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Opinion: Advancing neuroscience interactions with Cuba

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On December 17, 2014, US President Barack Obama announced historic actions toward normalizing United States relations with Cuba, and instructed Secretary of State John Kerry to re-establish diplomatic interactions between the two countries, so as “to

reach for a better future for the Cuban people, for the American people, for our entire hemisphere, and for the world.”* On April 11, Obama and Raul Castro held a historic meeting.

Much of the current discussion concerning the new relationship between the two countries is centered on resolving five decades of political and diplomatic differences, and we strongly encourage this political re-think. However, there is more to this new openness than simply enabling American-owned businesses to establish themselves along Havana's seaside Malécon esplanade, or allowing United States tourists to once again enjoy the beautiful Playa Paraíso and Playa Sirena. Establishing a new basis for United States scientific relations with Cuba is of utmost importance as relations warm. Forging more frequent and in-depth scientific dialogue would help to accelerate the process of normalization beyond political differences. Our trip to Cuba in October of last year, as part of an invited science delegation, points to a multitude of ways that open scientific exchange could benefit the science communities, particularly the neuroscience communities, in both nations.

Building on sentiments expressed even before Obama's recent announcement (1), we feel strongly that the United States should normalize scientific relationships with Cuba. Our Cuban colleagues have been leading contributors to the international scientific community, yet we as US scientists, in many cases, have not been able collaborate with them effectively; we cannot, for example, obtain joint research grants. And Cubans cannot attend most US conferences, nor can they teach in our university courses. Scientists in the two countries cannot exchange research materials, such as software or computational resources. These political barriers to science

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Any opinions, findings, conclusions, or recommendations expressed in this work are those of the authors and do not necessarily reflect the views of the National Academy of Sciences.

*www.whitehouse.gov/the-press-office/2014/12/17/statement-president-cuba-policy-changes.



The US government's apparent rethink of diplomatic relations with Cuba should have big implications for science, not just politics, argue the authors. Photo courtesy of Caroline O'Driscoll (University of Southern California Laboratory of Neuro Imaging, Los Angeles).

are artificial, arbitrary, even demeaning to both Cuban and US scientists, and are a source of awkwardness in the greater worldwide community of scientists. With a new era of diplomacy taking shape, now is the opportune time to take steps toward enhancing scientific openness.

Despite its diminutive size, Cuba has plenty to offer in the way of science research, insights, and advances. Even with the economic challenges of the long-standing embargo and chilled cultural relations, the island nation of Cuba has persevered in its pursuit of biotechnology (2) and the biomedical sciences (3). Others have noted the unique opportunities available for US–Cuban partnerships in atmospheric sciences (4), geology (5), computational biology (6), and oncology nursing (7). In addition, Cuba has a very strong medical care system (8, 9), and—according to the World Bank (data.worldbank.org/indicator/SE.ADT.1524.LT.ZS)—a high literacy rate among young people, which includes knowledge about science, technology, and engineering (10).

These factors no doubt contribute to a strong two-way communication between the lay public and research scientists in the cause of public health (9, 11). As a consequence, the general population has been eager to participate in scientific research (12). For example, Cuba's twin registry, consisting of more than 55,000 identified pairs, has reached an astounding 96% of the total population of

Cuban twins (13). And Cuban scientists have embarked on large-scale population studies, such as work on the ontogeny of the electroencephalogram (14), which routinely achieve more than 95% enrollment success. Researchers have also been at the forefront of infectious disease interventions (15), provided access to low-cost pharmaceuticals (16), and developed innovative family medicine programs, which would be otherwise unavailable in developing countries (17).

Moreover, medical services are Cuba's third most valuable export, and the nation has demonstrated leadership in sending physicians to the frontlines of the Ebola outbreak in West Africa (18). The top-tier biomedical research performed in Cuba has the potential to have an impact on world health, and research in wealthier nations will aid the Cuban population. Their efforts have particularly been evident across a quarter century of Cuban contributions to neuroscience research and its applications (19). However, US scientists' observation of, participation in, and collaboration with such activities was mostly impossible under the embargo.

