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Innovation in Teaching Awards

Title

2014 American Cultures Innovation in Teaching Award Recipient: Leslea Hlusko, Integrative Biology

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THE AMERICAN CULTURES CENTER

UNIVERSITY OF CALIFORNIA, BERKELEY

2014 AMERICAN CULTURES INNOVATION IN TEACHING AWARD RECIPIENT:

PROFESSOR LESLEA HLUSKO, INTEGRATIVE BIOLOGY 35AC

American Cultures Innovation in Teaching Award, Spring 2014 Nominee Statement (written by Leslea J. Hlusko)

OVERVIEW

Immediately after I was hired as an assistant professor in the Department of Integrative Biology, I developed IB35ac Human Biological Variation and I first taught it in the fall of 2005. The department was expanding its curriculum and research into the realm of human biology, and this course articulated well with the expanding interdisciplinary role that Integrative Biology plays. As you may know, this was the first course in the biological sciences to be included in Berkeley's American Cultures program (see the *Berkeleyan* 31 March 2005, vol 33(29) "American Cultures looks ahead").

Enrollment for the course has always been at capacity, and currently serves approximately 300 students each fall. In the fall of 2012, a lab activity was added to the curriculum. Due to the immensely positive feedback about the lab, in the fall of 2013, we increased the units from 3 to 4 and added a weekly discussion section. I am the sole instructor and oversee five GSIs.

This course addresses modern human biological variation from historical, comparative, evolutionary, biomedical, and cultural perspectives. It is designed to introduce students to the fundamentals of comparative biology, evolutionary theory, and genetics. A sound understanding of the biology that underlies human variation is essential for grasping the superimposed concepts of ethnicity and self-identity. As such, this course provides an essential foundation for understanding which components of human variation are biological and which are cultural, and how they have affected each other during the course of our evolution.

The course material is divided into three sections. Everything that humans do today is only possible because our biology enables us to do it (language, technological development, walk, breath, sleep, love, cry, etc.). Therefore, the first third of the class focuses on the evolutionary history that resulted in *Homo sapiens* and patterned all of the variation within our species. As part of this, we cover what evolution is and is not, what is science and what it is not. Much of the controversy in our society about evolution stems from a misunderstanding of what evolution really is and is not. In this first third of the class, we also get introduced to the types of genetic mechanisms that influence our biological variation and assess how much variation there actually is in our species compared to the amount of variation seen in other primates (learning that our species' genetic variation is about equivalent to just one subspecies of great ape).

The discussion sections for this part of the class are more like mini-labs. Students get to handle skeletal remains of humans and other vertebrates. Through these exercises, they get to see

and actually feel what variation looks like across mammals, across primates, across our evolutionary lineage, and ultimately, across and within our own species. We introduce them to geographic variation through replicas of human skulls from around the world, sexual differences between male and female skeletons, and how the skeleton changes over the course of an individual's lifetime. They learn what we can discern from skeletal remains, and also, what cannot be learned. They learn what are biological facts and what are interpretations.

The second third of the class focuses on human biological variation today. We start with skin color, learning the biology of human skin pigmentation, how it is patterned around the world through disparate selective pressures – the need to get enough sunlight in order to synthesize vitamin D while simultaneously keeping enough sunlight out of our bodies in order to protect folate, essential for DNA synthesis. Given that the amount of ultraviolet radiation that hits the Earth's surface varies by latitude, levels of skin pigmentation have been selected differently, and as such, skin color varies. That's all there is to it, biologically speaking. And in fact, this is so straightforward and evolutionarily essential that light skin color has evolved separately at least three times in our lineage. But the cultural implications are huge given that we are extremely visual and social primates. Millions and millions of years of evolution make us very sensitive to differences that we can so readily see.

After addressing skin color, we move on to discuss how our culture has played a role as a selective agent, leading to things like lactase persistence and increased exposure to prion diseases (such as Mad Cow Disease). We cover what is known about the genetics of variation in height, eye color, and body shape. This then leads us into a discussion of body fat and all of the various influences on susceptibility to obesity (ranging from the thrifty genotype hypothesis to the thrifty phenotype hypothesis, to obesogens, and ultimately the newest research on the importance of our gut microbiomes). We see how addressing the obesity epidemic is so much more complicated and interesting than just calories eaten and amount of exercise – all the result of our evolutionary history. We then talk about blood types and how various diseases have influenced the various frequencies of different blood proteins seen around the world (including Sickle Cell Disease/Trait and malaria, and the ABO blood groups and diarrhea). We talk about the immune system and how innate and acquired immunity work to give us a huge amount of variation in immune responses.

All of this ground-work gets us into a conversation about genetics in medicine. We use articles from the *New York Times* on the most recent issues in genetic testing, as well as National Public Radio interviews to get into the human side of this issue.

But there are other components of our species' variation that are not always at the forefront of our minds when we think of American Cultures. We delve into these realms of variation too: fertility, gender, and sexual orientation. How does human fertility really work? How is it that

some cultures end up with people having lots of babies and others, not so many? How can cultural practices interact with our biology to influence the number of children a woman gives birth to? What is gender versus sex? What does the latest biological research tell us about how genes influence sexual orientation? These lectures end up being some of the most provocative for students, many of whom tell me that they really appreciated, for the first time, really learning about our reproductive biology and understanding what is known about the biological influences on behavior and sexual orientation.

The discussion sections for this second third of the class are a combination of mini-labs and discussions based on outside-of-class readings. Students learn about how pigmentation varies in other animals, and how the evolution and biology underlying this is the same as for humans. Our discussion of various types of human biological variation in class provides the backdrop for two weeks of section revolving around the book Salt, Sugar, Fat by Michael Moss, which explores how the food industry exploits our evolutionary history to tweak food-like-substances that are irresistible.

The last third of the class provides more of the social sciences and humanities components essential to completing the American Cultures mission of the course. By this point in the semester, students have a strong grasp of human biological variation. Now, we go back in time to see how scientists have studied human variation in the past. We focus on the American history, and see how racist biology was an essential part of the establishment of American science. This was also essential to settling many other issues unique to the foundation of our country – for example, who built the impressive mounds in the Mississippi River Valley? Could people capable of such complex culture really be the ancestors of the living Native Americans? If the answer was no, then that provided justification for the incredibly harsh treatment the European immigrants were handing them. To demonstrate how controversial and important this issue was at the time, the first research funded by the Smithsonian addressed this question. The class then goes on to see how US scientists perverted intelligence testing from its original intent when developed in France, and ultimately how politicians used these data to dramatically shape the Immigration Acts of the 1920s, laws that ultimately kept millions of people from southern, central and eastern Europe from fleeing to the US just prior to World War II, not to mention the impact on immigration from the Pacific into California. While we have hopes that our science today is a far cry from where it was 100 years ago, or even 50 years ago, there are still issues to remain vigilant about, such as the Pioneer Fund and arguments over innate differences in IQ.

We end the class with a discussion about how human variation cannot be studied in a vacuum. And how race and ethnicity from a social science and/or humanities perspective similarly needs to incorporate an accurate understanding of the biology over which all of the cultural meaning

is superimposed. We bring the topic home by discussing survey data from the University of California survey data (UCUES), which found that things like academic major and family income account for as much if not more similarity in how students perceive the world around them as does their race/ethnicity. And we talk about bioethics around the topic of human genetic variation, as no one in this country today will remain untouched by these issues. California is a particularly rich place for human variation of all types – we are a true melting pot of cultural and biological variation. As such, the relevance of the course to Californian students is particularly easy to grasp.

Discussion sections for this last third of the class move the students deeper into the realm of biology operating within a broader cultural context. We use the book The Immortal Life of Henrietta Lacks (Rebecca Skloot) as a jumping off point for learning about the history of the Institutional Review Board (IRB) and laws protecting human subjects. Students research the IRB and are then assigned specific roles on one of those panels to discuss various historical episodes, such as the Tuskegee Syphilis study. We do this from various points in time, so that students gain an appreciation for the temporal perspective as well as the scientist versus non-scientist perspectives.

DISTINCT CLAIMS OF INNOVATION

In addition to the disciplinary breadth covered in this course, all revolving around the topic of human biological variation, IB35ac also has a significant writing component to it. (This is one of the reasons why we have not been able to increase enrollment even higher, despite the demand.) This writing assignment is perhaps one of the more pedagogically valuable parts of the course. Towards the end of the semester, once students have a solid understanding of what biology is, they are given a question that is based on some recent issue in the news and asked to respond to it using a biological argument. The students are asked to “think like a biologist”. To do this, they are given very detailed instructions and very detailed prompts (see attachments). Students choose from a number of prompts, four were available in the fall of 2013 (see attached). To give you a sense of what these are like, one of the 2013 prompts asked them to argue from the perspective of biology whether or not they think that the soda ban in New York City would actually help curb the obesity epidemic. Another prompt for the 2013 essay asked students to take a stance on whether or not genetic testing of people such as elite athletes ought to be done to help protect their health – a topic, unfortunately, so relevant that less than 3 months after the assignment a Cal football player report to have had Sickle Cell Trait died during a practice¹.

¹ See: http://www.mercurynews.com/sports/ci_25085731/cal-football-player-collapses-dies-during-conditioning-drills

I presented this writing assignment to the College Writing Program's panel "Writing Across the Disciplines" in February 2014. The feedback was tremendously positive (see emails), and will be used as an exemplar for a number of other writing workshops. Caroline Cole and Kimberly Freeman have since worked with my assistance to develop a course within the College Writing Program focused on writing in biology. This will be a new course offered for the first time in the spring of 2015. As you can see from the correspondence provided, the IB35ac writing assignment and my enthusiasm for teaching students to write in a discipline-specific manner as a way to better understand the discipline, provided an important coalescent point for this course becoming a reality.

INFLUENCE ON STUDENT LEARNING

As a human biologist with a strong background in anthropology, I am passionate about teaching students the importance of cross-disciplinary approaches to the problems and issues our society faces today. Human biological variation is one of these – from the day-to-day interactions one person has with other people on the street, to governmental policies on healthcare and food stamps, to how a doctor interacts with her patients. Ignorance underlies quite a lot of racism and hostility. I feel strongly that an understanding of the millions of years of evolution our species experienced would go a long way towards alleviating much of the anger, racism, and hostility that revolves around race/ethnicity/disability/disease/sexual orientation/etc. I have two goals for IB35ac. One is to reach students who may never take another biology class in their lives, to help them grasp how relevant our species' evolutionary biology is to their day-to-day lives. And the second goal is a counter-point, to reach the scientists that are so close to their disciplines that they forget that human biology doesn't operate in a vacuum, that the cultural and historical contexts are just as important to keep in mind as are the insights that will be gained by the science. The American Cultures program provided a unique opportunity to foster this class, and I want to thank you for the opportunity to make IB35ac a reality. The course has been improved substantially with two Instructional Improvements grants, and renovation of the Human Evolution Teaching Lab in the Valley Life Sciences Building in the summer of 2013, for which I am also very grateful. I've enjoyed teaching this class and am very proud of it, and I hope that you may consider honoring this course for the contribution it makes toward achieving the American Cultures' program goals.

