the dual violations of using eggs procured from his research assistants and having fabricated the ostensibly groundbreaking research results of papers published in the prestigious journal, *Science* (Hwang 2004, 2005). This scandal, and the embarrassment it was seen to bring upon South Korea, prompted those involved in Taiwan's stem cell research to take the production of guidelines and regulations more seriously. South Korea's streamlined and well-supported stem cell research facility was regarded with respect by many of the scientists I met. They spoke of efficient funding, collaborative and effective use of specific expertise in scientific teams, state of the art equipment, and a national laboratory to be envied. They also spoke of the efficiency with which regulations governing hESCR were drafted and implemented. Such praise for the South Korean research field was often contrasted with the Taiwanese situation in which many felt that scientific efforts were being duplicated in a research environment of intra-national competition rather than collaboration, often with an individual quest for fame named as the motivating factor. The Hwang scandal made visible a vulnerability that many felt also existed in Taiwan, and when I asked several of these scientists if they felt that a similar problem could emerge in Taiwan, most said that they worried that it could.

In the wake of the Hwang scandal, the Taiwanese government bodies involved in making SCR policy, and specifically the Department of Health (DOH), redoubled their efforts to make national guidelines to regulate stem cell research in Taiwan. A legal scholar who had been advocating for the establishment of SCR policy for several years felt that the Hwang scandal was responsible for garnering interest in making guidelines, as our discussion shows:

> Dr. X.: In our separate commission resolutions – we had made about three or four – about the policy on stem cell research, well, we could see that in order for stem cell research to proceed smoothly, we had to prepare some structure. To prevent scandals such as in South Korea from happening in Taiwan. Before, the legislators were not interested in regulation, but after the South Korea scandal they began to think that we need to do something about this. So that's why they organized this sub-commission (on SCR) to discuss and to redouble our efforts, which is very very rare in the DOH.
>
> J. Liu: So it was not until after the Hwang scandal that this particular sub-committee came together?
>
> Dr. X.: Yes. I had personally written a draft (of SCR guidelines) and submitted it in 2003. But at that time the government took a wait and see policy. They felt that they did not need to legislate then. So my draft was held in parliament. Even then, I thought we needed a good governance structure… I think most of the parliament wasn't interested or didn't have an idea of what was going on. Now, if the government has a full cabinet, I think this current draft could get easily passed because this field is not strongly politically controversial right now. But at that time (in 2003) they thought it was premature to make regulations… But now they think its important, since the scandal in South Korea.
>
> (interview excerpt 7/07)

After the Hwang scandal, those involved with SCR in Taiwan felt themselves to be vulnerable to similar embarrassments. The way to manage this vulnerability was viewed to be through the development, and subsequent promulgation, of regulatory guidelines.

The enhanced efforts made to create regulations for stem cell research in Taiwan after the Hwang scandal point to the fragility, or the perceived fragility, of the research environment and national reputation. South Korea gained significant international recognition as a leader in the stem cell field. This was so strongly the case that even after Dr. Hwang was vilified in the international press for fabricating research results and using eggs from his female research assistants, women in South Korea volunteered to donate their eggs for Dr. Hwang's continued research. Previously, the South Korean government had issued postage stamps honoring Dr. Hwang and promoting stem cell research in a series depicting a man in a wheelchair who stands, runs, leaps and subsequently ends in a heteronormative embrace.

(image from http://www.syracusestampclub.org/som/som_images/cloning_stamp.jpg)

And the nationalist importance of stem cell research is further expressed by Dr. Hwang himself in a New York Times article:

> Last Thursday, after the government announced that it would discontinue the stamps in his honor and edit out references to him in textbooks, Dr. Hwang insisted that he still had the technology to extract stem cells from human embryos, saying, "This is the Republic of Korea's technology."
>
> He apologized for the fraudulent data in his work, blaming a research partner.
>
> "I was crazy with work," Dr. Hwang said. "I could see nothing in front of me. I only saw one thing and that is how this country called the Republic of Korea could stand straight in the center of the world." (Onishi 2006)

South Korea and Taiwan share histories of Japan colonial rule followed by a period of military rule. Both are now relatively young democracies. In a world in which science, democracy, and capitalism are perceived to be the dominant modes of global modernities, stem cell science emerges as a promising way for nations to elevate themselves upon the global scene in a legitimate way. The Hwang scandal, however, showed how fragile this position could be and the brief period of South Korean triumph quickly became a source of deep national embarrassment. By enacting clear ethical standards and practices, Taiwan's government can promote stem cell research while precluding (at least ostensibly) the possibility of a Hwang-like scandal.

representing publics

Bioethics at the state level as well as internationally has been charged with representing the varied interests of "the public." As narratives of modernity often draw upon ideas of the ethical and as bioethics is increasingly asked to mediate what constitutes this realm of the ethical, new kinds of collectives are invoked in these discourses and determinations (Hayden 2007, Thompson 2005). In Taiwan, those active in establishing stem cell policy recognize and articulate that "the public" must be represented since "democracy demands it".[7] Social science scholars have shown how certain kinds of collectives and publics are constituted in relation to various projects of bioscience and bioethics. Paul Rabinow (1999) shows how lineage and patrimony in relation to genetic knowledge enhanced notions of the French nation. Charis Thompson (2005) shows how singular notions of "the public" or "public interest" are invoked in discussions of IVF and how, in the UK, this public is often represented by a popular public spokesperson, Lord Robert Winston, while in the US notions of privacy configure the relevant public agora. Cori Hayden (2007) shows how the idiom of benefit-sharing in bioscience assembles various kinds of collectives in the name of determining who holds interests in bioprospecting practices and objects. Franklin and Roberts (2006) track the creation, in the UK, of bioscience's publics, who in turn must be consistently and repeatedly consulted for reasons of ensuring proper bioethical governance.

In Taiwan, public consultations are becoming a part of the bioethical repertoire and stem cell science, biobank projects, and other biomedical projects of national significance are increasingly generating projects that seek to survey the attitudes of a Taiwanese public. A survey on the biobank project seeks to measure public knowledge of genomic science as well as their willingness to donate their biological samples for the biobank. These researchers conclude that Taiwanese public understanding of genomic science is relatively high and that if privacy can be assured, most Taiwanese would be willing to participate in the project (Hu 2006). And Tsai Duujian argues for a community-based approach to implementing the biobank as a way to generate social trust and to enhance both biomedical ethics and democracy (2006). A public survey of knowledge and attitudes toward stem cell research, on the other hand, suggests relatively low public understanding of stem cell science, as well as relatively low levels of objections to the pursuit of such science. Such surveys purport to represent the attitudes of Taiwan's publics, and they are generally viewed in the bioethical literature as a way of apprehending both public understandings of science and as representing and including publics in the governance of science. But, as Hayden (2007), following Strathern (2000), makes clear, there is a difference between representing and including publics and representing and including them *well.* How do these public surveys operate in relation to policy-making and how well do they represent Taiwan's varied publics?[8] These questions have generated relatively little attention, in Taiwan as elsewhere, as public surveys are, I suggest, less valued as a way of apprehending public sentiment than as a way of legitimating both governance and science as democratic and representative.

Marilyn Strathern, using the ironic case of a Canadian ethics panel, makes visible diversity's constitutive exclusions and erasures. In her analysis, an explicit attempt to account for Canada's heterogeneous publics ultimately comes to rely upon the commissioners' deferral to their own "moral reasoning". Strathern suggests that "difference can be turned into an amenable and governable fact not by reducing the significance of pluralism but by *exaggerating* it" since if "everyone differs, no one set of differences need be privileged" (2002:260). By constructing Canadian citizenry as essentially a collection of individuals, diversity becomes implicit and irreducible. Thus, the panel assembled ostensibly to account for and represent the diversity of Canadians ultimately comes to rely on its own insular set of moral guidelines, norms, and forms of reasoning in determining the adjudication of proper ethical regulation for a diverse population.

In Taiwan, an advisory report on stem cell research includes a set of proposed guidelines and the results of a public survey on attitudes to stem cell research. These proposed guidelines, it reports, are "in line with international ethical consensus and are aligned with the local ethos and values of Taiwan's people." (Tsai and Lee 2006:3) Although the report includes samplings of various groups, an hESC researcher worries about whether or not different perspectives are being included *well* in stem cell policy and policy discussions more generally:

> In Taiwan the major problem is there is no common consensus. You don't know the common consensus of the public. And the issue, as I've told you before, is it seems that not too many people care (about SCR). They maybe care about their stocks, or the house prices, but not too many people care about this issue. But everybody that works in this field, they really want to know what is the public opinion.
>
> They want to know. Myself, I want to know. I really want to know, what do they think about this. But personally I think that it's probably very difficult to know. This issue has never really been in the public domain for discussion. Even the people in the DOH, they've called for public meetings for this, but I always see the same faces joining the meetings. The same faces. So I don’t know.

This scientist worries that he is working in a potentially very controversial field that has, to date, failed to generate the public controversy and discussion that he thinks it merits and that it has elicited elsewhere. His worry is fueled in part by unfavorable representations of the science in the public media, such as a story written by another scientist in an educational magazine that equated hESCR related destruction of the embryo as equivalent to the killing of a human being. In my conversations with him, this researcher expressed a deep and ongoing desire for a dialogue that involved both public education but also a substantial response from these publics such that he might understand how his own research field is viewed by his fellow citizens.

scalar risk mitigation

Several scientists in the early period of my research worried about the lack of guidelines and were actively working on establishing formal government endorsed guidelines. When I mentioned the deep questioning and the significant effort made by some of these scientists to one of my ethicist colleagues, he said skeptically, "They don't really care about the ethics of it. They just want to make sure that they're not going to be punished later for doing illegal research." I am quite certain, however, that at least some of the scientists I got to know are deeply and genuinely concerned with the ethics of their work. This comment that some are more concerned with the legal ramifications of working on controversial science nonetheless underlines the role of bioethics in mitigating controversy and risk.

At the level of the individual, adherence to official guidelines can indeed help to ensure that one will not be subjected to legal punishment or social opprobrium. Bioethical policy and regulation is used not only to mitigate risk at the level of the individual, but also at the level of the science more generally. It serves this function at multiple scales, protecting the individual researcher, the institution, the state, and the science in various registers. The director of a national stem cell research program, for instance, worried to me about the hype that was being generated around stem cell research. Much of the media representation of stem cell research and researchers suggest a divide between the researchers and the rest of society. In addition to reinforcing an older "barbell" model of the relationship between science and society, in which they are construed as occupying separate and non-overlapping realms, these representations elide the different views that exist amongst the researchers themselves.

Some of the strongest criticisms that I heard about physicians and researchers, for instance, came from other researchers. A senior scientist expressed his concern about "another Dr. Hwang." Drawing on the South Korean scandal, he told me about another scandalous physician. Dr. Huang Hongyun is a Beijing neurosurgeon, schooled at Rutgers, who had returned to Beijing where he was doing stem cell transplants.

> You know, this Dr. Huang had been using olfactory stem cells for spinal cord injury and had six to seven hundred patients. I even heard that he wrote a letter to Christopher Reeve saying that for two hundred thousand dollars, US, he'd have him walking again. But you know, this kind of unregulated physician is really bad for stem cell research. An international committee is investigating the story, and the Chinese government has shut down his clinic. (interview excerpt 7/07)

He and a colleague discuss that there is some spontaneous recovery from spinal cord injury. His colleague explained:

> He (Huang) showed videos showing patients who could walk again. But there is some percentage of spontaneous recovery. And it's not really determinable by MRI, so that even if two people have the same MRI, they could have very different outcomes. It's very difficult to do controlled studies of spinal cord injuries. (interview excerpt 7/07)

Both scientists seem to agree that Dr. Huang's patients that he "cured" likely were those who would have recovered spontaneously without treatment. They and their colleagues are pleased that "China took that effort" to investigate and close his clinic.[9]

These researchers' principal concern with Huang's apparently unprofessional and possibly fraudulent claims seems to be the potential harm that scandals can cause for the field of stem cell research more generally. One says, "for stem cell researchers this is what worries us the most. We don't want society to expect too much in terms of what we can achieve now." In a subsequent conversation, he iterates this point, showing me a PowerPoint slide on a US survey suggesting that the general publics' expectations about therapy developments from stem cells are much more optimistic that those of stem cell scientists. His concern is that hype and "unregulated" physicians will lead the public to expect too much too soon, thus setting the stage for the fragile support of stem cell research to be undermined when therapeutic production is slower.

This senior researcher is eager to get stem cell research regulations in order, and he advocates for high standards of both scientific and ethical practice. He sees the generation of ethical guidelines that conform to international standards as a way of protecting this new and controversial field of research and of protecting Taiwan in the eyes of the international community. This illuatrates an interesting twist in the uses of bioethics. Bioethics has always concerned itself with issues of risk, and its principal instrument of informed consent is an explicit attempt to explicate the risks to the subject of participation. Despite critiques that informed consent actually serves to protect the institution rather than the research subject, and setting aside the obvious questions of what might constitute being adequately informed, or adequate consent, or even why these are adequate modes of mitigating risk, I suggest that here, bioethical policy is used explicitly and implicitly to attenuate risk to the field of research itself. That is, by formulating clear policies that limit certain kinds of research, nascent potential treatments and other potentially problematic practices, public support for the research itself can be stabilized and risks of public disappointment can be managed to some degree. If practitioners are forbidden from enacting unauthorized therapies, then this can help to mitigate the hype that stem cell research has generated, since unscrupulous researchers or clinicians are seen as having the potential to cause harm not only to their patients but to the field as a whole. Thus, bioethical policy is used to protect at multiple levels, the reputation of the state, the research field, a mode of governance as democratic and representative, and individuals.

Making policy: the stem cell bill draft

At a DOH meeting in early 2006, just a few months after the Hwang scandal, many kinds of experts came together to discuss the issues and how they might proceed in formulating guidelines for SCR. Twenty-six high-ranking experts sat around a large set of tables in the center of the room. Six graduate students in applied ethics seated themselves at a secondary set of tables. A Ph.D. candidate gave a presentation on what we all might learn from the Hwang scandal, and then each of the experts at the main table had a chance to speak briefly about their concerns. Representatives included several of the top SC researchers in northern Taiwan, a sociologist from a non-profit organization working on public attitudes toward SCR and his associates, two representatives from the DOH who were responsible for chairing the meeting, two philosophy professors (at least one a Confucian), a Christian physician, and several lawyers. After each person had a chance to speak on their concerns, a more informal discussion began and eventually several attendees spoke up in frustration, complaining that they had been coming to these meetings for years now, they kept repeating themselves on the same issues, talking about the same points, when, in fact, nothing was ever done to enact research policy or guidelines. As I have suggested, in the aftermath of the Hwang scandal, a new sense of urgency developed that enhanced the existing frustration at the slow progress, and much of the blame was put on the DOH representatives who were accused of not taking their job seriously. Later, one of the scientists explained to me that the DOH people were reluctant to take on this project because they thought it should be the jurisdiction of other government departments, and it simply was not a high priority concern. Many scientists, philosophers, and law scholars alike complained about the slow progress that they saw as a result of the political process, structure, and infighting in the legislature.

In the course of my research, I met many people involved in the process of making regulations and guidelines. These mainly included scientists and ethicists. In 2005 and 2006 an advisory group of social scientists and ethicists conducted a survey on public attitudes toward stem cell research. By the summer of 2006 their report, including survey results, was completed and submitted to the DOH. In February of 2007, one of the ethicists involved reported to me optimistically:

> Tomorrow I'm going to a public hearing on the regulation of stem cell research organized by the Health Department. I heard that they are going to push for the regulations based on the report…that we submitted last summer. (email excerpt 2/07)

The following week he sent me a report on the meeting:

> The drafting of the regulations for stem cell research is undergoing its first phase of preparation and there was a large group of people of all walks of life there. It seems to be going smoothly so far though there are different ideas around. The Health Department seems to be determined to have the regulation set in the next few months. (email excerpt 2/07)

When I returned to Taiwan in the summer of 2007 for follow-up research, I learned that the draft of a stem cell bill was still in the process of being approved. The general attitude was one of cautious optimism, as expressed in the quotation above. Most felt that general consensus had been reached, the draft had been agreed upon, and now it was just a matter of going through the political process of getting it approved in the legislature.

Although formal consensus had been reached, not everyone was satisfied. One of the attendees at an important meeting recounted to me that although they had created a draft that the committee had approved, there had been some dissent:

> Yesterday there was a professor from (a Catholic University), and he expressed his Catholic view; he opposed all kinds of research involving human embryos. But it was instantly rejected by the chairman. He told him that this meeting was to discuss legal issues, not religious questions.
>
> And when the (Catholic) University professor said that it was our common knowledge that we all come from a human embryo, a feminist legislator said that no, it is not our common knowledge, do not assume this, it is just your view. She just said we have different views, and this is just your view, and don't exaggerate and don't emphasize that this is just common sense. So it was just briefly discussed then dismissed.
>
> (interview excerpt 7/07)

Here, in order to make legislation or guidelines, the production of consensus is required, and consensus requires the silencing of unpopular positions, such as that of the Catholic professor. In Taiwan, the main opposition to hESCR comes from the Catholics. Christians in Taiwan represent about 3 to 4 percent of the population with Catholics estimated between 0.7 and 1.5 percent of the population. Taiwan has no state religion and religious freedom is protected by the constitution and is generally respected.[10] In the process of establishing guidelines for stem cell research, many called for open "public" representation, and Confucian, Buddhist, and Christian representatives (among others) were asked to voice their perspectives in meetings and various public meetings; this diversity of interest positions – a Catholic opposition and a Buddhist call for progressive ethical awareness, for instance – however, is lost in the current policy draft as it is reduced to a series of declarations of (im)permissible and requisite practices.

critiquing the draft

The international terrain of stem cell research and policy remains dominated by western countries and especially the US and UK. It is noteworthy that these countries also have the most clearly articulated regulatory apparatuses associated with the research.

Taiwan has reacted to the potential threat that stem cell science carries to its international reputation by making moves to establish a clear regulatory apparatus. In its current instantiation, the draft of stem cell research policy looks quite a lot like those guidelines of other countries. A legal expert synopsizes the spirit of the draft saying,

> It looks a lot like the UK. It makes a lot of reference to the UK policy. If I can use a brief phrase to sum up this regulation it is: "bold opening of this research area, with strict regulation." That is the spirit of this bill.
> (interview excerpt 7/07)

Some scientists complain that the bill is overly restrictive, having taken restrictions from all places and assembled them together in Taiwanese regulations. Although they were pleased that the regulatory process was progressing, a couple of scientists active in the process expressed their criticisms to me as an excerpt from my field notes recounts:

> Dr. A. said, "the proposed regulations are just a mixture of other countries. US, UK, Japan… They just study other country's regulations and put them together. It's totally hybrid." The scientists go on to suggest that in this way Taiwan will end up having the most strict and stringent guidelines of country. The picture they paint is that they take all of the prohibitions from all of the other country's guidelines and list them. But, she says, "they don't know the original meaning, and they do not realize that regulations evolve."
>
> "For instance," Dr. X. says, "at the most recent public hearing a law professor said that he had reviewed the items that we prohibit, and said that the ISSCR guidelines prohibit one additional item on primate research. And so he wanted to add this item. But we had already discussed this and had deliberately left it out." Both scientists emphasize to me that guidelines are subject to revision, that even the ISSCR guidelines used the NAS recommendations to revise their draft.
>
> They tell me that the FDA in Taiwan had done the same thing before; "it adopted all the foreign guidelines, and ended up prohibiting everything, so that they couldn’t do any pharmaceutical development here." But those guidelines have since been revised. They present the SCR guidelines as a complete mix of everyone else's guidelines – a complete list or checklist of all prohibitions, rather than a cohesive plan made for Taiwan. It is designed elsewhere and merely assembled or compiled in Taiwan.
> (field notes 7/07)

Many scientists and scholars had expressed a concern for making guidelines or regulations that were appropriate to Taiwan, and a tension reappeared regularly with the apparent need to conform to international standards while also making something appropriate to Taiwan.

Other scientists had concerns about specific aspects of the draft. In addition to the restrictive and hybrid nature of the draft in the above field notes excerpt, I encountered two main points of specific scientific contention. The first is more a point of interest than of dissent, but it is suggestive of the way in which some issues are brought into the arena of regulatory discourse while others are not; this is often determined less by concerns that may be specifically ethical but may have more to do with accepted practices in other countries and with access to research materials. This case involves the chimeric production of human-animal embryos. Dr. Hsiang, an hESC researcher suggested to me that the logic of the regulations around chimeric embryo production simply did not make sense in a scientific frame. He presents the relative lack of concern about chimera production as something that is unique to Taiwan and suggests that the specific prohibition against the production of certain kinds of human-animal chimeric embryos is about material scarcity rather than scientific sense. In the draft, it remains permissible with appropriate approval to place human nuclei in animal ova, but not the inverse. Human ova are difficult to obtain and are a limiting resource in hESCR; allowing the use of animal ova enables hESCR to proceed while removing the dual problems of scarce resources and the invasive procedures on women's bodies required to obtain such eggs. He says,

> So what I expect is that these regulations will be a mixture of different already published guidelines from other countries or from international guidelines…
>
> (he laughs) I don't know about other regulations, but this (the production of chimeric embryos) seems like it's very special to Taiwan. Because in the UK they debated this for a very long time until just recently they decided to allow people to use a cow egg. But in Taiwan they seem to have no problem on this issue, to make a so-called chimera.
>
> There's a very interesting issue in the regulations. Maybe it's not so important but it's that the regulations allow the scientists to put a human nucleus into an animal oocyte. But it does not allow scientists to put an animal nucleus into a human oocyte. And the justification is that human oocyte is very valuable material. So they don't want the scientists to put the animal nuclei into the human oocyte because the human oocyte is valuable. But scientifically I think that to put the human nucleus into an animal oocyte may be more problematic. Suppose we really grow a human being – because the nucleus is human! Because the oocyte only provides the cytosome to reprogram the nucleus, but genetically it's regulated by this donor cell. So when you put the human nucleus into the animal oocyte, then genetically they really could grow it as a human. So scientifically this doesn't make sense (as an ethical practice).
>
> (interview excerpt 7/07)

The scientist is suggesting that the prohibited practice of placing an animal nucleus in a human oocyte would produce an animal offspring if the chimeric embryo were to be brought to term, while the approved practice of inserting a human nucleus into an animal oocyte could result in the chimeric production of a human being. He suggests that perhaps this latter possibility should create a more significant problem for science and ethics. In this case, it seems that the specific material scarcity of human ova becomes a factor in ethical decision-making. This is part of the argument that Stephen Minger, the prominent proponent of allowing cow-human chimeric embryo production in the UK, uses to support his case. He suggests that the easy availability of cow ova as a by-product of the meat industry should be countered against the invasive procedures of harvesting ova from women.[11] In this way, the therapeutic promise of hESCR can be realized more quickly and women will no longer be asked to bear the burden of research material production bodily. The controversial practice of human chimeric production becomes, for Minger, a more ethical practice.

In the summer of 2007 material scarcity and a UK precedent were inadequate to counter a prohibition in Taiwan's policy draft on the creation of human embryos for research purposes. Most human embryos used for hESCR globally are "left-over" from IVF procedures. Waldby (2002) suggests that these embryos, once they are no longer intended for implantation and pregnancy, become conceptualized as waste and therefore as available for research purposes. Nonetheless, human embryos available to researchers remain scarce in Taiwan. Despite the difficulty in obtaining IVF embryos for hESCR, that draft of the stem cell bill prohibited the creation of human embryos for research purposes. Dr. Hsiang continues,

> On NT (nuclear transfer), there was a lot of discussion about this. The first question was about whether we should allow the generation of the embryo for research… So if we prohibit the generation of the embryo for research purposes, then in the process we also ban NT. But it seems like now they are separated into two issues… and NT is allowed for therapeutic research. In the UK they allow scientists to create the embryo… purely for research. So we have focused on this and discussed it, and they don't want people to create embryos for purely specific research purposes. So they have separated these two issues because it seems that they have made NT a special case, different than other research embryos. (interview excerpt 7/07)

While precedent exists to permit NT in the US and the UK, Taiwan takes a unique and more conservative stance on this issue, banning embryo production for research and thus concomitantly banning most practices of nuclear transfer. Dr. Wang works at a laboratory in an industrial park, and she takes exception to this ban on creating human embryos for research. When I asked her if she was satisfied with the proposed regulations she replied:

> Most of the regulations I agree with but there's one exception. After a lot of discussion, finally, they don't want to allow them to create embryos for the purposes of deriving cells for research. I don't agree with this because human embryonic stem cells are unique not only for their differentiation potential, but they are also useful in studying human disease models. But for that we would need to allow the creation of the disease-bearing embryo and derive the diseased cell line. Now in Singapore, Korea and England, and a couple of other countries, they allow this kind of research with central review committee approval. So I think we should also allow this kind of research… So in general, I am satisfied in the draft except this. (interview excerpt, Wang 7/07)

The draft at that time thus allowed for the production of some chimeric embryos, but prohibited the creation of human embryos for research purposes only, while discussions left open the possibility for revisiting this issue in the future. Dr. Wang suggests, on the grounds of other countries' precedents and research need, that embryo production for research should be allowed at least in some cases. As many of my informants pointed out, guidelines are subject to change. In fact, a year later, in the official stem cell guidelines issued by the Department of Medicine in August of 2008, this prohibition had been overturned. There, one permissible source of research embryos is specified as, "embryos or embryonic structures created using somatic cell nuclear transfer that have not developed the primitive streak."[12]

The perceived need for guidelines to be malleable in light of scientific and/or societal change underpins the major concern that many expressed regarding the proposed stem cell policy bill. The vast majority of my informants involved in producing regulations – scientists, ethicists, advisors and scholars alike – expressed general satisfaction with the draft, with one important exception. This concern is shared by many, and it involves the distinction between guidelines and law. An element of slippage exists between guidelines as recommended action and regulations as a legal apparatus, and in Taiwan in 2007 the stem cell bill draft was in the process of being made simultaneously as guidelines and as law. Many worried that this move to enact law in this field was premature and risked to hamper progress because it would thus be linked to slow-moving legal processes. Stem cell researchers, social scientists, philosophers and legal scholars alike worried about this dual move and its potential consequences. A sociologist and part of the ELSI team said:

> I think the problem is in the philosophical approach to the bill. Our administrative system or our legal regulatory system is very confident with very black and white kinds of regulations. And this is a key problem in developing things like SCR. Most countries will make a separate mechanism (to deal with issues as they arise over time) … instead of just setting it in black and white, written word by word. So they try to set up everything in very stable terms. I think this is a key issue.
>
> And the second thing, instead of setting up a kind of administrative guidance -- ethical *guidelines* -- they try to incorporate legal policy within the draft. I think it's very scary… It's not just the guidelines. It includes punishment. This is very extreme. They leave no room for uncertainty. I think this is a very big issue if we want to have this kind of research go on.
> (interview excerpt 7/07)

Rather than a set of recommendations or guidelines, or a mechanism with which to make judgments over time as the field changes, this draft of the bill is an attempt to make a durable set of codes and rules. It is significant that this contrasts significantly with US national policy. While specific states have certain laws in place, at the federal level the guidelines established by the National Academies of Science (NAS) are the main standard by which research practices are measured. In general, research institutions in the US adhere to these NAS guidelines voluntarily, in an effort to standardize their research and protect their institutional reputation (Sheehy 2008). In Taiwan, however, the stem cell bill is set to establish legal regulations with specified criminal consequences to infractions. It does not incorporate a mechanism for change and adaptation in the face of new findings, concerns, and fast moving scientific technologies, but is perceived as trying to account for everything at an early phase. A scientist expressed his concern:

> So even now, it's a question of if we are making law or just ethical guidelines… They are making law. But the law is really very different from ethical guidelines. Most of the material in the bill was gathered from the US or the UK, or other countries, but lots of them are actually ethical *guidelines*. It's *guidelines* for scientists, not *law*! But when you make a law, and then you find that there's a problem and you see that it's a ridiculous law, and that you need to change the law, well, it takes maybe ten or even twenty years to change it (because of the inefficiency and infighting in the legislative yuan of the government).
>
> So you need to be very very careful what you put into these regulations, because these regulations are for punishing people, to send them to jail. So you can only make principles really, you cannot make everything detailed and everything written, and to regulate people (at this level). Unless you already know everything and you can predict what kind of progress in science will happen in the next ten years.
>
> (interview excerpt 7/07)

He suggests that a more appropriate path might include making guidelines, outlawing certain specific practices, and allowing for most regulations to take place at the level of the IRB. While the IRB cannot enforce punishment, he says, they can communicate with a researcher's funding sources and report that ethical guidelines have been flouted. Furthermore, as I suggest in the next chapter, certain kinds of ethical considerations are increasingly being built in to biotechnological processes and products themselves, and scientific journals often require documentation that papers are based on research that complies with ethical as well as scientific standards. Considerations of downstream marketability of products, including publications, are increasingly being thought of in ethical terms in bioscientific fields in which human bodies in their biologies become a terrain of negotiation with multi-level stakes and interests. In the practice of bioethics at the level of policy however, nuanced interests, debates, and questions are subordinated to the purpose of reaching consensus and bioethics moves from considerations of "the good" to considerations of what is practicable in the name of science, the polity, the nation, and international reputations and circulations.

