National Institute of Diabetes and Digestive and Kidney Diseases
Network of Minority Research Investigators Workshop and Annual Meeting

Hilton Washington DC/Rockville Executive Meeting Center
Rockville, MD
April 24 - 25, 2008

Thursday April 24, 2008

WELCOMING REMARKS

Dr. Ricardo Azziz, M.D., M.P.H., M.B.A., Professor, Department of Obstetrics and Gynecology, Cedars-Sinai Medical Center and Departments of Obstetrics and Gynecology and Medicine, The David Geffen School of Medicine at UCLA, Los Angeles, CA

Dr. Azziz, chair of the Network of Minority Research Investigators (NMRI), welcomed participants to the NMRI 7th annual workshop. The NMRI was established by the National Institute of Diabetes and Digestive and Kidney Diseases' (NIDDK) Office of Minority Health Research Coordination (OMHRC) to provide a communication network of current and potential biomedical research investigators and technical personnel from traditionally underserved communities. The major objective of the Network is to encourage and facilitate the participation of members of underrepresented racial and ethnic minority groups in the conduct of biomedical research in the fields of diabetes, endocrinology, metabolism, digestive diseases, and nutrition, kidney, urologic, and hematologic diseases. The Network also encourages participants, especially young investigators, in choosing and advancing their careers.

Dr. Azziz recognized the Planning Committee for its work in making the workshop a reality, and he reviewed the agenda and logistics for the workshop. In addition, he recognized NIDDK NMRI staff—Dr. Lawrence Agodoa and Ms. Winnie Martinez—who are responsible for creating and maintaining NMRI.

Lawrence Agodoa, M.D., Director, Office of Minority Health Research Coordination (OMHRC), National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), National Institutes of Health (NIH), Bethesda, MD

Dr. Agodoa thanked Dr. Aziz for serving as chair of NMRI for the past year. He asked participants to introduce themselves and tell a little about their position and interests.

He emphasized that the workshop is an opportunity to network and meet people who can help you promote careers. He recognized those NMRI members who have received promotions or grants since the 2007 meeting.

Dr. Agodoa reviewed changes to the agenda and introduced the keynote speaker, Dr. Neil Powe from Johns Hopkins University Department of Medicine.

KEYNOTE ADDRESS

From Rags to Riches: *Rising from Academic Poverty to Academic Wealth*

Neil R. Powe, M.D., M.P.H., M.B.A., Professor of Medicine, School of Medicine, and Professor of Epidemiology, Bloomberg School of Public Health, Johns Hopkins University, Baltimore, MD

Dr. Powe presented information on how to become "academically wealthy," based on his personal experiences that prepared him for his career. After a summary of the history, mission, and activities of the Welch Center for Prevention, Epidemiology, and Clinical Research at Johns Hopkins University (JHU), Dr. Powe presented his 10 rules for academic wealth and how to use the rules for academic success. He applied each rule to his own experiences as a model for those at the beginnings of their careers to consider as they pursue advancement.

Rule 1: Get on the right train

Dr. Powe described his childhood growing up in Philadelphia, and how he developed an interest in medicine as a career by seeing physicians provide care to underserved patients in the urban health clinics in which his father worked as a city employee. He described how he was fortunate enough to have family and mentors in school who encouraged him to pursue his interests. He attended undergraduate school at Princeton in 1972, which was the right train for him. Princeton was quite a change from the urban environment in which he grew up and the public schools he attended in Philadelphia. He had the opportunity to work with the late Harold Weintraub, M.D., Ph.D., a pioneer in molecular biology of gene expression, who excited him about science and was his advisor in the Biochemistry Sciences Department for his thesis on red blood cell differentiation. Dr. Powe also described a paper he wrote on health care for the underserved in a course that reaffirmed his observations on medicine before college and piqued his interest in population science and health disparities.

Rule 2: Follow your passion

During his time at Princeton and later at Harvard Medical School, Dr. Powe developed a passion for how to evaluate whether new innovations work in medicine, for whom, and under what circumstances. This led to a journey that included taking a year off from medical school to pursue coursework in clinical epidemiology at Harvard School of Public Health to determine if he could understand how physicians make the decision to use new and emerging technologies, and the evidence behind these decisions. He used this background when returning to Philadelphia for an internship and residency in internal medicine. Later, he became a Robert Wood Johnson Clinical Scholar at the University of Pennsylvania, where he took further coursework at the Wharton Graduate School and performed research on new medical technologies and new models of health care delivery, influenced by the late John M. Eisenberg, M.D., then chief of the Section of General Internal Medicine at the Hospital of the University of Pennsylvania.