IB 35 AC: Human Biological Variation

FALL 2013

Lecture is held on Tuesdays and Thursdays, 9:30-11am in room 295 (Anderson Auditorium) of the Haas Business School. Discussion sections are held on Monday, Tuesday, or Wednesday and meet in room 1007 of Valley Life Sciences Bldg.

Faculty Instructor:

Leslea Hlusko, Associate Professor, Department of Integrative Biology
Office: 5085 Valley Life Sciences Building
Office Hours: 10am-12pm Wednesday, or by appt.

Graduate Student Instructors:

Theresa Grieco, PhD candidate, Dept of Integrative Biology
Ashley Poust, PhD candidate, Dept of Integrative Biology
Whitney Reiner, PhD candidate, Dept of Integrative Biology
Andrew Rush, PhD candidate, Dept of Integrative Biology
Melinda Yang, PhD candidate, Dept of Integrative Biology

All GSIs are available for course content questions. GSI office hours will be held on Fridays from 1-3pm in room 1005 VLSB. If you need to meet with a specific GSI, or cannot make this time, please make an appointment through the course email (see below).

Course email address: ib35ac@berkeley.edu

Course Description: This course addresses modern human biological variation from historical, comparative, evolutionary, biomedical, and cultural perspectives. It is designed to introduce students to the fundamentals of comparative biology, evolutionary theory, and genetics.

Prerequisites: There are no prerequisites for this course.

Course Format: This is a 4 unit lecture course with discussion section. Lectures will be held twice a week for a total of 3 hours, and students will participate in the one-hour discussion section each week in which they are enrolled.

Grading: Performance will be based on a total of 510 possible points distributed across five assignments:

- | | | |
|-------------------------------|-----------------|---|
| 1) Exam 1 | 100 points | Thursday, October 3, 2013, 9:30-11am (295 Haas) |
| 2) Exam 2 | 100 points | Thursday, November 14, 2013, 9:30-11am (295 Haas) |
| 3) Exam 3 (final) | 100 points | Tuesday, December 17, 2013, 3-6pm (location TBD) |
| 4) 5 page paper | 100 points | due Tuesday, November 26, 2013, 9:30am (295 Haas) |
| 5) Discussion section | 110 points | (10 points earned each section meeting) |
| 6) <i>Extra credit option</i> | <i>5 points</i> | <i>(Teaching Biology Project)</i> |

Final grades will be calculated as the total number of points earned divided by the total possible (510). Final grades are determined as:

98-100%	A+	83-87%	B	78-79%	C+	60-69%	D
93-97%	A	88-89%	B+	73-77%	C	<60%	F
90-92%	A-	80-82%	B-	70-72%	C-		

Exams will be entirely scantron graded. If necessary, exams will be scaled but not curved (this is to your advantage).

The student community at UC Berkeley has adopted the following Honor Code:

“As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others.”

The expectation is that you will adhere to this code, as your instructors pledge to do as well. For more information, please visit this website: <http://asuc.org/honorcode/index.php>

Policy on UC Berkeley’s Code of Student Conduct: All students are expected to follow the University of California at Berkeley’s Campus Code of Student Conduct, as is published at <http://campuslife.berkeley.edu/code-of-conduct>. Cheating, plagiarism, or any other form of academic dishonesty will not be tolerated (102.01).

Policy on plagiarism:

In academia ideas are our commodity. Taking direct text or ideas or data or results from someone else’s work without properly giving credit is essentially stealing. Representing them as your own is unethical and disrespectful. This is unacceptable in a university and we take it very seriously here at UC Berkeley. We will pursue disciplinary action against students who plagiarize in this class. If you are unfamiliar with plagiarism you need to read the plagiarism information we have posted on the course bSpace site prior to writing your paper. See also the tutorial on the Biosciences Library website: http://www.lib.berkeley.edu/BIOS/media/bio1b_tutorial/module4.html

Required texts:

Immortal Life of Henrietta Lacks, by Rebecca Skloot (paperback) ISBN 978-1-4000-5218-9

Living Color, by Nina G. Jablonski, UC Press ISBN 978-0-520-25153-3

Salt, Sugar, Fat, by Michael Moss, ISBN 1400069807

Course website:

There is a web site for the course available to enrolled students through bSpace at <https://bspace.berkeley.edu>. Abbreviated class slides will be posted by 8pm the night before each class meeting. Reading assignments and required readings outside of the required texts will be posted on bSpace. Important announcements related to the course will be posted on the bSpace site. It is your responsibility to check this site. You can sign up to receive announcements by email or get in the habit of checking the site regularly.

Email policy:

In order to keep class queries as a priority, we have established a class-specific email address. The instructors will respond to emails within 24 hours from 8am on Monday through 5pm on Friday. You will not receive email replies over the weekend.

Although email is available to you 24 hours a day 7 days a week, we unfortunately cannot be. Please keep this in mind. ALL EMAIL RELATED TO THE CLASS MUST GO THROUGH THE **IB35AC@BERKELEY.EDU** ADDRESS. Given the vast amount of research and administrative-related email correspondence that Dr. Hlusko and the GSIs face on a daily basis, WE CANNOT GUARANTEE A REPLY IF YOU EMAIL DR. HLUSKO OR THE GSIs DIRECTLY.

Please keep in mind that any of the GSIs and/or Dr. Hlusko will read **ib35ac@berkeley.edu** email. If you would like to discuss a confidential issue with only a particular GSI or Dr. Hlusko, please write to ib35ac@berkeley.edu to request a meeting or set up a meeting in person.

You must sign your email with the official name you use with the University and/or use your email address registered with the University. If we cannot tell that you are officially a student at Berkeley and enrolled in IB35ac this semester, we will not reply to your email. THIS INCLUDES MESSAGES SENT FROM CELL PHONES.

Please use proper grammar and complete sentences so that your request is clearly understandable.

Policy on accommodation of religious holidays and other scheduling conflicts: In compliance with Education code, Section 92640(a), it is the official policy of the University of California at Berkeley to permit any student to undergo a test or examination, without penalty, at a time when that activity would not violate the student's religious creed, unless administering the examination at an alternative time would impose an undue hardship which could not reasonably have been avoided.

All deadlines and exam dates are noted on this syllabus. It is your responsibility to note any conflicts with exams and due dates and let the instructor or GSIs know. If you have other scheduling conflicts, please see the guidelines at: <http://tinyurl.com/schedconflictguidelines>.

Policy on exams: We will not administer make-up exams. If you have to miss an exam for a valid, unforeseeable and urgent reason, one of your other exams will be counted twice. For example, if you have a valid family emergency and miss exam 1, you may choose either exam 2 or exam 3 to count twice. If you do find yourself facing an unforeseen emergency, please contact us as soon as possible to let us know.

Documentation will be required. Please note: this policy is for valid emergencies (i.e., illness, death in the family, need to attend a legal proceeding, your apartment burned down, etc.). Students are otherwise expected to take all three exams.

While we will remind you about exam logistics, you are responsible for making sure that you complete every question and turn in the exam before you leave the room in which it is administered. We will not accept your exam after you have left the classroom.

If you decide to enroll in two courses that meet at the same time (which we strongly advise against), be aware that you will have two final exams scheduled for the exact same time. We will not make accommodations for you – you will be expected to take the final exam for IB35ac.

Policy on the paper assignment: Only a documented illness or some other unforeseeable emergency will allow us to grant you a later due date for the paper than what is posted on this syllabus. Anticipated events do not count as acceptable reasons for turning in your paper late (even if it is a University-approved one), as you can and should plan ahead and turn your paper in early.

Policy on attendance for lecture: We do not enforce attendance. That said, be advised that exam content will primarily derive from lectures. The reading material is additional information that supplements but does not repeat what is presented in class. You are responsible for both. It is *strongly* recommended that you do not skip lecture.

Policy on attendance for discussion section: Again, we do not enforce attendance. That said, be aware that there will be an activity in each section worth 10 points of your final grade. There are 12 discussion section meetings. Your lowest section score will be dropped, for a maximum discussion section score of 110 out of 110. Another way to think of it is that each section meeting is worth about 2% of your final grade, outside of the pedagogical value. Material presented in section will be included on the exams. It is *strongly* recommended that you do not skip your discussion section.

Policy on laptop use in class: We will start the semester allowing the use of laptops in class SOLELY for the purpose of taking notes. In years past this has sometimes lead to an abuse of the privilege and resulted in class disruption. For example, students who use class time to catch up on Facebook or to watch movies distract the students around them. This negatively impacts the learning environment. Therefore, laptops will be allowed only if everyone follows these rules: 1) You are not allowed to run a power cable across the steps in the classroom or to sit on the stairs in order to have your laptop plugged in. This is a safety hazard. 2) You are only allowed to use your laptop for the purpose of taking notes. 3) I encourage students who are

distracted by the laptop activities of other students to let one of the instructors know. If laptop use starts to impinge on the classroom experience, they will be banned for the remainder of the semester for everyone.

Policy on cell phones: All cell phones need to be silenced during class. We all understand that there may be occasional situations in which you need to receive or send a text, but keep in mind that excessive texting or other use of your phones is distracting to other people in the class. If your cell phone activity becomes disruptive, you will be asked to leave the class.

Cell phones must be turned off and put away during all exams. If you use your phone (even if it just rings) during an exam you will be asked to leave and you will receive a zero on the exam.

Policy on students with learning disabilities: In order to adequately accommodate students with learning disabilities that require additional services, we need to know who you are and what your needs are by **September 15th**. If you delay processing your paperwork, we will not be able to accommodate you for the semester. The Disabled Student Program (DSP) requires a significant amount of lead-time from us prior to each exam, and therefore we cannot accommodate last-minute or late paperwork. Do not delay in finalizing and confirming your accommodations.