Promoting science: funding and bioethics as *da bai bai*?

On the new government funding commitment to support stem cell research, a scientist says,

> It's just *da bai bai* – meaning like everybody says they support it, but it's not sincere. It's just making something for people to look at. But it's not really a sincere effort to contribute, to think deeply and to arrange something that will really work. It looks like a lot of people come together. It looks good, but it's not really good. Like the *da bai bai*.
> (interview excerpt 7/07)

And when I asked him about the process of making stem cell policy, he replied, "another *da bai bai*." The *bai bai* is a Buddhist gesture. It is generally made facing a temple altar, a representation of a deity, or an incense stand. In the *bai bai* the two hands are placed together in front of the chest, and the head and hands are bowed forward together, often three times. It is often performed with sticks of burning incense held between the hands. The expression *da bai bai*, (large *bai bai*) here refers to the performance of a dramatic demonstration for its public effect rather than out of a devotional sincerity.

Many scholars point to bioethics' regulatory function, suggesting that it serves to legitimate groups and practices through something quite like an exercise in box-checking or audit. Rather than attending to the lived ethical stakes or even the philosophical debates, bioethics becomes an authorizing mechanism to protect various collectives and institutions and to authorize certain kinds of actions and circulations. It is no coincidence that funding support and consolidation are occurring at the same time in Taiwan as ethical research regulations are being solidified. Both perform important functions in promoting and protecting the field of research. The funding directly supports the research practice, while the ethical guidelines protect the reputation of the research, the researchers, and the state. Institutional bioethics often acts, I suggest, as a form of *da bai bai*. The process and the policy that constitute the practice and product of bioethics are public performances, they are symbolic and political acts that serve functions that are often not specifically ethical.

The concerted effort to bring together bioethical policy, professional expertise, and funding are illustrative of the central importance of bioethics in the legitimation and promotion of both the state and the science. In practice, this coalescence of institutional forms is the mission and work of the TSSCR as mentioned in the previous chapter but it also reflects a concern for efficiency. Efficiency, in terms of use of talent and expertise, use of embryos, and use of fiscal resources becomes frequently coupled with concerns about ethical and science policy. Even among those who support hESCR, for instance, there is still a commonly expressed view that, as a matter of ethics, one should use as few embryos as possible, and this perspective is bolstered by the fact that research embryos are scarce resources, thus each one – as a matter of ethics and of economics – should be used to its best potential.

In the interest of efficiency, collaboration and the promotion of SCR more generally, in 2007 the government pledged $25 million NTD (~USD 820K) per year for two years to promote stem cell research. In the summer of 2007, they issued a call for proposals in order to assemble a research team and program to which to award these funds. While the scientists are generally pleased that the field is receiving substantial government support, some worry that this funding structure may backfire. $25M for bioscience research, though a relatively modest investment in terms of global science funding, is nonetheless a substantial sum for Taiwan. One scientist applying for the funding, however, worries that the time frame may be unrealistic for producing results. With this amount of investment in the work, he worries that government officials and the public more generally may expect substantial results in a short period.

> The funding is for only two years. And I think it's too short. I'd prefer that they have less money for each year (and commit to a longer funding period). At least 3 years. But you know that, in Taiwan, they are quite short-sighted and they want to know your progress every year. And I think that probably at the end of the second year, they will want to know that you already published 3 or 4 papers with their money. Because at that scale its quite a huge amount of money in Taiwan, because normally the National Science Council will only give you like 1 or 2 million per year. And now we're talking about 25 million per year. So at that scale they maybe want to see more (than you can actually do). But two years is really too short because maybe you need like 7 or 8 months to train a new research assistant and then another year to establish your research system. The platform and culture material. And that's almost two years. So I say a two year project is too short. (interview excerpt, Tu 7/07)

Another stem cell researcher had told me that the stem cell program at the Industrial Technology and Research Institute (ITRI) had similarly problematic temporal limitations. ITRI is a uniquely designed collaboration of private and government funding with the specific goal of bringing technologies to market. It had substantial success in semiconductor research and production, and is a significant presence in Taiwan's stem cell research field. Some researchers from other laboratories have suggested that ITRI's model is built on semiconductor production, and that it is unreasonable to expect similarly fast results from SCR. Their funding model, I was told, is built on the assumption that if a project has not made marketable product within three years, it will be considered to be a failure and the project will be discontinued. This is a similar concern with the current government SCR proposal, as another scientist explains:

> Bioscience is not so fast. I think this is the fundamental problem. You can see this is a modern society, right – but then you see the government, the way they're working on this. If they really had scientists join this task force to make this (research funding) plan, then they should know that this will not work. (interview excerpt 7/07)

He is concerned that the public and the government both will expect fast and substantial progress and products to result from such a large investment of capital. Because, however, the pace of bioscience is relatively slower he worries that this funding structure will lead to disappointment and ultimately will reduce public and government support after the two years of the initial funding period are over. So although I suggest that SCR funding and policy production are dual practices of science promotion, these scientists suggest that funding, like science and policy, done poorly can have the unintended consequence of damaging the scientific field itself.

Discussion

Bioethics is a thoroughly modern form even if its roots are deep. It seeks to represent and intervene at multiple scales. It seeks to delimit the realm of the practicable in relation to controversial and fast-moving science. But it also occupies, itself, a very limited realm of what might be called ethics. Above, I have shown how it functions in Taiwan to limit risk exposure at multiple scales, from the individual scientist, to the state and the scientific field itself. It cannot, however, represent situated, specific, or lived experiences or sentiments in relation to any of these. So where bioethics can set limits upon what kinds of things might enter into various circuits of exchange, or what kinds of life forms might be created or destroyed, and what kinds of practices might be made upon the lives and bodies of others, it cannot speak to or for the lived realm of the ethical. It cannot apprehend why some might be motivated to donate their spare IVF embryos as a direct way of participating meaningfully in, or giving back to, a research program in which they feel themselves to have stakes (Thompson 2005); it cannot inculcate such sentiment. It cannot represent, nor answer to, the tortured and enduring questioning of the hESC researcher who has developed a hesitancy about using human embryos. It is not that he believes that they are persons; he is clear that the destruction of an embryo is not akin to murder. But there is room for doubt:

> I'm so careful about this is because I, as a human being, don't know what's going to happen to me. And maybe in my life something will happen, maybe for someone else it would be trivial – a tiny thing – but for me, maybe it will trigger something in me and change my point of view. Completely.
>
> So what's done has already been done. So say somehow it turns out that using a human embryo for research is really killing a person, and you've already used human embryos. Then you already killed a person, but at that time you didn't know, because it wasn't regarded like this. But afterwards, you have a different experience, and suddenly you realize it, and you change your mind. Then at that point you have to face a huge amount of guilt.
>
> There is already a huge burden on your shoulders. You have to carefully make sure – that you will not change your mind – really change your mind. But – you can't control it. You can't. It could just happen, maybe just in one second, and then your thinking is completely different. Yes. So you should be very careful. (interview excerpt, Tu 7/07)

His ruminations on his own work, current and past, are shaped by multiple factors. On the one hand, the very personal event of the birth of his first child caused him to pause, and perhaps to reconsider the ontological status of the human embryo. Once just a research tool on his bench, he now is more aware of the potentiality that it inheres and that it might become, given just the right set of contingent occurrences, someone's child. In a broader sense, the very clear and established practices and guidelines for human embryo management in the West, where he worked, served as a sort of buffer to his own questioning. While I believe this scientist to be predisposed to deep reflection, I suggest that in Taiwan, in the absence of clear guidelines and guidance from the ethical experts, he has been further prompted to do the ethical work himself. The irony here is that the effect of a lack of ethical regulatory structure has led not to unfettered research progress, but has had the effect of slowing his research as he takes on an enhanced sense of ethical responsibility.

Nor can bioethics at this level account for to the perspective of another researcher, more clear in her endeavors who sees the destruction of the embryo not as a destruction of life, but as an attempt to prolong it:

> So, in my opinion, if we use this embryo to create a cell line, it actually is to let the life to stay longer – to be unlimited. Okay, so instead of destroying that life, we maintain that life in this way.
> (interview excerpt, Wang 7/07)

Does cellular immortality bear on the ethical questions of human life? Institutional bioethics does not speak to these kinds of reflections; it does not ask these kinds of questions.

In bioethical deliberations and policy-making the realm of the ethical becomes flattened. John Harris points to the problematic manner in which official ethical reports and guidelines are made. That is, they are made at high-level meetings with the explicit purpose of achieving consensus:

> And consensus can often only be marshaled around high-minded, resonant, and increasingly abstract and ambiguous principles. Too little attention is paid to the consequences of these principles, when applied to particular circumstances and to the ways in which they are often incongruous with other equally widely held and respected principles that have escaped formal articulation in international conventions." (Harris 2001:7)

Indeed, as he suggests, such reports often exclude the ethical arguments themselves, pointing rather, to the conclusions as if the moral principles at stake are self-evident. As his example of UNESCO's *Universal Declaration on the Human Genome and Human Rights* declares, "practices which are contrary to human dignity, such as reproductive cloning of human beings, shall not be permitted" (in Harris 2001:5). There is, however, no explanation as to what might constitute human dignity, or what it is about human reproductive cloning that constitutes an obvious contradiction to such dignity.

In Taiwan, I met both a Confucian bioethicist and a Christian minister who suggest that under some circumstances human reproductive cloning should be permissible. Not only is it not necessarily contrary to human dignity, as the UNESCO report indicates, but it can contribute to human experience and dignity in meaningful and culturally appropriate ways. The minister explained to me:

> That the human being wants to prolong his life is reasonable.
> And that the human being wants to improve their life can also be justified.
> And that the human being wants to be better is also acceptable.
> And the human being should also pay attention to the harmony of the society.
>
> Of these four principles, human cloning doesn't break the first three. Also, it doesn’t violate human rights. If I want to clone myself, or if one of my children passed away and I want to clone him or her again, to remember the last one, well it doesn’t, what shall I say, it doesn't harm others.
>
> And then for instance if I'm not married, and I don’t have a child, and then when I'm older… say, I'm older and I'd like to have someone, for instance,

> to preserve my business and such, then of course, human cloning, should be okay.
>
> So the philosophy to extend our life and our values and to be better, it's all okay. One of the difficulties with human cloning is social harmony. And human cloning may create some problems in terms of social harmony but, well, I think not really. Except in really exceptional cases.
>
> But in normal cases, so many people in society have the wrong impression about human cloning. If I want to clone myself, people say, "then how can we distinguish you (from the clone)?" But from my personal understanding, if I want to clone myself, well no. If I am 60 years old, then the clone would be all different. And even if I decided to clone myself, he may not become the same because of the growing environment. So, they say if you make a clone from Michael Jordan then he'll become another Michael Jordan, but not really – it depends where he's raised, and the whole educational environment and families. And so in this case I would say that he (the clone) is also an independent individual, and he has his rights or her rights according to the law. It's only a person with the same DNA… Like a twin, in a way. (interview excerpt 8/06)

Some might find the production of a clone for business purposes to be overly pragmatic. People have offspring, however, for many reasons that might include multiple considerations of continuity, including having someone to pass on familial lands and traditions, as well as business and filial duty. By invoking the specific environmental conditions in which the clone would be raised, and thus pointing to the development of an independent and equally rights-bearing person, the minister refuses a kind of genetic reductionism that posits DNA singularly as that which makes the person unique. Furthermore, by considering the temporal distance of the clone from its original, he remakes the clone as a unique individual, like a twin out of time.

The Confucian bioethicist explained to me that from a Confucian perspective, human cloning might be permissible. His main orientation of human reproductive cloning is as a means to achieve familial continuity, a central concern in Confucian cosmologies. He objects to cloning, however, at the current stage of technology in that the risk of doing harm is too great. His objection is technical, for:

> Confucians regard cloning as a technology that could make up for problems with procreation. In cases where old people have lost all their offspring in an accident, for instance, or with unmarried single people, or with homosexuals. (interview excerpt 7/06)

Thus, for him, human reproductive cloning can be a means to correct a deficiency in terms of offspring. Notably, he also uses it here in a progressive social frame to expand kinship notions and possibilities for groups traditionally marginalized from reproductive equity. For both the minister and the philosopher, then, cloning serves as a potential corrective to problems with lineage continuity, and in this sense, can add to human flourishing and dignity.[13]

In offering these examples, I do not suggest that there is an emergent consensus in Taiwan in support of human reproductive cloning. I use these examples, rather, to demonstrate that multiple ways exist to frame ethical thinking. And when it seems that near universal consensus had been reached to prohibit human reproductive cloning, people whose lives are explicitly devoted to considerations of ethical matters, and various groups, offer counter-arguments. Statements declaring, like that of UNESCO, that human cloning violates human dignity not only fail to do much analytical work, as Harris suggests, they also fail to represent divergent views on how to constitute dignity and the realm of the ethical. How might bioethics account for such divergence in its global travels?

As bioethics travels it has been subjected increasingly to critiques that challenge its applicability in different regions. Bioethics, here, is positioned as a Euro-American form of reasoning that travels in global encounters alongside biomedical science.

> One must recognize that contemporary Western expectations regarding the roles of individuals and families, as well as the ranking of important moral values, cannot themselves be established without begging crucial questions or arguing in a vicious circle. At the foundations of bioethics, the West has no privileged position over the developing world in determining how those value rankings should be made.
> (Engelhardt 2001:xiii)

As Engelhardt, a self-described orthodox Christian Libertarian Texan notes, there is no fundamental ground of discursive reasoning upon which a content-full global bioethics might be found. What are the assumptions that inhere in bioethics, what is the individual or the person when, for instance, "Taiwan's constitution says that it will protect all people, but it doesn't say when a person begins" (field interview 9/05)? How does bioethics operate in relation to different regimes of virtue, value, and truth, and how is it used as a mode of transnational and international science and governance? Even that body of ethical philosophy that articulates historical, deontological, or even embodied (e.g. the "yuck factor") expressions and considerations of ethics cannot be found in most instantiations of institutional bioethics. Rather, as Chen Zhu, the Vice-President of the Chinese Academy of Sciences, suggests,

> bioethics is not to hinder or fetter the advancement of science, but to create a good ethical environment to protect and promote the healthy development of science, and meanwhile impose necessary norms on it to urge it to defend human rights and dignity. (Chen 2006:2)

And Geoff Lomax, a substantial player in California's stem cell administration suggests, "Regulations are not restrictions; they are enabling" (2008). In this sense, contemporary bioethics models a new relationship between science and society. It surpasses the push-pull model of oppositional relations, and the model in which society struggles to keep pace with forward-moving science. It is engaged with stem cell science at every step, authorizing and facilitating its next moves. Never has science's own sociality been more apparent. Ironically, however, in situating itself so closely to its sciences, bioethics limits its own ethical scope. It loses its critical function as its professional life comes to rely precisely on its intimacy with the sciences it seeks to regulate. And it loses its grounding in a lived, embodied, and situated sense of what might constitute the realm of the ethical.

In this chapter, I attend to questions of what bioethics is and does. Addressing Confucian and Buddhist views in relation to hESCR adds to discussions of the global applicability of bioethics in light of concerns and realities of ethical pluralism. Taiwan gives us important empirical examples of Confucian and Buddhist (and other) perspectives as they are engaged (or effaced) in discussions of hESCR ethics and policy. It is, however, increasingly apparent that bioethics is a form of applied thinking that takes on institutional functions that tend to erase its philosophical, moral, and lived ground. This has the effect of silencing, or at least marginalizing, important questions of ethical pluralism and specific context as science practice and policy becomes increasingly internationalized and responds principally to practical considerations of conforming to standards of publishing, funding, marketing, national interest, and managing multi-scalar risks.

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[1] Das (1999) sets up a tension between global health projects such as vaccination campaigns in India in which community health workers are mobilized to ensure that all children are vaccinated but ignore the sick child dying for lack of oral rehydration therapy in the setting of desperate familial deprivation. She asks that bioethics – and anthropology – consider that the focus on the priorities of global public health simultaneously ignore the local private sufferings of many. Churchill rhetorically asks what the right questions for bioethics might be and suggests that the fact that issues of social justice and health disparities are not constituted as bioethical problems is a deep problem for the field of bioethics itself (1999:266). Rose asks why end of life dignity is a bioethical problem but not "the massive 'letting die' of millions of children under five years of age each year from preventable causes?" (2007:31). And Harris suggests that the "increasing gulf between rich and poor, and the injustice, both relative and absolute, that it entails" is one of the greatest ethical issues of our time and needs to be addressed as part of any bioethical agenda (2001:22). In Taiwan, as elsewhere, stem cell research and high-tech medicine more generally risk to create a form of biomedical apartheid, a term I derive from Philippe Bourgois' example of inner-city apartheid in the US (Bourgois 1995).

[2] On ethical pluralism generally see the edited volume by Madsen and Strong (2003). For challenges to Western Bioethics from Filipino perspectives see Alora and Lumitao's volume (2001).

[3] Also see Francis Soo, citing Tang Jun-yi who,

> …claimed that while China's problems were concerned with science and technology and politics and economics, they were primarily problems of culture. China had lost its own source of vitality: its Confucian moral foundations. Therefore, to solve China's problems, it was not enough merely to add science and technology, or to dress her in democratic institutions. Rather, the solution must entail not only material progress through S&T, but also a return to Confucian self-cultivation of moral values…
>
> In *the existence of life and the spiritual world* he suggests that "by returning to Confucianism, the individual would become a moral self and China would become a moral society. Only then, based on a solid moral foundation, would China be able to develop S&T, to adopt democratic institutions, and eventually to effect material progress. All this in turn would bring about the possibility of a world in which all people would be united in and through spirituality" (In Soo 2001:665-6).

Here, Tang's perspective can be viewed as developing Confucianism as a foundational ground for a global bioethics in a world in which ethics is prior to science and technology in the constitution of global ethical modernities.

[4] It should be noted, however, that although abortion and embryo politics may not produce substantial public debate, the lost or aborted fetus can occupy a significant moral and affective space as Moskowitz (2001) details in his account of Taiwanese abortion politics and ideas and practices around fetus ghosts.

[5] I have yet to encounter any Confucian-based objection to hESCR in person or in print. While Buddhist formal doctrine prohibits killing, my distinct impression is that Taiwanese forms of

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Buddhist practice are notably flexible. A different Buddhist master advocates for a form of "intentional vegetarianism" in which he suggests that the important thing is that one intend no harm to the animal directly, and he acknowledges that in living, one must sometimes do harm. He uses the example of antibiotics use as a medical treatment that relies upon the deliberate killing of many bacteria, but remains acceptable. A language teacher of mine is a practitioner of Tibetan Buddhism, a denomination that traditionally does not prohibit meat consumption. She eats meat and she told me, "Well, of course it would be better to not eat meat, that is the ideal. But, my sister-in-law is such a good cook!" She further explained that it was permissible to eat meat as long as one did not directly cause the harm to the animal: "For instance, if you go to a restaurant to eat fish, it's okay. But if they have a fish tank and you point to the one you want and they kill that one for you, that is prohibited".

[6] Dr. Geoff Lomax, for instance, of the California Institute for Regenerative Medicine and the Interstate Stem Cell Alliance in the US, mentioned at a talk that he was a bit dismayed when he heard scientists speak of regulations as restrictions, where in fact, they are enabling the science (2/6/08 UCSF). In Taiwan, most of the high level researchers support and seem to welcome formal, government level regulations.

[7] It is interesting to note the role of the public survey or consultation as a mode of democratic governance. A European social scientist who researches bioethical stem cell policy in mainland China noted, in 2008, a lack there of the constitution of such publics, and thus a concomitant lack of methods for surveying them. The accuracy of her statement is beyond the scope of my expertise, but it does suggest that a conscious push to consult the public is an important element of representational democratic governance.

[8] This remains an open question since the focus of my research was on expert knowledge and did not substantially study public attitudes. This should, however, be done to make a full and supported argument about how well (or poorly for that matter) such surveys can, in fact, represent a diverse public.

[9] I have heard from other researchers that Dr. Huang currently operates out of a new clinic, and has eluded Chinese authorities by changing the sites of his practice.

[10] These estimates and representations can be found in multiple sources including the US Department of State. See http://www.state.gov/g/drl/rls/irf/2004/35395.html.

[11] Minger 2007, personal communication.

[12] "Directive on Human Embryonic and Human Embryonic Stem Cell Research Ethical Policy." August 9, 2008. Declaration number 0960223086 of the Bureau of Medicine. Trans., C. Hardin.

[13] A substantial social science literature exists on reproduction and reproductive technologies and on the kinship, affective and existential aspects of experiences with childlessness, with assisted reproduction, and with their effects on the subjects' self-concepts and life projects. See, for instance, Gay Becker (2000), Charis Thompson (2005), Sarah Franklin and Celia Roberts (2006), and Jeanette Edwards, S. Franklin, et al (eds.) (1993), and Marilyn Strathern (1992).

CHAPTER THREE

Biotech entanglements: exchanging biologicals

In chapters one and two I address, in part, how scientific expertise is shared or contested, how it crosses national and institutional borders, and how it comes together, or resists coming together, in collaborative scientific efforts. Many of the scientists I encountered bemoaned the lack of collaboration between laboratories, suggesting that this atomization of research labor and expertise would slow the overall progress of stem cell research in Taiwan. Although some expressed views that Taiwan still lacks a critical mass of specific stem cell scientists, most suggested that the main problem is that while adequate expertise in the field exists in Taiwan, a lack of collaboration leads to high levels of competition and inefficiency. In this chapter, I ask how collaboration exists in terms of biological materials, rather than expertise. What kinds of relations and subjectivities are formed through exchanges and storage of human biological materials? What new ways of thinking about the human occur in making such exchanges? While much of the sharing of scientific materials is done in the name of efficiency, using examples from my fieldwork as well as from the literature, I suggest that such exchanges are implicated in much broader shifts in the ways that we come to constitute the human body and its marketability. The ethical effects of this, and the exchanges themselves, are emergent biological knowledges and techniques that increasingly seem to render the human body as partible.[1] Using examples from Taiwan of marrow data banking, umbilical cord blood banking, and a national biobank project, I consider how multiple ways of viewing the body, its parts and its person, are simultaneously at play, and I examine the role of bioethics in the collection, storage, and circulation of human biological materials and data.

A substantial literature begins to accumulate on the commodification of human biological material enabled by emergent knowledges and techniques in the biological sciences and both limited and facilitated by new patent and bioethical regimes.[2] A prevalent conventional Western view of the human body represents it as a kind of container of the individual, an inviolable whole, as articulated by Justice Mosk in the case of *Moore v. Regents of the University of California* in which cell lines from John Moore's diseased spleen were derived and commercialized without his consent:

> Our society acknowledges a profound ethical imperative to respect the human body as the physical and temporal expression of the unique human persona... (This commodification violates) the dignity and sanctity with which we regard the human whole, the body as well as mind and soul.[3]
> (in Rabinow 1996:145)

In contradistinction to Mosk's view, however, new technologies (de)compose the human body as a body of fragments. And despite laws, at least in the United States and the United Kingdom, that derive from anti-slavery legislation and prohibit the holding of a property interest "in the person," biological materials are increasingly subject to market-place circulations. From payment for blood (Titmuss 1997), to egg-buying advertisements in campus newspapers, to patenting varied forms of life (Kevles 2003), the commercial value of human biologicals[4] has had an unstable and contested history.

I am interested here in how human biological fragments circulate in exchange relationships and how a field of bioethics is engaged in these circulations.[5] One might say that I am interested in how an economy of human biological materials articulates with an economy of ethics.[6] This chapter is an exploration of this overlap in which I suggest that notions of the ethical circulate in various interactions with biological materials, and our understandings of the relationships between biologicals, ethics, markets, and collectives are reconfigured through these circulations. I further suggest that institutional bioethics enables a kind of market thinking in the transactions that it authorizes. These circulating items, however, do not move in a vacuum and their value is determined by multiple factors including a future-oriented temporality and various socially and culturally specific circumstances. Thus, they are infused with meanings, social values and, increasingly, market values as well.

