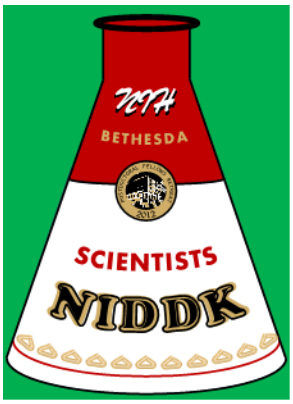
THE iNFORMER
NATIONAL INSTITUTE OF DIABETES
DDK FELLOWS NEWSLETTER
AND DIGESTIVE AND KIDNEY DISEASES
VOLUME 5, ISSUE 1 - FEBRUARY/MARCH 2012

NIDDK FELLOWS SCIENTIFIC RETREAT



April 26-27, 2012
Natcher Conference Center

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Are you new (less than 6 months at NIH)? You are not required to submit an abstract.

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In this issue

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The **iNFORMER** is published by the Fellows Advisory Board (FAB) in collaboration with the NIDDK Fellowship Office

~
Webmaster
Christine Krieger
~

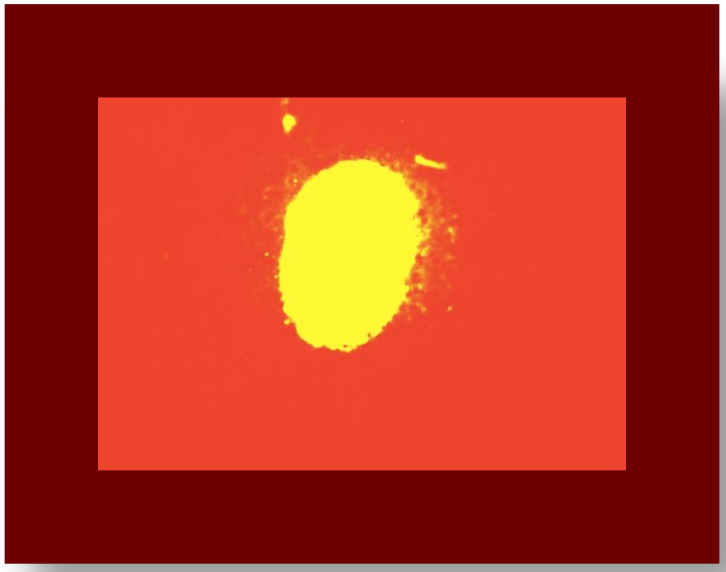
Spotlight: Awesome Lab Picture

Is it a solar flare?

No, there are no astronomers at NIDDK….

It is an over-exposed pancreatic islet stained for insulin.

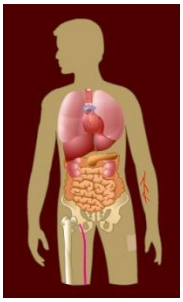
Submitted by Ahmed Kablan, Ph.D.



SEND US YOUR IMAGES!

Do you have a great picture of a gel, a fluorescent cell, or a beautiful diagram that you are looking to share? We are looking for pictures for the next issue of the iNFORMER. Please email them to niddk.informer@gmail.com

YOUR COMMENTARY



Responses from the readers on their views of donating your body to science.

While research on human tissue provides data more relevant to developing treatments for human disease such endeavors have major disadvantages, namely loss of control. In mouse studies, for instance, researchers can control their subjects' genotype, diet, drug regimen, and general lifestyle. Yet, even with that level of control, scientists are ill-equipped to explain or predict the manifestation of disease. Why would anyone believe scientists could do any better using human tissue instead of traditional animal studies? Given the ethical implications and logistical difficulties using human tissue in research, would you be willing to donate your or a loved one's body to medical research?

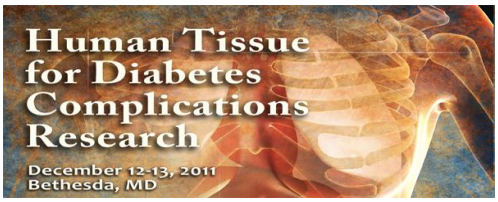
"I do not want to end up like Henrietta Lacks and have parts of me floating around sixty years after I die."