Extra credit project: Your one and only opportunity to earn extra credit for this course will introduce you to the pedagogy of biology, i.e., teaching biology. For 5 extra points, you are invited to either respond to an article about science education or participate in a study directed by Diane Lam, a PhD candidate in the Graduate School of Education (dianelam@berkeley.edu). She will be coordinating all of the logistics around this extra credit opportunity. More details will be posted on bSpace and announced in class.

Course Outline and Due Dates:

Exams and the paper assignment due dates are in **bold**. Discussion section topics are in *italics*.

** Reading assignments will be posted on the course website. **

Aug 29 Class 1: Introduction

Sep 2, 3, 4 Discussion Section: no section this week

Sep 3 Class 2: Evolution

Sep 5 Class 3: Scopes & the Skeleton

Sep 9, 10, 11 Discussion Section 1: Concepts of evolution

Sep 10 Class 4: Our place in nature

Sep 12 Class 5: The human diaspora as recorded in rocks

Sep 16, 17, 18 Discussion Section 2: Human cranial variation

Sep 17 Class 6: No lecture today

Sep 19 Class 7: Genetics

Sep 23, 24, 25 Discussion Section 3: Genetics

Sep 24 Class 8: The human diaspora as recorded in our DNA

Sep 26 Class 9: Variation, speciation, & heritability

Sep 30, Oct 1, 2 Discussion Section 4: review for exam during section meeting times

Oct 1 Class 10: Comparing variation

Oct 3 Class 11: EXAM 1

Oct 7, 8, 9 *Discussion Section 5: Topic 1 related to Living Color*

Oct 8 Class 12: Skin color

Oct 10 Class 13: Gene-Culture evolution

Oct 14, 15, 16 *Discussion Section 6: Topic 2 related to Living Color*

Oct 15 Class 14: What we look like

Oct 17 Class 15: Thrifty genotypes & natural selection

Oct 21, 22, 23 *Discussion Section 7: Topic 1 related to Salt, Sugar, Fat*

Oct 22 Class 16: Blood

Oct 24 Class 17: Genetics in medicine

Oct 28, 29, 30 *Discussion Section 8: Topic 2 related to Salt, Sugar, Fat*

Oct 29 Class 18: Fertility I: Biology

Oct 31 Class 19: Immunity

Nov 4, 5, 6 *Discussion Section 9: Paper workshop 1*

Nov 5 Class 20: Fertility II: The interface with culture

Nov 7 Class 21: Sex & Gender

Nov 11, 12, 13 *Discussion Section: no section, evening review session (Nov 12, Tues, 6-8pm, rm 100 GPB)*

Nov 12 Class 22: Sociobiology (genetics of behavior)

Nov 12 6-8pm *Exam 2 review session in room 100 GPB*

Nov 14 Class 23: EXAM 2

Nov 18, 19, 20 *Discussion Section 10: Paper workshop 2*

Nov 19 Class 24: The science of race, Part 1 (before 1900)

Nov 21 Class 25: The science of race, Part 2 (1900-1960s)

Nov 25, 26, 27 *Discussion Section 11: Topic 1 related to Immortal Life of Henrietta Lacks*

Nov 26 Class 26: Why race matters in America today (PAPERS DUE AT START OF CLASS)

Nov 28 No Class: Thanksgiving

Dec 2, 3, 4 *Discussion Section 12: Topic 2 related to Immortal Life of Henrietta Lacks*

Dec 3 Class 27: The bioethics of human variation in the 21st century

Dec 5 Class 28: The future

Dec 9, 10, 11 Review sessions will be held during normally scheduled discussion section times and in the same room where all previous sections will have been held (1007 VLSB).

Dec 17 Tuesday, 3-6pm EXAM 3 (final exam, location will be announced by the registrar's office)

August 29, 2013

IB35ac Class 1: Intro

As this is the first time we'll meet, this lecture will introduce you to the structure and goals of the course. I'll also describe how I came about teaching the class and how my views on the subject have changed over the years. This is a biology course, but it is also an AC course; I'll explain what this means and why. And I'll also argue that it DOES matter whether or not you understand the biology of human variation, no matter what your major or career plans. We'll start the course content with a quick overview of life on Earth, setting the stage for Class 2's discussion of evolution.

Assigned reading:

none

September 3, 2013

IB35ac Class 2: Evolution

This lecture introduces you to Charles Darwin and what it was he is so famous for (evolution by natural selection). We'll discuss evolutionary fitness, homology versus analogy, and primitive versus derived.

We can't talk about human evolution without addressing how religion comes into play with the science. Since evolution forms the basis for all of human biological variation, this lecture will also address why the study of evolution is science, and contrasting this with teleological perspectives (i.e., creationism and intelligent design). We'll get more into the creationism debate in the next lecture.

Assigned reading:

Sulloway FJ. Why Darwin rejected intelligent design. In: Intelligent Thought, 2006, edited by J Brockman. pp. 107 – 125.

(Apologies for the goofy way this chapter was scanned into the PDF – all of the pages are there but you'll need to get used to the orientation.)

If you want more (but definitely NOT required):

Supplemental reading:

Editors. 2009. A theory for everyman. *Scientific American* January, p. 32.

Lehrman S. 2008. The Christian man's evolution. *Scientific American*, November p. 100-102.

Shermer M. 2006. Darwin on the right: why Christians and conservatives should accept evolution. *Scientific American* October, p. 38.

Supplemental in-depth reading:

Dennett DC. 1995. Darwin's Dangerous Idea. Touchstone, New York.

Numbers RL. 1992. The Creationists: The Evolution of Scientific Creationism. University of California Press, Berkeley.

Extra-Curricular Reading (fiction):

McDonald R. 1998. Mr. Darwin's shooter. Atlantic Monthly Press, New York.
(historical fiction)

Muller RA. 1999. The Sins of Jesus. Auravision Publishing.

*** This is a Berkeley professor. He teaches the Physics for Future Presidents class.

Additional Resources:

National Center for Science Education (<http://ncseweb.org/>)

"The National Center for Science Education (NCSE) is a not-for-profit, membership organization providing information and resources for schools, parents and concerned citizens working to keep evolution in public school science education. We educate the press and public about the scientific, educational, and legal aspects of the creation and evolution controversy, and supply needed information and advice to defend good science education at local, state, and national levels. Our 4000 members are scientists, teachers, clergy, and citizens with diverse religious affiliations."

Check out the TalkOrigins Archive, a website that explores the creation/evolution controversy

<http://toarchive.org/>

There are some really interesting articles organized by topic under "Browse the Archive."

September 5, 2012

IB35ac Class 3: Scopes & the Skeleton

And since we are talking about evolution we definitely can't forget about the (in)famous Scopes trial of 1924. I'll discuss that a bit today. Then for something completely different, we'll discuss the skeleton as a phenotype – how it varies and the sources of that variation. The skeleton is a great entry-phenotype for thinking about how genes, environment, evolution, and culture influence its shape, aka, "morphology."

Assigned reading:

Gibbons A. 2009. Civilization's cost: the decline and fall of human health. *Science* 324:588.
Study the three skeletons provided in the PDF named, "Larsen_OurOrigins_skeletons"

If you want more (but definitely NOT required):

Supplemental reading:

Chapter 3 from:

White TD, MT Black, PA Folkens. 2012. Human Osteology 3rd edition. Elsevier, Academic Press, San Francisco.

Supplemental in-depth reading:

Larson EJ. 1997. Summer for the Gods. Basic Books.

September 10, 2013

IB35ac Class 4: Our place in nature

This lecture is a whirlwind review of the evolution of life on Earth, mammalian evolution, and a quick overview of primate evolution up to about 1 million years ago. I'll talk about how the planet has changed in terms of environment, plate tectonics, orientation of continents, contingencies (asteroids), etc.

Assigned reading:

White TD. 2006. Human evolution: The evidence. In: Intelligent Thought, edited by J Brockman. pp. 65 – 81.

Pontzer, H. (2012) Overview of Hominin Evolution. *Nature Education Knowledge* 3(10):8
<http://www.nature.com/scitable/knowledge/library/overview-of-hominin-evolution-89010983>

If you want more (but definitely NOT required):

Supplemental reading:

Gibbons A. 2009. A new kind of ancestor: *Ardipithecus* unveiled. *Science* 326:36-40.

Gould SJ. 1994. The evolution of life on Earth. *Scientific American*, October 92-100.

Milton K. 1993. Diet and primate evolution. *Scientific American*, August p. 86-93.

Van Arsdale, A. P. (2013) Homo erectus - A Bigger, Smarter, Faster Hominin Lineage. *Nature Education Knowledge* 4(1):2

<http://www.nature.com/scitable/knowledge/library/homo-erectus-a-bigger-smarter-97879043>

Supplemental in-depth reading:

Dawkins R. 2004. The Ancestor's Take: A Pilgrimage to the Dawn of Evolution. Houghton Mifflin.

Shipman P. 2001. The Man Who Found the Missing Link: Eugene Dubois and His Lifelong Quest to Prove Darwin Right. Simon & Schuster.

Walker A and Shipman P. 1996. The Wisdom of the Bones. Knopf.

Trinkaus E and Shipman P. 1992. The Neanderthals: Changing the Image of Mankind. Knopf.

Supplemental Activity:

In October 2009 a team of scientists (including your IB35ac professor) lead by Professor Tim White here at Berkeley published a suite of papers describing the life and times of a 4.4million-year-old human ancestor. The species is called *Ardipithecus ramidus*, and the skeleton on which much of the work was based is nicknamed "Ardi." The Discovery Channel documented this amazing new discovery with a two-hour documentary, "Discovering Ardi." We have put this on reserve if you'd like to check it out. This will give you a great sense of how the science of paleontology is done, as well as a good introduction to this very early member of our family tree.

To view "Discovering Ardi" go to the Media Resource Center, Moffitt Undergraduate Library. Be sure to bring your Cal student ID card. The video can be checked out for a restricted amount of time and must be viewed in the Media Resources Center (MRC), which is on the bottom (1st) floor of the Moffitt Undergraduate Library during the following hours:

Monday - Thursday: 9 am - 9 pm*

Sunday: 1 pm - 9 pm*

Friday: 9 am - 5 pm*

* Patrons viewing materials in MRC must exit 15 minutes prior to closing times, so that equipment may be cleaned

Saturday: 12 noon - 5 pm*

How do I get to the Moffitt Undergraduate Library?