In Taiwan, exchanges of human biological materials, and collection and storage of biologicals and data, have their own specific stories and considerations. The ethical space of stem cell research is overdetermined. Nonetheless, dominant ethical considerations in relation to technologies of storing and exchanging human parts reflect broader international discussions and concerns. So although regionalist and culturalist narratives are in play, the set of problems addressed in relation to the ethics and the exchangeability of human biological materials is drawn from a set of established international debates. These focus chiefly on a set of intertwined concerns about issues of informed consent, altruism, commodification, privacy, and beneficiaries. These emerge as central themes of ethical consideration in Taiwan's debates about how to obtain requisite human biological materials ethically in biotech endeavors.

Although concerns about exchanging human biologicals are expressed in the dominant idioms that emerge from within a technical bioethical apparatus, these sets of established principles and instruments apply themselves, and are taken up, in different ways. Using examples of three different kinds of procurement and banking practices in Taiwan, I suggest that each privileges a different way of thinking about, or in relation to, individuals, collectives, and exchangeability. In this chapter, I first consider how the conventional distinction between gift and commodity is exceeded in contemporary practices of bioscience. Next, I examine some of the difficulties in procuring research embryos and biologicals in Taiwan, showing how a specific and fast-changing socio-political landscape contributes to research conditions of scarcity.

Next, I examine cases of biological banking in Taiwan, each of which I suggest points to different, and sometimes apparently contradictory, ways of thinking about and relating to individuals and collectives. In this section, I draw upon three examples: the popularity of Umbilical Cord Blood (UCB) banking; the success in establishing a Buddhist benevolent bone marrow registry; and the resistance to a proposed national biobank project. In considering these projects, and varied responses to them, I argue that each mobilizes different modes of relating that elicit specific concerns that are variably focused on the individual, the collective, and the broader political context. In each case, the ethical is configured differently. I suggest that UCB banking reflects a mode of neoliberal individuation that frames the ethical in terms of familial obligation, while marrow banking locates itself in terms of a responsibility based in notions of ethnic similarity. In contrast, the difficulties encountered by the national biobank project are expressed in the language of institutional bioethics. New ways of configuring the ethical, and relationality, emerge through the lens of these cases, and even the instruments and logics of formal bioethics are reconfigured in what Warwick Anderson calls the "new transactional order emerging in science" (2000:735). Finally, in Taiwan, I suggest that claims and obligations around biological citizenship are invoked in different ways in relation to each of the specific bio-scientific projects that I discuss, and that new modes of subjectivation and affiliation therein both overlay themselves upon older models and discourses of affiliation and responsibility and reformulate themselves in new ways. These new modes are irreducible to generalized claims of biological citizenship or biosociality, but they do configure the biological as a terrain of both conflict and collaboration and as the ground of new ways of thinking, relating, and being biologically.

Gifts and commodities

A significant anthropological literature addresses itself to the gift and has served to consolidate a distinction between gift and market economies.[7] Herein, the gift is distinguished from the commodity by multiple factors; whereas the commodity is alienable, the gift retains an attachment to its giver and thus serves to maintain an obligation and a durable moral bond. Warwick Anderson (2000) elaborates and complicates the distinction between gift and commodity, and thereby gift economy and market economy, in his account of exchanges of biological materials in the search for the etiology of kuru disease. He acknowledges Nick Thomas' (1991) suggestion that an analytic distinction between gift and commodity is useful. Indeed he moves between commodity, gift, and barter exchanges within his own account, but he shows clearly that such a distinction is neither easily recognized nor maintained in science's "new transactional order". In this richly textured account, he demonstrates this difficulty and suggests:

> The complicated misrecognition of exchange relations that occurs repeatedly in kuru research suggests that we should avoid a slavish

> adherence to transactional typologies. The general distinction between a gift economy and commodity economy can be heuristically useful, but such categories are not easily discerned in a cross-cultural setting, a situation where no one could agree on what was a gift and what was a commodity, what was available for barter or appropriation and what was out of circulation. (Anderson 2000:714)

By tracking the different networks of relationships in which kuru biologicals traveled, Anderson addresses the translational problem of meaning as well as the question of how human biological materials travel in science.

Similarly, Lawrence Cohen (1999) demonstrates the transformability of the gift (as a moral object) into a commodity and vice-versa. This transformative capacity is visible in a single human kidney shown to be a mobile signifier that can be alternately framed as gift or commodity. In an interview with a woman who had sold a kidney, she reframes the sale as a gift in honor of the Tamil leader, MGR, who had received a kidney transplant. She tells Cohen, "I would have given him (MGR) both of mine" (Cohen 1999:139). Cohen suggests,

> The current order of the commoditization of everything… is countered here by resuscitating MGR as the politician-father and the idealized order he has come to represent. In invoking MGR's need for a kidney, this seller rescripts her sale into a gift to the Tamil leader that revives the idealized social relations of that time and renders all such sales unnecessary. (Cohen 1999:139)

This trade between moral and market economies supports Janet Radcliffe-Richard's anti-paternalistic "life for life"[8] way of conceptualizing and ethically justifying the sale and purchase of kidneys. Reframed as a single instance of privatized exchange and mutual benefit, this perspective obscures the larger field of the historical production of inequality. In this way, the exchange is positioned as outside of history and allows for the production of a present (set of relations) that is independent of larger social processes.

As Anderson's and Cohen's accounts make clear, the dichotomous representation of moral and market economies, of gifts and commodities, is exceeded in contemporary biosciences in which exchange relations seem to become increasingly complex. Indeed, in exchanging human biologicals, this distinction becomes difficult to sustain, both because of the porosity of boundaries between the domains and their inherent instability. This is also because, as Appadurai (1988) articulates and as Anderson and Cohen illustrate, the objects themselves are not stable; the commodity form does not inhere in the object, but is something the object may take up at certain phases in its life course.

In Taiwan, blood and the data it holds, and eggs and embryos, are sometimes given as gifts. At other times they have been taken under dubious conditions of consent. For instance, in his critique of the Taiwan Biobank project, Yang Hsiu-I suggests,

> Following the long tradition of conducting public health research in Taiwan, the Taiwan Biobank pilot program team led by biomedical scientists collaborates with the local health care system to provide free medical check ups to attract potential participants' agreement to donate blood sample into a national data bank. (Yang 2007)

I heard the suggestion many times that free health checks were used as a way to obtain access to blood samples for research purposes without being explicit that such samples were to be used for research. A stalled national Taiwan biobank project suggests a public spirit of biological parsimony, but large scale donations for a marrow bank suggest, rather, a generous spirit of therapeutic solidarity. And the popularity of umbilical cord blood banking is suggestive of new modes of privatization and prudentialism. In each of these examples, the biological objects themselves take on different meanings, values and stakes, and in this, they both draw upon and reinforce different ideas about relationality, responsibility, and the context of the biological gift-commodity.

Here I consider three projects of scientific modernity in Taiwan in relation to circulations of biological materials. I suggest that each of these projects draws on different specific concerns and modes of subjectivation in a fast-changing Taiwan. Aihwa Ong (in press) suggests that ideas about collectivity operate as a consistent thread within varied Asian biotech sites. Such ideas are present in varying degrees in each of these projects, and other ideas and modes both reinforce and contradict ideas about the collective by emphasizing ethnic similarity and responsibility on the one hand, and privatization and individualism on the other.

Situating the biological

In the name of the nation, the region, and the ethnic community, Taiwan's citizens are asked to genetically participate in varied projects of biological material and data banking. In an era in which the market values of human biologicals are increasingly at stake – materially, scientifically, and ethically – new questions emerge. Aihwa Ong stresses the significant role that Asian states tend to play in creating conditions for biotech innovation. She further shows how individual concerns and practices tend to align with broader social goals of biotech development. Both cultural and state expressions of collectivist ethics align with biotech promotion, which, in turn, holds a specific and ethical, though not uniform, value for Asian states. It is at once a way to "'catch up with' and potentially surpass 'the West'" in scientific knowledge production and also an ethically mandated way to protect Asian populations from "biorisks that menace Asian futures" (Ong in press).

Biotech in Asia thus configures itself somewhat differently than in Euro-American examples shaped by neoliberal and voluntary biosocial affiliations. It fosters, rather, new kinds of relations between citizens in mutual recognition of shared biologies and imagined shared biological futures. It also fosters new relations with the state. Ong identifies a conjunction in Asian biotech in which states configure the population as in need of protection and as simultaneously a resource for biotech projects. This is the case in biotech projects in Taiwan. Its acceptance, however, is uneven. International bioethical concerns conjoin there with heightened political concerns about government accountability, democracy and human rights with the effect that a once ostensibly compliant Taiwanese population has become more difficult to enroll in some projects of science.

In this climate of enhanced political consciousness, a more recalcitrant attitude toward authorities, and the heavy marketization of biomedical research, human biological materials are becoming increasingly difficult to obtain. In vitro fertilization (IVF) is a relatively mature field in Taiwan, and most human embryos available there for stem cell research are products of IVF. A stem cell scientist explains the system of procuring human research embryos at one of Taipei's hospitals:

> Often for IVF they get four embryos, and they implant two and they freeze two. But it's not uncommon for them to produce eight embryos, implant 2, freeze 4, and use the extra two for research. They get consent up front for the use of the extra two, and if an embryonic stem cell line is produced then the woman is informed. And if they become therapeutically valuable, then she and her family have the first priority in obtaining these clinical benefits. But there's no benefit for commercial application or profit.
> (interview excerpt 3/06)

So although commercial benefit is disallowed in this agreement, a form of potential benefit sharing remains intact in the future clinical benefit that may result from the donation.[9] At this hospital, in addition, many of the embryos have been stored for over ten years and are often no longer of use to the couple that stored them. It is, this researcher suggests, "relatively easy to get patient consent for these embryos to use for stem cell research." While a relatively stable research embryo supply seems to exist at this hospital, it also appears to be exceptional in this regard. The researcher explains to me that, in general, the deteriorating relationship between patients and their physicians (see Chapter One), and the lack of adequate bioethical regulation, create a general reluctance to donate on the part of patients. He says, "furthermore, the relationship between MDs and patients in Taiwan is often not one of cooperation… The patients usually won't just donate tissue or embryos, but will want compensation." Others who made similar comments also principally attribute the reluctance to donate to a lack of trust or good relations between patient and MD, rather than to a more general attitude of commercialism and profiteering.

Laura Li succinctly captures the central dynamics of the deteriorating physician-patient relationship, locating it in the move within medicine from a focus on relationality and healing to a market orientation.

> Repeated scandals, from incorrect medication and falsification of medical records, to an injured child being refused emergency treatment, are making medicine a high-risk profession full of pitfalls for practitioners, and are rapidly eroding health-care personnel's status in society.
>
> Medicine has traditionally been a vocation, a calling to heal and save. But today doctors and patients seem to stand at opposite ends of a market transaction. (Li 2005:3).

The structure of the National Health Insurance (NHI) system of reimbursement exacerbates this situation by both having low rates of reimbursement and by compensating based on the number of patient visits, regardless of type or length. Physicians often are compelled to see as many patients as possible, sometimes as many as a hundred a day, and visits often last for only a few minutes. Lai Chi-wan, a repatriated clinician who is active in health care reform in Taiwan, claims that the "NHI system undermines medical quality" (in Chang 2005), and his claim is substantiated by countless reports from Taiwanese patients. Arthur Kleinman (1980, 1995) reports that troubled physician-patient relationships have a longer history in Taiwan. In the 1960s and 1970s healers were viewed as morally ambiguous; their healing power was seen, for instance, to be tainted by potentially morally corrupting motivations of economic gain. In contemporary Taiwan, this relationship seems to be further deteriorating.

In the context of the declining status of physicians and increasingly troubled relationships, another hESC researcher reports that human embryos are difficult to obtain. His only access to them is through collaborative projects with other labs that have direct connections with IVF clinicians. Each of his collaborators complain to him of the difficulty in obtaining materials.

> I asked my friends because I have a lot of friends working in IVF centers, and the majority of my friends say that it's very difficult to get donations of human embryos from the IVF patients in Taiwan.
>
> It's like this: I'm a stem cell biologist. I would like to use the materials of my patients. I would like them to understand the process first. There's a lot of tension between patients and physicians about this issue. Some of the patients, they think that "you use our materials without telling us." They make a lot of accusations like this. Certain people in Taiwan make them aware. So they never want to donate anything because they have this idea. (interview excerpt 8/06)

This researcher characterizes a general attitude of mistrust fostered by the aforementioned environment and multiple accusations made of physicians taking patients' biological samples without consent. While a few IVF physicians have cultivated enduring relationships with their patients and are rewarded with embryo donations, a general lack of availability of research embryos threatens to impede seriously Taiwan's hESC research progress.

The relationship of publics to scientific projects in general and especially to state sponsored scientific projects, though largely shaped by internationally circulating debates and questions, remains influenced by culturally and politically specific factors. An hESC researcher who had previously worked in the UK reinforces this perception as he comments on the difference in the ease of embryo procurement between the UK and Taiwan:

> It wasn't like this in the UK. I think basically there the regular patients are more willing to donate their embryos for research because they have a good relationship between the common public and the medical field. In Taiwan, I don't see this. I see the barriers to it, *and the distrust between levels of people*. So it's difficult. I think it's difficult in reality to use human embryos or to do this kind of research in Taiwan because you probably can't get the number of embryos you need.
>
> (interview excerpt 8/06, italics added)

In the UK, he identifies a generally more positive and trusting relationship between publics and scientists. In contrast, in Taiwan, he identifies an increasing level of suspicion between a general public and authority bearing elites. In the narrative above, the scientist draws upon the particular nature of Taiwan's democratization, which includes a strong egalitarian and anti-authoritarian component. The ruling party prior to democratization, the KMT, was associated with high levels of specific expertise and social capital, which many among the opposition saw as contributing elements in their own history of suppression and marginalization. Thus, as I discuss in Chapter One, a strand of Taiwan's contemporary sociopolity is characterized by a heavily individualistic leaning that includes a strong anti-authoritarian sentiment. A small irony in this situation is that many of the returning scientists and others at the forefront of Taiwanese biosciences support an independent and democratic Taiwan, but find themselves nonetheless stymied in their scientific proposals by an increasingly uncooperative and self-determining public that demands enhanced accountability from its scientific communities.

Problematic physician-patient relationships limit biological donation, and this scarcity is exacerbated by a lack of collaboration between researchers (see Chapter Two) which is driven, at least in part, by a quest for individual fame. One clinician tells me, on the lack of collaboration, "certainly there is the question of glory – this plays a role". In a small, informal survey that I conducted at a national laboratory of thirty-two stem cell researchers, sixty-nine percent of those that answered the question stated that egg and/or embryo procurement was *the* major issue facing hESCR in Taiwan. Individuals reluctant to donate their embryos (and eggs, etc.) and researchers reluctant to share because of a race to be famous combine such that at the different levels of procurement and circulation a scarcity of requisite materials for hESCR is perceived as a significant problem for both individual researchers and for the field as a whole.

By contrast, South Korea, at the height of its international recognition as a leader in stem cell research, was a model of centralized and collaborative research. There, donating eggs and embryos was viewed as a national duty, and even in the aftermath of the Hwang scandal, hundreds of women came forward with offers to donate their own eggs in support of Dr. Hwang. In Korea, national pride in scientific achievement was seen to motivate biological donation. In Singapore, Ong (in press) reports that patient donation of their surplus IVF embryos for research purposes is high because these patients want to support the stem cell industry. These donations are generally framed in terms of altruism and patriotism.

In some polities a framing of scientific projects as inherently collective and in the general interest of human or national flourishing promotes an environment that supports higher rates of biological donation. In Taiwan, however, an enhanced democratic consciousness has supported the development of the autonomous individual as a political and bioethical subject in its own right. This makes up a part of the fast changing social and political landscape in Taiwan and combines with divisive identity-politics, a faltering economy and national health insurance system, and a general decline in the physician-patient relationship. These shifts contribute to a continuing unease about the relationships between scientific endeavors, government bodies, individuals, and their biological materials and information, leading to a general environment of lower donations. Nonetheless, a singular characterization is not possible, as both individualizing and collectivizing moves are visible in different projects; a low embryo supply and neoliberal individualist moves suggested in umbilical cord blood banking, for instance, are counteracted by explicitly altruistic donations made in the name of a benevolent marrow data bank. And the troubles of the Taiwan biobank may have less to do with a reluctance to donate than questions of representation and marginalization and an enhanced global awareness of the multiple and unpredictable uses of knowledge production in human genomics.

Umbilical Cord Blood Banks: neoliberal futures and a new prudentialism

Private umbilical cord blood (UCB) banking in Taiwan is overwhelmingly popular. Advertisements for private cord blood storage abound in metro stations and in all forms of public media. Felix Hong (2008) reports that "Taiwan has one of the highest market penetration rates for cord blood saving," and suggests that cord blood companies anticipate significant continued industry growth there. Its popularity is not principally explained in neoliberal terms, however, but rather by recourse to narratives of culture and tradition, as I discuss below. In the US, a preference for private over public UCB banking is unremarkable in a society characterized and founded on its particular form of individualism. Nonetheless, in the US appeals to collective (public) UCB banking, and against private individualized banking, are present. The American College of Obstetricians and Gynecologists and the American Academy of Pediatrics, for instance, both recommend against privatized banking. Many other individuals and groups offer the critique that private UCB banking relies upon marketing that targets parental fears to purchase a service that is unlikely to ever render any benefit to the child or family. Private UCB banking agencies nonetheless continue to employ statistics and narratives of fear and responsibility to encourage people to privately bank their children's cord blood. Most of the arguments against private cord blood banking are framed in terms of the predicted (non)usefulness of the banked blood and predatory marketing practices. Thus, even arguments against private UCB banking are framed in market terms, rather than on an explicit concern for a public sphere or a potential communal therapeutic resource.

For a researcher working at a private Taiwanese UCB banking organization, stem cell research ushers in a new era of individualized therapies, of which private UCB banking is a key component:

> In bone marrow transplants, for instance, a match of six MHC (major histocompatibility complex – a immunological genetic marker used to determine relative compatibility between donor and recipient) is usually required. But even a 5 loci match is often used. But this is not good enough even with a 6 loci match, because then still need immune inhibitory drugs, and also because of the minor histocompatibility complex… Public banking is dangerous, because it's not a perfect match. Medical therapies will be individualized. I could use my own cells to save my own life! (interview excerpt 7/07)

This quotation exemplifies not only the rationality behind stem cell research's dream of the autologous transplant, but also consolidates a distinction between private and public banking and thus privileges a therapeutics focused at the level of the individual rather than the collective. By invoking danger as a component of public banking, this researcher forecloses debates on public good or therapeutic community in favor of a scientifically framed understanding of risk and individualized therapies.

Nikolas Rose, writing on shifting modes of European government, charts the emergence of flexible labor practices as a replacement for full-time lifelong employment as the dominant arrangement of labor. With labor flexiblization, he suggests, comes economic insecurity as the space of employment becomes a zone of vulnerability rather than stability and lifelong inclusion (Rose 1999:158). In flexible labor, extant social divisions are buttressed by social insurance and, citing O'Malley, Rose tracks the resultant rise of "the new prudentialism" (O'Malley 1996, in Rose 1999:159).

> It uses the technologies of consumption – advertising, market research, niche marketing and so forth – to exacerbate anxieties about one's future and that of one's loved ones, to encourage each of us to invest in order to

> master our fate by purchasing insurance designed especially for us and our individual situation. (Rose 1999:159)

I argue that UCB banking is an instantiation of this kind of new prudentialism that plays on anxieties about future risks and vulnerabilities and operates through market technologies. Labor in Taiwan has long been flexible. Few expect guaranteed employment. People change jobs frequently, and there is no widespread similar history of lifelong company employment as in the US and Europe. Many of Taiwan's graduate students in the biosciences express deep worries about their future employment prospects, and despite relatively stable macro-economic indicators, economic insecurity is a common theme in everyday conversation and media reports alike. While scarcity and change are nothing new in Taiwan, I suggest that UCB banking points to another kind of "new prudentialism," a biomedical prudentialism that similarly concerns itself with possible future risks. Thus, cord blood banking is a new form of biological insurance that, like all insurance, one hopes never to use but nonetheless must have in the name of being responsible and secure.

Although I suggest that the popularity of UCB banking in general, and the preference for private cord blood banking more specifically, can be read as moves toward privatization and prudentialism, they can also be linked to longer traditionalist narratives. When I inquired about what I saw as a surprising popularity of UCB banking, most of the explanatory narratives that I received resorted to culturalism and tradition. A stem cell researcher explained the popularity in terms of a traditional attitude that places a high value on the care of future generations:

> The public is not well informed by media reports. In Taiwan, even now, there's no successful example of cord blood transplantation curing certain diseases, but many people want to store cord blood stem cells. *My*

> *understanding is that it's about tradition*. In our country we tend to think more for the child. So if we know that stem cells may be good for our child's future, parents will want to invest in that. It's just like investing in hope, you know. They may not ever need to use the cord blood stem cells, but they only have one chance. So, I think parents want to do that because they're thinking of the child. (interview excerpt 7/07, italics added)

Even in the face of what he describes as a poor public understanding of UCB banking and its likely limited potential uses, he posits a traditional disposition to do all one can for one's child as the principal motivating force behind the popularity of Taiwan's UCB banking industry. A cord blood industry representative echoes this kind of thinking in a press interview:

> The booming market for private cord blood storage in Taiwan is due not just to government medical policy, but rather *to a strong sense of family values in the country, which originate from traditional Han Chinese societal mores*, according to Chris Tsai, CEO of BabyBanks, the cord blood business unit of Bionet Corp., one of Asia's leading cell-tissue banking and therapy companies.
>
> …
>
> "Children are considered very precious and many parents are willing to sacrifice for their children," said Tsai. "If there's a chance to save their children someday, then parents can't afford not to."
>
> (Fu 2006, italics added)

Another researcher from a private cord blood company explained it to me in similar terms:

> *This concept is from the Chinese*. Because we hope that the next generation is better than the older ones. If I have enough money, I'll do anything for our child. If I heard of anything that might have an advantage for our child, I'll take it. Then too cord blood banking in Taiwan is just like an insurance company, and people sell it and use persuasion just like insurance. Then there's also a comparison, if our neighbor saves their child's stem cells, why haven't I saved my child's?
>
> (interview excerpt 7/07, italics added)

Both of these researchers, and the BabyBanks CEO, appeal to narratives of cultural value and tradition in their explanations for the popularity of UCB banking in Taiwan. They also, however, go a step further and acknowledge the insurantial and prudential underpinnings that draw upon and mobilize both fears and hopes in relation to a child's future. Clearly a high value for the care of one's child is neither unique to Taiwan nor to the Chinese. Nonetheless, cultural or traditional reasoning apparently holds explanatory appeal in thinking about the relative overrepresentation of UCB banking in Taiwan. Such an appeal to traditional cultural values coming from cord blood industry representatives might be read as a way of obfuscating or justifying the commercialization of fear and hope that UCB comes to represent. Similar explanations, however, recur elsewhere, as in the first of the quotations from a stem cell scientist uninterested in UCB market share who claims that "it's about tradition." Dual strands within the above quotations invoke tradition and culture on the one hand, and insurance and investment on the other, indicating the multiple modes of reasoning that are simultaneously in play.

Private UCB banking is viewed as a familial investment, mainly directed at the donor newborn, but also as a potential therapeutic source for other family members. Amid much publicity, the UCB of President Chen Shui-bian's grandchild was privately stored. The importance of storing this particular baby's UCB was enhanced by the suggestion that it might be useful, as stem cell science progresses, in treating the first lady's paralysis.[10] The first lady, Madam Wu, has been in a wheelchair since she was injured in a car accident in 1985. The birth of the presidential grandchild and the specific example of a potential familial therapy, combined with direct presidential appeals encouraging fellow Taiwanese to bank UCB has helped to promote this already burgeoning industry there.

Private UCB banking is generally viewed in Taiwan as the preferred way to store umbilical cord blood. It is not uncommon, a researcher told me, for grandparents to pay for UCB storage if a child's parents cannot afford it, and this is viewed again in terms of familial responsibility and caring. Still, not all families can afford private UCB storage, and it is principally a matter of economics that determines whether or not UCB is stored publicly or privately. Most private UCB banks in Taiwan offer different levels of banking that constitute stratified relations of public and private determined by payment levels. One stem cell researcher who has several good friends who work for UCB banks explained the payment system as follows:

> In Taiwan, there are quite a few public cord blood banks already, and even with private cord blood, the companies can still can offer a patient to look for a match, and if they find one in their bank that matches then they can discuss with the person who stored the cord blood if they want to offer it to someone else. There are quite a few cases already from foreign people asking for cord blood from our banks. I think it was from a country in the Middle East, one company told me. Even private banks offer links to international databases.
>
> There are different types of storage agreements, and each company is a little different. If you pay the most, then you can store it for yourself only. If you pay less, then it's part of a more public kind of bank, but you get some priority to search the database for a match. And the difference for the public bank is that people can store their blood without paying anything, but they also don't get the priority to search for a match. If they put their cord blood with the public bank, then they can search the database, but they may no longer have their own cord blood.
>
> So most people, if they can afford it, they'll put it in a private bank, for themselves only. Quite a lot want to do that, yes.
>
> (interview excerpt 7/07)

I suggest that at the same time that collections of bio-information and biological samples are being solicited and donated in the name of a public good in other scientific projects in Taiwan, new instantiations of the private emerge. A preference for private banking that this researcher identifies reflects, I suggest, a more general societal move toward privatization that is also buttressed by biological understandings of immunocompatibility and genetic vulnerability. This includes a privatization of risk that inheres in biomedical prudentialism and is linked with practices of responsibilization, which Rose (1999) identifies as that neoliberal move that makes individuals accountable for the proper management of the self, thus obfuscating the social production or management of risk and vulnerability. The preference for private banking also articulates with newer concerns about privacy as expressed in relation to the Taiwan biobank project, both in terms of medical records privacy and also is what we might call biological capital – a biological material that has therapeutic and/or economic productivity or the potential for such productivity. UCB banking relies upon the production of a particular kind of public, one that responds to media, presidential, scientific, and marketing appeals to the kind of responsible citizen, consumer, and parent who will provide this important form of private insurance in the name of the child, family, and country.

New ways of conceptualizing selves and publics conjoin in novel arrangements in light of emergent biomedical technologies. As it becomes increasingly possible to intervene at the level of biological processes, as biology no longer necessarily prescribes a fixed destiny, parents are compelled to store their children's cord blood because of a traditional impetus to do the very most one can for one's child. An appeal to traditional family-oriented values comes together with marketing hype and a new consumerism, with presidential appeals to responsibility, with new biomedical techniques, and with, I suggest, emergent modes of privatization and prudentialism. Umbilical cord blood banking thus signals a confluence of private sector medicine, a responsibilized and individualized public, and a future orientation.