Rule 3: Become a driver

This rule refers to the choices made independently after receiving a solid background education. Along with this strong foundation, Dr. Powe was attracted to join the faculty at Johns Hopkins where he could use his talents in medicine and public health.

Rule 4: Let important questions guide you
Dr. Powe explained how defining important research questions is critical to academic success. He showed how he asked important questions that led to a series of sentinel research studies that helped to define the new field of outcomes research.

Rule 5: Seize the moment
It is difficult to know at the time if opportunities presented to you are career-defining moments; this is easy in hindsight. This occurred for Dr. Powe when he arrived at JHU, attended a lecture at Grand Rounds on erythropoietin, and talked with the lecturer afterwards. It was this discussion that helped merge his passion and academic background. He conducted sentinel studies evaluating the effectiveness and safety of the new biotechnology, recombinant human erythropoietin, used to treat anemia in end-stage renal disease patients.

Rule 6: Understand the rules of the game
One of the most important rules for younger researchers is to understand the rules of the game in the institution. Publication is an important part of that game, and publishing with mentors and researchers esteemed in a field is very helpful. The goal is to create first author original research. Another important aspect is understanding how to present your ideas in writing and orally, thereby securing grant money. Another important aspect is sustaining research by collaborating with other investigators within and outside your institution. Dr. Powe provided examples of strategies that explained how the rules of the game can enhance an academic research career, leading to success. He used the example of the CHOICE study to show the progression of coming up with an idea, putting together a research team, securing funding, conducting the study, and ultimately publishing and disseminating the results.

Rule 7: Stay focused on the important
Staying focused on areas that are of interest and competency for a researcher allows one to increase his or her depth in a chosen field of study. Using the CHOICE study, Dr. Powe explained how conducting ancillary studies and publishing results allowed an in-depth exploration of fundamental relationships in the treatment of kidney disease patients; more than 40 manuscripts have been published in leading journals based on results of the CHOICE study. These studies have influenced medical practice.

Rule 8: Learn from sages
This rule speaks to the role of mentors in career choices and advancement. For example, mentors provide encouragement, instill confidence that you have their support, and believe in your abilities and that you will succeed. Effective mentors engage you in regular personal interactions and should meet with you in one-on-one meetings at least weekly. He said it is important to know that promotion is earned, not an entitlement that someone is guaranteed. Learn the value of being mentored and being a mentor. Dr. Powe learned to mentor early and has mentored hundreds of trainees and faculty who now are conducting pioneering research and have become leaders in their fields.

Rule 9: Don’t take it personally
On a personal level, it is important to know that there will be bumps in the road. When you are turned down for your first grant, do not take it personally, but work to revise the grant and

resubmit it. Seek advice from successful researchers in the field so you know you have a quality proposal. There are many people who will support you during failures, but it is up to the individual to accept failure, learn from it, and overcome it by trying harder.

Rule 10: Don't miss three pointers
This is a rule that speaks to importance of being a "real" person and spending quality time with family and friends. Dr. Powe described how he attended nearly all the varsity basketball games of his daughter and never wanted to miss her three-point plays. The strength for academic wealth one garners from family and friends cannot be replaced.

Note: Dr. Powe was the first African American in the 100-year of Johns Hopkins Medicine to be promoted to full Professor in the Department (he was the third in the entire School of Medicine). He also was the first African American to achieve the rank of full Professor in the Johns Hopkins School of Public Health. Just after the NMRI annual meeting, in recognition of his accomplishments, the board of trustees of the Johns Hopkins University appointed Dr. Powe as University Distinguished Service Professor of Medicine, an honor bestowed to only 27 individuals ever at the Johns Hopkins School of Medicine.