"If a person is healthy, they would do the most good donating their organs for transplant. But people with diseases like diabetes cannot do this, so why not let their last act be for the future betterment of mankind."

"I would leave it up to my children. They are the ones who will have to deal with seeing slides of my tissue up in journal articles or websites. Furthermore, it is impossible for a tissue donation to be completely anonymous. Someone in a position of power could discover the identity of the donor, and any genetic or health information out there about me could affect my children's situation."

If you would like to weigh in on any topic covered in the issue please send your comments into us at niddk.informer@gmail.com

The living need for research on human post-mortem tissue



By Christine C. Krieger

While discussions surrounding death typically concern the spiritual needs of the deceased, attendees of the NIDDK Human Tissue for Diabetes Complications Research (HTDCR) Conference were focused primarily on the demands of the living. Last December, diabetes investigators met at the Hyatt Regency in Bethesda to discuss the use of post-mortem human tissue in research. Despite the success of insulin-replacement therapy, diabetes patients can suffer serious cardiac, neuropathic, nephropathic, and retinopathic complications. Using animal models to explore multi-system disorders has shown limited success. In fact, dogmas regarding the pathogenesis of diabetes are based, not on tightly controlled animal studies, but on pancreatic autopsy data from the 60's. For human diseases, post-mortem examinations remain the major source of information. Yet, the use of human subjects and tissue in research is logistically difficult. Whether the knowledge obtained from these studies is worth the difficulties involved was an underlying concern during the conference and is one of the central questions for any researcher committed to using human tissue to study human disease.

Modern clinical and molecular research methods utilizing post-mortem human tissue have already progressed our understanding of disease pathogenesis, successes which were presented in a series of talks. Many talks addressed neural disorders, since the brain is perhaps the most uniquely human organ. Still, the relatively long human life-span enables human-specific pathogenesis in systems common to all mammals, as described in a few talks on chronic illnesses. All presentations contained ideas and lessons applicable to any disease.

Important aspects of disease cannot always be detected in living patients and are instead revealed in basic histopathological studies. Post-mortem work on multiple sclerosis (MS) brain tissue led researchers like Dr. Bruce Trapp (Cleveland Clinic), to consider MS an immune as well as a neurodegenerative disorder established the phenomena of cortical demyelination. Dr. Renu Virmani's (CVPath Institute) autopsies on people who died suddenly of heart attack have already changed the use of metal stents during treatment of heart disease, and at the conference she discussed her recent findings on intraplaque hemorrhages as a possible cause for atherothrombosis. Dr. Jan Lindeman (Leiden University Medical Center) based his studies of atherosclerosis on peri-renal aortic tissue collected from tissue donors during kidney transplants, cleverly taking advantage of the existing organ transplant network. All these cases studied phenomena still occurring at the moment of death, an advantage when using post-mortem tissue.

Genetic studies are potentially the most valuable outlet for post-mortem tissue, especially given the greater feasibility preserving post-mortem DNA rather than protein. Dr. Joel Kleinman (NIH) collected RNA and DNA in post-mortem brain tissue from virtually all stages of life and, at the conference, described the course of gene expression in the prefrontal cortex from fetal development to old age. Not limited to the nucleus, Dr. Douglas Wallace (University of Pennsylvania) presented his investigations of mitochondrial genotypes, which have been shown to vary amongst organs and change during disease. Comparing natural changes in gene expression to those occurring in patients will hopefully lead to promised gene-based therapies.

Technology is the key to overcoming some of the major hurdles associated with the use of post-mortem tissue. MALDI imaging mass spectrometry and tissue microarrays obtain large amounts of genomic and proteomic data from single tissue slides. Bringing meaning to the data is the purpose of bioinformatic studies like the Genotype-Tissue Expression (GTEx) Project, a NIH program studying genetic variation in samples from post-mortem donors and surgery patients. Environment, one of the least controlled variables of human tissue research, is no match to the digital revolution. Vanderbilt University's eMERGE network, a database of genotypes linked to de-identified electronic medical records, may be an important tool to find phenotypes associated with variant genotypes.