Marrow data banking and common biological fates

While an individuating mode is visible in the strong preference for private UCB banking, marrow data banking is suggestive of a collectivist mode of biosociality; it is a biosocial mode, however, in which a genetic notion of self is overlaid onto older configurations of ethnicity. Where UCB banking is a product, at least in part, of a form of responsibilization at the level of the family or the lineage, I suggest that marrow banking represents responsibilization at the level of the ethnic or regional group.

In contrast to the difficulties faced by the proposed Taiwan Biobank project and the difficulty in obtaining research eggs and embryos, the Tzu Chi Foundation has, over the years, amassed one of the largest bone marrow databanks in Asia. Founded in 1993 by Buddhist Master Shih Cheng Yen, the Tzu Chi Bone Marrow Registry grew quickly with a dedicated grassroots team of volunteers spreading Master Cheng Yen's message of "Great Love" (*Da Ai)*. Volunteers were mobilized in many different public places including at shopping malls and train stations encouraging the people to donate blood samples and to be entered into the registry. By 1998, Tzu Chi's was the largest marrow registry in Asia (Shaw 1999). Broadening its reach, the center now has reciprocal agreements with several international counterparts including in Australia, the US, Hong Kong, and Singapore, and has provided bone marrow for transplants for individuals from each of the aforementioned countries as well as Canada and Japan. In 2005, Tzu Chi celebrated their 1000th successful bone marrow match. Through its enduring charitable and international mission, Tzu Chi has become a major player in a multinational network of bone-marrow registries. Whereas the Taiwan Biobank has received a skeptical response, Tzu Chi's explicitly benevolent mission and its grassroots approach to soliciting blood donations has elicited a significant public sharing, based largely on its mobilization of public trust.[11]

Marrow registries in Taiwan and in the US (and elsewhere) employ discourses of ethnicity, race, and ancestry to encourage certain kinds of people to register. Governing bodies including UNESCO and the American Anthropological Association (AAA) have issued statements declaring that race is a social category and not a scientifically meaningful category. Even as the concept of race is problematized in some of the social science and medical literature, ethnicity is increasingly being invoked as a proxy for biological similarity and difference in medicine, science, and politics. The Minneapolis-based National Marrow Registry, for instance, in a brochure specifically recruiting "Asian and Pacific Islander Donors" reads:

> Some characteristics of marrow type are unique to people of specific ancestry. Although it's possible for an Asian or Pacific Islander patient to match a donor from any racial or ethnic group, the most likely match is an Asian or Pacific Islander donor. More Asian and Pacific Islander volunteer donors are needed, so others can have a chance for the future. (2006)

Such narratives of ethnic similarity and compatibility are used, as in this brochure, to grant specific responsibility to certain kinds of people based on ethnic identity and a presumed responsibility to those others who are ethnically similar. Similarly, Taiwan's Tzu Chi marrow registry has become recognized as a global source of Asian bone marrow.

New modes of identity and belonging overlay themselves upon older categories such as ethnicity. That is, in these discourses of biological banking, ethnicity and biosociality come together as shared modes of peoplehood (Lie 2004)[12] that are mutually reinforcing – they presuppose a genetic basis for ethnicity that, in turn, is itself expressed as biological similarity (i.e. histocompatibility). Nikolas Rose (2007) has emphasized that we come to understand ourselves as biological subjects in increasingly molecular terms. I suggest that narratives that mobilize ethnic similarity in relation to immunocompatibility, as with marrow registries and umbilical cord blood banks, represent a new form of biosociality that links itself to ideas of ethnic molecular similarity, rather than to specific disease (pre)conditions. Even as the concept of race is constituted as not biologically valid, the notion of ethnicity as biological is inscribed in these biomaterials collections. Narratives of ethnic similarity and responsibility are used to support public cord blood banks, marrow registries, and the Taiwan biobank project. Public banks create new kinds of collectives that are linked by shared (imagined) vulnerabilities and potential therapies in the form of pooled biological resources and presumed biological compatibilities. This form of biosociality draws upon imaginations of shared disease vulnerabilities and simultaneously seeks to responsibilize individual "donors" to their imagined ethnic communities as potential therapeutic sources.

Now, with advances in stem cell research and in contrast to the private realm of UCB banks, Tzu Chi has created a public umbilical cord blood bank. This too is a project with an international vision; it is a member of AsiaCORD, an Asian network of public cord blood banks founded in 2000 in Bangkok with members also from China, Japan, Thailand, South Korea, and Vietnam (Takahashi 2006). Tzu Chi's emphasis on public banking serves as an important counterpart to private banking. It aligns with Tzu Chi's collectivist and benevolent mission, and situates Taiwan as an important global source for ethnically and biologically specific therapeutic materials.

A Taiwanese physician and researcher who had worked in the US for many years emphasized the transnational importance of the Tzu Chi marrow registry. While she was working in the US, one of her Asian-American patients required a bone marrow transplant, but they were unable to locate a suitable donor domestically. Finally, she said, they located a donor through the Tzu Chi database, and a transplant was successfully performed. In this story, Taiwan's substantial marrow database served as an important medical resource for a perceived global ethnic community; a minority population in the US is served by a biologically similar group residing in Taiwan, and in this instance, Taiwan becomes a therapeutically benevolent community itself. The quotation from the US-based marrow registry brochure above, however, makes clear that shared ethnicity only raises the likelihood of finding a compatible donor and that histocompatibility crosses ethnic boundaries. These are, thus, loose and imprecise sets that nonetheless are taken up in biological notions of ethnic community and compatibility. Such imaginations and narratives are taken up in multiple projects that use a scientific grounding to define graduated circles of biomedical inclusion.

The Taiwan Biobank project: national science, suspicion, and bioethics

Experts from Asian countries increasingly speak of biomedical technological projects in terms of studying and remedying "Asian" diseases that are understudied in the bioscientific endeavors of Euro-American dominated science. Wen-ching Sung (in press) recounts a conspiracy theory proposed by Tong Ceng that SARS was manufactured by the US as a biological weapon targeting Chinese. Such theorizing, along with scientific claims that SARS is more lethal in Asians because of a genetic susceptibility, enhances the perception of SARS as an Asian disease (Lin et al 2003). A scientist took particular pride in explaining to me his laboratory's work demonstrating both the existence of pulmonary stem cells and also that SARS death was related to the virus targeting these stem cells. As a result, they were working on the development of lung stem cells in vitro for therapies involving acute respiratory distress, such as SARS. This project seemed to take on enhanced meaning for him as it dealt with a specific local and devastating disease. As Asian states "catch up" in terms of biomedical research, many projects are framed in terms of an ethno-biological specificity, in which projects of bioscience are geared toward regionally specific medical concerns. Ong and Chen (In press) have identified the conjuncture between biocapitalism and biosecurity within imaginations and practices of Asian biotechnology, in which a concern for the population is expressed in terms of both enhanced health and economics. Here, the population is a resource for biological extraction and knowledge production as well as an object of ethical concern and therapeutic protection.

It is in this context and with these explicit concerns that the Taiwan Biobank project was conceived. It is exemplary of the conjuncture that Ong and Chen identify. It was proposed as a way to create a valuable repository for both national science and therapeutics. Where Tzu Chi has had remarkable success in building up one of the largest registries for Asian marrow, with over 280,000 potential marrow donors registered as of February 2006, however, the Taiwan Biobank project has met with substantial resistance. I suggest here that the biobank project was conceived of as a national resource with significant economic and therapeutic potential, but that a lack of understanding of emergent public concerns stymied its progress and has resulted in the production of a sphere of critical experts and a reluctant public. A combination of relatively naïve scientific experts, an enhanced public engagement, a changing political climate in which expertise is increasingly questioned, and an immature bioethical apparatus brought the biobank project to unanticipated controversy. I further suggest that it is through enhanced bioethical measures that the biobank project might eventually move forward, and in this way bioethics is made visible as an instrument that facilitates the progress of scientific projects. This instrument works, in part, by focusing (i.e. containing) debates into a set of specific concerns and principles and then managing them through bioethical means.

As I have suggested in previous chapters, public confidence in Taiwan's government has been undermined by a history of foreign occupations, martial law, current divisive politics, and a series of recent political corruption scandals. In this climate of enhanced attention to democratic representation, self-determination, and human rights, citizens and human rights activists are becoming increasingly concerned about their political rights and the uses to which their biological information and samples are subject. A 2005 local election scandal further eroded public confidence in medical professionals and confidentiality principles when a team of physicians released to the press, without his consent, a candidate's medical records. Increasingly, people in Taiwan are asking why they are being asked to donate their biologicals. What began as an ostensibly straightforward exercise in collecting blood samples from Taiwan's multiple ethnic groups in the interest of creating a national biobank has become an exercise instead in public controversy. Tai and Chiou point to societal changes and shifts in public attitudes in relation to the biobank project,

> During the last decade, Taiwan has been undergoing a rapid process of democratization, and nowadays a strong conviction can easily be detected in public discourse that such basic values in a pluralistic democratic society as personal autonomy and social justice should be accorded moral weight to be balanced against the familiar appeal to national prosperity or general welfare. (Tai and Chiou 2008:2)

As Tai and Chiou articulate, a more general societal shift toward enhanced valorization of democratic principles and individualism shapes the ground upon which national science is now practiced. These shifting attitudes are reflected in broadening discussions regarding human rights and social justice and are specifically visible in ELSI (Ethical, Legal, and Social Implications)[13] concerns expressed in relation to the biobank project. And discourses and principles of bioethics, and the trans- and international debates that they draw upon, come to generate fear and resistance in Taiwan's publics and ELSI representatives. Although it is through bioethical discourses that these fears are generated, I suggest nonetheless that it is through bioethical apparatuses and enhanced communication that they may also come to be managed.

Publics and sciences: mutual mis/understandings

Many scientists suggest that the biobank is good for the country and that if public understanding were better, the project would not face its current problems. The biobank design is envisioned as bringing together Taiwan's centralized national health insurance records, genetic information, and its strength in information technology with the goal of improving health for the population and strengthening and promoting biomedical technology more generally. Minister Lin Feng-ching of the Science and Technology Advisory Group emphasizes the governmental rationale behind the biobank project and its role in international scientific competition more generally:

> We are building on our high-quality medical care facilities and the national health insurance program already in place… With this series of programs, we can transform Taiwan into an important medical research center for genetic sciences in Asia…
>
> We are under pressure of time to get the 'Taiwan - Biomedtech Island' plan going as soon as possible. Both Singapore and China have also started on similar national biomedical databank projects in recent years... We can compete well in the advanced biomedical fields and become the leader in the field in Asia. (Taiwan News, 2005/04/07)[14]

The biobank project is thus envisioned as an important component of a national science program, with the potential to bolster Taiwan's presence on the stage of global biomedical technology. At a talk at Academia Sinica, Taiwan's premier national research institution and the center of the biobank project, a researcher explained to the audience the strengths of Taiwan for creating a biobank. In his talk, he detailed four major points highlighted on PowerPoint slides:

> Taiwan's population is genetically homogeneous: The Taiwanese population is a relatively genetically homogeneous population. We have different genes, our lifestyle is different from the Western lifestyle, and we have different traditions.[15]
>
> Geographical isolation: Taiwan is a geographically isolated area.
>
> Compliance of study participants: traditionally the compliance … is very good. Traditionally the researcher … acknowledges that to do a study in Taiwan is not difficult.
>
> Nationwide insurance system: … and we have a nationwide insurance system, so that is very helpful for… medical information gathering. And the medical professional in Taiwan are well qualified. (talk excerpts 5/06)

Drawing on Taiwan's specific geography and genomes, its ostensibly compliant population, and its well qualified scientific and medical experts, he positions Taiwan as a unique and near-optimal site for assembling a local biobank. He concluded his presentation with a discussion on how these strengths have been undermined by the problems that the biobank project is now encountering:

> So, these are the main strengths. I want to emphasize the strengths of these aspects for the Taiwan Biobank. However, my last slide is to show that the ELSI community in Taiwan has been really very picky. They begin to learn about the biobank project in Taiwan. We wanted to unify these strengths, but they are not strengths anymore. For example, initially the Taiwanese population was really willing to let us use their health information, but currently we are criticized about whether we're using the health examinations to make the public forget about informed consent or privacy or confidentiality. So the compliance of the Taiwanese population is no longer a strength for the Taiwan Biobank. And secondly, about insurance, … the ELSI community in Taiwan questions whether we can use the national health insurance records. (talk excerpts 5/06)

In this narrative, the speaker suggests that Taiwan's unique strengths for making a national biobank have been challenged by an overly zealous ELSI community. When I approached the speaker after his talk, he said to me that it was only after they began using the term "biobank" that things became difficult. He speaks of a lack of information among the ELSI people, and complains that after he had spoken with them several times and had taught them a lot about the science, that now they come back as his interrogators. He feels that the information that he taught them about the science is now being used against him. But, he emphasizes, the biobank methodological concept is easy to understand, and the project as a whole should be very good for Taiwan.

Many of the scientists that I met spoke of the need for greater public understanding of the science. They emphasized the need for public education, transparency, and better communication with their publics. Two members of the biobank team explain that the project brings together scientific progress with a concern for the population. The biobank will "provide a huge resource for biomedical research" while also addressing common diseases in Taiwan, improving treatment and prevention, reducing medical costs, and making "it possible to achieve the goal of improving our nation's health" (Ou and Shen 2007:3). They continue that such a project will raise many issues including "ethical and social considerations," confidentiality, and sample management among others. They conclude this section, however, emphasizing that, "The most important thing is to communicate with the general public and to make them understand the importance of the Biobank and educate them in the development of science and genetic technology" (Ou and Shen 2007:3). The underlying assumption evident in these narratives is that if the public were to understand the science, then they would not have the questions, concerns, or objections currently raised. The tone of the many scientists I spoke with varied significantly. Some had self-critical admonitions, saying, "we need to do a better job. We need to be very open and clear and transparent," while others conveyed of an attitude of exasperation and frustration at not being able to simply practice the science.

Other scholars, however, point to a lack of understanding not on the part of "the public" but on the part of the scientists. The research environment, they suggest, has changed. Liu Hung-En writing on the biobank argues "that its researchers are still not fully aware of the problems of past research practices, and they seem to disregard the importance of legal and institutional frameworks for the biobank project" (Liu 2006). He continues that most IRBs (Institutional Review Board) in Taiwan are "unsound," a sentiment echoed by several of my informants -- ethicists and scientists alike. Such narratives emphasize that it is not simply public education that holds the answer to the controversies and questions raised by the biobank. They suggest, rather, that the scientific community must itself become more aware of, and more sensitive to, the needs and concerns of a changing public sphere. It is a sphere in which scientific appeals and projects are not assumed to be self-justifying in the name of knowledge production, the nation, or the population, but in which experts must be accountable to a pluralistic and increasingly self-determining public or set of publics.

As I interviewed Dr. Hsu, a law professor involved in ELSI projects in Taiwan, I handed him my own informed consent forms, required by my university's IRB. As he considered and then signed them, we discussed casually how for this kind of interview these informed consent forms often seem a bit silly. He was quick to add that in other contexts they can be very important, and that the issue of informed consent has generated a lot of controversy regarding the biobank:

> A lot of controversy has arisen out of this… It has created a lot of anxiety. And there's nothing they (the scientists) can do. And they can’t understand why. They think that they're just doing research. And they don't think that they intend to do harm to anyone. They think that even if there is some kind of harm, then still it's very minimal. So this kind of harm seems very exaggerated to them. Because that's the viewpoint of the scientist.
>
> They want to set up the bank, and they have taken the traditional way to do their research. But that's the problem, they don't, they don't (understand). Of course we cannot blame them a hundred percent, that's just the research way. They don't get their mistake. Because they don’t get that the environment or that the public has changed. The public wants to collect information, about what the scientists are doing, and they don’t give the scientists a hundred percent trust, they have some concerns, and before they conduct their research, these concerns need to be clarified.
>
> They have a complete research project, but they don't have any solid legal (framework)… of course they don't have enough communication with the

> people. So they may have made an unforgivable mistake. Of course now they are trying, but the harm has been done. (interview excerpt 7/07)

Where conventional models of the relationship between science and society tend to portray a fast moving realm of science with a social sphere lagging behind, Dr. Hsu and others quoted above point to, rather, a fast changing society in which science "as usual" no longer functions. They invert conventional narratives that call for enhanced public understanding of science and call, instead, for a scientific community that takes seriously the task of understanding of its publics. In this sense, we can move beyond dichotomous models of science and society that represent science on one hand and its publics on the other. Rather, we can view scientists themselves as constituting a particular kind of public that both participates in knowledge production and requires education regarding science and other publics.

A social scientist and community organizer, Dr. Zhang, tries to bridge this gap by establishing better communication and ELSI infrastructure. He suggests that part of the problem with the biobank project is that it was set up without adequate community consultation. Dr. Zhang, who is part of the official ELSI consultation group, says:

> Part of the problem is with the biological team. They key manager of the national biobank project, Dr.___, we are trying to learn from each other. He's a very outstanding researcher and was working in the US, so we invited him to come back. However, a good researcher is probably not the best person to do a good public consultation. And a good researcher is probably not the best person to design a solid, comprehensive national project. It's a totally different thing. So in the past year we've learned from each other and we've tried to find out what do they mean by the biobank, what is their perspective, their goals, their applications, their perspective on genomic or individualized medicine. However, from our perspective there's no engagement with the public.
> (interview excerpt 7/07)

Here, Dr. Zhang positions community consultation as its own field of expertise and as a way of making public concerns a concern for science. He is optimistic that the biobank project will proceed, and he supports it as long as it develops in tandem with a strong ELSI component and enhanced public consultation. The science-publics relationships here are shaped by socio-ethical debates. In this frame of multi-directional communication and education, scientists become another kind of public – one to be managed, consulted, and educated in its own right.

In this climate of increasing property interests in human biologicals, and in a time of decreasing trust between researchers and other publics, and between clinicians and their patients, Taiwanese blood, DNA, and embryos are becoming increasingly difficult to obtain for non-private projects. Where one scientist above positions the ELSI community as an impediment to scientific progress, I suggest that it is through addressing ELSI (and beyond) concerns and developing a more mature bioethical apparatus that the biobank might, in fact, progress. Most of the critiques of the biobank project are made around concerns and principles well established within the field of bioethics. Specifically, these tend to cluster around the bioethical themes of informed consent, benefit-sharing, privacy, and the uses to which resultant data might be put. Of all those I spoke with, and those within the print articles that I consulted, not even the most ardent of critics advocate for abandoning the biobank project. Still, Dr. Shen, one of the project's main scientists, has said that if "the ethical issues related to the biobank evolve into an ideological issue of absolute right or wrong and the public is forced to take sides, the institute would rather abandon the project than see it become socially disruptive" (in Chuang 2006). However, ethicists, philosophers, social scientists, scientists and legal experts have all suggested that the project might, even should, move forward if it can be managed responsibly. Such responsible management would include enhanced public consultation, comprehensive and standardized informed consent protocols including forms of community consent where appropriate, privacy guarantees, and clear mechanisms for downstream benefit-sharing. It is thus through ideas and instruments of bioethics that public trust can be fostered in a no-longer-compliant research population, and public trust, itself, becomes something to be technically and institutionally managed.

Biological citizenship?

The varied ways in which individuals and populations come to know themselves as biological subjects and objects, and to constitute themselves in biologically relevant relations, has been generative of substantial social commentary. Rabinow suggests that we concern ourselves not only with the newness of various biotechnologies, but also consider,

> the effacement of "oldness" of so many of the background assumptions and practices that lurk unexamined at the edges in these cases which contextualize the technology and frame our questions and responses.
> (Rabinow 1996b:130)

Indeed, various instantiations of "oldness" are effaced in new movements within biotechnological innovation, but some forms are retained and, implicitly and explicitly, are deeply meaningful in specific projects of bioscience. In these biological banking projects in Taiwan, I suggest that both old and new ways of considering selves, relationships, and responsibilities come together in novel configurations, and modes of biological citizenship are differentially expressed depending on the specific project and perceived stakes.

For Rose and Novas, the distinguishing feature of biological citizenship (see Chapter One:13-4) is the linkage between citizenship projects and knowledges and/or practices emerging from the biological sciences as they relate to human beings, as individuals and in their relations with others. Drawing on Ian Hacking (1999), Rose and Novas describe a process of “making up citizens” which consists in the dissemination of biologically relevant information through authoritative channels, and also:

> The creation of persons with a certain kind of relation to themselves. Such citizens use biologically coloured languages to describe aspects of themselves or their identities, and to articulate their feelings of unhappiness, ailments, or predicaments. (2005:445-6)

In an era of enhanced biomedicalization (Clarke 2002, Clarke et al. 2003) or biomedicalism (Thompson 2005) individuals are increasingly thinking of themselves as biological, becoming scientifically literate, and affiliating themselves in biologically meaningful relations. They are also engaging with biological marketplaces in new and active ways, as donors, consumers, patients, and as ethical agents.

For Rose and Novas, biological citizenship has both individualizing and collectivizing moments.

> Biological citizenship is both individualizing and collectivizing. It is individualized, to the extent that individuals shape their relations with themselves in terms of a knowledge of their somatic individuality. Biological images, explanations, values and judgments thus get entangled with a more general contemporary 'regime of the self' as a prudent yet enterprising individual, actively shaping his or her life course through acts of choice…
>
> Biological citizenship also has a collectivising moment. As Paul Rabinow has shown, new forms of 'biosociality' as new ethical technologies are being assembled around the proliferating categories of corporeal vulnerability, somatic suffering, and genetic risk and susceptibility. (Rabinow 1996).
>
> (Rose and Novas 2005:442)

On the one hand, individuals come to be responsible and self-governing as they enact "technologies of the self" as proper biological subjects and citizens. These individuated subjects come to know themselves and to be responsible for themselves in biological and somatic terms. Collectivizing movements are arranged in new modes of affiliation based in biological knowledges and commonalities. Paul Rabinow (1996) has suggested biosociality as a concept with which to understand these new kinds of social affiliations based in shared biological, and especially disease-related, factors, histories, or predispositions. Such biosocial arrangements exist in multiple forms, including disease-specific advocacy groups and shared biomedical conditions including use of assisted reproductive technologies. Charis Thompson suggests that, in "the biomedical mode of reproduction" of which assisted reproductive technologies are exemplary, biosociality has become the "notion of peoplehood" in scholarship on biomedical technologies (2005:252).

Where Rabinow, and Rose and Novas concern themselves principally with Euro-American contexts, here, I consider three projects of biological material and data banking in Taiwan in relation to ideas and practices of biosociality and biological citizenship. I suggest that molecular, and specifically genetic, knowledges both evoke new ways of conceptualizing selves, and map onto older ways of configuring affiliation. Each of these bio-banking projects is intertwined with emergent imaginations of selves and collectives in relation to a fast-changing socio-political sphere. In each of these, the biological objects themselves take on different meanings, values, and stakes, and in this, they both draw upon and underscore different ideas about relationality, responsibility, and the context of the biological object. The Taiwanese projects of UCB and marrow banking are not the activist biosocial groupings that are exemplified in examples of (Western) HIV/AIDS activism (Epstein 1998), PXE (Rose 2007, Rapp et al. 2004), or related disease-specific groups. Rather, they are imagined as preventive practices oriented around understandings of genetic similarity and difference.

Ong and Chen invoke the notion of "communities of fate," described as:

> The affective mapping of collective interests engendered by biotech innovations that resuscitate folkloric notions of family, ethnicity and the nation. The nesting circles of solidarity and commonality sustained by cultural paternalism, ethnic identifications and nationalist discourses are finding a new ally in rationalizations of the genome. (Ong in press)

In the three projects that I discuss, several narratives draw on such communities of fate – these envision a population or group coming together in its biological futures, with shared responsibility in its disease vulnerabilities and in its recognition of each other as therapeutic donors – one for the other. Such narratives, however, are also challenged by an enhanced ethos of individualism and privatization. Even though such challenges are most often articulated in the dominant idioms of bioethics, the cultural and ethical ground upon which decisions actually play out are already permeated with notions of moral bonds, duties, and communities of fate.

Private UCB banking is about individualized potential therapies. It generates a responsible, active engagement with biological futures at the level of the individual or the family in its genetic relatedness. Private UCB banking in Taiwan is, I suggest, a fundamentally atomizing practice popularized by consumerist technologies and scientific and governmental appeals to making citizens responsible for the future health of their families.

In contrast, the Tzu Chi marrow registry is fundamentally a collectivizing enterprise. It is imagined to operate at the level of the ethnic (or regional) community; this includes multiple scales from specific Taiwanese, to a greater Chinese ethnic population, to Asians more generally, and potentially even beyond. It is not, I suggest, biosociality as usual; where most examples of biosociality draw upon varied forms of patient activism and affiliation, and are most often organized around a specific disease (pre)condition, the marrow registry appeals to older forms of affiliation and altruism. It is a gift (or at least the suggestion of a promise of a gift) made in recognition of oneself as a potential biological source of healing for another. The science and rhetorics of marrow compatibility reinforce notions of ethnic similarity and responsibility, and as a result, the Tzu Chi Marrow Registry has become an important global source of Asian marrow pairing. Thus, this is a form of collective biosociality, but it is organized not around specific disease conditions or vulnerabilities, but around a biological understanding of ethnic similarity.

In the US, discourses of ethnic similarity and responsibility are also mobilized in relation to stem cell banking. Bok et al (2004) argue that in the interest of social justice stem cell banks in the US should follow an ethnic representation strategy. Although this would mean that fewer Americans overall would likely benefit from such banking practices, it would serve different ethnic communities more equitably. Ethics here come to encompass a broad range of ideas and practices, many of which reconfigure our relations to one another in multiple ways, be it in terms of ethnic or national identity, or newer forms of biosocial affiliations. These biosocial arrangements may well represent new ways of viewing ourselves in relation to our biologies, but I suggest that they do not efface older notions of self and group identification, but rather, often serve to reinforce older notions of affiliation such as familial, regional and ethnic categories which take on newly biologized meanings in the light of emergent genetic and molecular knowledges.

Given Tzu Chi's success in recruiting marrow data and donors, and its suggestion of a biologically and biosocially generous population, it is perhaps surprising that the Taiwan Biobank project would meet with such resistance. Tzu Chi's mission is explicitly benevolent and the foundation has enjoyed strong public support and trust for many years. In contrast, the biobank project was conceived in a context of enhanced political and scientific skepticism. Where the scientific community involved in the design of the biobank envisioned a straightforward project of collecting samples, it failed to adequately consider the constitutive role of public trust in such endeavors. Now, as a population resists, public trust comes to be managed through technical concepts and institutions of bioethical significance. Where the biobank scientist referred to a compliant population as a scientific strength in Taiwan, an assumed public trust and the compliance that might follow from it can no longer be assumed there. Rather, it becomes clear that the only way that the biobank might progress is through a well organized, well publicized, and comprehensive management apparatus that addresses bioethical principles, policies, and enforcements. Thus, public trust becomes a thing to be managed through a technical process of accountability measures rather than a product of durable relations of mutual concern and responsibility.