1. The Moffitt Undergraduate Library is located near the center of campus, just Northeast of the large Doe Library
2. Upon entering the MRC, present your Cal student ID in order to check out the Ardi video. If it is already checked out, you may have to wait or come back later as there is only one copy on reserve.
3. The MRC staff will direct you to the screening room with a DVD player to watch the video. If you have trouble loading or screening the video, ask the staff for assistance.
4. When finished, properly eject the video and return it in its original condition (ie. in its case) to the MRC staff desk.
5. For further information on the policies of the MRC, please visit their website: <http://www.lib.berkeley.edu/MRC/>

September 12, 2013

IB35ac Class 5: The Human Diaspora as Recorded in Rocks

Today we'll travel from about 500,000 years ago to the modern spread of humans around the world. We'll talk about the interlacing lines of evidence that reveal this evolutionary history, focusing on the data that we find in rocks (fossils, artifacts) and their temporal and geographic placement. A complicating factor in all of this is climate change, as sea levels and glacier coverage have changed quite dramatically, making different parts of the world's landmass to varying degrees easier or more difficult to access.

Assigned reading:

*** These readings are a bit more detailed than necessary, so please don't spend time memorizing detail beyond what I covered in lecture. ***

Bae, C. J. (2013) . Nature Education Knowledge 4(8):4

<http://www.nature.com/scitable/knowledge/library/homo-erectus-a-bigger-smarter-97879043>

Campisano, C. J. (2012) Milankovitch Cycles, Paleoclimatic Change, and Hominin Evolution. Nature Education Knowledge 4(3):5

<http://www.nature.com/scitable/knowledge/library/milankovitch-cycles-paleoclimatic-change-and-hominin-evolution-68244581>

Harvati, K. (2012) What Happened to the Neanderthals? Nature Education Knowledge 3(10):13

<http://www.nature.com/scitable/knowledge/library/what-happened-to-the-neanderthals-68245020>

If you want more (but definitely NOT required):

Supplemental reading:

Diamond J. 2002. Evolution, consequences and future of plant and animal domestication. *Nature* 418:700-707.

Feder KL. 2002. Frauds, Myths, and Mysteries: Science and Pseudoscience in Archaeology. McGraw-Hill Mayfield, San Francisco. Chapter 7: The Myth of the Moundbuilders, pp. 149 – 175.

Mellars P. 2009. Origins of the female image. *Nature* 459:176-177.

Stringer C. 2002. Modern human origins: progress and prospects. *Philosophical Transactions of the Royal Society of London B* 357:563-579.

Trinkaus E and Shipman P. 1993. Neandertals: Images of ourselves. *Evolutionary Anthropology* 1(6):194-201.

Walker PL. Caring for the Dead: Finding a common ground in disputes over museum collections of human remains.

Supplemental in-depth reading:

Diamond J. 1997. Guns, Germs, and Steel. Vintage, Random House.

Mann CC. 2006. 1491: New Revelations of the Americas Before Columbus. Knopf, New York.

Wiley GR and Sabloff JA. 1974. A History of American Archaeology. W. H. Freeman and Co., San Francisco. (this is an essential read if you are thinking of studying archaeology)

Extra-Curricular Reading (fiction):

Kurtén B. 1980/1995. Dance of the Tiger: A Novel of the Ice Age. University of California Press, Berkeley.

September 19, 2013
IB35ac Class 7: Genetics

Offspring look like their parents because they inherit genetic material from them. I'll introduce the concept of meiosis and recombination, and the definition of "gene". We'll briefly talk about regulatory elements, protein-coding elements, the triplet code, RNA, founders, etc.

Assigned reading:

If these basics of genetics are new to you, please check out DNA From the Beginning at:

<http://www.dnafb.org/>

This is a fantastic on-line learning site sponsored by the Cold Spring Harbor Laboratory.

There are three primers: Classical Genetics, Molecules of Genetics, and Genetic Organization & Control. If you are very new to genetics, or want a great review, go through all three. If you are just looking to catch up on what we talked about in class today & then some, just go through the Genetic Organization & Control section.

Another excellent resource:

<http://www.nature.com/scitable/ebooks/essentials-of-genetics-8/contents>

If you want more (but definitely NOT required):

Supplemental reading:

Carroll SB, Prud'homme B, Gompel N. 2008. Regulating evolution. *Scientific American* May, p. 60-67.

Mindell DP. 2008. Evolution in the everyday world. *Scientific American* January, p. 82-89.

Supplemental in-depth reading:

Carroll S. 2005. Endless Forms Most Beautiful: The New Science of Evo Devo and the Making of the Animal Kingdom. W.W. Norton & Co.

Extra-Curricular Reading (wonderful non-fiction book but a bit outdated):

Ridley M. 1999. Genome: The Autobiography of a Species in 23 Chapters. Perennial, Harper Collins.

September 24, 2013

IB35ac Class 8: Genetics: The Human Diaspora as recorded in our DNA

There is DNA inside and outside the nucleus. Mutations can happen in the genetic material in both places, but this happens at different rates. What are the implications of this? Introduction to four forces of evolution, HWE, and mtDNA and YDNA studies of modern human diaspora.

Assigned reading:

Fisher SE, Ridley M. 2013. Culture, Genes, and the Human Revolution. *Science* 340:929-930.

If these basics of genetics are new to you, please check out DNA From the Beginning at:

<http://www.dnafb.org/>

This is a fantastic on-line learning site sponsored by the Cold Spring Harbor Laboratory. There are three primers: Classical Genetics, Molecules of Genetics, and Genetic Organization & Control. If you are very new to genetics, or want a great review, go through all three. If you are just looking to catch up on what we talked about in class today & then some, just go through the Genetic Organization & Control section.

Another excellent resource:

<http://www.nature.com/scitable/ebooks/essentials-of-genetics-8/contents>

If you want more (but definitely NOT required):

Supplemental reading:

Drayna D. 2005. Founder mutations. *Scientific American* October p. 78-85.

Ho, S. (2008) The molecular clock and estimating species divergence. *Nature Education* 1(1)

Stringer C. 2002. Modern human origins: progress and prospects. *Philosophical Transactions of the Royal Society of London B* 357:563-579.

Pakendorf B and Stoneking M. 2005. Mitochondrial DNA and human evolution. *Annual Reviews Genomics and Human Genetics* 6:165-83.

Interesting newspaper articles:

Berger J. 2010. God said multiply, and did she ever. *New York Times* Feb 18, 2010

Supplemental in-depth reading:

Wade N. 2006. Before the Dawn: Recovering the Lost History of our Ancestors. The Penguin Press.

Klein J and Takahata N. 2002. Where Do We Come From? Springer-Verlag, New York.

Extra-Curricular Activity:

Learn about Dr. Lynn Margulis who figured out that mtDNA are bacteria that long-ago came into a symbiotic relationship with animals and plants, the endosymbiosis theory. She's an inspiring woman. <http://evolution.berkeley.edu/evosite/history/endosym.shtml>

September 26, 2013

IB35ac Class 9: Variation, speciation, & heritability

Now that you've learned about how we evolved and how we got all around the world, now we'll start talking about how this has shaped the variation seen in our species. But what exactly is variation? How do you measure it? What causes it? How can we start to understand what variation is inherited and what's not? Darwin's theory relied on the observation that variation is inherited. This principle underlies heritability analyses, and we'll briefly discuss what this means (regression analyses and early estimates). You'll also be introduced just briefly to Francis Galton (C. Darwin's cousin) and eugenics. You'll get to know him much better in November.

Assigned reading:

Mayr E. 1976. *Evolution and the Diversity of Life*. Cambridge, MA. Belknap Press of Harvard University Press. Chapter 3: Typological versus Population Thinking, pp. 26-29.

If you want more (but definitely NOT required):

Supplemental reading:

Byers, D. (2008) Components of phenotypic variance. *Nature Education* 1(1)

<http://www.nature.com/scitable/topicpage/adaptation-and-phenotypic-variance-1132>

Wray, N. & Visscher, P. (2008) Estimating trait heritability. *Nature Education* 1(1)

<http://www.nature.com/scitable/topicpage/estimating-trait-heritability-46889>

Extra-Curricular Reading (fiction, and you may find it a little disturbing so be forewarned):

Mawer S. 1998. Mendel's Dwarf. Harmony.

October 1, 2013

IB35ac Class 10: Comparing Variation

Now we know that there is genetic variation within our species, and that evolution and the diaspora of our species has shaped this variation. But, just how much variation is there? Today we'll look at other species of primate and other animals to see if human genetic variation is a little or a lot.

Assigned reading:

Check out: "Climate change causes loss of genetic diversity"

http://evolution.berkeley.edu/evolibrary/news/120301_chipmunks

If you want more (but definitely NOT required):

Supplemental reading:

Lewontin RC. 1976. The problem of genetic diversity. The Harvey Lecture Series 70, 1974-75.

Pages 1-20.

Extra-Curricular Activity:

Watch the famous primatologist Sue Savage-Rumbaugh talk about bonobos:

http://www.ted.com/talks/susan_savage_rumbaugh_on_apes_that_write.html

October 3, 2013

IB35ac Class 11: Exam #1

October 8, 2013

IB35ac Class 12: Skin color

Starting with this lecture we'll delve into how genes influence the variation we can actually see in humans. First and foremost, the most obvious phenotype of interest is skin color. Why does this vary? Does this variation mean anything? How has selection shaped this pattern of variation? You'll be introduced to the importance of folic acid and Vitamin D.

Assigned reading:

Part 1: Chapters 1-6 of the assigned Jablonski book Living Color.

If you want more (but definitely NOT required):

Supplemental reading:

Diamond J. 2005. Geography and skin colour. *Nature* 435:283-284.

Interesting newspaper articles:

Associated Press. 13 Oct 2008. Doubling of Vitamin D for Children is Urged. *New York Times*

Brody JE. 19 Mar 1998. Osteoporosis Linked to Vitamin D Deficiency. *New York Times*

Parker-Pope T. 2009. The pain of being a redhead. *New York Times* Aug 6th

Rabin RC. 26 Aug 2008. Vitamin D Deficiency May Lurk in Babies. *New York Times* (nytimes.com)

Saint Louis C. 2009. Confused by SPF? Take a number. *New York Times* May 14th

Supplemental in-depth reading:

Hoekstra HE. 2006. Genetics, development and evolution of adaptive pigmentation in vertebrates. *Heredity* 97:222-234.

Jablonski N. 2006. Skin: A Natural History. University of California Press, Berkeley.

Parra EJ. 2007. Human pigmentation variation: Evolution, genetic basis, and implications for public health. *Yearbook of Physical Anthropology* 50:85-105.