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Autopsies are as relevant today as they were 50 years ago. As long as one post-mortem study has the power to counter dozens of animal ones, investigations using human tissue must be pursued. Improved technology can make the most of tissue donations, minimizing the sacrifice of loved ones. But will it be enough? Though progress has been made understanding disease, cures have yet to be found. Is telling a patient that their donation will one day lead to a cure misleading, or is the hope for a disease-free future the greatest gift scientists can give? This author cannot say. What this author does know is, unlike the number of open faculty positions or the state of the economy, donating your body to science is one thing you can control.

Contributing to the cause

By Christine C. Krieger

The days of grave robbing to obtain cadavers are long past. To acquire human tissue, a researcher – who has written an extensive protocol, been approved by ethics committees, obtained informed consent, etc. etc. etc. – need only ask. Non-profits are a valuable resource for this purpose because of their ability to recruit and organize willing donors. Highlighted at the conference were two such organizations, the Joslin Medalist Program and the Network for Pancreatic Organ Donors with Diabetes (nPOD). The Joslin Medalist Program encourages diabetes patients to enact life-style changes to manage their diabetes by recognizing individuals who have been insulin-dependent for 25, 50, or 75 years. The 50-Year Medalist Study was organized in order to search for genetic, environmental, psychological and physiological factors common amongst individuals who have managed to survive at least 50 years with diabetes. A large proportion of medalists are complication-free, providing a unique opportunity to study protective factors in complications studies. Supplementation of epidemiology data with post mortem studies promises to provide an unprecedented understanding of diabetes complications. nPOD was set up to provide the crucial tissues necessary for diabetes research. In collaboration with accredited organ procurement organizations (OPOs), nPOD processes, distributes, and stores tissues from donors either diagnosed with type 1 diabetes or positive for type 1 diabetes autoantibodies. In 2011, nPOD recovered a record number of 50 cases and shipped 242 tissue/organ samples to investigators. Clearly, many individuals afflicted with disease will contribute to the cause of better health for future generations. Unfortunately, sample size is still a problem. Those interested in cases of 75+ years of diabetes have only 34 people to study from the Medalist program. Better than nothing, but not sufficient for statistically significant findings. To address such problems, Vanderbilt University created eMERGE, which collects and genotypes leftover blood from common clinical diagnostic tests and links that information to de-identified medical records. This database has already proven to be a rich source of information; even a typical animal study would not be as encompassing. Similar to Facebook's privacy policy, eMERGE operates on an opt-out option. Patients participate unless they specifically request not to be included. Though in spirit very different than donations solicited from non-profits such as nPOD, these contributions are crucial to the future success of genetic therapy.

For more information…

"Without Autopsies, Hospitals Bury Their Mistakes"

Joslin Medalist Program

The eMERGE Network: A consortium of biorepositories linked to electronic medical records data for conducting genomic studies

On Reforming Graduate Education

By Nadine L. Samara

The central goal of most biomedical graduate institutions in the United States has been to train Ph.D. students to effectively conduct scientific research. Students learn to plan and execute experiments, analyze data, report their results, and publish in peer-reviewed journals, and graduates are often most prepared for careers in academia and industry. This type of training should remain an institution's primary purpose, but it ought to be supplemented with classes or workshops that would allow Ph.D. graduates to become successful scientists in academic and non-traditional careers. Unfortunately, most graduate curricula produce Ph.D. scientists who lack the ability or skills needed to manage labs effectively or navigate in the non-academic world.

In particular, there is little emphasis on training students for non-traditional, or non-academic careers, despite the fact that they are the more common and available routes for most science Ph.Ds. Fortunately, this issue has not gone unnoticed by many funding institutions, including the National Institute of General Medical Science (NIGMS), which released a report in 2011 entitled "Investing in the Future," which can be accessed at http://publications.nigms.nih.gov/trainingstrategicplan/Strategic_Training_Plan.pdf.

The report outlines a plan for reforming biomedical and behavioral research training. One of its premises is that "not all trainees choose an academic path today, nor should they, and a variety of professions benefit from well-trained scientists who address critical societal needs." The report further recognizes that "many trainees possess the skills and passion to contribute their scientific expertise to the worlds of business, policy, teaching or writing."