The biobank seeks to study diseases of significance to the Taiwanese, which it also understands as a resource for scientific and capital development. In this way the population, in its biology comes to be a national resource of both bio-scientific and economic capital. But whereas many Taiwanese are willing to enroll themselves as biological subjects and citizens in varied projects, many resist their conscription into the citizenship project of the biobank. The popularity of private UCB banking and Tzu Chi's marrow bank success both point to a willingness to relate to oneself as biological and as linked to others in one's biology. The biobank suggests, however, that only some projects have the capacity to enroll and responsibilize biological subjects. In the biobank project, Taiwanese refuse to be biological citizens in this sense. Rose and Novas suggest that "Biological citizenship in a political economy of hope requires active political engagement – it is a matter of *becoming* political" (2003:454). Here, however, it entails a political and biological refusal, one which suggests itself to be located in a political economy of risk and fear as well as one of hope. In this refusal, we might say that they nonetheless configure themselves as biological citizens, in that even a refusal remains part of the same discourse (Foucault 1978), but it configures quite a different form of biological citizenship than the hopeful, active, and self-organized one depicted in celebratory accounts of biosociality and bio-citizenship from below.[16]

Discussion:

The resistance to the national biobank project is a result of a confluence of factors that draws upon broad concerns about risks of biological discriminations or exclusions, but it is also linked to larger socio-political shifts. In Taiwan, democratization enabled the rise of the DPP on an independence (from China) platform that also included a strong focus on enhancing social programs and equality. In the subsequent economic downturn, these programs largely failed as the state government found itself trying to balance conflicting demands for domestic programs with those of the global economy.

> Since the 1990s a lot of liberalist policies and measures, such as tax cuts, privatization, deregulation, and so forth, had been widely enforced to restructure the Taiwanese economy from state-led to market-led, even though it was accompanied by rising social costs of unemployment and inequality. (Ku 2004:317).

The perception of the abdication of the state in vulnerable economic times is enhanced by a troubled national health insurance plan that is reportedly on the verge of bankruptcy. A scholar researching the problems with health insurance told me that he had heard stories of people dying for lack of a health insurance card, and he worried further about proposed limits on expenditures for the elderly. Thus the apparent preference for private UCB banking takes place in a context of increased privatization and economic (and biological) vulnerability more generally.

In an arena in which human biologicals are increasingly invested with specific value – therapeutic and fiscal – and enabled to move in local and global circuits of exchange, ideas and realms of markets, ethics, and human collectives hang together in new ways. An older model of the relationship between society and science positions science as racing ahead and society (and its ethics) as struggling to keep up. Now, fast-paced stem cell research, ethical considerations and instruments, and market processes and concerns come together in novel formations, and with them emerge novel subjective and collective modes of relating. These formations are not stable, and varied sensibilities, values, and interests lead to a shifting landscape of affiliations and regulations that track across new terrain as the newborn, the group, and the nation become sources of biovalue.

Where trust facilitated the collection of marrow data for Tzu Chi, now ethics takes on a specific market value that enables collection of biomaterials as well as future circulations of both scientific knowledge (as in journal publications and patents) and therapies. Marilyn Strathern writes, for instance, that in considerations of IPR (intellectual property rights), as with scientific authorship, "the whole process of social/ethical validation will become part of what is transacted. (The value of the commodity will include its certification)" (2005:477). Sarah Franklin shows how considerations of the ethical are being built into emergent biomedical technologies in the interest of downstream product marketability. In Franklin's account corporate awareness of public anxieties about the use of human embryos and the production of new forms of life leads to, for Geron corporation, an approach which is to "reengineer an ethically sensitive biotechnology" in the field of stem cell research (2003:113). Here, a means-end rationality based on a profit motive incorporates explicitly an ethical component. In human tissue transfer, Waldby and Mitchell suggest that informed consent, bioethics' foundational instrument, can be viewed as "the mechanism that transforms a gift into property" (2006:71), thus serving to introduce the gift into the marketplace. Rose and Novas also suggest that the "co-production of health and wealth is a profoundly ethical endeavor," resulting in reconfigurations of "the morality governing the very nature of economic exchange" (2005:457). Indeed, they are correct that in biotech, "ethics is becoming central to the production of health and wealth" (Rose and Novas 2005:457). Increasingly, as human biologicals are seen to occupy multiple fields of value, the certification of their collection and distribution as ethical becomes a critical feature in the future transactability of their derived products and services. Each of these examples from

Taiwan points to different and sometimes novel configurations of people's relationships with themselves as biological, and while they suggest emergent modes of relating biologically they do not suggest uniformity. People's relations to themselves in their biologies, and to others in theirs, depend on the projects, the stakes, and a myriad of specific contextual factors as they are forming not only newly configured biological relations with themselves and others, but ethical ones as well.

In this chapter I point, through specific examples, to what I see as new entanglements of the market, science, and ethics, as well as modes of subjectivation. I do not suggest that these exist as separate domains; they have long been intertwined. Indeed, Merton (1973b) and Kohler (1999) have shown that the sciences have their own ethical codes, including an ethos of scientific sharing.[17] The market itself operates according to its own ethical logics, and as Weber (2002) shows, American capitalism is rooted in a particular interpretation of Protestant religious ethics. A clear divide, thus, between markets, ethics, subjects, and science may have never pertained. Now, the field of bioethics often turns its attention to such questions as what is patentable or transactable under what circumstances and with what consequences, as well as with how to both facilitate and limit the incorporation of proliferating objects into fields of exchange. With these examples from Taiwan, my contention is not that such entanglements are necessarily new, but that these fields come to interact in new ways and in new formations as new objects and subjects are brought into circulation. Through these circulations, I suggest that ethics, markets, and biotechnologies are refashioning each other. An analytic attention to cross-cultural movements within the "new transactional order emerging in science" (Anderson 2000) may help to clarify what is at stake, for whom, as well as perhaps, if we are fortunate, to guide us more clearly toward what might constitute right action.

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[1] See Strathern (1988) on the Melanesian body as "partible," constituted relationally and comprised of detachable parts.

[2] In the anthropological literature see especially: Franklin and Lock (2003), Scheper-Hughes and Wacquant (2002), Sunder Rajan (2007), Waldby and Mitchell (2006), Sharp (2006), Hogle (2003) and Landecker (2000).

[3] Note that this was a minority dissenting opinion in the *Moore vs. UC Regents* case.

[4] I borrow the term "biological" as a noun from Hannah Landecker.

[5] In this paper, I use bioethics to denote the normative, institutionalized field of Bioethics. Bioethics is more generally, of course, a multivalent term indicative of varying sets of practices, discourses, attitudes and affects.

[6] My use of "economy" is deliberate. I use it in both the formal sense of the market, and to indicate those spaces of human interaction in which objects imbued with values of multiple kinds are transacted. So I might restate my perspective here to ask how human biologicals are made to circulate in a market economy ethically. This view requires a reconfiguration of received ideas about both biologicals and ethics, as well as perhaps the market.

[7] Please see, for instance, Mauss, Bourdieu, and Titmuss who contribute to the central core of this literature. Mauss (1970) suggests that the circulation of objects as gifts in the Melanesian kula served a functional role in establishing and maintaining social relations. In this view, the exchange was not about the objects *per se*, but about the relationships that they reinforced, thereby enhancing and sustaining social stability. There, the role of exchange is not that of the accrual of value, as in a market frame, but rather the strengthening of social bonds through relations of obligation and reciprocation. Bourdieu (1977) inserts a temporal consideration into the gift relationship. The gift, he asserts, relies on timing. A premature reciprocation rejects the gift and (dis)places the exchange into a market economy. It is the passage of time that allows the exchange to be that of a gift, and to be apparently outside of a calculative process characteristic of commodity exchange. Bourdieu here positions the gift as an obligatory exchange misrecognized, through the vehicle of time, as voluntary. And Titmuss (1997), arguing against payment for human blood in the UK, suggests that altruistically donated blood served to reinforce a social bond which itself operated in a realm of meaning and social cohesion that exceeded the value of the blood and derivatives themselves.

[8] Cohen quotes R.R. Kishore as he explained the case for kidney selling in India. Citing cultural attitudes as a barrier to cadaveric organ donation ("the mentality will not support it"), Kishore performs his reasoning: "Look, I'm a man dying of hunger. I ask this one for help, he does nothing. That one, nothing. Now I ask you. You day: I'm also dying. I need an organ. I'll help you if you help me." Cohen comments that for Kishore, "allowing for an exchange of one man's surplus money for another man's surplus kidney is not really traffic, but 'life for life'. Everyone wins". (in Cohen 1999).

[9] Mainstream bioethical debates would likely specify (at least) two additional points: the therapeutic intention must be the primary concern in the collection of eggs and production of embryos such that any research embryos must be a distinctly secondary consideration that in no way compromises the IVF procedures; and, the IVF treatment agreements can in no way be affected by or contingent upon the production of these extra research embryos.

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[10] See for instance the following article: "Grandchild's stem cells may help First Lady walk again: Doctors say stem cells from newborn's umbilical cord blood may help Madam Wu, paralysed waist down for past 17 years" at http://www.dpa.org.sg/news/news02-july01-03.htm.

[11] More recently Tzu Chi has been the target of some rumors and criticism, mainly centered around questions of how the money in the organization is procured and used. Some have also expressed concern with how the organization will be managed as the charismatic leader ages. Still, in spite of such rumors, Tzu Chi enjoys a predominantly positive public reputation.

[12] John Lie defines modern peoplehood as:

> By modern peoplehood I mean an inclusionary and involuntary group identity with a putatively shared history and distinct way of life. It is inclusionary because everyone in the group, regardless of status, gender, or moral worth, belongs. It is involuntary because one is born into an ascriptive category of peoplehood. In addition to common descent – a shared sense of genealogy and geography – contemporary commonality, such as language, religion, culture, or consciousness, characterizes the group. It gropes toward a grouping larger than kinship but smaller than humanity. It is not merely a population – an aggregate, an external attribution, an analytical category – but, rather, a people – a group, an internal conviction, a self-reflexive identity. (Lie 2004:1)

[13] ELSI is a designation that emerged in relation to concerns about the Human Genome Project. It fails, of course, to capture the full scope of interests in relation to projects of science including, to name a few, economic, philosophical, political, and religious elements. It nonetheless serves as an efficient and recognized shorthand for the broad range of social interests around projects of science, and it is in that sense that I use it here, while recognizing the ways in which it simultaneously serves to discursively delimit the scope of such concerns.

[14] http://www.etaiwannews.com/Taiwan/Society/2005/04/07/1112837550.htm

[15] The homogeneity of Taiwan's population is a matter of debate and interpretation. Most classificatory systems name four main ethnic groups, Minnan, Hakka, Mainlanders, and Aborigines. Some consider Minnan, Hakka, and Mainlanders to be distinct groups while others consider all to be Han Chinese (but see chapter five), and the Aborigines are usually represented as comprising nine distinct cultural and genetic groups. Additionally, much intermixing has occurred.

[16] This is to suggest that this is a biological citizenship that resists. It configures itself in its resistance.

[17] Kohler makes a distinction between a moral economy and a market economy. Both are at play in his account of drosophila geneticists, but new associations proliferate (for which he offers a material base) between people and people and people and things, various organizations, etc, and with them, new ways of thinking about economy that exceed this kind of dichotomy.

CHAPTER FOUR

Aboriginal Genetics: bioethical translations

Leo T. S. Ching (2001) writes on how Taiwan's Aborigines were conscripted into Japanese military projects during the period of Japanese colonial rule in Taiwan (1895-1945). He describes the discourses of *doka* (assimilation) and *kominka* (imperialization) for making and naming the Aborigines as Japanese.[1] While under the Japanese colonial program, the Aborigines became nominally Japanese, however, they were denied any related citizenship rights. Ching recounts the story of a group of seven Aborigines who, in 1979, visited Japan's "Yasuguni *jinja*, a shrine that consecrates the spirits of Japanese soldiers killed during the Second World War" (Ching 2001:1). These Aborigines, some widows of those enshrined there, had come as representatives of their communities and the descendants of the hundreds of Aboriginal soldiers who died fighting as Japanese during the war more than thirty years earlier. They had come to reclaim and repatriate the spirits of their ancestors and husbands, but ultimately failed since, they were told, Japanese custom requires the soldiers' spirits to remain in the shrine.

> Despite their resolve, the aborigines had to leave the Yasuguni shrine and appeal to the Ministry of Health and Welfare. Even at the ministry, Japanese bureaucrats rejected their plea. The spirits of their families never returned, lying idly among the departed souls of the tens of thousands of Japanese soldiers, commemorated for their undying dedication to the Japanese nation. (Ching 2001:4)

This failure of the Aborigines to reclaim and repatriate their ancestral spirits is predicated on the naming of these Aboriginal soldiers as Japanese and on the refusal of the Japanese government to acknowledge its colonialist contradictions. That is, although these dead soldiers fought and died as Japanese, the survivors and families, no longer Japanese, are denied any corresponding compensation or redress given to Japanese citizens.

Ching recounts the conscription of Taiwan's Aborigines into military projects of Japanese nation and empire-building during the first half of the twentieth century. In this chapter, I address how Taiwan's Aborigines are conscripted, or resist conscription, into contemporary projects of Taiwanese science and nation-building, and how their particular history of social disenfranchisement intensifies bioeconomic considerations of exchange and commodification. Enhanced interest in indigenous genetics in a world in which DNA is subject to patent claims and DNA and cell cultures from Taiwan's Aborigines are already commercially available for online purchase, has also led to enhanced concerns about protecting Aboriginal interests. Global movements supporting the human rights and self-determination of indigenous peoples are exemplified in organizations such as the World Council of Indigenous Peoples and the Indigenous Peoples Council on Biocolonialism. In Taiwan, democratization has been accompanied by an enhanced sensitivity to issues of human rights, political representation, public deliberation, and issues of distributive and social justice more generally. In the previous chapter, I describe different projects of human biological material and data acquisition. In light of long histories of subordination, it is not surprising that scientific projects that involve biological sampling of Taiwan's indigenous peoples raise particular concerns and resistances in Taiwan, as elsewhere. This chapter addresses one dimension of the bioethical translational context as it applies to Aboriginal genetics research; specific concerns for indigenous populations present unique bioethical challenges with enhanced attention to principles and practices of informed consent, benefit-sharing, and commodification.

Scientific interest in Aborigines

Taiwanese Aborigines have long been subjects and objects of scientific interest. In the 1960s, for instance, Chai Chen-Kang, a scientist at a Maine laboratory with a reputation for biometrical genetics in laboratory mice, transferred his techniques and methods to Taiwanese Aborigines. Applying techniques of biometric analysis in 1962 to some 4500 Aboriginal adults and children, Chai (1967) is credited with methodological innovation along with a catalogue of Aboriginal measurements.

> The anthroposcopic observations are on the lip thickness, nasal bridge form, eye opening, fold and colour, ear lobe and point, hair colour and form, and skin colour. The eight body measurements are stature, suprasternal height, spina ilica and sitting height, biacromial and instercristal breadth, chest girth and arm length. The eleven head measurements are head length, breadth and height, minimum frontal, bizygomatic and bigonial breadth, internal interocular breadth, face height, nasal height and breadth, and mouth breadth. PTC taste reaction, palmar dermatoglyphics, blood pressure and pictorial intelligence tests on figure discrimination and substitution and block counting complete the list of observations. (J.N. Spuhler 1968 in a review of Chai's book)

Where Chai used now discredited physiological measurements to infer genetic relatedness between tribes, advances in genomic science have served to enhance scientific and medical interest in Taiwan's Aborigines. Studies on specific disease conditions or predispositions have multiplied alongside an enhanced interest from population genetics for which the Aborigines hold particular significance. Taiwan's Aboriginal tribes are thought to be among the "purest" populations in the world; that is, they are the most genetically homogeneous (Lin et al 2000; Cavalli-Sforza 2000). Additionally, they have been linked with Austronesian and Polynesian populations, positioning them as potential early ancestors of these populations and thus as an important source of scientific knowledge about ancient human migrations. This linkage is especially significant in political movements that seek to distance Taiwan from mainland China, as I discuss in Chapter Five, especially since China's studies have tended to posit Taiwan's Aborigines as originating in the mainland (Tai and Chiou 2008).

In such projects as these, Aboriginal genetics are implicated in both biomedical science and politics. As a result of their genetic "purity" Aborigines are viewed as a uniquely Taiwanese resource, biologically and culturally. They serve as singular pool for bioscientific knowledge production that can only take place in Taiwan. As I suggest in the next chapter, claims of purity can be used to disarticulate the Aborigines from an ancient history in mainland China and to bolster claims of a uniquely Taiwanese genome that are taken up in specific projects of desinicization. Furthermore, using rhetorics of protecting and helping, such genetic projects can be used to support a vision of a humanitarian politics that aligns itself with concerns of social justice and human rights, bolstering a particular version of Taiwanese ethical modernity. In these ways, Aboriginal genetics are viewed as important and useful in varied projects in Taiwan, especially in relation to bioscientific knowledge production, political identity, and making an ethical modern polity. Although the approaches employed to address the specific concerns of Aborigines in relation to genetic projects are generally expressed in bioethical idioms, I suggest that such mainstream bioethical approaches are unlikely to ensure ethical practice or to generate the trust that biological participation would require in the absence of much broader socio-political reforms.

Popular mainstream characterizations of Aborigines as good dancers and singers and as particularly hardy resonate with broader and more globalized characterizations of marginalized groups of native, enslaved, or otherwise exoticized peoples. For example, a researcher and health worker from a charitable Christian organization dedicated to improving Aborigines' health recounted a conversation with one of her patients: "I said to her, how can you be so tired all the time. You know you are Aborigine – you are supposed to be very lively and energetic!" Other depictions, however, position Aborigines as lazy and as agents of their own disenfranchisement, as described by Isak Aso from Taiwan's Ami (Pangcheh) tribe,

> The colonial myth-makers have characterized the Aborigines of Taiwan as "inherently lazy," "unproductive," "hooked on booze" and "lawless," or else as "good at singing and dancing" and "natural born athletes." The colonizers meanwhile see themselves as "benevolent and generous," "active and assertive" and "disciplined." The media repeats these stereotypes, with superficial understanding.
>
> (Afo 2000 in Munsterhjelm 2005:11).

Munsterhjelm (2005) takes Afo's perspective, along with an analytical orientation that positions the Aborigines as current colonial subjects of Taiwan's majority populations, to support an argument that alcoholism studies among the Aborigines amount to a form of biocolonial repression misrecognized as benevolent helping. Indeed, genetic studies of Aboriginal alcoholism seek to link high rates of alcoholism to a genetic predisposition. In doing so, however, the problem is located as one internal to Aboriginal genetics and physiology thereby often obfuscating long entrenched social marginalization and land dispossession that are arguably more important factors in the production of high rates of Aboriginal alcoholism.

In recent years the status of the Aborigines in Taiwan has begun to improve, politically and socially, as their historical and continued marginalization has become a political and human rights concern in itself. In 1996, a government body to represent Aboriginal interests was formed, the Commission of Indigenous Peoples, and in 2005, the Basic Laws of Indigenous Peoples were promulgated. At a more quotidian and individual level, where it was common in the past for people to deny Aboriginal ancestry, especially among those of mixed descent, it appears that Aboriginal identity is becoming increasingly valorized. While most statistical figures suggest the Aborigines to comprise approximately two percent of Taiwan's total population, a study conducted in 2004 by the Council of Hakka Affairs showed that when multiple choices were allowed for ethnicity, 5.3% self-identified as indigenous (the survey percentages total 120.8, allowing for multiple selections from individuals).[2] I suggest that the higher number of people self-reporting as Aboriginal likely results from the decreasing stigmatization of Aboriginal identity more generally.

Nonetheless, Aborigines continue to suffer from social, economic, and medical disenfranchisement. Studies of specific medical conditions or susceptibilities, or posited Aboriginal genetic resistance to certain diseases, add to the construction of Aborigines as distinct and genetically exotic. In addition to the alcohol studies mentioned above, others have suggested a genetically based resistance to HIV and SARS infection. In the first case, a physician posited a resistance to HIV infection because no HIV-related deaths among Aborigines had been reported, despite their substantial overrepresentation in Taiwan's sex industry. He proposed to collect and bank 40,000 samples of Aboriginal blood to test his hypothesis, but failed to consider that reporting mechanisms, or other causes of Aboriginal death, may have explained this apparent discrepancy in HIV-related death rates among Aborigines.[3] While some studies suggest that Aborigines are more susceptible to tuberculosis, but less susceptible to rheumatoid arthritis, still others have been conducted that suggest that Aborigines are genetically less susceptible to SARS infection as a 2003 paper claims,

> Densely populated regions with genetically related southern Asian populations appear to be more affected by the spreading of SARS infection. Up until recently, no probable SARS patients were reported among Taiwan indigenous peoples who are genetically distinct from the Taiwanese general population, have no HLA-B* 4601 and have high frequency of HLA-B* 1301. While increase of HLA-B* 4601 allele frequency was observed in the "Probable SARS infected." (Lin 2003)

This study and others served to suggest SARS as an "Asian" disease fostered by a particular Asian genetic vulnerability. This article further specifies SARS as a specifically southern Asian vulnerability, but it also posits the Aborigines as less vulnerable because they "are genetically distinct" from Taiwan's "general population."

Studies such as these serve to differentiate the Aborigines and to make them as a genetically distinct and biomedically exotic population. Larissa Heinrich traces Lam Qua's 19th century (bio)medical portraiture in relation to the development of a Chinese identity as the "Sick Man of Asia," resulting from the conflation of "illness with a nascent racialized Chinese identity" (1999:242), that was nonetheless "curable" through western medicine. Similarly, I suggest, in contemporary Taiwan, biomedicalism sets the stage to position Aborigines as both sick and curable. By establishing Aborigines as "sick", Aboriginal poor health is used to justify the need for intervention, which in turn justifies the need for more biomedical information about them as a population. Whether in campaigns to improve Aboriginal health or in scientific studies to characterize their genetic markers, Aborigines are constructed as a particular kind of population.[4] In the frame of health improvement, as with any public health project, making the Aborigines as a unique population requires distinguishing them from Taiwan's larger population. Even, therefore, in programs with the explicit goal of ameliorating health conditions of Aborigines, the target population is discursively constructed as other and as in need of intervention. Such constructions have effects since expert knowledge, in making categories and reporting social relations, simultaneously serves to format them (Mitchell 2002:118). Projects of studying Aboriginal health, specific diseases, and genetics seek to inculcate Aborigines with a sense of themselves as biological and biomedical subjects. In this frame, their ostensibly unique genetics are seen as a key component in their own improvement as well as in the production of knowledge about the human species and history as a whole.

This construction of otherness in order to understand the whole of humanity is nothing new in scientific and anthropological knowledge production. Indeed, anthropology finds its own history in complicity with colonial administrations, and its early models of a teleological progression of human existence from savage to civilized (i.e. Euro-American) long positioned so called primitive populations as sites for the modeling of pre-civilized humans. While I believe that the discipline's own crisis, self-critique, and subsequent self-reflexivity now make it uniquely positioned to be especially sensitive to representational and knowledge producing practices and politics, it is not surprising that many indigenous communities continue to view anthropologists and other "experts" with suspicion and resentment.

Bioethics and the Aboriginal subject

In the context of sustained social disenfranchisement and targeting as populations of scientific interest, bioethics' foundational instrument and principle of informed consent takes on particular meanings and nuances. Jenny Reardon (2005), in her account of the failed Human Genome Diversity Project (HGDP), suggests that group consent was viewed as an important and substantive bioethical innovation to address the particular interests of indigenous peoples. Indeed, under Taiwan's 2005 Basic Laws of Indigenous Peoples, collective consent for research on indigenous communities is arguably a legal right (Tai and Chiou 2008), and Liu Ching-yi, a law professor and vice president of the Taiwan Association for Human Rights, suggests that Article 21 of these laws mandates the collective consent of the Aboriginal group in the collection of biomaterials (Chuang 2006). As with the HGDP, however, ethical considerations in projects involving Taiwan's Aborigines as biomedical subjects have often been viewed as ancillary to the projects themselves and, similarly, informed consent and group consent fail to assuage many concerns.

Discussing informed consent in relation to the general controversy around the biobank project, a professor emphasizes the specific controversy elicited by one strand of the biobank's interest in Aboriginal groups,

> For instance with collecting blood from Aborigines, this (informed consent) is very controversial. The Aborigines think that they are cheated and that they are deprived by the Han Chinese or by parliament. It's an historical debt. And this is a debt that has exerted much influence on the national biobank project. (interview excerpt 7/07)

Indeed, the fact that Aborigines are specifically targeted as one of the sample populations for the pilot project enhanced the concern from human rights groups, Aboriginal groups, and ELSI scholars. In light of the disenfranchisement that constitutes the basis for the historical debt that the professor mentions above, and among proliferating stories of Aboriginal blood samples being taken for scientific projects without adequate disclosure or consent, concerns accumulate. These concerns are most often expressed in terms derived from bioethical idioms, and specifically, informed consent, benefit sharing, and commodification. Here, I discuss first some of the stories that have emerged about problematic sampling of Aboriginal biologicals and the concomitant commodification that some of these projects entail. Next, I discuss the role of benefit-sharing and informed consent as they are employed to attempt to attenuate some of these concerns, working effectively, I suggest, to enable the collection and use of Aboriginal blood and DNA in projects of science. Here, bioethical idioms and instruments serve a translational function. They do this through attempts to mediate scientific and Aboriginal interests with promises of ongoing ethical practice. Bioethical regimes become more than a set of rules; they facilitate science by offering assurances of its limitations. They enable commodification by simultaneously limiting its scope. And, since modernity draws not only on the language of science, but increasingly is expressed in the language of ethics, these bioethical discourses serve as indicators of Taiwan's own modernity, making itself as an ethical and democratic socio-polity.