Extra-Curricular Reading:

Johnson JB. 2006. What race was Jesus? 'Color of the Cross' puts a different face on the debate (movie review). SFGate.com 7Nov 2006

Extra-Curricular Activity:

Watch Nina Jablonski give a wonderful presentation about her work on skin color:

http://www.ted.com/talks/nina_jablonski_breaks_the_illusion_of_skin_color.html

October 10, 2013

IB35ac Class 13: gene-culture coevolution

Today we'll explore how our cultural practices can act as the selective agent on our genetic material through the examples of lactose intolerance and prions.

Assigned reading:

Check E. 2006. How Africa learned to love the cow. *Nature* 444: 994-996.

If you want more (but definitely NOT required):

Supplemental reading:

Prusiner SB. 2004. Detecting Mad Cow disease. *Scientific American* July p. 86-93.

Stoneking M. 2003. Widespread prehistoric human cannibalism: easier to swallow? *Trends in Ecology and Evolution* 18:489-490.

White TD. 2001. Once were cannibals. *Scientific American* August p. 58-65.

Interesting newspaper articles:

Wade N. 2010. Human culture, an evolutionary force. *New York Times* March 2nd

Supplemental in-depth reading:

Harris & Meyer. *Yrbk Phys Anth* 2006?

Extra-Curricular Reading:

October 15, 2013

IB35ac Class 14: What we look like

We'll talk about Mendel and his pea plants, and then apply those concepts to variation in human height, hair color, eye color, and a couple of other aspects of our phenotype. We'll also revisit and elaborate on Bergmann and Allen's Rules, and that *MC1R* gene that came up in the discussion of skin color and Neanderthals.

Assigned reading:

none

If you want more (but definitely NOT required):

Supplemental reading:

Pearson, H. 2007. The roots of accomplishment. *Nature* 446:20-21.

Barry, JD. 2010. Red for danger? The effects of red hair in surgical practice. *BMJ* 341:1304-5.

Interesting newspaper articles:

McGee H. 2010. Cilantro haters, it's not your fault. *New York Times* April 14th

Parker-Pope T. 2009. Unlocking the secrets of gray hair. *New York Times* March 10th

Supplemental in-depth reading:

Hrdy D. 1973. Quantitative hair form variation in seven populations. *Am J Phys Anthropol* 39:7-18.

Y. Ruiz, et al., Further development of forensic eye color predictive tests, *Forensic Sci. Int. Genet.* (2012), <http://dx.doi.org/10.1016/j.fsigen.2012.05.009>

Sturm RA. 2009. Molecular genetics of human pigmentation diversity. *Hum Mol Genet* 18:R9-R17.

October 17, 2013

IB35ac Class 15: Thrifty genotypes, natural selection

Today we'll focus on body fat as a way to talk about the interplay between our past environments and the westernized one we find ourselves in today.

Obesity epidemic slides in my lecture are from:

<http://www.cdc.gov/nccdphp/dnpa/obesity/trend/maps/>

Assigned reading:

Watch the video *Lecture 1: Deconstructing Obesity* from the Howard Hughes Medical Institute:

<http://www.hhmi.org/biointeractive/obesity/lectures.html>

If you want more (but definitely NOT required):

Supplemental reading:

Diamond J. 2003. The double puzzle of diabetes. *Nature* 423:599-602.

Tutton R, et al. 2008. Genotyping the future: Scientists' expectations about race/ethnicity after BiDil. *Journal of Law, Medicine & Ethics*, fall, pages 464-470.

October 22, 2013

IB35ac Class 16: Blood

There is a lot of variation within the various characteristics of our blood, and much of this variation has been, and continues to be patterned by different environmental factors around the world. Today we will talk about the impacts of mosquitoes and diarrhea on human variation.

Assigned reading:

Dunavan CP. 2005. Tackling Malaria. *Scientific American* 293(6):76-82

If you want more (but definitely NOT required):

Supplemental reading:

Drayna D. 2005. Founder mutations. *Scientific American* October p. 78-85.

Interesting newspaper articles:

Wilford NJ. 2010. Malaria most likely killed King Tut, scientists say. *New York Times* Feb 17th

Supplemental in-depth reading:

Carter R., Mendis, K.N. 2002. Evolutionary and historical aspects of the burden of malaria.

Clinical Microbiology Reviews 15:564-594.

Packard, R.M. 2007. The Making of a Tropical Disease: A Short History of Malaria. (Johns Hopkins Biographies of Disease). The Johns Hopkins University Press.

Westhoff, C.M. 2004. The Rh blood group system in review: a new face for the next decade.

Transfusion 44:1663-1673.

October 24, 2013

IB35ac Class 17: Genetics in medicine

Today we want to introduce you to the field of medical genetics, and particularly how genetic tests are starting to be used at various stages of a person's life to inform them of their genetic disorders and predisposition for certain diseases. PRIOR to class you may want to read the following four newspaper articles from the *New York Times*. They are all posted as PDFs on bSpace.

Assigned reading:

"F.D.A. faults companies on unapproved genetic tests," by Andrew Pollack, *New York Times*, June 11, 2010.

"On a mission to sequence the genomes of 100,000 people," by David Ewing Duncan, *New York Times*, June 7, 2010.

"My genome, my self," by Steven Pinker, *New York Times*, January 11, 2009.

"Genes now tell doctors secrets they can't utter," by Gina Kolata, *New York Times*, August 25, 2012

If you want more (but definitely NOT required):

Supplemental reading:

Drayna D. 2005. Founder mutations. *Scientific American* October 78 – 85.

Other Interesting newspaper articles:

Kolata G. 2003. Using genetic tests, Ashkenazi Jews vanquish a disease. *New York Times* Feb 18th

Wade N. 2009. Genes show limited value in predicting diseases. *New York Times* April 16th.

Wade N. 2010. Genetic finding may provide a test for longevity. *New York Times* July 1st.

Extra-Curricular Reading:

Gessen M. 2008. Blood Matters: From Inherited Illness to Designer Babies, How the World and I Found Ourselves in the Future of the Gene. Harcourt Books, Orlando FL.

Radio programs we will listen to in class:

<http://www.npr.org/2011/01/13/132908098/new-gene-test-screens-nearly-500-childhood-diseases>

<http://www.npr.org/2011/01/13/132908943/The-Ethics-Of-Genetic-Screening-For-Parents>

<http://www.npr.org/templates/story/story.php?storyId=1763554>

<http://www.npr.org/templates/story/story.php?storyId=1690425>

Think this stuff is really fascinating? Here's a possible career path:

National Society of Genetic Counselors

<http://www.nsgc.org/>

Supplemental reading: genetic_counselors.pdf

National Human Genome Research Institute,

Frequently Asked Questions about Genetic Counseling

<http://www.genome.gov/19016905>

October 29, 2013

IB35ac Class 18: Fertility (the biology)

What about all those babies that some cultures have? How does that happen? Is it genetic? Today we'll talk about the biology of human reproduction in order to get a sense of how different cultural practices might influence it.

Assigned reading:

none

If you want more (but definitely NOT required):

Tierney J. 2007. The whys of mating: 237 reasons and counting. *New York Times*, 31 July.

Supplemental in-depth reading:

Weschler, T. 2006. Taking Charge of Your Fertility. Harper Paperbacks; 10th edition

(Every woman should read this book. Every man that is remotely interested in sex with women or having children should read this book too.)

Extra-Curricular Reading (non-fiction):

Roach M. 2008. Bonk: The Curious Coupling of Science and Sex. W.W. Norton & Co., New York.
(a very fun read...)

November 5, 2013

IB35ac Class 20: Fertility (the interface between biology and culture)

What about all those babies that some cultures have? Today we'll talk about the biology of human reproduction and see how cultures tinker with it to affect the number of children a woman has, and how this has evolved over time.

Assigned reading:

none

Related UC Berkeley research:

ScienceDaily. 2010. Reduced fertility linked to flame retardant exposure. Web address:

<http://www.sciencedaily.com/releases/2010/01/100126123208.htm>

<http://www.pbs.org/wnet/nature/episodes/frogs-the-thin-green-line/video-agricultures-effect-on-frogs/4848/>

and if you find that shocking, read:

Blumenstyk G. 2003. The price of research. *The Chronicle of Higher Education*, October 31.

If you want more (but definitely NOT required):

Supplemental reading:

Bouquet-Appel J-P. 2011. When the world's population took off: The springboard of the Neolithic demographic transition. *Science* 333:560-561.

Lee R. 2003. The demographic transition: Three centuries of fundamental change. *Journal of Economic Perspectives* 17(4):157-190.

Newson, L, Postmes T, Lea SEG, Webley P. 2005. Why are modern families small? Toward an evolutionary and cultural explanation for the demographic transition. *Personality and Social Psychology Review* 9:360-375.

Supplemental in-depth reading:

Saradha B, Mathur PP. 2006. Effect of environmental contaminants on male reproduction.

Environmental Toxicology and Pharmacology 21:34-41.

Extra-Curricular Reading (non-fiction):

November 12, 2013

IB35ac Class 22: Sex & gender

What are the genes and genetic mechanisms that underlie the differences between men and women and people who aren't really either one? We'll talk about the ultimate battle between the sexes, the difference between sex and gender, and some other interesting aspects of, perhaps, the most important variation within our species.

Assigned reading:

Ridley, M. 1999. Genome: The Autobiography of a Species in 23 Chapters. New York: HarperCollins, pp. 107-121.

Interesting newspaper article:

Bergner D. 2009. What do women want? *New York Times* Jan 25th

If you want more (but definitely NOT required):

Extra-Curricular Reading:

Colapinto J. 2000. As Nature Made Him: The Boy Who Was Raised as a Girl. HarperCollins, New York.

October 31, 2013

IB35ac Class 19: Immunity

Why do some people get sick all the time, and others not so much? Why do some people get asthma but others don't? Your immune system has to protect your body from all types of pathogens in the environment. How does it do this? We will begin with a brief overview of how the immune system works and will discuss how immune systems and immune responses can vary from person to person.

Assigned reading:

Check out: <http://www.hhmi.org/biointeractive/immunology/index.html>

Visual animation about antibody diversity:

<http://outreach.mcb.harvard.edu/animations/antibody.swf>

If you want more (but definitely NOT required):

Supplemental reading:

Bach, J.F. The effect of infections on susceptibility to autoimmune and allergic diseases. *N. Engl. J. Med.* 2002; 347: 911-20.

Fowke, K. et al. Resistance to HIV-1 infection amongst persistently seronegative prostitutes in Nairobi, Kenya. *Lancet.* 1996; 348:1347-1351.