The report stresses that success in research training needs to be redefined in order to make the necessary improvements. Thus, it states that a successful education produces Ph.D. graduates who are trained for and competitive in a variety of different careers from which they can choose. Additionally, "the idea that success is limited to academic research careers must be modified and broadened to include those careers in industry, government, education, communications, law and other sectors that require sophisticated research skills."

In order to make the necessary changes, three actions were proposed by NIGMS: 1) Encourage diversity in perspective, background, and approaches, 2) Expose trainees to various career paths, and 3) increase collaboration with non-academic organizations such as professional associations to increase awareness of career options. The NIGMS released a blueprint in January 2012 for implementing their strategy that can be accessed at http://www.nigms.nih.gov/Training/StrategicPlanImplementationBlueprint.htm.

At the NIH, Ph.D. graduates are needed to fulfill many non-academic positions. For example, Dr. Sandeep Dayal works as a health science policy analyst at NIH/NIDDK. He spends a significant portion of his time at work reading scientific research papers from a variety of disciplines, digesting the information, and writing about the topic in lay language. His major challenge is "to read and understand the science in depth, and write about it concisely without losing accuracy." Thus, his extensive training and understanding of the biomedical sciences are pre-requisites for this job. However, other skills such as writing, leadership, diplomacy, and people management are also essential for his success as a science policy analyst. While Dr. Dayal had the foresight and opportunity to participate in graduate student government, where he acquired many of these skills, most graduate students are under pressure to produce results and graduate within a specific time frame, and do not feel that they have the time for extracurricular activities. Other students are discouraged from taking non-science courses or participating in student organizations by their mentors. Many of these students graduate without the abilities or credentials needed to get hired in non-academic careers.

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While many graduate schools provide indirect opportunities for students to acquire these skills, such as participation in their graduate student organizations to acquire leadership skills, as Dr. Dayal did, or writing for the school newsletter, most institutions do not directly train students effectively for future employment. Dr. Jon Lorsch, Professor of Biophysics and Biophysical Chemistry at the Johns Hopkins University School of Medicine, agrees that graduate education needs to change. Some of his recommendations include incorporating courses into the curriculum that teach economics/business, patent law, teaching, science writing. These could be "seminars taught by experts in these areas, offered in the evenings and once a week" according to Dr. Lorsch. They would not have to interfere with research priorities and would give students a practical introduction to key aspects of each of these fields. Dr. Lorsch also suggests internships and externships, where students teach at a local college or high school for instance, once or twice per week.

While postdoctoral fellows at NIH are fortunate to have the Office of Intramural Training and Education (OITE) as well as the Foundation for Advanced Education in the Sciences (FAES), which offers courses in multiple disciplines, many institutions lack these organizations. It is crucial for institutions that focus on graduate level training to have similar organizations so that career development begins at an earlier stage than postdoctoral fellow.

One of the main challenges for people who work in education reform is that they "face a resistance to change," as Dr. Lorsch has experienced from colleagues who do not necessarily agree with the conclusions of NIGMS, or are content with the current graduate educational structure. It is not surprising that many professors believe that success is measured by achievement in academia, as this is the career path they have followed themselves. They often consider non-traditional careers as secondary, less prestigious, or not worthy of a Ph.D. This perspective is so common that a significant number of students and postdoctoral fellows hesitate to discuss their future career prospects with their mentors. Some principal investigators believe that if they are funding the students, then they should be spending all of their time in the lab solely producing data.

These perspectives, however, do not change the reality that graduate education needs restructuring to accommodate the shifting landscape of the science job market, where academic positions are scarcer than ever, and scientists are needed in many other sectors of society. If academics continue to deny that things have changed, and churn out more Ph.D.s who are poorly trained for the career paths that fit them best, then the future for young scientists is bleak. Hopefully, the NIGMS report and others like it will begin to have an impact on the dominant mentality in the world of academia, so that things can begin to change, and students can be prepared for a variety of different careers that benefit from Ph.D.-level training in the life sciences.

Question to the readers…

Are postdocs paid enough?