OVERCOMING BARRIERS TO MINORITY INVOLVEMENT IN HEALTH RESEARCH: ENGAGING AND EDUCATING THE MINORITY RESEARCH SUBJECT

Keith Norris, M.D., Executive Vice President for Research & Health Affairs, Charles Drew University of Medicine and Science, Lynwood, CA

Dr. Norris said there may not be one answer for overcoming barriers to minority involvement in health research, but his own experiences offer some strategies that have worked for many people. Five areas must be addressed to overcome barriers. They include understanding clinical research, concerns of not being a benefactor, communication (e.g., language and culture), research ethics/subject protection, and a sense of community in the academic community that allows trust.

A survey was conducted to determine the level of understanding and trust in research among minority communities. African American women (n = 8) participants had greater knowledge of research, followed by Latino men (n = 12), African American men (n = 8), and Latino women (n = 4). Shared motivators for participating in research and clinical trials included having a disease without a cure, helping a close family member, finding new cures for disease, staff from the same racial/ethnic group, childcare provided, transportation provided, and a limited number of visits required. There were different motivators among the African American and Hispanic groups. Shared barriers included fear of experimentation or harm, research for disease with current medications, transportation, lack of financial resources, time conflicts (e.g., work and family), need for childcare, and the number of visits required. Again, there were differences among the study groups. The survey showed that minority groups need to have barriers removed —and motivators encouraged—to increase the number of minority participants in research and clinical trials.

Strategies for educating minority communities about research exist if researchers understand the community. The most important aspect is communication; studies show that 48 percent of Americans cannot read well enough to understand a bus schedule. This is a clear message that medical information is not likely to be understood by most people. To a large extent, today's research addresses many of the barriers that the minority community has to participating in research, although researchers have not communicated the situation effectively. The key principle to remember is to convey information and confirm understanding.

It is important that minority communities participate in clinical research to reduce racial/ethnic disparities in health outcomes, to reduce gender/age disparities in health outcomes, to evaluate new approaches to improving health and health care systems, and most importantly, to improve the health of the community.

Academia and communities can develop partnerships to enhance the role of minorities participating in research. The primary challenge for developing these partnerships is the interface between academia and communities. A structure for addressing this challenge is Community-Based Participatory Research (CBPR), which according to the Kellogg Foundation is "a collaborative approach to research that equitably involves all partners in the research process and recognizes the unique strengths that each brings." CBPR projects are designed to provide a locus of control and collaborative ownership; leverages are built for ownership for actions, as well as promoting organic development of thought, building networks, and cultivating leadership. They must be built on respect and common values and purpose.

In summary, the following recommendations are suggested for creating and maintaining partnerships between academia and communities.

- Be thoughtful about the decision to partner, and ask who, why, and how.
- Use a memorandum of understanding to establish the partnership and use as the guiding principle for roles, responsibilities, and expectations and ultimately to reduce conflicts.
- Create an effective Community Action or Advisory Board, but recognize this alone does not establish a partnership.
- Continue to look for win-win scenarios and consider the potential long-term implications of early successes.

MINORITY HEALTH AND HEALTH DISPARITIES

Joyce Hunter, Ph.D., Deputy Director, National Center on Minority Health and Health Disparities (NCMHD), NIH, Bethesda, MD

Dr. Hunter provided background information on the NCMHD, which is one of the 27 Institutes and Centers (ICs) that comprise the NIH. NCMHD was established by Public Law 106-525, the Minority Health and Health Disparities Research and Education Act of 2000. Dr. Hunter mentioned that NCMHD has awarded grants to some of the NMRI attendees and encouraged other attendees to consider submitting grant proposals.

Dr. Hunter stated the mission of NCMHD, which is to promote minority health and to lead, coordinate, support, and assess the NIH effort to reduce and ultimately eliminate health disparities. In an effort to accomplish its mission NCMHD will 1) conduct and support basic, clinical, behavioral, and social science research; 2) promote development of research infrastructure and training; 3) foster emerging minority programs; and 4) disseminate information by reaching out to minority and other health disparities communities.

NCMHD also has as part of its mission the lead responsibility for coordinating the development of the NIH Health Disparities Strategic Plan. The NIH Health Disparities Strategic Plan's overarching goals include research, research capacity building, and community outreach.

Dr. Hunter then described the NCMHD research programs. In addition to its own research programs, NCMHD has had a long history of co-funding health disparities research projects selected for funding by other NIH ICs and federal agencies.