Supplemental in-depth reading:

Lam D. Characterization of the Immunomodulatory Activities of Sterile House Dust Extracts in a Murine Model of Asthma. 2008 (M.S. thesis)

November 7, 2013

IB35ac Class 21: Sociobiology (Genetics of Behavior)

In 1975 E.O. Wilson proposed the hypothesis that some animal behaviors are determined by genetic factors (called “sociobiology”). The reaction to this was extreme – many people thinking this was a crazy idea. Today we’ll talk about the concept of the tabula rasa, the environment of evolutionary adaptedness, and some of the evidence that demonstrates that some of our behaviors are somewhat influenced by our genes.

Assigned reading:

None

If you want more (but definitely NOT required):

Supplemental reading:

Horgan J. 1995. The new social Darwinists. *Scientific American* October p. 174-181.

Young L. 2009. Love: neuroscience reveals all. *Nature* 457: 148.

Interesting newspaper articles:

Aamodt S and Wang S. 2009. Guest column: Mugges by our genes? *New York Times* March 24th.

Reynolds G. 2010. Phys Ed: Do our genes influence our desire to exercise? *New York Times* May 19th.

Supplemental in-depth reading:

Pinker S. 2002. The Blank Slate. Penguin Books.

Extra-Curricular Reading (non-fiction, but not peer-reviewed science):

Hamer D. 2004. The God Gene. Anchor Books, Random House.

November 19, 2013

IB35ac Class 24: Race in America, Part 1 (before 1900)

How has race been defined historically? How has it been used politically in the United States before 1900? We'll talk a bit about the start of archaeology in this country and see how intertwined it was with questions about race and priority. You'll also be introduced to the early science of race in the United States, and especially Samuel G. Morton who collected a lot of skulls.

Assigned reading:

Gould SJ. 1996. The Mismeasure of Man, 2nd edition. WW Norton & Co., New York. Chapter 2 (pages 30-107).

If you want more (but definitely NOT required):

Supplemental reading:

Feder, KL. 2002. Frauds, Myths, and Mysteries: Science and Pseudoscience in Archaeology. McGraw-Hill Mayfield, San Francisco, pages 149-176.

Supplemental in-depth reading:

Gould SJ. 1996. The Mismeasure of Man, 2nd edition. WW Norton & Co., New York.

November 21, 2013

IB35ac Class 25: Race in America, Part 2 (1900 – 1960s)

Today we'll get into the subject of intelligence, from head shape to IQ testing and how this mattered for immigration policy in the United States.

Assigned reading:

Gould SJ. 1996. The Mismeasure of Man, 2nd edition. WW Norton & Co., New York.
Chapter 5 (pages: 176 – 233).

If you want more (but definitely NOT required):

Supplemental in-depth reading:

Gould SJ. 1996. The Mismeasure of Man, 2nd edition. WW Norton & Co., New York.
Section on Franz Boas (p.81-100) from: Bohannon P and Glazer M. 1988. High Points in Anthropology, 2nd edition. McGraw-Hill, Inc., San Francisco.

Waller JC. 2004. Becoming a Darwinian: the micro-politics of Sir Francis Galton's scientific career 1859-65. *Annals of Science* 61:141-163.

November 26, 2013

IB35ac Class 26: Why Race Matters in America Today

Why is this class listed as an AC course? Isn't AC supposed to be about ethnicity and other social issues? If these questions have crossed your mind, today you'll get introduced to these larger issues. If they haven't crossed your mind, then today will be a great opportunity to learn why human biology can't be studied in a vacuum; the social implications matter. We'll review what a race is from a biological perspective, and then talk about ethnicity (compare/contrast). We'll talk a little about the US census and about the importance of perception and self-perception. Last, we'll get back to the biological arguments. First, we'll talk about the developmental psychology, that little kids notice and how they get all the wrong ideas when their parents pretend like it doesn't exist. And last, we'll talk a little about race and forensics, getting back to some of the things you studied in the lab.

Assigned reading:

Kaplan EA. 2005. Black like I thought I was. <http://www.alternet.org/stroy/16917/>

Bronson P, Merryman A. 2009. See baby discriminate – kids as young as 6 months judge others based on skin color. What's a parent to do? *Newsweek*, Monday, Sept 14, 2009.

Link available through bSpace.

<http://infoweb.newsbank.com/iw->

[search/we/InfoWeb?p_action=doc&p_topdoc=1&p_docnum=1&p_sort=YMD_date:D&p_product=AWNB&p_text_direct-](http://infoweb.newsbank.com/iw-search/we/InfoWeb?p_action=doc&p_topdoc=1&p_docnum=1&p_sort=YMD_date:D&p_product=AWNB&p_text_direct-)

[0=document_id=%28%2012A9F50DDC20F550%20%29&p_docid=12A9F50DDC20F550&p_theme=aggdocs&p_queryname=12A9F50DDC20F550&f_openurl=yes&p_nbid=N5FB5ANOMTM4NDY1NTA2Ni43MDM3NTY6MT05OjEyOC4zLjAuMA&&p_multi=NWEC](http://infoweb.newsbank.com/iw-search/we/InfoWeb?p_action=doc&p_topdoc=1&p_docnum=1&p_sort=YMD_date:D&p_product=AWNB&p_text_direct-0=document_id=%28%2012A9F50DDC20F550%20%29&p_docid=12A9F50DDC20F550&p_theme=aggdocs&p_queryname=12A9F50DDC20F550&f_openurl=yes&p_nbid=N5FB5ANOMTM4NDY1NTA2Ni43MDM3NTY6MT05OjEyOC4zLjAuMA&&p_multi=NWEC)

Schmidt P. 2010. Much research on campus diversity suffers from being only skin deep, new studies suggest. *The Chronicle of Higher Education*. April 13, 2010.

PDF available on bSpace.

If you want more (but definitely NOT required):

Supplemental in-depth material:

Check out courses in Ethnic Studies... we have a wonderful program.

December 3, 2013

IB35ac Class 27: The bioethics of human variation in the 21st century

Human biology, human variation, and medicine also can't be studied without serious attention paid to the ethical dilemmas this work often poses. Today you'll be introduced to the study of bioethics. You delved into some of this with your essay topics, so now you'll get a chance to learn about this discipline more formally.

We have a guest speaker for today, so lecture slides won't be posted ahead of time.

Assigned reading:

None

December 5, 2013

IB35ac Class 28: The class where Prof. Hlusko summarizes the entire semester in 80 minutes

Today I'll summarize what we've covered over the course of the semester and why I think it is important for someone living in California today.

Assigned reading:

None – or, actually, all of it!

If you want more (but definitely NOT required):

Supplemental reading:

Prewitt K. 2005. Racial classification in America: where do we go from here? *Daedalus* Winter 5-17.

Supplemental in-depth reading:

Arnold JE, Walsh MR, and Hollimon SE. 2004. The archaeology of California. *Journal of Archaeological Research* 12(1):1-73.

Extra-Curricular Activity:

RadioLab's episode on race, aired Nov 28, 2008.

<http://www.wnyc.org/shows/radiolab/episodes/2008/11/28>

What are the basic requirements for this assignment?

You are assigned to write an original 4-5 page paper. You are given 4 options and will work with your GSI to figure out which one you'll respond to. You'll notice that there is not a simple answer for any of these. You are assigned to think through an argument and present it on paper. There is not a right answer or a wrong answer, rather, you will be graded on how well you make your argument.

One of the goals of IB35ac is to teach you how to think in terms of biology – how to “think like a biologist”. Therefore, this paper assignment is your opportunity to demonstrate how well you can make an argument while wearing your “biologist hat”.

A “4-5 page paper” refers to the actual text of your paper. Cover page, figures, and references don't count. You should write 1,150-1,400 words. Less than 1,150 is not enough detail, more than 1,400 is too much.

Please don't waste paper by printing a separate cover page or unnecessarily printing the references on another page.

You will be graded on how well you write. In order to make a good argument, you have to be able to convey your ideas effectively and efficiently.

You have a month to work on this before the first paper workshop in section, so you can easily overcome any writing difficulties you may have. Good writers aren't born that way – they work at it. We've provided tips on how to do this in the “Advice for Writing” handout.

A Suggested Outline

In your paper you need to:

- 1) set up the question and the opposing views
- 2) state your position
- 3) present *at least* 2 separate points of evidence that support your position
- 4) present a point that could be seen as contradicting your position
- 5) explain why this is not a detrimental blow to your position
- 6) summarize what you've presented and offer an idea for either a future research direction, or make a statement referring to the broader implications

You can think of your paper in terms of paragraphs. For example:

- Paragraph 1: Introduction
- Paragraph 2: Background, additional information (if needed)
- Paragraph 3: Supporting point 1
- Paragraph 4: Supporting point 2
- Paragraph 5: A counter point
- Paragraph 6: Your response to the counter point
- Paragraph 6: Conclusion

This outline will vary though, depending on how you want to address the question and how you connect the ideas. Just remember that paragraphs should not be more than about 75% the length of a page, at most.

I have posted three excellent papers written by past students in IB35ac to give you a sense of what we expect. These papers all received perfect scores (the maximum number of points that year was 120, it is 100 this year). The topics they addressed are different from what you have been assigned and were

supposed to be shorter than what you are assigned – be sure to keep that in mind. **YOUR PAPER IS EXPECTED TO BE LONGER.**

Formatting instructions

We will be very strict on formatting. In scientific publishing, journal editors are very particular about how a submitted manuscript is formatted. Since this is an opportunity for you to experience biology writing, we are giving you the “full meal deal” and including formatting expectations. Please refer to the three example papers to see what the formatting looks like. This year’s formatting requirements are the same (although, do not forget, your paper will be longer).

Show your talent and creativity through the words on the paper, not by what font you use. The text must be in 12 point font, Times New Roman or Times Roman, double-spaced, 1 inch margins on all sides. The paper is standard 8.5” x 11”.

Put your last name only (**not** your first name), SID, the course, the date, the question you are responding to in the top left-hand corner, single-spaced and in bold faced 12 point type. Page numbers should appear in the lower right hand corner.

Your title should be bold-faced 12 point type and double-spaced below your heading, and centered on the page. The text of your paper should start double-spaced below your title.

Just following the text of your paper, you need to note the number of words – calculate this using the “word count” tool that comes standard with most word processing software. It is under the “tools” drop-down menu in Microsoft Word.