Tales of taking Aboriginal blood (or saliva) without adequately informed consent are becoming increasingly common, especially as the scientific and economic value of the blood continues to rise. Many begin to wonder aloud if blood drawn for health checks was really taken out of concern for the health of the community members, or if it was set up as a means of gaining access to Aboriginal blood and hence DNA. An article in the Taipei Times newspaper addresses some of the more commonly expressed concerns:

> "No researcher told the people whose blood was taken why and how their blood would in fact be used," Chen said. "Different researchers told them the same thing: that their blood was to be used for a health check," he said.
>
> "But why should a mere health check require so much blood?" Watan and Chen asked as they recounted how, although 3ml of blood was sufficient for a health check, many researchers drew between 10ml and 20ml and divided the blood into different tubes.
>
> Three years ago, the former provincial health bureau implemented an overall health checkup for gout and liver diseases in Aboriginal areas. The researchers drew 10ml of blood from each person and divided it into three tubes. "One tube for a gout check, one for liver diseases, and the third tube for what?" asked Watan (an Aborigine reporter).
>
> (Liu Shao-hua 2000)

Questions are sustained regarding the underlying purposes of the health checks, of whether consent given was adequately informed, and of the ultimate uses to which Aboriginal blood and information it holds might be put. Accusations of surreptitious blood collection from Aborigines proliferate in media reports and community discussions. Tai and Chiou (2008) point to improvements in the Department of Health's regulations for research on human subjects as overdue progress, succinctly characterizing past and persisting problems with Aboriginal blood collection:

> The indigenes, in particular, have been persistent victims of a long history of exploitation in which researchers often went to tribal villages to covertly collect blood samples under the guise of "free health checks." A news report even quoted a villager as saying that in just one year he gave blood "eight" times – meaning, perhaps, "several" times in his native tongue – for "free health checks." Moreover, the Bureau of Health Promotion has been offering indigenous elderly two physical examinations per year for free, but, lacking a sound monitoring procedure, this well-intentioned health policy has unfortunately made the examinees vulnerable to surreptitious, unconsented extraction of more blood from them than is necessary for the proclaimed purpose. (Tai and Chiou 2008:108-9)

Thus, under the guise of helping via the provision of medical checks, Aboriginal blood has been made available to researchers. In the current atmosphere of enhanced concern for human rights, democratic governance, and research subject protections, and a global indigenous rights movement, Aboriginal medico-genetic exploitation has become an important political issue in Taiwanese discussions about biological material collections and uses.

At the same time, broader social analyses include an implicit critique of historical and socio-structural factors involving Aboriginal communities. Professor Hsu, the legal scholar, describes developing resistance on the part of Aboriginal communities to ongoing requests for their blood:

> The Aboriginals they are thinking, every time you come here, you draw my blood. You give me some compensation – 1000-2000 NTD (~30-60 USD) – or some nutri-foods. But what benefit is it to me really. I'm still part of a deprived group. (interview excerpt, Dr. Hsu 7/07)

Here, even in the context of some measure of direct compensation, minor acts of reciprocity cannot atone for broader social marginalizations. And, given the enhanced recognition of past actions offered as ostensible acts of caring or giving that turn out to be, rather, covert acts of taking, Aboriginal resistance grows.

Taiwanese publics in general are becoming more interested in protecting their rights, privacies, and futures than in participating in large scale research projects in the service of an abstract good (Tai and Chiou 2008). Aborigines are particularly sensitive to such issues, especially in light of being positioned in such projects, as with the HGDP, as populations of historical interest (Reardon 2005). In the proposed HGDP, as with several contemporary projects, concerns with sampling populations before they disappear positions contemporary human groups as museological and scientific objects, rather than as human communities interested in their own cultural and community survival. Reardon describes the representational problems that arose in the descriptions of "isolates of historical interest" in HGDP narratives:

> In almost all of the documents that announced the Project, as well as workshop reports, indigenous groups were described as "vanishing" or "disappearing," groups of historical interest that needed to be "preserved" for study before they "lost" their "identity" (Cavalli-Sforza et al., 1991, 490; Human Genome Diversity Project 1992b, 5). Yet this was exactly the representation that indigenous groups themselves opposed. Not only were they not disappearing, they were here to stay and demanding protection of their rights as well as representation in international governing bodies, just as any other free peoples would. (Reardon 2005:105)

In these contexts, in which indigenous people's biological materials are represented as of greater significance than the people themselves, concerns about commodification of such materials become particularly significant. Such concerns are not abstractions, but are substantiated by stories such as that of the patented cell line derived from the Hagahai indigenous peoples of Papua New Guinea. In the 1990s, the US Department of Health and Human Services was granted a patent by the US Patent and Trade Office on a human T- lymphotropic virus derived from members of the Hagahai (Santos 2003). Indigenous rights groups have expressed increasing concern of the granting of patent rights on materials derived from their biological and genetic materials, as well as on the immortalization of cell lines without explicit and enduring individual and community consent (Santos 2003:35 n. 2).

Taiwan's Aborigines are generally classified as comprised of nine separate groups (although some suggest twelve). When I visited a Bunun village, I was struck by the numerous Catholic and Presbyterian churches that line the narrow streets. At a Presbyterian seminary devoted mainly to Aboriginal students, one of the teachers showed me a map of the Aboriginal territories and their corresponding group names. As he did so, he explained to me that each of these names, in their respective languages, means the same thing: "man or human being."[5] Of these, two groups, the Ami and the Atayal have found their cells represented in a US laboratory supply source; DNA and cell cultures derived from Taiwan's Aboriginal Ami and Atayal people are available for $55US (.050mg) and $85US respectively from the Coriell Institute for Medical Research in New Jersey.

In a world in which indigenous peoples worldwide are treated as subjects and sources of biological information and materials, and in which these biological materials and their derivatives come to have increasingly explicit scientific and market values, accusations abound of biopiracy, biocolonialism, and "vampire" projects in which indigenous blood and other biologicals are mined, harvested, or otherwise taken. Most of the biomedical and bioethical discourse produced to address such concerns are expressed in dominant bioethical idioms of informed consent and benefit sharing. While the altruistic donation was once viewed as a guarantee of ethical procurement and against the influence of undue inducement, in contemporary bioscience, the imbalanced nature of the altruistic donation becomes, itself, ethically problematic.

Benefit-sharing and critiques of altruism

Observations that biotechnology relies upon donations of human biological materials that are then often subject to exclusive property rights claims, have led to reconsiderations of altruism as a necessary good. Rather, the altruistic gift is increasingly seen as the originary action of a relationship, or a series of relationships, that serve to materially or financially benefit all those involved except the original giver. Furthermore, an insistence on altruism as a guarantee against undue inducement or the against the commodification of that which perhaps ought not to be commodified, ignores the impossibility of ensuring ethical practice downstream. Amid the intense commercialization that constitutes a substantial part of contemporary biotechnological production, the presumed ethicality of the altruistic donation is increasingly being superceded by modes of "giving back" that are seen to found new, and ostensibly more equitable, exchange relations (Hayden 2007).

Cori Hayden points to the rising call in bioethical circles for replacing altruism with a new principle:

> This novel principle is *benefit-sharing*, and the idea, at its simplest, is that participants in research deserve some form of returns, precisely because their participation is leading to lucrative products for biotechnology, diagnostics, and pharmaceutical companies. (Hayden 2007:731)

In an earlier work, Hayden (2003) shows how bioprospecting – rooted in historic practices of colonialism, exploitation and extraction of resources from the global south for northern benefit – is remade as ethical practice by importing deliberate market principles in the form of benefit-sharing. Here, Hayden shows how the introduction of market principles into bioprospecting legislation re-positions bioprospecting as ethical action by making transactions explicit, by naming beneficiaries and specifying transactional and contractual agreements. She notes, however, that though discursively framed in terms of ethics, benefit-sharing is also a mode of politics, "or at least an exercise in political imagination" (2007:731) that configures collectives in particular ways and provides new modes of political legitimation in the name of a science that must give back. The emergence of critiques of the altruistic donation in the midst of downstream potential fortunes, and the concomitant emergence of collective research subjects, leads to a reconsideration and reformulation of both collectives and appropriate relationships within bioscience, including fiscal relationships.[6]

Hayden suggests that benefit-sharing, despite its popularity as a politico-ethical solution to problems of commercialization within bioscience, is already largely a failed idiom in terms of facilitating "giving back" downstream. Still, it remains seen as a potential solution to problems of Aboriginal blood procurement in Taiwan, and many of the critiques of the biobank project are framed in terms of collective interests and benefit-sharing. Calling for enhanced public deliberation on the biobank project (see Chapter Three), Liu Ching-yi suggests that the project "involves the Taiwanese people's health, privacy and property rights," and he asks whether or not "there has a been a promise to share any benefits that may result from future research and development?" (2006:8). If, however, as Hayden suggests, benefit-sharing is already largely a failed idiom, then it cannot answer to the deeper implications of Aboriginal blood collecting and indeed, it becomes a form of politics that promises to give back in order to facilitate practices of scientific taking. As Dr. Hsu suggests above, direct compensation in the form of nominal payments or nutri-foods cannot address the deeper concerns of Aboriginal marginalization, and similarly, future promises of benefit sharing do little to protect and guarantee Aboriginal interests now or in the future.

Informed consent and Aboriginal DNA

Dr. Lee, in his soft and gracious manner, invites me to join him and his colleague to discuss their work on Taiwanese blood samples. A longstanding member of the

Presbyterian church, Dr. Lee is a prominent scientist in Taiwan. The Presbyterian church has been active in Taiwan since the late 1800's and they, along with the Catholic church, are prominent in Aboriginal communities. Over many years, and largely through his church affiliation, Dr. Lee has accumulated a large collection of blood samples from Taiwanese Aborigines. These blood samples, and information derived from them, have made Dr. Lee famous in Taiwan and have formed the material basis for several publications in international scientific journals.

Most of these samples were collected at the church, following explanations from Dr. Lee about the purposes of his research. He told me that he had explained to his research subjects that giving blood would enable him to help them by providing information about their origins and hopefully also to ameliorate some of their common medical conditions. Later in my research, I interviewed a friend of Dr. Lee, a high-level geneticist working at a government laboratory, and learned that she was also conducting research on samples provided by Dr. Lee. Both of these scientists express a two-fold concern that motivates their research; they want to help Taiwan as a country and to help the Aboriginal communities.

Even framed in rhetorics of helping, however, scientific reputations and knowledge production are also at stake in Aboriginal biological sampling. As I discuss in the preceding chapter, a proposed national biobank project is the subject of heated public controversy and debate. And public confidence in the government has been undermined by a history of foreign occupations, martial law, current divisive politics, and a series of recent political corruption scandals. In this climate of enhanced attention to democratic representation, self-determination, and human rights, Aborigines are becoming increasingly concerned about their political rights and the uses to which their biological information and samples are subject. In this current political climate, Dr. Lee has become the subject of public criticism regarding his collection of Aboriginal blood and questions have been raised as to whether or not he obtained adequate informed consent. These questions, in turn, raise additional questions of the nature of the blood collections themselves; was the blood given to Dr. Lee a gift and was it authorized to circulate in future and various circuits of scientific and affective relations? Dr. Lee assured me that his interest is in protecting and helping the Aborigines and that informed consent was obtained for all the samples.[7]

Some of these concerns express a rising political consciousness while others carry somewhat paternalistic undertones as when a concerned professor told me, "yes, but do they really understand what they're consenting to?" Other accounts, however, take the bioethical instrument of informed consent as the problematic object. For instance, in response to my question about concerns regarding informed consent and the collection of Aborigines' blood and the Taiwan biobank project, the Reverend laughs,

> Yeah, what do you mean by consent? What does it mean to be informed? How do you inform them? How do they understand? So this is another issue related to what I am saying, you know, human beings are relational beings. (interview excerpt 8/06)

In invoking relationality, he calls into question both the instrument of informed consent and the conditions of ethics more generally. He questions not only the meaning of being informed and of consent, but also why such information and consent might be the way of constituting right action.

I suggest that informed consent as both a concept and a set of practices, while a necessary minimal standard, occupies an exaggerated semantic space in bioethics.

Critiques of informed consent have become common in the critical social sciences and bioethics literature. Indeed, they also ask what might it mean to be informed? What might constitute consent? What ethical questions does it obscure? Is it, as Sarah Franklin (2006) asks, an empty exercise in box checking? The Reverend suggests that it is in the relational space between people, rather, where ethics is located. It is not in formal and signed documents nor in procedural formalities that claim to authenticate practices as ethical, but in the space of meaningful human interaction.

> If relations are good, then okay. Yes, this is really an issue if you go to a rural area and you want to do some investigation… You ask, "May I do a questionnaire?" ... I think most of the old people will say no. They don't want to answer anything, or they'll answer but it's not their real opinion. You know in Taiwan, especially because we were under martial law for fifty years, you know, people don't so easily trust strangers. But then if you are related by good friends or respectable seniors and they say "okay this young lady wants to do some research, would you please help her," so because there's this senior person that they trust, then they would like to do it.
>
> In that sense, there's informed consent. So in that case, how do we define informed consent? Formal informed consent, you know, with so many legal terms, and philosophical terms, it's hard for anyone to really understand. For instance on the computer, when you want to download something, you have to click "ok", that you've read it, but did you really read it? (interview excerpt 8/06)

Here, informed consent is reframed as a product of a personal relationship, an introduction made between trusted friends or elders. This kind of informed consent, made without formal documentation but through personal introduction, is framed in quite different terms by the Reverend. Where formal informed consent, with its abstract principles and often stilted language may obfuscate as much as it might clarify or inform, a personal introduction and appeal to help between people makes informed consent as an interpersonal relationship which is implicitly understood to inhere an enduring and reciprocal obligation. His narrative points also to the constitutive role of trust in gaining meaningful consent.

In this frame, I ask what would proof of informed consent look like for Dr. Lee, who gained access to Aboriginal blood samples through his long-standing relationship with the community and the church? In a deliberately generous hermeneutic mode, I suggest that the accounts of Dr. Lee position the donation of the blood as an approximate form of gift exchange based in trust and given with the expectation of care. Dr. Lee was able to collect a substantial number of blood samples precisely because he was trusted by the community. He subsequently shared his samples with the second researcher in a spirit of friendship and scientific sharing.[8] I suggest that both of these transfers of blood were made because of privileged relationships and were based in ideas about reciprocity, responsibility, and trust which create a durable bond between researcher and donors, as well as between the two researchers. This is not to suggest that these dyads, nor the fields of exchange, are necessarily similarly constituted, but simply to foreground the types of relationships that are mobilized in the exchanges.[9] In this frame, formal informed consent can be seen as an enactment of a contractual mode characteristic of a market economy and one that may have the effect of effacing more durable modes of commitment and sociality.[10] In this case, the presence of (adequate) informed consent documents would likely foreclose the public critiques of Dr. Lee, but could not answer to questions of what might constitute Dr. Lee's affective obligation to the Aboriginal communities.

In his analysis of the market, Michel Callon suggests that "cognitive science presumes that the individual economic agents are capable of mental calculation"

(1998:4). I suggest that the principle of informed consent operates similarly; it presents a calculative sphere, presupposes and then responsibilizes the consenting individual, and asks them to enter into a contractual mode of relation. This becomes standardized ethical practice, since it insists upon the "informed" agent(s) and mobilizes their own capacity for calculative action, which in turn is substantiated by its documentation. The consent process can thus be viewed as an enactment of market principles. This is not the Reverend's relational form of trust-based informed consent. The rational agent is informed such that they can make rational choices based on a supposedly full disclosure of information. In this calculative frame, the agent/subject is then given the agency to make a choice to participate or to decline to participate, to give or not to give, based upon a relative weighting of risks to potential benefits. In this way, the contract implied and enforced by the informed consent document can be seen as an enactment of market calculation and exchange. In fast-moving arenas of biomedical technologies, however, it becomes increasingly apparent that many future or potential risks and implications of contemporary practices cannot be anticipated, and thus, full disclosure of such risks – a central component of informed consent protocols – cannot be fulfilled in a complete manner.

While I question the operation of informed consent above in that it instantiates a kind of market thinking in what might otherwise be a more durable relationship, and while I have presented a generous interpretation of Dr. Lee's relationships, I do not mean to romanticize the donor-recipient dyad. Indeed it may be problematic in many ways, and furthermore may be viewed as merely enabling the circulation into broader fields of the initial gift. As Anderson (2000) shows in his account of kuru, exchanges of biologicals are subject to misrecognition, and assumptions and relationships may not be durable as the objects circulate in broader fields of exchange. If a privileged dyad motivates, by trust, reciprocal duty, or altruism, the donation of biological material such that it can later be circulated in a broader transactional order, then the moral dimension of the initial dyad can be seen as being subject to instrumentalization in the interest of freeing up such objects for circulation.[11]

The role of relationships of trust are found in practices of biobanking as well, and an umbilical cord blood bank with an explicit interest in collecting and preserving the umbilical cord blood (UCB) of Aborigines remains relatively free from the various criticisms discussed above. Zoebaby[12] foundation was founded just over three years ago. It is a Christian-based UCB bank, with a particular interest in banking the cord blood of Aborigines, and an even more specific interest is those Aborigines living on Orchid Island. The Aborigines of Orchid Island have been the subjects of some of the worst practices of scientific collecting (Tai and Chiou 2008), but nonetheless Zoebaby has been successful in collecting Aboriginal UCB and has avoided many of the criticisms that have plagued other bioscientific projects. Zoebaby's director and founder has worked for many years with Aborigines and sees UCB banking as an important means by which to include Taiwan's Aborigines in the promise of stem cell therapies. The foundation was founded as a charitable organization, underwritten mainly by a successful businesswoman but also supported by smaller donations from their church and individuals. The explicit mission is to establish and maintain a responsible and reputable cord blood bank with a special emphasis on the inclusion of Aborigines.

Taiwan's Aborigines, as a group, tend to be much poorer than other Taiwanese, and the assumption is that most Aborigine families cannot afford the relatively high fees required to collect and store umbilical cord blood. Currently the Zoebaby bank has over 350 UCB units, of which about 69% are paying customers. The foundation offers a unique model of private cord-blood banking in which the service charge from a paying family also covers the collection and banking of that of a baby from an "under-privileged family." Even though Zoebaby's current budget is not adequate to subsidize UCB collection and storage for non-paying clients, the director takes all Aboriginal cord blood, making for an unbalanced budget. "But," the researcher assures me, "money can come in the future, cord blood only comes once."

Their interest is expressed in benevolent terms of including Aborigines in the promise of UCB banking and stem cell therapies, and it is important because, he says, "of how genetically different the Aborigine people are from us." As he says this, he withdraws from his file cabinet a piece of paper showing a map of the genetic relational proximity between populations of Aborigines, other Taiwanese, and various other human kinds (reproduced below in its English version).

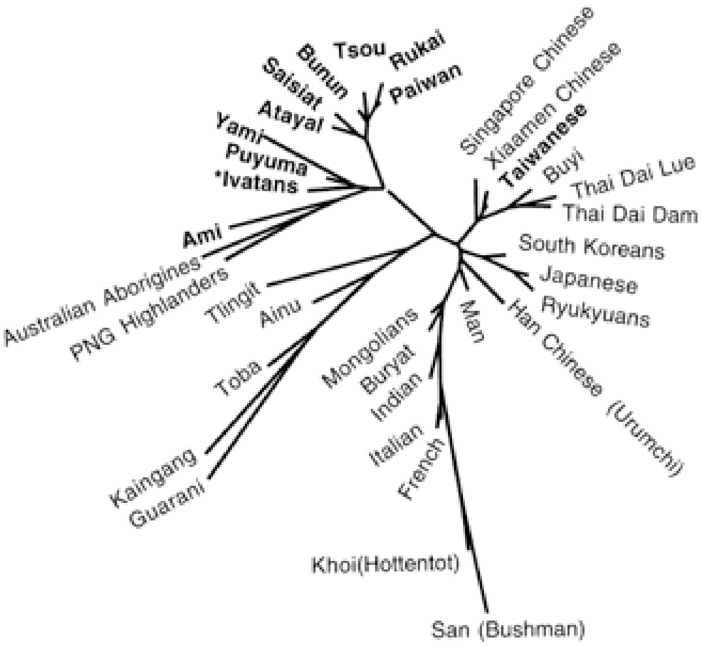

Fig. 1. Neighbor-joining population dendrogram of nine of Taiwan’s indigenous tribes and other ethnic groups. The DA genetic distances were calculated from the gene frequencies of HLA-A and -B loci at the serological level and HLA-DRB1 locus at the allelic level. Data from other populations were take from references described in the statistical analysis.
(Chu, C.-C., et al. 2001:15.)

The neighbor-joining tree is a map depicting the relative evolutionary and genetic distances between populations as measured by counting select alleles. The map shows the nine Aboriginal tribes clustered at one end (upper left), and in bold lettering, while the Taiwanese, understood here as Minnan and Hakka peoples, are listed in bold toward the right of the figure. In the next chapter, I discuss how Aboriginal genetic markers are taken up in projects of nation-building and identity-making in part through bringing Aborigines and "Taiwanese" together through genetic admixture. Here, however, these charts depict the genetic distance between the Aborigines and the "Taiwanese" and substantiate the Zoebaby researcher's depiction of the Aborigines as unique populations significantly different from his category of "us."

Discussion

Despite the enhanced popularity of benefit-sharing models, reciprocity and responsibility are not about direct compensation, and may not even be about downstream benefit sharing. Rather, they entail real enfranchisement at multiple scales. Aborigines are willing to participate in projects of science, as the examples of the Zoebaby foundation and Dr. Lee's sizeable collection of blood samples demonstrate. These relationship-based accounts point to the constitutive role of trust in mobilizing human biologicals for circulation. Ultimately, however, these projects of science may not be self-justifying as global organizations representing indigenous peoples point to historical instantiations in which such genomic projects have only had deleterious effects on the populations studied. Such studies as those seeking a genetic explanation for high rates of Aboriginal alcoholism lend themselves to the production of victim-blaming narratives, just as a focus on genetic uniqueness lends itself to etiologies that efface the influence of socio-political marginalization. Furthermore, genetic studies often serve to disrupt native narratives, histories, and understandings of self and community/lineage. Certainly, such concerns and other fears of genetically-based potential discriminations (e.g. employment, insurance, marital or reproductive) are generated by a broader international indigenous rights politics, but they are also buttressed by long histories of specific disenfranchisement.

Bioethical discourses seek to both address and resolve these problems within bioscientific research. Critiques of informed consent as both ethically inadequate and as a market mechanism point to the role of bioethical instruments in facilitating, through their authorization, projects of science. An alternate model of informed consent and benefit sharing might be of some assistance in facilitating engaged dialogue. Toward this end, Charis Thompson (2008) proposes a model of "truly informed consent" in which the science gives back not property claims but information, and therefore potentially useful knowledge, to the donors. In this way the goals of medical science conjoin with those of the donors and what the science gives back is precisely that which it has to give. Truly informed consent thus involves not box-checking exercises, but an active and sustained mutual engagement on the part of the researchers and the individuals (or communities) who act as biological (re)sources.

Ong and Chen (in press) identify a conjunction in Asian biotechnology that positions the population as both a resource for biocapitalism and as a collective in need of protection and securitization. This is the case for Taiwan's Aborigines in genetics research as well, however, such dual narratives of population in regard to a majority or otherwise privileged group work quite differently than when applied to marginalized or disenfranchised ones. In the case of Taiwan's Aborigines, these dual narratives serve repeatedly to position them as either populations of specific scientific interest or as sick or distressed and in need of special protections. Both narratives appeal to different poles of the same biopolitical discourse that constructs the Aborigines as special kinds of populations that require specific kinds of intervention, either through scientific collecting in the name of knowledge production and possible future therapies, or in public health oriented measures of intervening upon and improving a problematic population.

I do not suggest that the creation of Aboriginal exceptionalism is necessarily inappropriate. Indeed, I find convincing Tai and Chiou's (2008) argument that a collective *dissent* regarding participation in genetic research among Aboriginal groups can supercede individual *consent* without being antithetical to individual liberty and principles of democracy. While scientific projects seek to represent the Aborigines in a biological and ontological sense, Tai and Chiou's concern is also with their representation in a political sense.[13] On calls for a process of public deliberation on the Taiwan Biobank Project, they suggest that Aborigines, with their specific histories of disenfranchisement, serve as particularly important players in gauging the effectiveness of such a process:

> Nevertheless, it seems safe to say beforehand that since indigenous peoples are one of the four populations targeted by the Taiwan Biobank, whether or not they, as a social group or community that has long suffered various sorts of inequalities, can *really* (not only formally) have an equal representation in the deliberative process in question may serve as a litmus test for the adequacy and trustworthiness of such a process. (Tai and Chiou 2008:106)

By acknowledging a historical and persisting social vulnerability, and the significant risks that they face as a targeted group within the biobank project, these authors suggest that it is morally justifiable to demand community consent in the name of safeguarding Aborigines' specific interests. Such interests include individual and group genetic privacy and protection, and not subjecting Aborigines, in their biologies, to exclusive property rights claims by others. Identities are also at stake; scientific studies often create narratives that compete with indigenous ones, and in Taiwan, as Tai and Chiou recount, some indigenous groups have been frustrated by research suggesting that they are either on the verge of extinction or no longer genetically distinct enough to qualify as separate indigenous peoples (2008:113). Additionally, Tai and Chiou make the important acknowledgement that legal recognition of rights (or other protections) does not necessarily translate into actual recognition in practice.

As Reardon (2005) describes, the HGDP was conceptualized by its sponsors as a way to catalog and gain knowledge to benevolent ends, however the project’s failure can be attributed to a failure to produce commensurable approaches to representation, interests, and ethics. Several of the sponsors saw the project as a corrective to problems of representational bias in the Human Genome Project (HGP), that is, they wanted to attend to the criticism that the HGP was not representative of the world population, but rather was a representation of a particular kind of human (i.e. Caucasian). Such a criticism is reminiscent of critiques of Euro-American medical studies that used as the unmarked research subject a white male body. In attempting to represent difference (by attending to different populations) in a biological sense, sponsors sought to simultaneously attend to representation in a political sense. It would seem that only when Aborigines in Taiwan have full social, economic, and political representation, will they be in a position to participate securely and meaningfully in broader projects of (national) science. And even then, looming questions of what scientific knowledge is for may not be adequately answerable, for even as genomic science seeks to know and to tell the truth about people and groups, people have their own knowledges and histories. Many Native Americans, for instance, resist the search for a scientific origin story or linguistic groupings, since as one spokesperson articulated, they already know their origins, and “we know who talks like us” (in Reardon 2005:139). Similarly, the Kavalan people of Taiwan have articulated that they can narrate their own tribal history and do not need outsiders to do it for them; "From their past experiences, they came to believe that genetic research projects aiming to tell the origins of indigenous peoples tend to do more harm than good to the peoples they study" (Tai and Chiou 2008:114).

Specific interests in, and concerns regarding, collections of Aboriginal biomaterials accentuate the need for more enduring kinds of commitments in projects of emergent bioscience more generally, in which humans, their communities, and their biologies are increasingly implicated. Mainstream approaches within bioethics will likely fail to ensure current or downstream ethical practice, and therefore will be unlikely to generate trust and subsequent biological participation. Rather, a different kind of relationship, in which communication, reciprocity, and mutual responsibility between donors/participants and the scientists will need to be developed – one with enduring and reciprocal commitments, and one that simultaneously fosters a context in which science and the people that it both requires and implicates work together meaningfully.