NCMHD is sponsoring a trans-NIH Health Disparities Summit called "The Science of Eliminating Health Disparities" on December 16-18, 2008, at the new Gaylord National Hotel in Maryland (see the NCMHD website at http://ncmhd.nih.gov/ for more information). The Summit will provide an opportunity to showcase grantees, supported by all of the NIH ICs, which are engaged in health disparities research.

Discussion

A participant asked Dr. Hunter to explain how to participate in the Minority Health and Health Disparities International Research Training Program. She responded that NCMHD issues an RFA, and any U.S. institution can apply. The research plan of the application must provide a detailed description of the research training program for the students at the U.S. institutions, as well as the research experience at the international site.

In response to a question about the Centers for Excellence, Dr. Hunter explained that under the P-60 awards an institution could develop partnerships; NCMHD does not dictate the scientific area, which makes it more flexible than other ICs. She strongly encouraged participants to consider submitting proposals to NCMHD. As a follow-up, a participant asked if proposals for the P-60 award are reviewed the same way as in other ICs. Dr. Hunter said they would be reviewed using the same basic review criteria that all NIH ICs use.

PARALLEL INTERACTIVE WORKSHOPS—DEVELOPING AND MAINTAINING AN INDEPENDENT RESEARCH PROGRAM

During the parallel interactive workshop sections scheduled during the meeting, participants selected two of the following presentations to attend. During the scheduled time period, each workshop leader presented the materials twice.

Developing a Career in Academic Administration
Dr. Norris

The principles of running any organization—whether in academia or in another field—are the same. The mission of the organization does not determine how fiscally savvy and prudent an administrator needs to be. The academic world needs good administrators, but often, in academia, administrators are chosen because of connections rather than expertise.

Dr. Norris recommends that people interested in working in academic administration should earn a Master of Business Administration. He and others have found this degree very helpful because of the perspective it provides. Other participants in the session pointed out that degrees in educational leadership also are available.

Individuals who are considering an academic administrative position should seek out a mentor who can spend time talking about what the position entails, what skill sets are needed, and what additional skills the person considering the position may need to acquire. At a particular institution, there likely are to be certain committees that can provide important insights into how the institution operates and the roles of the individuals holding particular administrative positions. Serving on these committees is valuable. Understanding finance is important, so participation on a high-level finance committee may be particularly useful in helping a prospective administrator really understand the operations of an institution, and it can be a very powerful vehicle for positioning a person to be competitive for a future position. While determining what additional skills to acquire, the finance committee member is simultaneously meeting people who will be influential in determining who will be the next person in various administrative positions. Participating in such committees may also help some people to realize that administration is not for them, which is also a valuable lesson.

Moving into administration can have drawbacks. Sometimes, when a faculty member moves into administration, it can create hard feelings because people may think that the individual is looking for fame, power, or visibility. One's former faculty colleagues can become alienated. Faculty and administration are often seen as being at odds, with different priorities.

There is also an opportunity cost to being an administrator because it takes time away from other aspects of an academic career. One participant noted that it may be more difficult to make progress in research and obtain tenure if you have substantial administrative responsibilities. Another participant told the group that he had turned down an opportunity to be promoted from assistant to associate dean because it would have required increasing his administrative time commitment from 25 to 50 percent.

In response to a question about administrative career paths, Dr. Norris said that it is not necessary to be a department chair before becoming a dean. There are currently two tracks toward deanship: one through the roles of division chief and department chair, and the other through more specialized administrative roles, such as in medical education or financial administration. Increasingly, people are coming to the position of dean through the second path.

Maximizing Your Lab's Efficiency and Effectiveness
Carlos Isales, M.D., Professor, Department of Orthopaedic Surgery, and Associate Director, Medical College of Georgia, Augusta, GA

Dr. Isales conducted his breakout session as an open discussion, inviting participants to comment on their own experiences in setting up and running research laboratories. Many of those comments focused on personnel issues.