References and proper citation

Part of scholarly writing includes giving proper credit to those whose ideas came before you, providing your reader with an understanding of where you are coming from, and where you got the data/results/specific points to which you refer. Therefore, citations and references are critical. If you don’t cite someone, you are essentially representing their work as your own; that is what we call plagiarism. Taking words verbatim from someone else’s paper without using quotes and a citation is plagiarism, so is using their ideas without giving credit. Plagiarism is bad in academia, given that our most precious commodities are our ideas. In fact, you can be expelled from the University if you plagiarize. So you need to be extremely conscious of this at all times when you are writing a paper. It is better to over-cite than to under-cite.

Additionally, all students are expected to follow the University of California at Berkeley’s Campus Code of Student Conduct, as is published at <http://students.berkeley.edu/uga/conduct.asp>, and is described in further detail at <http://students.berkeley.edu/sas/SJA/students.htm>. Cheating, plagiarism, or any other form of academic dishonesty is not tolerated (102.01). In general, not knowing what plagiarism is doesn’t qualify as a valid excuse. So, if you are confused, check out <http://www.lib.berkeley.edu/TeachingLib/Guides/Citations.html>. Ah, the library is always helpful...

So in terms of references, you need to give credit to people when you refer to their ideas. Additionally, when you present facts, you need to point the reader to your source for those facts. Within the text of your paper, you cite other people’s work as demonstrated in the following examples:

As Butler notes, “Ridges are less stable than cusps, and they must be used with caution as guides to cusp homology” (1956:52).

For example, Darwin (1859) noted different beak shapes on the various islands.

Given the highly conserved nature of developmental pathways (Carroll et al., 2001) and the similarities between human and mouse tooth development (Davideau et al., 1999), the population-level genetic architecture seen in the baboons may well be representative of other primate species.

At the end of your paper you need to provide the full citation referred to in your text.

Since this is a human biology class, we will use the referencing format of the *American Journal of Physical Anthropology*, also known as CSE (specifically “CSE name-year” format). Use this website to identify how to cite different types of references using CSE:

<http://library.duke.edu/research/citing/workscited/> A few examples are also listed below.

Butler PM. 1956. The ontogeny of molar pattern. *Bio Rev* 31:30–70

Darwin C. 1859. *The Origin of Species by Means of Natural Selection*, 1st ed. London: John Murray.

Gingerich PD, Schoeninger MJ. 1979. Patterns of tooth size variability in the dentition of primates. *Am J Phys Anthropol* 51:457–466.

Trinkaus E, Churchill SE, Ruff CB. 1994. Postcranial robusticity in Homo . II: humeral bilateral asymmetry and bone plasticity. *Am J Phys Anthropol* 93:1–34.

If you refer to material presented in lecture by Dr. Hlusko, you must cite this as well. Please use the format in the example below.

Hlusko, L. 2010. Class #7: Variation, speciation & heritability. IB35AC: Human Biological Variation. September 16.

How will I be graded?

This paper is worth 100 points. We will break down the scores as follows:

18 points	framework: is there a good introduction, background, and conclusion section?
18 points	1 st line of evidence or point supporting your position
18 points	2 nd line of evidence or point supporting your position
18 points	the counter point and response
18 points	quality of writing and readability
10 points	formatting

How do the two paper workshops in section work?

One of the essential parts of scientific writing is the review process. None of your instructors has ever submitted or published a paper that wasn't reviewed by colleagues, coauthors, mentors, or other trusted acquaintances before it was first submitted. The constructive criticism of a colleague is essential to good scientific writing.

We have designed two writing workshops that will take place during your section meeting. The first is on Nov 4-6th and the second is Nov 11-13th. Therefore, you should think of your paper as being DUE on November 4th, 5th, or 6th, depending on when your section is. Bring your final paper to that workshop. The better the manuscript you bring, the better the workshop will run and the better your ultimate paper will be.

Don't forget that you will get 5 points in each of these sections for handing in a copy of your paper, and another 5 points for participating in the review/editing activity. That is 10 points in each section. Essentially, the two paper workshops bring the total point value of this assignment to 120 points. As such, we suggest taking full advantage of the workshops.

How do I turn my final paper in?

You'll hand your paper in at the start of class (9:40am) on November 26th (the Tuesday before Thanksgiving). Therefore, you'll need to bring a hard copy of it with you to class. **EMAIL SUBMISSIONS WILL NOT BE ACCEPTED.**

***** NOTE: THIS IS THE TUESDAY BEFORE THANKSGIVING BREAK. IF YOU PLAN TO BE OUT OF TOWN THAT DAY YOU MAY TURN YOUR PAPER IN EARLY. *****

What happens to my grade if I miss the 9:40am November 26th deadline?

Papers handed in between 9:45am November 26th and 12pm November 27th will have 20 points deducted. Papers will not be accepted after 12pm on November 27th.

It is always tragic to see students who arrive to class 15 minutes late and want to hand in their papers, horribly disappointed that they will lose 20 points. While this might seem draconian, we do this in order to be as transparent as possible and remove the possibility of capriciousness. Imagine this scenario: two students have independent printer problems at 8am the morning the paper is due. Student A decides to skip her shower and tooth-brushing in order to make it to the computer lab with enough time to print the paper and make it to class on time. She arrives at 9:28am. Student B decides to take a shower and brush his teeth before leaving for the computer lab. He walks into 295 Haas to hand in his paper at 9:50am. Is it really fair to Student A to accept both as on-time? If you answer "yes", where do we draw the line? What about Student C who decided to skip the two paper workshops and write their paper starting the morning it is due. This student drops by my office at 12:30pm on November 26th to hand in the paper, saying that they had experienced printer problems. Should I accept their paper? See my dilemma? We have to draw the line somewhere, and the start of class is the clearest one.

That said, all late papers must be dropped in Dr. Hlusko's Dept of Integrative Biology mailbox in room 3040 Valley Life Sciences Bldg (open until 5pm on Nov 26th and until 12pm on Nov 27th). **EMAIL SUBMISSIONS WILL NOT BE ACCEPTED.** Note that the day before Thanksgiving the office closes early, hence the 12pm deadline.

If you experience an emergency that is clearly unforeseeable (such as health or family emergency) that caused a delay in your turning this assignment in on time, please let us know as soon as you are able to contact us, explain the situation and provide documentation. The instructors will consider your case and determine whether or not to accept your paper.

If you will be out of town or have a University-sponsored athletic event or performance, or interview that will interfere with handing in your paper on November 20th, or if you need to travel that day, please hand your paper in **BEFORE** November 20th. Plan ahead.

Should a pregnant woman be held accountable for the implications that her health and lifestyle during pregnancy have on the health of her child?

In 2009, a 17-year-old girl in Utah paid a man to beat her in hopes that it would end her unwanted pregnancy; the attempt was unsuccessful. She was not held criminally responsible since the judge ruled that she did not break any of the current laws in the state. In response, Utah State Representative Carl Wimmer proposed a law in 2010 (H.B. 12, <http://le.utah.gov/~2010/bills/hbillenr/hb0012.htm>) that would criminalize her actions. There were a range of reactions to this proposed bill (see the *New York Times* article listed below). For example, the ACLU came out against it for fear of the implications for women who miscarry unintentionally (<http://www.acluutah.org/HB12.htm>). Both Houses in the State Legislature passed this law. The governor vetoed the first version of the bill that would criminalize “reckless” behavior, signing a more restrictive interpretation of an illegal abortion (<http://jurist.law.pitt.edu/paperchase/2010/03/utah-governor-signs-bill-criminalizing.php>).

Numerous studies have shown that a woman’s health and lifestyle during pregnancy influence the health and well-being of her child for virtually all of that child’s life. *Time Magazine* recently published a cover story that provides a compelling overview of this science (see PDF posted on the bSpace site). We have provided four scientific papers that provide you with more of the details of the research presented in the Time article and will serve as the more appropriate references for your paper.

While this Utah girl’s actions are by all accounts extreme, it raises the question: **Should a woman be held legally accountable for the effects that her own health, biology, and lifestyle during pregnancy have on the long-term health and well-being of her child?**

For this question you will need to read and cite these four sources:

Hay DF, Pawlby S, Waters CS, Perra O, Sharp D. 2010. Mothers’ antenatal depression and their children’s antisocial outcomes. *Child Dev* 81:149-165.

Ismail S, Buckley S, Budacki R, Jabbar A, Gallicano GI. 2010. Screening, diagnosing and prevention of fetal alcohol syndrome: is this syndrome treatable? *Dev Neurosci* 32:91-100.

St. Clair D, Xu M, Wang P, Yu Y, Fang Y, Zhang F, Zheng X, Gu N, Feng G, Sham P, He L. 2005. Rates of adult schizophrenia following prenatal exposure to the Chinese famine of 1959-1961. *JAMA* 294:557-562.

Novak DA, Desai M, Ross MG. 2006. Gestational programming of offspring obesity/hypertension. *The J Matern Fetal Neonatal Med* 19:591-599.

You are welcome to bring in other sources as well, including your text books and the reports cited in the paragraphs above. You may also refer to examples presented in lecture.

News reports, blogs, and other research articles you might find interesting, and links therein:

<http://parenting.blogs.nytimes.com/2010/10/06/drinking-while-pregnant/?scp=2&sq=pregnancy%20alcohol&st=cse>
<http://parenting.blogs.nytimes.com/2010/03/03/jailing-a-woman-for-a-miscarriage/?scp=2&sq=utah%20law%20pregnancy%20miscarriage&st=cse>

Kelly YJ, Sacker A, Gray R, Kelly J, Wolke D, Head J, Quigley MA. 2010. Light drinking during pregnancy: still no increased risk for socioemotional difficulties or cognitive deficits at 5 years of age? *J Epidemiol Community Health* online: 10.1136/jech.2009.103002

Malspina D, Corcoran C, Kleinhaus KR, Perrin MC, Fennig S, Nahon D, Friedlander Y, Harlap S. 2008. Acute maternal stress in pregnancy and schizophrenia in offspring: a cohort prospective study. *BMC Psychiatry* 8:71

Paul AM. 2010. How the first nine months shape the rest of your life. *Time Magazine*, Oct 4:50-55.

Controlling our “sweet tooth”

On May 30, 2012, New York City Mayor Michael R. Bloomberg announced a plan to ban the sale of sugary soda drinks larger than 16 ounces (<http://www.nytimes.com/2012/05/31/nyregion/bloomberg-plans-a-ban-on-large-sugared-drinks.html?pagewanted=all>). As you can imagine, outrage ensued. While the legal and ethical issues surrounding this plan are outside the scope of IB35ac, the proposal draws attention to an important health issue here in the United States, as well as globally: obesity.