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[1] Ching further specifies,

> The dominant Japanese colonial discourses of *doka* (assimilation) and *kominka* (imperialization) does not simply signify a shift or a conversion from one category of identity to another, such as from 'aborigines' and 'Taiwanese' to 'Japanese' or from 'colonized peoples' to 'imperial subjects.' Rather, these are ideological formations that purposely obfuscate and deflect the issue of the legal and economic rights of the colonized to that of some generalized cultural process of becoming 'Japanese' and' imperial subjects.' *Doka* and *kominka*, by urging and then insisting that the colonized become 'Japanese' (*nihon minzoku*), conceal the inequality between the 'natural' Japanese, whose political and economic privileges as citizens (*kokumin*) are guaranteed, and those 'naturalized' Japanese, whose cultural identities as Japanese (*nihonjin*) are required, but whose political and economic rights as citizens are continuously denied. In short, it was to conceal the fundamental problem of the citizenship of the non-Japanese within the empire that the categories of 'Japanese" (in *doka*) and 'imperial subjects' (in *kominka*) were constructed and mobilized. (2001:6).

[2] Reported in Tai and Chiou (2008:107).

[3] Aborigines have, in fact, been diagnosed with HIV infection and AIDS. Some offer culturalist explanations such as closer family support to explain low rates of reporting, while others suggest that low AIDS-related mortality rates among Aborigines may result from their low overall population and the fact that they may be dying of other conditions that are either not related to, or not reported as, AIDS.

[4] See Reardon 2005:(78 and 192 n. 124.) for a discussion of the problematic definitions of population, and the disagreements as to whether or not "population" was the right unit of analysis in studies of human diversity, including the failed Human Genome Diversity Project.

[5] It is beyond the scope of this chapter, but it should be noted that movements of Presbyterians in Taiwan are irreducible to simple manifestations of missionary practices. They involve a contextual theology and, similarly to Catholic liberation theology movements in Latin America, these perspectives and principles are taken in Taiwan as components of both Aboriginal and national liberation, self-determination, and political empowerment. As Hannah, a Presbyterian, feminist philosopher, and my friend and colleague, patiently explained to me, this is a movement that seeks to make Presbyterian sensibilities appropriate to, and respectful of, its culturally specific context. It is also significant that Taiwan's Presbyterian Church made a formal declaration in 1991 supporting Taiwanese independence from China and calling for a new constitution including special provisions to "especially protect the rights and benefits of aborigines and ethnic minorities". Please see Sun, H. T. and Yang, C. S., 1991, "The Presbyterian Church in Taiwan: A Public Statement on the Sovereignty of Taiwan", available at: www.taiwandocuments.org/pct07.htm.

[6] Hayden describes how these new moves in the name of research ethics rely upon the formulation of new kind of collectives and publics, who can then be addressed, queried, represented, and compensated in ways considered to be appropriate.

[7] I am doubtful that the nature of the consent would be adequate to dominant contemporary standards of informed consent, if it was obtained at all. In another account, Dr. Lee told me that he announced to the congregation what his project was and why he needed the blood samples, I suspect that this is the extent of any informed consent procedure. Clearly, agreeing to give a blood sample can be read to be indicative

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of consent. Whether or not adequate informed consent was actually obtained is not a crucial point for the argument that I make here.

[8] On the ethos of sharing in scientific circulations see Kohler (1999) and Merton (1973).

[9] As Anderson (2000) shows, however, the assumptions that found these kinds of exchanges may not be shared and the bonds that they assume may not be, in fact, durable.

[10] Waldby and Mitchell suggest that informed consent in embryo donation "serves to regulate and formalize the transfer of possession from donor to recipient" (2006:71). In these cases it seems that rather than protecting the health and interests of the donor/subject, it acts as the mechanism of property transfer into a research institution that in turn makes its products available for exclusive property rights claims. Waldby and Mitchell suggest that informed consent in cases of tissue transfer generally can be viewed as "the mechanism that transforms a gift into property" (2006:71).

I suggest further that in most informed consent documents pertaining to embryo donation or transfer for research we can actually pinpoint the moment that this transformation occurs and that it involves a material change in the object. At the point at which consent is given, ownership of the embryo is given to the (e.g.) research laboratory, but in contrast to Waldby and Mitchell, I suggest that this kind of property still retains something resembling a gift-like attachment to its origins, specified in both the limited purposes to which it may be put -- in most cases donors can specify some kinds of limited applications for their embryos -- and in the persisting, though limited, rights that the donors retain in revoking consent.

A second transformation, however, signals the production of a specific form of property. The informed consent documents signal a transformative moment at which the investment of work in the derivation of the cell line comes to be weighed against the privilege of the donors to revoke their consent. I suggest that the embryonic cells come, in this moment, to constitute property in the Lockeian sense of natural resource with work added, and therefore subject to relatively free movement – that is, they become freely transactable. It is in the moment when the cells are harvested from the embryo, that this investment of work and of capital makes this transformation complete; it detaches the embryo's products from its origin. It is in this moment that it loses its prior attachments and becomes wholly the property of the lab. With the addition of time and work, the embryo takes on a different material form, accrues a different value, and confers different rights. In the transformation of the human embryo into property, the market enters into the institutional realm of the ethical through the instrument informed consent documents. It is both the material shift from embryo to its components and derivatives, and its concomitant framing as property, that transforms the revocable object of donation to the freed (transactable) object(s) of science. Waldby and Mitchell articulate the property-based interests of informed consent with clarity, "in our analysis, *informed consent is already based on property rights: the rights of the recipient"* (2006:73, italics in original).

[11] This points to the need to consider the different levels of interaction which are engaged in order to allow biologicals to circulate. This initial dyad may simply be the starting point from which a bio-fragment is eventually alienated and enabled to circulate in a broader field of (e.g.) commercial exchange, whether or not this was intended in the original exchange.

[12] A pseudonym

[13] On these dual meanings of “representation” see Hayden 2003:21.

CHAPTER FIVE

Making Taiwanese (stem cells): identity, genetics, and hybridity

A prominent stem cell researcher announced that the aim of his study on human embryonic stem cells (hESC) was to "establish hESC lines with genetic characteristics of the Taiwanese."[1] In producing uniquely Taiwanese stem cell lines he is simultaneously participating in the discursive production of a uniquely Taiwanese identity founded in genetic claims to difference. Contemporary social science literatures suggest that identity is a contingent and shifting abstraction. For some in Taiwan's elite scientific circles as well as in the popular media, however, genomic science is being used to claim a material and historical basis for a unique Taiwanese identity. Following Latour (1993) that "science is politics by other means," making "Taiwanese" as a scientific category can be viewed as supporting an oppositional political claim
Toward both Taiwan's Kuomintang (KMT) party and the mainland's Chinese Communist Party (CCP).

Appeals to genomic science to know the truth about identity render identity as an irreducible material essence, granting science epistemological privilege, and erasing the myriad cultural, imagined, agentive, and affective components of identity formation. In this way, identity becomes an object of scientific knowledge, and is constituted as a "field of truth" (Foucault 1981:69). In this chapter, I track one such identity-making discourse circulating in Taiwan. It is a discourse that suggests the Taiwanese represent a genetically distinct population from the Han Chinese. I argue that both this strand of

Taiwanese identity-making and the making of Taiwanese stem cells rely on a series of discourses and practices of purification and hybridization that result in the production of populations understood as natural kinds, and constituted as biopolitical objects.

Genetic nationalism

It is into highly charged discourses about Taiwanese nationalism that a strand of genomic science inserts a claim, via population genetics, to authenticate a uniquely "Taiwanese" identity.[2] There is nothing particularly new about using genetic knowledge to buttress or deny claims about ancestry or identity, and a substantial literature addresses new forms of subjectification, sociality, and citizenship that emerge in light of advances in genomic science.[3] Rabinow shows how DNA samples in a French biobank were re-framed as a "national patrimony" in an effort to resist their commercialization (1999:131). French DNA was thus re-conceptualized as something more than a biological object and made into an entity invested with value in both an economic and a moral sense. Wen-Ching Sung (in press) shows how Chinese DNA is similarly viewed as a multi-valent national resource in need of protection from foreign exploitation. Not only the materials of knowledge production, but genomic knowledge itself can take on nationalistic valences. Joan Fujimura (2000) shows that the material continuity between all forms of life inferred from shared DNA can be used to bolster a sense of national pride when a prominent researcher suggests that new genomic sciences will substantiate a Japanese view of the world in which ideas about continuity and animism figure prominently.

In these accounts, claims made through genomic science in relation to nationalist projects require an essentialization of what it means to be French, Chinese, or Japanese. Similarly, Taiwanese identity claims made in relation to genomic knowledge require a specific conceptualization of what it means to be Taiwanese. The construction of a Taiwanese identity based in claims about genetic ancestry offers a unique example of how knowledge production in the biological sciences is taken up in projects of identity-making and nation-building.

Situating "Taiwaneseness"

Taiwan's recent history includes a series of foreign occupations including 17th century settlements by the Dutch and Spanish, followed by an influx of Minnan and Hakka from southern China. Fifty years of rule by Japan ended in 1945 when, in contested treaties, Taiwan was ceded to the Nationalist KMT government. Claiming to be the true representatives of China, the KMT invoked martial law until 1987, effectively creating minority rule over the Minnan and Hakka majority already living on the island.[4] Following a period of reform and transition, full electoral democracy was established in 1996. Although Taiwan currently operates an autonomous democratic government, Beijing's "one-China" policy claims Taiwan and its people as part of China.

President Chen Shui-bian was re-elected in 2004 in a divisive, contested, and close election. In his election campaigns he ran on a strongly pro-independence platform. Despite an economic downturn and losses in the 2008 elections Chen's party, the Democratic Progressive Party (DPP), remains involved in a deliberate project of building a national identity.[5] The pro-independence project articulates with various alternative modes of identity-building, including divisive ethnicity-based discourses, educational reform, and the "new Taiwanese" movement of the 1990s. The "new Taiwanese" (*xin Taiwanren)* advocate a more inclusive approach to "Taiwaneseness" measured as a level of attachment and commitment rather than a specific ethnic origin (Lynch 2004). Dittmer succinctly captures the tension and variability in mobilizing ethnicity in Taiwanese identity-making:

> The focus has heretofore been on the impact of ethnic origins on national identity. True, after 30 years in which ethnicity was coercively "constructed" by the ruling KMT in support of a superimposed Chinese cultural heritage, the ethnic (or subethnic) cleavage seems to have reemerged in essentially primordial form (viz., *benshengren* vs. *waishengren*), in which capacity it functions as a potent mobilizational weapon in the tactical armory of the DPP in its electoral struggle in pursuit of "creeping independence." But the rise of the "New Taiwanese" since 1996 shows that ethnicity still has constructivist, as well as primordial, features, with ethnic identification subject to variation on both calculations of material or strategic advantages and idealistic emotional appeals.
> (Dittmer 2004:483)[6]

Scholarly analysis of Taiwan's contemporary identity focuses on a moving target, as Dittmer points out. It is into this dense, variable, and richly contested terrain of identity and nation-building that genetic science is used to make truth claims about what it means to be Taiwanese.

On "Chineseness"

Narratives of identity are made in contradistinction to other ways of being. In Taiwan, multiple and at times contradictory discourses circulate on what it means to be Taiwanese, and these are most frequently shaped in constitutive tension with what it means to be Chinese. Discourses about "Taiwaneseness" and Taiwanese modernity, however, are refracted off of multiple others. As for diasporic or overseas Chinese[7] more generally, the Taiwanese "face many directions at once – toward China, other Asian countries, and the West – with multiple perspectives on modernities" (Nonini and Ong 1997:12). I am interested here, however, in the argument that seeks to create a Taiwanese identity that disarticulates itself from a Chinese identity.

An argument to be not Chinese requires an examination of what it might mean to be Chinese. An emergent literature addresses itself to the multiple ways of constituting "Chineseness" in contingent configurations that are simultaneously local and transnational. While much of this literature is concerned with making explanations to account for the apparent exceptionalism of Chinese transnational capitalist networks (Tai 1989, Reding 1990), more subtle accounts attend to the new kinds of subjectivities, imaginaries, discourses, and cultural practices that emerge alongside new conceptualizations and lived realities of "being Chinese."[8] Less common still are accounts of those who seek actively to disarticulate themselves from their ascribed identities as Chinese.

The standard historiography of the Chinese, generally promoted by both the Chinese Communist Party (CCP) on the mainland as well as the KMT, supports a common origin for all ethnic Chinese. In this story, a common ancestry is traceable back to *Huang Di*, the Yellow Emperor, and spatialized on the Central Plains of northern China. This account links all ethnic Chinese to a common ancestral, territorial, and cultural origin and it had been the official story taught in Taiwan since KMT rule began in 1945.[9] Tu Weiming explains:

> The question of Chineseness, as it first emerged in the "axial age" half a millennium prior to the birth of Confucius in 551 B.C., entails both geopolitical and cultural dimensions. While the place of China has substantially expanded over time, the idea of a cultural core area first located in the Wei River Valley, a tributary of the Yellow River, and later encompassing parts of the Yangtze River has remained potent and

> continuous in *the Chinese consciousness*. Educated Chinese know reflexively what China proper refers to…they know for sure that the center of China…is in the north near the Yellow River.
>
> (Tu 1991:3 italics added)

In this way, China, and consequently the origins of "Chineseness," are spatialized to an originary location not far from China's contemporary capital of Beijing. Additionally, this spatialized origin is linked to an ancestral origin in *Huang Di*. While, as Tu articulates, civilizational and cultural references, rather than ethnic references, are often prominent in discussions and definitions of "Chineseness," *Huang Di* denotes an ancestral and ethnic origin, and is often evocative of continuity and ethnic pride among the Chinese.[10] Certainly there is no single "Chinese consciousness" and ways of being Chinese exceed older models based in national, territorial, ethnic and cultural configurations.[11] The idea of some kind of Chinese essence is nonetheless mobilized to specific ends, including those of entrepreneurial capitalist alliances based on shared Chinese ethnic identity, (Nonini and Ong 1997:4; Hsing 1997) and those underwriting triumphalist narratives of Chinese capitalism and ethnic chauvinism among the elites of this capitalism (Ong and Nonini 1997).

In contradistinction to this singular narrative, however, "Chineseness" is constituted, imagined, and lived in a multiplicity of ways. Moving away from the idea of "Chineseness" as an essentialized identity rooted in cultural, ancestral, or geographic narratives of commonality, (so-called) diasporic, migrant, transnational, residual, and PRC citizen Chinese are enacting and resisting "Chineseness" in new, contingent and fluid ways.[12]

Chinese not territorialized upon the PRC nation-state have been named in multiple ways, most commonly as *huaqiao* (overseas Chinese) or *haiwai huaren* (Chinese living overseas). Some such accounts highlight nativist attachments to, or longings for, an ancestral homeland. Others focus on displacement and (non)assimilation, or even on second-wave remigrations to more affluent countries (Tu 1991). In nearly all such accounts, Taiwanese are represented as constituting part of this group of overseas Chinese.[13] Some accounts even position them as the penultimate keepers of a residual authentic Chinese culture unspoiled by the perceived Communist excesses on the mainland.

Such culturalist discourses generally position the Taiwanese as being more authentically Confucian, which in turn is strongly linked with Han identity, and then equated with "Chineseness." This position claims the Taiwanese as more culturally Han, and therefore as more Chinese than those living in China under the radical changes of the last century (Brown 2004). Counter-discourses, of course, also exist to disrupt these narratives by citing Taiwanese cultural uniqueness and cultural distance from the Chinese (Chen 2005). Whether claiming the Taiwanese as culturally distinct from the Chinese, or as more culturally Chinese than those contemporaries living on the mainland, both discourses rely on essentialist constructions of what it means to be Chinese. Any such claims are complicated by the contested political claim that Taiwan is part of China. Thus the question as to whether and how Taiwanese are Chinese draws on multiple narrative and political strands that may be alternately evocative of citizenship status, cultural status, or ethnicity.

On being Taiwanese

Taiwanese, like Chinese, is not a stable signifier. Melissa Brown and Marie Lin take this category to include the Hoklo or Minnan and the Hakka ethnic groups. Brown

(2004) uses the term Hoklo to refer to those Taiwanese who speak Minnan dialect (or "taiwanese", *taiyu* or *taiwanhua*).[14] Lin (2001) refers to these same people as Minnan. Both the Hoklo/Minnan and the Hakka mainly began immigrating to Taiwan in the "first-wave" of Chinese immigration from the southeastern provinces of China during the 1600s. However, many of the so-called Mainlanders (*waishengren*) who came to Taiwan as the Communists took over China call themselves Taiwanese, as do their descendants who were born and raised in Taiwan.[15]

Additionally, many people, Minnan, Hakka, and Mainlanders alike consider themselves to be both Chinese and Taiwanese. A set of excerpts from my field notes illustrates some of the complexity involved in these naming practices:

> I handed (the researcher) my name card, printed in English on one side and Chinese on the other. She looked at it for a moment, then looked up at me and asked, "So, are you Chinese or Taiwanese?"
>
> I asked R. and C. (both from Yilan county) if they considered themselves to be Taiwanese or Chinese or both. R. immediately and emphatically replied that they were Taiwanese, "of course!". But a few minutes later, he came over to me and said, "Well, actually, I think I am Chinese, too."
>
> E. told me that she is both Taiwanese and Chinese. She continued, saying that she thinks this question will become obsolete. "I think it's a question because of the current political situation. I think in ten years or so, we will be either Taiwanese or Chinese, depending on the politics then".
>
> I asked L., a junior stem cell researcher, if she considers herself as Taiwanese or Chinese. Her parents are both *waishengren*, but she was born here, so I expected her to say both. But she immediately specified the complexity of the situation, "it depends on what you mean by the question. Do you mean nationally, culturally, or ethnically?" She goes on to make a distinction between Aborigine and Han, and specifies that in referring to the Taiwanese, she means Han. She does not make a distinction between Han and Taiwanese. (field notes excerpts)

I use these examples to illustrate the flexibility and importance of context in ethnic naming practices in Taiwan. A series of public surveys addresses these questions of self-identification by attending more closely to naming practices such as what it means when one says "my country" (*wo guo*) or "my people" (*wo guo ren*) (Wang and Liu 2004). These survey results suggest that a clear distinction between "Taiwaneseness" and "Chineseness" is more flexible and more slippery than is represented in most political discourses, and that public attitudes toward the question of Taiwan independence rely more heavily on practical and contextual circumstances than on ideological stances (Niou 2004).

Making categories

A series of studies and papers conducted and published by Marie Lin and colleagues form the core genetic foundation for claims that differentiate a Taiwanese population from the Han Chinese. They define "Taiwanese" as comprised of the Minnan and Hakka ethnic groups. Using population genetics techniques of Human Leukocyte Antigen (HLA) allele counting, they disarticulate the "Taiwanese" lineage from the *Huang Di* origin story, and thereby de-link them from the Han Chinese.

> "Taiwanese" have been told that their ancestors originated from the Central Plains of North China but migrated to the southeast coastal area sometime after the Han Dynasty… Hence they are assumed to be descendants of "pure" northern Han Chinese from the Central Plains and thus belong to the great tradition of Han. (Lin 2001:192)

The HLA studies, however, suggest that the these Minnan and Hakka Taiwanese come from a genetically distinct population whose ancestors are thought to be the ancient Yueh, indigenous to the southeastern coast of China, and ancestors also to the Singapore and Thai Chinese. These studies thus link the "Taiwanese" as genetically close to the "Singapore Chinese" and the "Thai-Chinese." It would seem, therefore, that it is not specifically 'being Chinese' that this narrative seeks to disrupt, but being northern Han Chinese, with its attendant history of singular ancestry for all Chinese. In fact, the genetic data is used to substantiate a new historical narrative:

> The Minnan (Min) were one of the ethnic groups among the Yueh who lived in Fuchien…the present-day Minnan are descendants of indigenous Minnan peoples although probably limited gene flow from the northern Han occurred… the barbarian status of the Yueh gradually disappeared and they were finally given Han status in history, thus probably resulting in *misinterpretation and erroneous self-assertion* of present-day Minnan as "pure" descendants of the northern Han. In Chinese history, many ethnic minorities adopted Han culture, and many peoples from within these ethnic groups often announced that they were Han, most likely because the Han culture was more dominant at that time and so being a member of a Han ethnic group was both beneficial and a source of pride in the past. (Lin 2001:197 italics added)

This narrative shows the flexibility that inheres in identity-making, and recognizes that ethnic categories are made in relation to specific contextual factors. However, it reasserts genetic science as the true way to reckon descent and ethnic identity, rendering claims based on cultural or historical factors as "misinterpretation" or "erroneous self-assertion."

The scientific categories themselves, however, are subject to examination since, as Foucault (1981), Hacking (1999), Bowker and Starr (1999) and others in the science studies literature have shown, categories are consequential, and category-making is an instantiation of power/knowledge. Contrary to the perception that categories simply reflect real distinctions between groups, categories are reflective, rather, of present interests and available technologies (Rose 1999).

The category of Southern Han is particularly illustrative of the work that goes into category-making, as well as of the work that categories do. Lin places the "Taiwanese" (Hakka and Minnan) as closer to a distinct Southern Han population. Writing on haplotype testing among Taiwan's Aborigines she gives the following comparative results:

> All these haplotypes were also shared by other Asian populations… including Maori, PNG Highlanders, Orochons, Mongolians, Inuit, Japanese, Man, Buryat, Tlingit, Tibetans, Thai Chinese, Yakut, Thais, Javanese, Timor, Buyi, Miao, Singapore Chinese and "Taiwanese". However, no haplotypes were found to be shared by the indigenous groups and either Northern or Southern Han. (Lin 2000:4-5)

This passage contains a noteworthy rhetorical move. As with any classificatory system, the logics of classification are obscured by the reified categories themselves. By inserting them into an accepted classificatory system of distinct groups, Lin reifies a distinction between Southern and Northern Han.[16] She creates an additional distinction, however, since by listing separate categories for "Taiwanese" and both the Northern and Southern Han, she effectively makes "Taiwanese" as a separate and non-Han category. A subsequent paper iterates this schema, reporting that for "Taiwanese" three separate analyses suggest that,

> Minnan and Hakka clustered together with other southern Asian populations including southern Han, Singapore Chinese and Thai-Chinese. Northern Han formed a cluster with Koreans as well as Man and Hui populations. (Lin 2001:194)

In this way, by naming categories of Northern Han, Southern Han, and Taiwanese in population genetics, these groups are made to appear as naturally occurring populations. Southern Han is itself a category that emerges from a set of culturally particular and historically situated naming practices. When I asked a population geneticist close to these studies to clarify the relationship between the "Taiwanese" and the Southern Han, she explained to me:

> Southern Han is just the people who migrated from the north. But most of the people in the south of the Yangtze are indigenous to that area, and

> actually most are ethnically Yueh… They just put all the people including any ethnic mixture as Southern Han; the Han culture became Southern Han because they were defined by culture. (interview excerpt 2/06)

This geneticist further explained that Southern Han is therefore made up of both northern migrants and southern indigenous groups. This explication of the making of the category of Southern Han – as a mixed group sharing an identity based on specific historical factors and cultural naming practices – underscores the situated character of categories in both identity-making and population genetics. The rest of the argument, however, renders these kinds of naming practices and identity-making practices as inauthentic. The "Taiwanese" who imagine themselves as Han could be said to be engaging in a similarly situated practice of identity-making, but instead are positioned as misrecognizing because, like the non-migratory Southern Han, they don't know the truth about their origins. It is through science, and specifically through population genetics, that these authors "hope to clarify the truth about the origin of 'Taiwanese'" (Lin 2001:193). The truth of identity origins is thus viewed as available through science and implies that cultural, historical, and other ways of reckoning identity are invalid.

What genomic science tells us about groups and relations, however, is determined largely by the project with which it is involved. Political discourses that use Lin's scientific findings to support a distinction between Chinese and Taiwanese rely on a conflation of Chinese with Han; they presuppose a singular kind of "Chineseness." Alternate modes of constructing Han or Chinese as a cultural identity exist (Tu 1991, Ong 1999:261 n. 64). A Confucian culturalist narrative, for instance, would claim the Taiwanese as Han even in light of genetic discontinuity (Brown 2004). Thus an interest in supporting the conventional historiography and in constructing "Taiwaneseness" as compatible with "Chineseness" could apply a cultural categorical schema in making these identities.

As Sung (in press) shows, Chinese genome projects are used on the one hand to articulate an ethnic *diversity* of China's 56 recognized ethnic groups that is also viewed as a resource for biotech development. On the other hand, narratives of genetic *unity* are used to buttress territorial claims over both Tibet and Taiwan. Specifically, the genetic relationship between the Han and the national minorities residing in the north and the south is respectively very close, while more significant differences exist between southern and northern Han populations (Sleebaum-Faulkner 2006). In any of these accounts, whether arguing for a distinct Taiwanese genetics or an inclusive Chinese genetics, there is room for interpretive maneuvering. Thus even as Taiwanese studies seem to substantiate a material and scientific basis for a unique identity, Sung shows that genomic studies from mainland China make national unity out of ethnic multiplicity and continue to claim the Taiwanese as Chinese.

Aboriginal admixtures

While the scientific narratives of "Taiwaneseness" operate principally by establishing the Minnan and Hakka as having links to the indigenous Yueh population of southeastern coastal China, a second narrative strand links these Taiwanese to indigenous populations in Taiwan. Lin further distinguishes the "Taiwanese" by observing that 13% of the "Taiwanese" HLA-A, -B, and -C three locus haplotypes appear to be of Aboriginal origin, and thus are presumed to result from several hundred years of interbreeding between the "Taiwanese" and the Aborigines (Lin 2000, 2001).[17] While Lin notes that this indicates a relatively small Aboriginal contribution to the "Taiwanese" genome, this admixture is nonetheless seen to contribute to genetic distinctness and has been taken up in both popular and expert imaginations as further distinguishing the people of Taiwan from the Chinese. A pair of field notes excepts captures a sense of how this information is taken up:

> When I initially expressed doubt about the uniqueness of the Taiwanese genome, and suggested to my colleague that this surely was a tactical political construction, she told me that I should look into it. That, in fact, the Taiwanese were genetically thirteen percent Aborigine.
>
> A genetic researcher, familiar with Lin's work, identified herself as "Minnan Taiwanese." She recounted a story in which she visited a Maori tribe in New Zealand and a Maori man became so excited upon learning that she was from Taiwan, because they shared an ancestral lineage. She was deeply touched, but said, "of course he couldn't tell that I'm not Aboriginal, …(I am) Yueh and Aboriginal, probably a mix."