Traditionally, postdocs are expected to work extremely long hours for very little pay in return for the opportunity to be a PI and run their own lab. The potential for tenure and overall quality of life was considered a fair exchange for a low salary. Yet the current PhD oversupply means that the promise of future job security cannot be met. If PIs, through no fault for their own, cannot assure their postdocs' future employment, do they have the right to require overtime without compensation? If a PI will not pay fair market value for their PhD scientists, are they obligated to allow their postdocs to pursue internships and other extracurricular activities? As a postdoc, would you rather have a higher stipend compensate for a 40+ hour work week, or accept less pay for the time to pursue non-academic interests?

Please email your comments to christine.krieger@nih.gov or niddk.informer@gmail.com. Selected responses will be shown in a future iNFORMER issue.

Supply and Demand: The NIH Request for Information on the Future Biomedical Research Workforce

By Emily Cordas

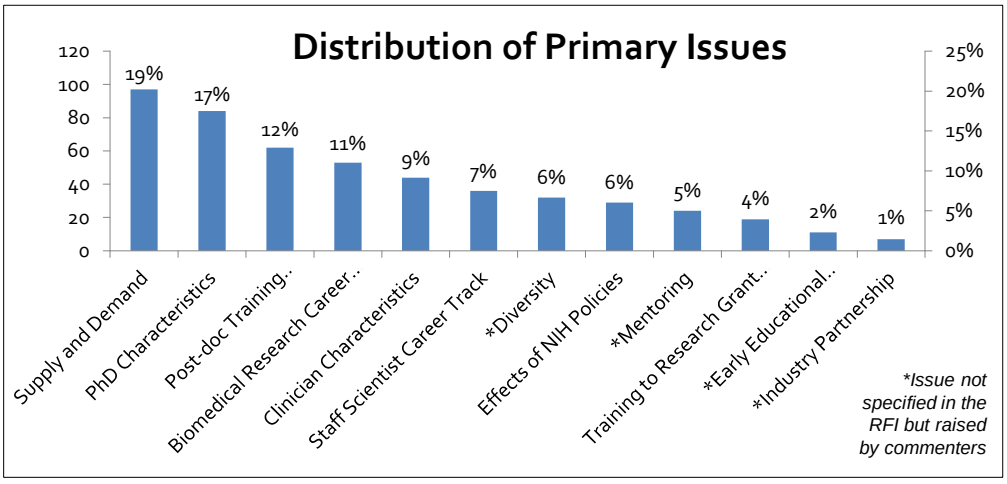
In April 2011, the Biomedical Research Workforce Working Group was formed to help identify and examine issues related to the future of the biomedical research workforce in the United States and make recommendations to the Advisory Committee to the NIH Director on how to support the biomedical workforce. On January 27, 2012, they released a report summarizing comments received on the future of the biomedical workforce. 219 individuals submitted comments, of which 20% spoke on behalf of an organization (including NIH-funded investigators and research institutes), 75% provided personal comments, and 5% were NIH staff. Most of the commenters came from the extramural community and included a broad range of students, post-docs, investigators, scientific societies, and grantee institutes.

What won't be surprising to most of us in the training program of NIDDK is that the number one issue was supply and demand. Noting that too many well-qualified scientists cannot find jobs in academia, the committee recommends that the NIH should reduce the number of students and post-docs that it supports to decrease the over-supply of PhDs. Furthermore, they advise that there should be an increased awareness of alternative careers for PhDs. To help address the demand-side, they recommend that NIH should increase funding and restructure the current funding program so that it has a wider distribution of funds.

Although all issues affect those of us in the postdoc community, two issues of particular interest are the Post-doctoral Fellow Training Characteristics (on pages 15-17 of the report) and Mentoring (on pages 22-24). It was noted by many that post-doc training is too long and this is due, in part, to the fact that there are more people looking for fewer available faculty positions. Another issue discussed here is compensation. The low pay and long hours of a post-doc career path is considered unappealing by many thirty-somethings.