The obesity epidemic is multifactorial in that its underpinnings are social, environmental, epigenetic, and genetic – and therefore our evolutionary history played a role in shaping how and why this epidemic is occurring. We have provided you with four scientific articles describing these various underlying factors in some detail.

Considering the biology and evolution of our species, do you think that a ban, such as what Mayor Bloomberg has proposed, could improve health and slow the epidemic? While you could easily argue one side or the other of this question from a purely non-biological perspective, for the purpose of this class we want you to make your case using only biological (including evolutionary) arguments. Your supporting points and counter point all need to be based on biological data. Be sure to read the instructions on how to write this paper before outlining your strategy.

For this question you will need to read and cite these four sources that are all provided on bSpace:

- Bellisari A. 2007. Evolutionary origins of obesity. *Obes Rev* 9: 165-180.
Christakis NA, Fowler JH. 2007. The spread of obesity in a large social network over 32 years. *N Engl J Med* 357(4): 370-379.
Holtcamp W. 2012. Obesogens: An environmental link to obesity. *Environ Health Perspect* 120(2): A63-A68.
Novak DA, Desai M, Ross MG. 2006. Gestational programming of offspring obesity/hypertension. *J Matern Fetal Neonatal Med* 19(10): 591-599.

You are welcome to bring in other sources as well, including your text books and the reports cited in the paragraphs above. You may also refer to examples presented in lecture.

Other articles provided on bSpace that you might also want to cite, if relevant to your line of argument:

- Knutson KL. 2012. Does inadequate sleep play a role in vulnerability to obesity? *Am J Hum Biol* 24(3): 361-371.
Schell LM, Gallo MV. 2012. Overweight and obesity among North American Indian infants, children, and youth. *Am J Hum Biol* 24(3): 302-313.
Thompson AL. 2012. Developmental origins of obesity: Early feeding environments, infant growth, and the intestinal microbiome. *Am J Hum Biol* 24(3): 350-360.
Wells JCK. 2012. Obesity as malnutrition: The role of capitalism in the obesity epidemic. *Am J Hum Biol* 24(3): 261-276.

News reports, blogs, and op-eds you might find interesting, and links therein:

- Neistat C. 2012 Sep 9. Soda Ban Explained. *New York Times*.
<http://www.nytimes.com/2012/09/10/opinion/soda-ban-explained.html> (online video)
Lieberman DE. 2012 Jun 5. Evolution’s Sweet Tooth. *New York Times*.
<http://www.nytimes.com/2012/06/06/opinion/evolutions-sweet-tooth.html> (pdf provided on bSpace)
Kolata G. 2007 Jul 25. Study says obesity can be contagious. *New York Times*.
http://www.nytimes.com/2007/07/25/health/25cnd-fat.html?_r=1 (pdf provided on bSpace)
Begley S. 2009. Born to be big. *Newsweek* Sep 21
(pdf provided on bSpace)
Grynbaum MM. 2012 May 30. New York plans to ban sale of big sizes of sugary drinks. *New York Times*.
(pdf provided on bSpace)

Should physicians use a patient's skin color as a proxy for their ancestry?

In her first book about human skin, Jablonski notes that, *"In recent years, an increasing number of studies have used skin color in medical research as a surrogate for "race" or a genetically distinct group. This approach is disturbing because... Skin color is not an accurate proxy of ancestry and must be used with great caution in medical circumstances when decisions are being made about patient treatment"* ([Skin](#), UCPress, 2006, p. 95).

However, it is becoming increasingly evident that people vary in how they should best be treated by medical science, and that some of this variation patterns by geography. For example, the Federal Drug Administration (<http://www.fda.gov/Drugs/DrugSafety/PublicHealthAdvisories/ucm051756.htm>) recently warned that a popular drug for reducing high cholesterol has a significantly higher frequency of severe side effects in Asian people. A recent issue of Consumer Reports [onHealth](#) also highlights the importance of "ethnic heritage" in your medical care (pdf provided).

Ultimately, it is likely that we will all have our genomes sequenced and doctors will tailor treatment specifically to your respective allelic composition. But what do we do in the meantime?

Should physicians use their patient's skin color as a proxy for geographic ancestry when considering treatment regimes?

For this question you will need to read and cite these four sources:

Crawley L. The paradox of race in the Bidil debate. *J Natl Med Assoc* 99:821-822.

Caulfield T, Fullerton SM, Ali-Khan SE, Arbour L, Burchard EG, Cooper RS, Hardy BJ, Harry S, Hyde-Lay R, Kahn J, Kittles R, Koenig BA, Lee SS, Malinowski M, Ravitsky V, Sankar P, Scherer SW, Séguin B, Shickle D, Suarez-Kurtz G, Daar AS. 2009. Race and ancestry in biomedical research: exploring the challenges. *Genome Med* 1:8.1-8.2.

Gravlee CC, Dressler WW, Bernard HR. 2005. Skin color, social classification, and blood pressure in Southeastern Puerto Rico. *Am J Public Health* 95:2191-2197.

Relethford JH. 2009. Race and global patterns of phenotypic variation. *Am J Phys Anthropol* 139:16-22.

You are welcome to bring in other sources as well, including other readings for the class and the reports cited in the paragraphs above. You may also refer to examples presented in lecture.

Another article that you might find relevant, depending on your argument:

Ousley S, Jantz R, Freid D. 2009. Understanding race and human variation: why forensic anthropologists are good at identifying race. *Am J Phys Anthropol* 139:68-76.

Medical Genetic Testing: Are there instances when it should be required?

Over the last decade at least 21 college football players have died as a result of the intense cardiovascular training; it was later found that 8 of them were carriers for sickle cell anemia (they were heterozygous for HbS/A, see class #16, October 19, 2010). In April 2010 the NCAA's Division I Legislative Council responded by passing a requirement that all participating athletes have a blood test to determine whether or not they have sickle cell trait (<http://www.ncaa.org/wps/wcm/connect/public/ncaa/resources/latest+news/2010+news+stories/september+latest+news/background+on+sickle+cell+trait+and+the+ncaa>).

Much of the controversy around the NCAA's decision revolves around the concern of discrimination (Thomas and Zarda, 2010), which serves as an example of the concern about medical genetic testing more generally (McNamee et al., 2009).

An interesting contrast, however, is the legal requirement at the state level for all newborns to be screened for numerous genetic mutations (<http://www.cdph.ca.gov/programs/nbs/Pages/default.aspx>), many of which are treatable if identified early. As an extension of this program, the California Department of Public Health is working to ensure that all pregnant women are provided with prenatal screening <http://www.cdph.ca.gov/programs/pns/pages/default.aspx>. All newborns in the United States are already tested for sickle cell trait, although many people still do not know their status.

With all of this in mind, **should people be required to be tested for a particular genetic mutation in order to protect their health in certain circumstances (such as elite athletics)?**

For this question you will need to read and cite these four sources:

Konstantinopoulous PA, Karamouzis MV, Papavassiliou AG. 2009. Educational and social-ethical issues in the pursuit of molecular medicine. *Mol Med* 15:60-63.

McNamee MJ, Muller A, van Hilvoorde I, Holm S. 2009. Genetic testing and sports medicine ethics. *Sports Med* 39:339-344.

Miah A. 2012. Genetics & Sport: Bioethical concerns. *Rec Pat DNA Gene Seq* 6:197-202.

Roseff SD. 2009. Sickle cell disease: a review. *Immunohematology* 25:67-74.

You are welcome to bring in other sources as well, including your textbooks and the reports cited in the paragraphs above. You may also refer to examples presented in lecture.

Other sources that you might find relevant, depending on your argument:

Molz D. 2010. Sickle cell testing, unless athletes balk. *Inside Higher Ed*. April 14.

Thomas K, Zarda B. 2010. In NCAA, question of bias over a test for a genetic trait. *New York Times*, April 11.

Thomas K. 2010. NCAA council approves testing for sickle-cell trait. *New York Times*, April 13.

NCAA news release. 2010. Background on sickle cell trait and the NCAA. September 9.

Wackerhage H, Miah A, Harris RC, Montgomery HE, Williams AG. 2009. Genetic research and testing in sport and exercise science: A review of the issues. *J Sports Sci* 27:1109-1116.

IB35ac
Advice for Writing
(by Dr. Hlusko)

Writing a paper should be thought of as a 2-step process.

The first step – figure out what you want to say. Do research. Compile data points, ideas, and references that you want to include. The penultimate phase of STEP 1 is a detailed outline. The final phase of STEP 1 is a first draft of your paper.

The first draft is NOT a finished product, but rather the starting point of STEP 2. Once you have a draft written, print it out and put it away for a couple of days. Don't think about it.

After 3-7 days, take your draft out of its folder. Sit down in a place where you can really concentrate and READ IT CRITICALLY. Pretend that your least favorite person wrote it, and look for their mistakes, weaknesses, misspellings, grammatical errors, missteps in logic, etc.

I advise that you read a hard copy of your paper. It is often easier to read critically off of the printed page rather than a computer screen

Take these edits and revise your paper. This is the second draft of your paper.

Put this second draft aside for at least a day (3-4 days is even better). The next time you revisit your paper, shut yourself away in a room by yourself for a little private time. Read your paper OUT LOUD to yourself, slowly, several times. Listen carefully to what you are reading. Do your ideas flow logically? Do you stumble over phrases that make no sense? Is every sentence necessary? Are your paragraphs focused? Do your points build and culminate with your conclusion?

Revise your paper with these edits. This is the third draft of your paper.

Now, you are ready to ask someone else to read your paper. Ask this person for CRITICAL comments. It is not usually helpful to get a romantic partner or your mother to help you with this; millions of years of evolution have lead to mamas and lovers not being very objective. You need assistance from someone who will be objective. Perhaps you may want to ask more than one person to provide comments. Don't take their comments personally, it's about a paper NOT how wonderful you may (or may not) be. Incorporate these comments as you see fit.

You now are on the fourth draft of your paper. It should be a good paper by now, but if you want to make it perfect, repeat the Step 2 process once or twice more. Time between reads is critical, otherwise you'll remember exactly what you wrote and cannot be self-critical. If at any stage in the process you decide that you don't like what you've written, feel free to start over. Oftentimes the best paper is the one you write after throwing away the first idea.

So, the most important point is that you should not procrastinate!!! Start working on your paper NOW. There is no reason that each and every one of you shouldn't be able to get a perfect score on this assignment.