The Aborigines have been linked genetically and linguistically with New Zealand's Maori's and are thought to be of Austronesian origin, a linkage of particular importance since it posits a separate origin for the Aborigines where mainland Chinese studies have tended to suggest that they migrated originally from China.

The significance of the Aboriginal contribution to the "Taiwanese" genome is further enhanced by the suggestion that "Taiwan's indigenous tribes are probably the most homogeneous (the "purest") population in the world" (Lin 2000:1). Since purity in population genetics is understood as a result of isolation from other populations, the Aboriginal contribution enhances the uniqueness of the "Taiwanese" genome. By linking "Taiwanese" with the autochthonous Yueh of southeastern China contemporary "Taiwanese" can make an ancestral claim to a region on the mainland. By linking through centuries of interbreeding, even if to a relatively small degree, to the Taiwanese Aborigines, these "Taiwanese" can simultaneously make an attenuated claim to indigeneity on the island. These dual genetic narratives serve to authenticate a uniquely Taiwanese genetic identity, buttressed by claims of both Aboriginal purity and specific admixture.

Taiwanese stem cells

Population genetics relies on the production of categories of people in a comparative frame. By comparing genomic markers using techniques of HLA typing, mitochondrial DNA, and Y-chromosome testing, scientists infer degrees of relatedness between groups. HLA markers are also used in determining relative degrees of histocompatibility between individuals and are critical in discussions of organ, bone marrow, and stem cell transplantation. In general, it is thought that the more closely related individuals are genetically, the more closely compatible they will be as biological material donors and recipients. Thus, population genetics and medical science suggest that individuals within a population are more likely to be histocompatible than individuals from different populations.

Current stem cell based therapies, such as bone marrow and umbilical cord blood transplantation, rely on finding histocompatible sources, and a specific promise of stem cell therapies draws on the potential to create stem cell lines with a patient's specific DNA (autologous transplants). Furthermore, medical science points to differential incidences of genetic diseases in different populations (Duster 2003). Stem cells with "Taiwanese genetic characteristics" insert themselves into these discussions of population difference and therapeutic hope. At his talk, a Taiwanese clinician and stem cell researcher discussed the characteristics of the five human embryonic stem cell (hESC) lines he had derived from thirty "discarded blastocysts" left-over from in-vitro fertilization (IVF) treatments. He described his research aims in a series of slides stating:

> It is necessary to establish hES cell lines with the genetic characteristics of the Taiwanese.
>
> The aim of this study is to establish hES cell lines from discarded and donated IVF embryos derived from Taiwanese.
>
> …to establish the HESC line with genetic characteristics of the Taiwanese.
>
> (field notes 10/2005)

When I asked him to clarify the importance of producing hESC lines with specifically Taiwanese genetic characteristics, he replied, "because people in the race – different populations – have different genetics." He envisions a promissory future of foreseeable treatments and "spare body parts for tomorrow" and is "very optimistic that (stem cell scientists) can convert hopes to realities in the near future." [18] His project, therefore, is to ensure that the Taiwanese are included in the therapeutic promise of stem cell research by conducting research on that genetically distinct population and their stem cells. Simultaneously, his rhetoric and his research represent the Taiwanese genome as unique, and thereby support the construction of a uniquely Taiwanese identity.[19] This researcher conducts his research in the frame of a populational therapeutics based in notions of shared heritable diseases, and relative measures of histocompatibility.[20]

As previously mentioned in Chapter Three, Aihwa Ong and Nancy Chen (in press) invoke the notion of "communities of fate" to underscore, in part, how genomic sciences reinforce affective ties based in older notions of family, ethnicity and nation. Genetics are seen to bolster these affective ties as ethnic groups are configured as therapeutic communities in which each individual serves as a potential therapeutic source for the other, while the group also shares perceived potential biological fates. The concept of communities of fate includes a scalar element, operative differentially at the level of the family, the ethnic group, or the nation. In deriving "Taiwanese" stem cells, I suggest this researcher is working on both the ethnic group and the nation. But other narratives are at play in stem cell fields. For instance, cord blood contains therapeutically useful stem cells, and Taipei's Sun Yat-Sen Cord Blood Bank, founded in 1998, suggests that its next aim "will focus on balancing the tilted donor-search for ethnic minorities in Taiwan" (Chen 2006) understood to suggest a focus on Aboriginal groups. In these stem cell narratives, new genetically inflected modes of identity and belonging overlay themselves upon older categories of ethnicity and nation; these modes presuppose a measurable genetic basis for ethnicity that is also expressed as biological similarity.

Purification and hybridization

Technologies of genetic identity-making and technologies of making stem cells both rely on conceptual and technical processes of purification and hybridization. Stefan Sperling (2004), invoking Mary Douglas, suggests that in the German context a concern with purity is expressed in relation to contamination fears in processes of importing both immigrant workers and human embryonic stem cell lines to regenerate the German *Volk*. He shows that the same political rationalities are mobilized in Germany's policy discourses on immigration and hESC research and processes of conceptual purification are required in order to ensure the suitability of both immigrants and stem cell lines for incorporation into the nation's body and body-politic. In Taiwan, however, I suggest that a distinction is more aptly made between purity and hybridity, although contamination remains salient, in making both Taiwanese identities and Taiwanese stem cells.

In the space of the stem cell laboratory both purity and hybridity become bi-valent, variably considered as dangerous or desirable. The technical requirements of the laboratory seem to require an intervallic switching between purposeful hybridity and necessary purity. While the ultimate goal of stem cell research may be a therapeutics of pure self exemplified in the dream of autologous therapies, the production of stem cells with "Taiwanese genetic characteristics" is a therapeutics envisioned at the level of the population. Whereas stem cell research elicits images of self-replicating pure cell lines and pure therapies, it relies on a series of interplays between hybrids and pure forms. Murine models are commonplace in stem cell research, and rely upon the production and maintenance of pure (i.e. genetically identical) strains of mice. Human embryonic stem cell lines are immortalized through the production and ideally infinite reproduction of identical cells. Out of stem cell research laboratories, however, has come a proliferation of previously unimaginable hybrids: somatic cell nuclear transfer (SCNT) performed with human nuclei and rabbit or cow ova; pigs in Taiwan university laboratories with jellyfish genes spliced into their genomes such that they fluoresce green under black light; human stem cells grown on animal feeder culture, to name but a few.

Purity in the stem cell laboratory comes to rely not only on a system that produces and catalogs contamination and danger conceptually, but on one that also technically produces these contaminants and risks. Just as purity is constituted in relation to danger (Douglas 2002) the lab-based dream of purity relies on the presence of the hybrid. Human stem cells cultured on animal feeder layers may not be therapeutically useful because of xenocontamination risks *in vivo*. But it is the human, in the space of the lab, who often constitutes the greatest risk. We had such a contamination scare at one of the laboratories I visited recounted in my field notes:

> At lab A. they had a bad scare last week. The techs working with human cells containing HIV discovered that the virus had breached the bounded space of the clean room. They quarantined the lab and later declared it safe. But the sense of emergency was still evident in way they told the story, and there is talk of converting the entire lab into a clean room.
> (field notes excerpt)

It is the human form as near self, in the form of the human-virus hybrid, who here became the most risky contaminant in the space of the laboratory.

Similarly, making the Taiwanese identity discussed here relies on mixing pure populations. Selves are made from hybridizations of others. That is, "pure" autochthonous populations are drawn on to produce a unique "Taiwanese" population that is necessarily hybrid. The technique of measuring, HLA haplotyping, is a counting of immunological markers used to infer historical degrees of relatedness.[21] And a subsequent rhetorical purification process serves to render this population as pure, in a sense. That is, there is a conceptual purification that goes along with the making of "Taiwanese" as a discrete category and a reified identity of its own. In this way, "Taiwanese" makes its uniqueness by claiming purity on the part of its genetic contributors.

Drawing on high levels of Aboriginal populational purity spatialized in Taiwan, and claiming descent from indigenous mainland ancestors, these geneticists contribute to a narrative of uniqueness made through genetic admixture, that is, through hybridization. Furthermore, population genetics understands purity to mean homogeneity, therefore even a population with an explicitly hybrid origin can be theoretically purified over time.

Gene flow between populations is understood to cause a convergence to common allele frequencies, which Templeton explains as "the homogenizing force resulting from genetic interchange" (Templeton 2003:236). In this way, the conceptual purification is supported by population genetics theory as well.

Purification and hybridization conceptually require the production of categories (Latour 1993, Douglas 1966). That is, neither the concepts of purification and hybridizaton, nor the populations themselves, exist outside of relational definitions and a categorical system. Similarly, the genomic science that seeks to authenticate a particular form of "Taiwaneseness" produces categories of people, understood as populations, and then places those populations in comparative tension to create readings or countings from which to infer degrees of relatedness, degrees of similarity and difference, degrees of purity and hybridity. Within this epistemological frame, populations are constructed as pure and/or as hybrid (admixtures). In the laboratory example, it is the human cells as near-self that pose the greatest risk; similarly the tension between "Taiwaneseness" and "Chineseness" in populational discourses suggests that the near-self here is also constituted as risky. These relative positionings of perceived riskiness may foreshadow the danger that is Mary Douglas' constitutive outside to purity.

…and danger

The scientific papers discussed above suggest identity to be biologically inscribed. A prominent genomic researcher who returned from the US to become an important player in Taiwan's biotechnological progress advocates for a strong and democratic Taiwan that acknowledges its own unique history. She characterizes more clearly the elements of voluntarism and choice in identity-making.

> I think whichever way you decide, you want to be Chinese, you want to be Taiwanese, you want to be Aboriginal, it's fine. But you have to make that decision or choice based on knowledge, not based on ignorance. And what bothers me is that there is so much ignorance, it's that they weren't given the facts and then allowed to make a choice. That to me is not acceptable. (interview excerpt)

Her concern, it appears, is not with making a specific Taiwanese identity *per se*, but with recuperating a valorized identity, rather than accepting an imposed identity and historical narrative. The KMT period of martial law largely took the form of authoritative and sometimes brutal rule by a minority group. In this sense, the new discourse of Taiwanese identity based in genetic uniqueness may be viewed as an insurrectionary recuperation of a subjugated identity.

This same researcher, however, also alludes to what might be the problem with constructing a genetic narrative of Taiwanese identity:

> Like Nazi's, you raise those Nazi kids. You are very patriotic. You're doing the right thing for the country, right, but do they really know all the facts before they were given that choice to say, "I want to be a Nazi?" That's how I feel, that a real democratic society ought to have that. Be given all the facts then you decide – not that you only know half-facts – then make a choice. (interview excerpt)

She refers to the tactics of the KMT during the period of martial-law as well as in contemporary politics, in promoting the narrative that all people in Taiwan with roots in mainland China are descendants of *Huang Di.*[22] As such, they were positioned as either inheritors of the "real" China as claimed by the KMT government, or subjects of mainland China as claimed by the CCP. Both positions are resisted in new narratives of Taiwanese identity. In claiming a genetic basis for identity, however, the specter of race-thinking is raised, and with it the dangers of biologized identity-making which finds its exemplar in Nazi Germany. While the researcher uses the Nazi example to vilify the KMT, it nonetheless underscores the danger of constructing biologized identities more generally, including the new genetic Taiwanese identity.

These examples of Taiwanese identity-making and Taiwanese stem cell making both rely on the production of a population defined in a biological sense. In the work of Lin's team this population is defined based on a set of genetic markers, counted, and distinguished from other populations, also understood as biological. The goal of making stem cells with Taiwanese genetic characteristics underscores one researcher's project of ensuring that this population is included in the therapeutic promise of regenerative medicine that stem cell research hopes to signal. Both moves can be viewed as parts of a project of nation-building and both rely on fundamental practices of purification and hybridization – discursive and technical – and on the production of a population.

It is this population that Foucault identified as the object and target of biopower. In his formulation of the emergence of modern European racism, he traces the bifurcation within society of a single race (understood as a discursive political construct with multiple shifting meanings and power effects) into plural races (Foucault 1981, 2003). This marks a shift from war between states, to an interiorization in which a tension emerges between the pure race and the subrace(s). Here, it is the interiority of the other, the corrupting influence of the subrace(s), that comes to be perceived as threatening to the purity and quality of the general population.

Such internal exclusions are heightened in the genetic discourse of Taiwanese identity with its strong divisions between who is and who is not authentically Taiwanese.

I do not suggest that Taiwan must follow a 20th century European course of nation-building, state-making, modernization, or racism; clearly it has its unique course to take. And the construction of a Taiwanese identity as genetically hybrid would seem to foreclose the possibility of a purity-based racial politics. Nonetheless, the biological production of categories of people, and medical discourses of regeneration, do appear to call for a biopolitical analysis.

Subjecting the specificities of identity-making and stem cell making in Taiwan to critique is, following Foucault, not to suggest that it is bad, but that it is dangerous. The creation of categories of people who qualify, in a biological sense, as authentically Taiwanese necessitates the concomitant creation of those who do not so qualify. Contemporary accounts of the global proliferation of genocidal logics and practices based in ethnic and biological ideas about difference underscore the risks in creating biologized identities. In a young and deeply factionalized democracy such as Taiwan's, it would seem that politics and sciences of inclusion would be in order.

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[1] This statement was made at an internal laboratory lecture given on October 20, 2005 in Taipei. Both anthropological convention and compliance with my human subjects protocol require the maintenance of confidentiality and therefore I name neither the researcher nor the site.

[2] I use the term Taiwanese in its most inclusive sense – that is, it might include Minnan, Hakka (*kejia ren*), Aborigines (*yuanzhumin* – original inhabitant), and Mainlanders (*waishengren* – outside the province, although a more inclusive term is beginning to circulate *xinzhumin* – new inhabitants). I use "Taiwanese" in quotes either when referring to others' usages of the term, or to call attention to its potentially problematic or specific usage. Similarly, Chinese is a problematic designation, since it can be used to mean an ethnic or cultural designation and/or a national identity. When using the term in its ethnic valence, I often attach the qualifier Han for clarity. This is, however, still problematic, since who counts as Han (and by whom) is part of the question addressed here.

[3] See, for instance, Paul Brodwin (2002) and Elliot and Brodwin (2002), and Rabinow (1996) and Rose and Novas (2005).

[4] The 2003 Taiwan Yearbook estimates Taiwan's ethnic composition as follows:

Aborigines	<2%	
Minnan and Hakka	85%	(with a respective ratio of approximately 3:1)
Post-1945 Han Chinese	14%	

Interestingly, they also state that "the Han form the largest ethnic group in Taiwan, making up roughly 98 percent of the population; 15% of this group came to Taiwan after 1945," thus giving another example of the flexible naming practices at play in Taiwan that alternately refer to the Minnan and Hakka as Han, Chinese, or Taiwanese, or a combination of these. (Taiwan Yearbook 2003:25).

[5] I refer to the DPP and the KMT as the representative parties in Taiwanese politics. It should be noted, however, that other parties are active. The KMT and its affiliated parties are commonly glossed as the "pan-blue" alliance, while the DPP and its affiliates are "pan-green". Here, DPP and KMT can be read as stand-in references for "pan-green" and "pan-blue" respectively.

[6] Note that *Benshengren* is used to denote the Minnan and Hakka while *Waishengren* refers to those who came in the 1940's immigration wave.

[7] I hesitate over this usage as it reinscribes Taiwanese as Chinese, which is precisely what is at issue in these discourses.

[8] See for instance, Ong and Nonini 1997, Ong 1999, Rofel 1999.

[9] I take a nominalist sensibility to each of these terms – ethnic, ancestral, territorial, cultural – and consider them to be indicative of narrative tropes that people invoke in flexible and meaningful ways, and not as stable signifiers.

[10] What exactly *Huang Di* represents is somewhat open to interpretation. One of my colleagues, Wenshan, suggests that while *Huang Di* can refer to a blood-based ancestral lineage, it can also be interpreted as a symbolic reference constitutive of an inclusive symbolic family.

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[11] In his fascinating account of Taiwanese identity-making during the Japanese colonial period, Leo T. S. Ching (2001) posits particular emergences of Chinese and Taiwanese consciousness to colonialist situations:

> The universalistic assertion of a "Chinese consciousness" is a response to the real danger posed by the equally universalizing tendency of Western (and to some degree Japanese) imperialism. Likewise, the emergence of a specifically Taiwanese consciousness and its imagined and imaginable Chineseness are overdetermined by the specific status of Chinese nationalism on the one hand and Japanese colonialism on the other. (Ching 2001:66)

[12] As Ong and Nonini (1997) saliently articulate, many, and especially the gendered poor, are absent and silenced in these discourses of Chinese capitalism and entrepreneurialism.

[13] In fact, it is the overseas qualifier that is sometimes challenged, since China's government claims Taiwan's territory and people as its own.

[14] *Taiyu* can be viewed as a problematic way of referring to the language spoken by the Minnan (*Minnan hua*), since it means Taiwanese language, and therefore creates a categorical exclusion of other kinds of Taiwanese.

[15] Of course, some Aborigines also call themselves Taiwanese, and arguably are the only ones who can legitimately claim nativist attachments to the land.

[16] They are not the first to make such a move. See Imanish 1992 and Yao 2002.

[17] The Oxford English Dictionary defines haplotype as: "The particular combination of alleles present in a specific region of a chromosome; (originally) spec. that of the major histocompatability complex." Kittles and Royal suggest that "in order to examine lineage, or the 'gene history' of autosomal markers, it may be important to examine closely linked loci. A set of polymorphic, linked alleles inherited as a unit is considered a haplotype" (2003:223). And Templeton explains further:

> In this sense, a haplotype is like an allele, with the main difference being that a haplotype can refer to any segment of DNA and not just a gene. A mutation at any site in this DNA region usually creates a new haplotype that differs initially from its ancestral haplotype by that single mutational change. As time passes, some haplotypes acquire multiple mutational changes at several nucleotides, and, as a result, differ from their ancestral type. (Templeton 2003:246)

[18] On the “promissory” component of biotechnology and biocapital, see Charis Thompson 2000 “The Biotech Mode of Reproduction”. Cited in Sarah Franklin 2003.

[19] The science and the practicability of his project are matters of some debate. One researcher suggested that this project would require ten to twenty thousand hESC lines to be therapeutically meaningful, and another suggested that the meaning of the HLA markers may be based in scientific fallacy.

[20] On the concept of race in population genetics see Jenny Reardon 2005.
For a discussion of how race, as a variable concept, is inscribed in ethno-racial considerations in genetic research, disease incidence, and biomedical practice see Troy Duster 2003.

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[21] This points to the need to interrogate both the technique itself and its underlying assumptions, but that is beyond the scope of this chapter.

[22] This rendition of Chinese/Taiwanese history is still taught in Taiwanese classrooms, although recent changes include a consideration of Taiwan's history in its own right in addition to a history of China.

CONCLUSION

A clinician who had returned to Taiwan after many years of practicing in the US complains that the medical system in Taiwan is problematic. He explains that it is structured such that physicians have an incentive to see as many patients as possible, resulting in a typical visit or examination that lasts only three to five minutes; "the National Health Insurance reimbursement is tiny, so to make a living physicians need to see a lot of patients." But it is also, he says, because patients are "dazzled by technology." He tells a story of how one of his patients upset him. She came to him with very typical migraine presentation. He recounts the following conversation after he had spent forty-five minutes talking with and examining her:

> Patient: But you haven't examined me! You haven't used any machines, taken an MRI or a CT.
>
> Physician: You have been to two other hospitals. One gave you a CT and the other an MRI. Both were normal weren't they?
>
> Patient: Yes. But I heard you had a new machine so I came here.

The physician was very insulted. "People are too mesmerized by the technology," he says and explains that this has several consequences; it undermines the patient-physician relationship and increases costs because of redundant medical care and the expense of high-tech medical care. He says, "now people come to the hospital not to see the doctor, but to see the machines." In patient encounters like the one described above, a sense of being modern is bolstered by access to expertise and high-tech medicine.

Throughout the preceding chapters, I suggest that stem cell research is an important element in constituting Taiwanese modernity. Biomedical science surpasses older notions of science as interested only in the pursuit of pure knowledge while its applications reside in a disconnected realm of the social. Stem cell research is particularly revealing of this shift in which the co-production of science and society is made apparent. It emphasizes translational research that links explicitly the basic scientific research and its therapeutic application. It also plays into the fetishization of high-tech medicine in Taiwan described by the clinician above. Stem cell research simultaneously promises medical, economic, and political uplift while substantiating imaginations of modernity.

I take modernity as an imagined mode of participating in global forms and ways of being that are marked largely by rational and technocratic institutions and practices. Following the Weberian notion of modernity embodied in global forms, Collier and Ong (2005) emphasize the uneven adoption and specific interactions of such forms. Weber's observation that capitalism and science are powerfully universalizing is perhaps even more astute today than when he first wrote it, and today it certainly seems that science and capitalism have never traveled in such apparent proximity to one another. At present, bioethics conjoins with science to facilitate its travels and to ensure its downstream marketability. Stem cell research is a modern technology that is incorporated into Taiwanese aspirations of fully realized modernity marked by success in high-tech science and already evidenced in Taiwan's world-class semiconductor manufacturing. Stem cell research, meanwhile, is capable of universalization through its transnational dispersals. But it is articulated differently in different sites as Charis Thompson elegantly demonstrates in her comparative ethnographic accounts of Hwang Woo Suk's South Korean stem cell laboratory and that of Singapore's Biopolis. This comparison shows, as she suggests, that "stem cell research in the two countries reveals dramatic differences… that belie the regional and economic parallels a shared label of Asian Tiger tends at first to suggest" (Thompson in press). This dissertation is an account of how stem cell research is articulated in another Asian Tiger nation, Taiwan.

In several Asian countries stem cell research is imagined as mode of knowledge production with which to advance themselves in an arena in which the West holds historical prominence. It is a way, as Aihwa Ong (in press) notes, of "catching up" with and surpassing the West. Some initially imagined that flexible bioethical regimes would accelerate research progress. This appears to be true only within rather narrow limits, and ideas of fast moving research unfettered by a regulatory apparatus have largely given way to explicit bioethical and research regulations. One example I give of this phenomenon is a Taiwanese hESC researcher who, upon returning to Taiwan from working in the West, became hesitant in his research. Three years after returning he still had not used a human embryo because of a lack of governmental and institutional regulatory structure combined with a deeply personal acknowledgement of the unknowable nature of the ethical status of the human embryo. Paradoxically, freedom in contemporary biomedical research is increasingly achieved through regulation.

Bioethics thus becomes an essential element in a nation's achieved status as modern. That is, modernity comes to inhere in a kind of ethics. Singapore, once imagined as a space free from restrictive stem cell research regulations, has come to enact an explicit ethical apparatus. South Korea's Hwang scandal made evident the national embarrassment that can occur when ethical infractions occur, both in terms of treatment of research subjects or donors and standards of scientific practice. Similarly, Taiwan enacted, just after the period represented in this dissertation's research, a stem cell bill regulating research use of human embryos and stem cell research more generally. Observing the processes related to policy-making in Taiwan makes visible how bioethics more broadly is constitutive and representative of new kinds of relationships, concerns, questions, subjects, objects, affiliations and interests. It demonstrates how bioethics, at an institutional level, performs a transnational function of standardizing science practice in relation to research subjects and scientific material extraction, circulation, commercialization, and use. Being scientifically advanced and participating actively in global flows of capital are no longer adequate markers of modernity and increasingly, acting ethically becomes an essential aspect of being legitimately modern.

I have focused on two struggles that shape Taiwan's modernity. The one is a struggle well represented in the postcolonial literature of how to make a nation that is "modern" while still maintaining a sense of self-determination and uniqueness; that is, its modernity is of its own making rather than an inferior instantiation of a Western form. I have shown that Taiwan's modernity, as represented through bioscience and bioethics, expresses this tension in an exemplary manner. It seeks to advance both science and capital through state support of stem cell research, which it insures with bioethical regulation, thereby conjoining the three principal markers of modernity: science, capitalism, and ethics. The second struggle centers on competing visions of how to constitute a modern and ethical Taiwan, and this one is represented most clearly in narratives of freedom, democracy and self-determination. That is, it constitutes itself as a political modernity, and this has come, as I show in Chapter One, to challenge the authority of experts in roles of conventional authority, especially in science and medicine. This enhanced political consciousness is often articulated in bioethical terms and affects practices of biological collection and collectivity as I show in Chapters Three and Four.

Bioethics maps onto a rather limited terrain and the actual ethical constitutes itself much more broadly. In Chapter Two I track perspectives from Confucian and Buddhist representatives involved in stem cell bioethics in Taiwan and I suggest that while they are consulted, even welcomed, their perspectives are lost in the processes of making policy. This is not to say, however, that Buddhism and Confucianism (among other ethical systems) do not figure into these processes. Indeed, Buddhist and Confucian norms shape the social surrounding in which stem cell research, and this dissertation research, take place. They shape everyday thinking and behavior, including at the research bench. Kinship ethics, for example, animate the popular practice of private umbilical cord blood banking as I discuss in Chapter Three. And notions of extended collective responsibility are both enacted and resisted in varied projects of biological collecting as Taiwan is imagined as a source of therapeutic production for broadly constituted Asian populations (see Chapter Three).

State investments in biotech projects in Asia tend, as Ong and Chen (2005) identify, to take a dual view of the population in a biological sense as at once a resource for biotech production and as in need of protection. This protection (or securitization) is conceptualized as biological especially as "Asian" diseases such as SARS and Avian influenza are seen as specific ethno-regional threats. State projects, such as the Taiwan Biobank and stem cell research funding are prompted by, and represent, these dual roles of the population. As the researchers that I portray here work on their scientific projects, many are simultaneously working on patriotic projects of nation-building and population protection as I discuss especially in Chapters One and Five.

These projects, and biomedical science in general, shape notions of biogenomic belonging in Taiwan. Chapters Four and Five show how Taiwan's Aborigines are positioned in both biotech projects and Taiwanese identity. They are viewed as important resources for biotech development because of their unique and historically significant genetics. These research projects foreground Aboriginal genetic uniqueness and serve to distinguish them from Taiwan's broader population. But in Chapter Five I show how the inclusion of Aboriginal DNA in the "Taiwanese" genome is used to bolster a claim to a unique Taiwanese genetics. These various projects show how stem cell research in Taiwan serves broad political and social goals.

Stem cell science is a modern global form; yet it serves deeply nationalistic visions of the role of biotechnology, and its adoption and interactions are uneven and situated. Here, I have shown how, in Taiwan, it is shaped by state investment, governance processes, and multiple actors interested in advancing a nation. It represents a deliberate conjoining of biotechnology and national development that mobilizes collectivist ethics and creates specific biological inclusions and exclusions.

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