To address these issues, the group recommends that NIH increase availability and length of transition funding for senior post-docs, to raise the NRSA pos-doc stipend, requiring that all NIH funded post-docs receive this amount, and, finally, to require more documentation and monitoring of career progress and planning. One of the main issues that came up in the Mentoring section was how widely the quality of the mentoring experience varies. Therefore, they suggest that the NIH should promote more a structured mentoring experience with plans and guidelines for careers and mentorship. They also suggest prioritizing career development and mentorship over high publication output in determining the financial support labs receive from NIH training grants. Another key issue is that many of the senior investigators are currently having to spend more time obtaining funding and, as a result, have less time for their mentoring duties. It was suggested that training grant budgets could also include the salaries of mentors and support staff to help alleviate the burden on the mentors.

To view the report:
http://acd.od.nih.gov/BWF_RFI.PDF
To view the committee webpage:
http://acd.od.nih.gov/bwf.asp



A sugar addict weighs in on sugar regulation

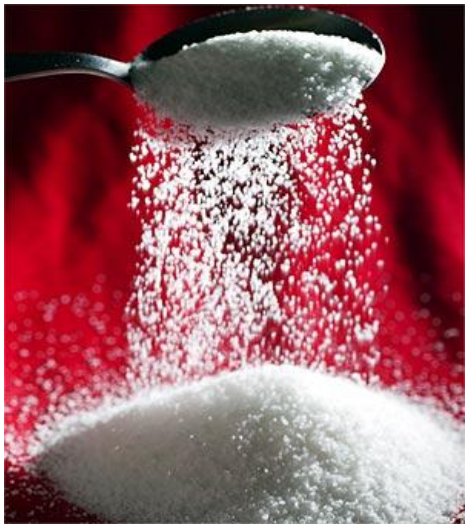
By Emily Cordas

It is 2:30 pm and my blood sugar levels are dropping. I can't focus, I certainly can't multi-task, and I am increasingly becoming cranky. That q-PCR is not going to get done without a few random empty wells, or possibly a missing primer from the mix. Instead, this would be an excellent time to weigh in on the hot topic commentary in Nature, "The Toxic Truth about Sugar." The article came out at the beginning of February and was written by a group of doctors who believe sugar should be a regulated substance, like alcohol and tobacco.

Their concern is that diabetes is becoming one of the greatest health burdens in the world, and not just in the developed world. Not only is sugar consumption linked to obesity, but also induces all of the diseases related to metabolic syndrome. They argue that sugar meets the four criteria that justified the regulation of alcohol: unavoidable, toxic, potential for abuse, and a negative impact on society.

But I can find solace in the thought that my powerful friends in the sugar industry will probably fight against it. Back in the 1960s, they did manage to fund research to provided proof that two artificial sweeteners, saccharine and cyclamate, are potential carcinogens and effectively destroyed consumers' confidence in those sugar substitutes. They can certainly make sure I do not need to see a pharmacist for my afternoon sugar high. What would they give me? A packet of aspartame, like methadone for the heroin addict? Are they going to start to place pictures of diabetes patients missing limbs on sugar bags like they put blackened smoker lungs on cigarette boxes?

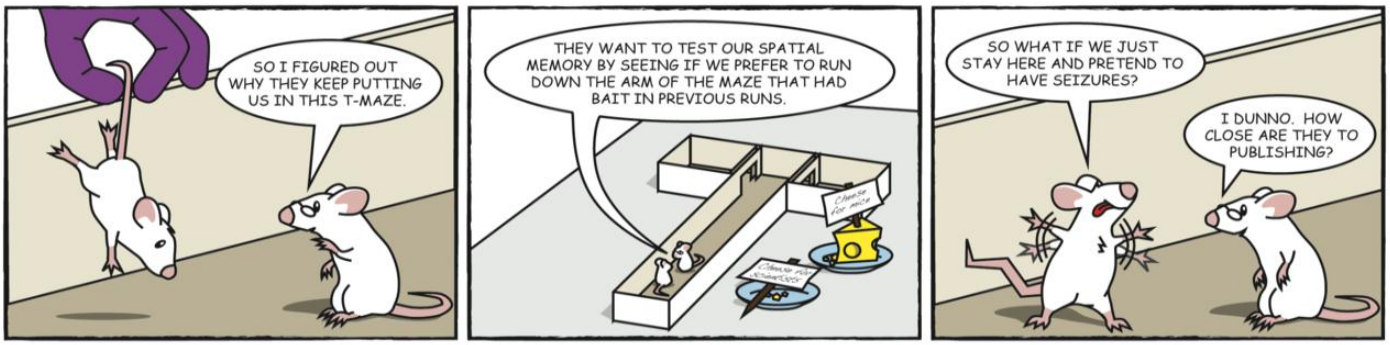
Actually, the doctors feel that best ways to regulate sugar consumption would be applying a tax to sugary foods and limiting sales to children by placing age restrictions on purchasing and limiting sales during school times. They reason that since this approach works for reducing alcohol and tobacco consumption it may also work for sugar. So if their suggestions are taken, my sugar highs might cost me a bit more and would maybe even solve the US debt crisis.