During our October visit, we witnessed the Cuban enthusiasm for biomedical science first hand, specifically their recent efforts in neuroscience. For three days we had the opportunity to participate in the anniversary of the Cuban Neuroscience Center (CNEURO) and to join in the inauguration of their new research facility. The relatively small core of CNEURO scientists has had a disproportionate impact on basic methods in neuroscience, particularly in electrophysiology (20), neuroimaging (21), and neuroinformatics (22). For example, few research centers have been as influential in the quantitative analysis of brain electrical activity as have scientists at the CNEURO (23). Each of us has also benefited personally from the leadership of these researchers through international activities, as well as the broad impact of the CNEURO group on our research.

The primary reason for the celebration was CNEURO's acceptance of the incredible gift of a modern high-field MRI scanner (a Siemens 3 Tesla Allegra system) from the University of Maastricht in The Netherlands, now Cuba's third MRI instrument. Once this MRI scanner is commissioned fully, with help from the Siemens Corporation, we anticipate a major increase in the creative output of the CNEURO scientists accompanied by new opportunities for enhanced collaboration with them. We note with interest that a previous attempt to make a similar gift of MRI neuroimaging instrumentation from a United States-based institution proved impossible

under the prior conditions of the economic embargo. It is unclear if such an exchange of scientific technology would be possible even under any new economic arrangements between the two nations. We worry, however, that without the appreciation of US and Cuban policy-makers, the scientific potential

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of such “low-hanging” opportunities for sharing expertise, technology, and avenues for research collaboration might be overlooked as the new economic and diplomatic relationship takes shape. Input from Cuban and US scientists in these discussions would help to ensure that new policy agreements take such opportunities for scientific benefit into account.

A further important emphasis of the CNEURO inaugural program involved the planning of an international training program consisting of Latin American student and faculty exchanges among developed, as well as economically disadvantaged, countries. These discussions seek to set the stage for providing state-of-the-art knowledge to a population of early-stage investigators who would otherwise lack such access. Through normalized relations, the United States could play an important role in such programs for science education and training. Indeed, the Center for Strategic and International Studies (24) has suggested that now is the time to accelerate academic and science-based exchanges between the United States and Cuba. Many students from US universities already visit Cuba annually to take part in overseas educational programs (25). It is still unclear how educational exchanges for those Cuban science students wishing to visit US colleges will operate under the new US policies.

Although a US scientist can, in principle, travel today to Cuba for scientific or educational purposes under the Office of Foreign Asset Control's General License, one limitation is the uncertainty over paying for such travel from one's NIH, National Science Foundation, or other federal research grants. Prior rules involved having an organization in a



The Cuban Neuroscience Center in Havana, Cuba. Photo courtesy of Mark Cohen.

third-party country reimburse one's costs related to visiting Cuba. For the US Government to provide needed clarification or simply make such travel feasible as a grant-related expense—in concert with the soon-to-be amended General License—would greatly facilitate scientific visits to Cuba, as well as joint research activities, and even attendance at international conferences held there.

The US–Cuban economic and political relationship is famously complex, with many dimensions that we, as biological scientists, are unqualified to solve. Nevertheless, on the cusp of historic change in US–Cuban international policy, now clearly is the time to further strengthen the mutual scientific interactions that have developed over the past decade (26). It is urgent that we, the scientific community, ask our government and representatives to explore immediately available and longer-term steps to support the health of scientific interactions between the United States and Cuba. These steps include, but should not be limited to, addressing the sharing of scientific data, tools, and technological resources, professional development opportunities, and an explicit policy statement that US scientists are permitted to be reimbursed from their federal grants for scientific travel to Cuba.

Indeed, we hope that new dialogue with Cuba spearheaded by the White House will be followed closely by meaningful moves to promote truly complete scientific cooperation

and exchange. Beyond general diplomatic relations, we believe that unique opportunities exist for US scientists to visit Cuba, exchange scientific ideas, share technologies, and undertake collaborative projects. CNEURO's achievements have already demonstrated to the world the unique contributions that Cuban neuroscientists can make to the international community. We see even greater potential to advance not

only diplomatic but scientific relations between our countries.

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