Original article:
http://www.nature.com/nature/journal/v482/n7383/full/482027a.html
Article on the sugar industry and sugar substitutes:
http://query.nytimes.com/gst/fullpage.html?res=9901E0D71E31F931A35753C1A9679D8B63

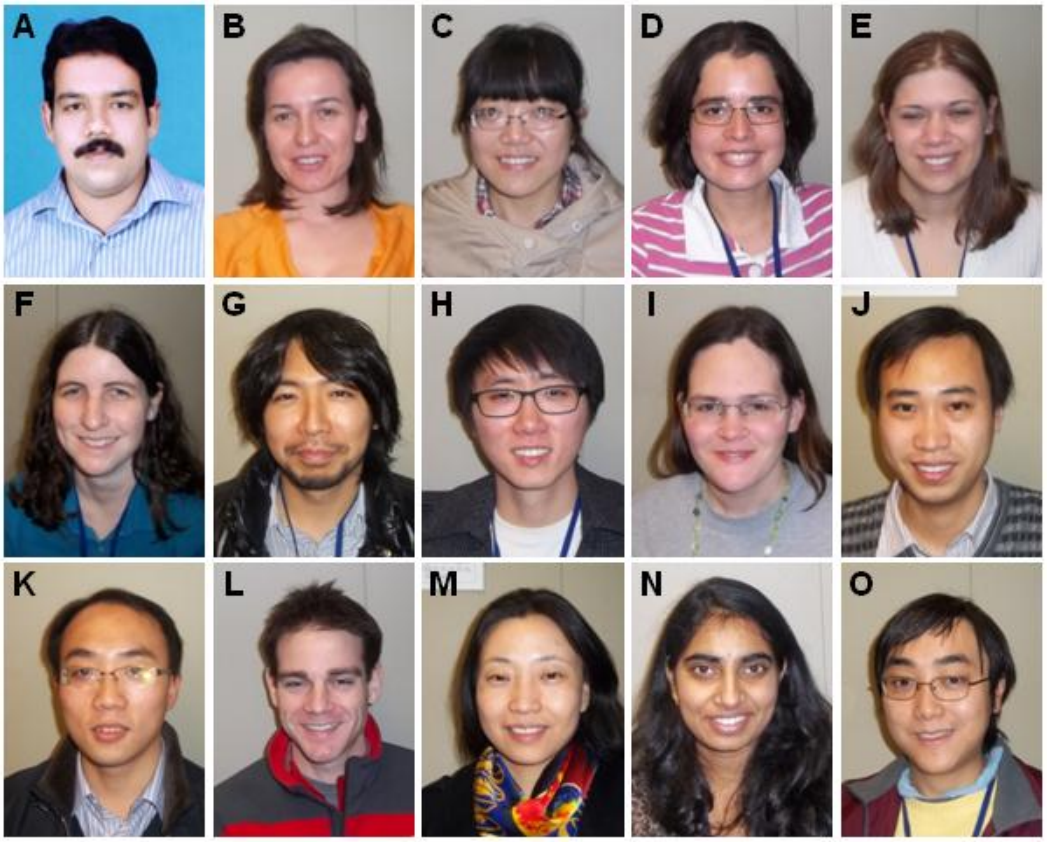
Unnatural Selection Comic

Irving Wang, Josh Meisel and Jenna Tonn



http://unnaturalselectioncomic.tumblr.com/

Welcome New Fellows!



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