One participant noted that he had hired too many people for his laboratory in the first year and found that the laboratory worked more efficiently when he cut back to a smaller staff for the second year. Others drew attention to the difficulty of choosing good technicians. Several commented that having a good lead technician or laboratory manager is a key to success but that such individuals can be difficult to attract, particularly for researchers working at historically black colleges or other smaller institutions in metropolitan areas that also are home to larger universities or hospitals. One participant suggested that in such situations, it may be best to hire a less qualified technician, perhaps one with only a high school diploma, and train that person to the necessary level. Another participant complained that many technicians want to work in a laboratory only for a few years before attending graduate school or medical school, but another noted that such individuals often make excellent technicians for the relatively short time that they are available. Other personnel issues raised by the participants included the difficulty in recruiting personnel for laboratories that work on infectious diseases; the fact that some types of grants will not allow researchers to hire people who are not U.S. citizens; and the lack of graduate students at colleges that only teach undergraduates. Although undergraduates may have the potential to be good researchers, the short time in which they can participate in a research project may limit their usefulness.

In his comments and in written materials handed out at the session, Dr. Isales also focused on personnel issues, noting that the people hired for a laboratory can be both its greatest resource and its greatest impediment to progress. It often is difficult for a new principal investigator (PI) to make the transition from being a researcher to being a "boss." Hiring a key person (a senior technician) as the second-in command for the routine running of the laboratory is crucial. Training people for a laboratory is time-consuming, taking about 1 year, so it is best to avoid recruiting people who will only stay in the laboratory for shorter periods. Once people are trained, the PI should avoid micromanaging. Constantly looking over people's shoulders is generally a waste of resources.

Discussion participants noted that keeping the size of the laboratory small may sometimes be advantageous. In a large laboratory, the PI's time may be focused more on management and human resources issues than on science. One participant noted, however, that an advantage of a large laboratory is that laboratory meetings are more stimulating and intellectual. Dr. Isales recommended keeping the laboratory small at least initially since this approach provides the best opportunity to learn from mistakes.

Managing a Clinical Research Program
Glenn Chertow, M.D., M.P.H., Professor, Stanford University School of Medicine, Palo Alto, CA

Dr. Chertow provided insight into what he has learned about managing a clinical research program from the perspective of a young investigator who ended up managing his own program. Five aspects of management—managing yourself, managing others, managing time, managing expectations, and managing to stay sane—provided an outline for his advice. Above all, it is important to understand what factors were instrumental in causing someone to pursue a research career. Among those factors are altruism, idealism, and finance, as well as a sphere of influence for the individual. Understanding the factors that are personal to an individual allow them to manage themselves in their career.

Career decisions are difficult to make, and it must be understood that a research career may mean forgoing a career in clinical practice. Working for the MD degree, however, will allow many options and career choices. One way to view the difference in careers regarding the sphere of influence is to recognize that a clinician in private practice may influence the lives of hundreds of patients; the clinician educator in academia can favorably influence the outcome for thousands of patients; but the clinician investigator in academia can favorably affect the lives of all patients and have global reach.

The decisions made early in the career of a potential clinical investigator are far-reaching. Training during residency fellowships and choices of faculty positions must be made from the viewpoint of the ultimate career goal; these decisions must be well-thought-out and based on the best path to achieve career success. Remember that the "patterns you set are the patterns you live by" as the mantra for managing yourself. Other important dictums are to balance effort and expectation; do not promise what you cannot deliver, be careful not to bite off more than you can chew; and be a good academic citizen, but know when to say "no."

In managing others, there are three equally important spheres: those you work with, those who work with you, and those you work for. Interactions with people you work for should always include a focus on managing expectations, maintaining transparency, and keeping in mind the need to earn your independence. For managing those you work with, it is important to recognize competing priorities and stresses, consider the specific tasks and individuals' strengths and weaknesses, and realize that writing tasks may not be a strength for all those with whom you interact. For those who work for you, be deliberate when you hire; check references; make sure the position is sufficiently challenging; recognize that most research staff want to work harder than you think, as long as they are fully engaged in the work; and job satisfaction is related more closely to feeling part of something important, rather than salary, benefits, and scheduling.

Managing expectations and time also are important. It is important to recognize that others may have different priorities than you (e.g., family, children, and administrative activities), and that time deadlines need to be kept as a priority that adjusts to needs of staff.

Staying sane in the academic research setting is a function of individual adaptation to the pressures and occupational hazards (e.g., drug and alcohol use, depression, sleep deprivation, and chronic medical conditions) inherent in career choices. It is important to make time for one's

personal life and to not be too hard on oneself; things sometimes go wrong or do not work out as anticipated. Although a career as a clinical investigator can provide intellectual stimulation, an opportunity to continue doctoring, a varied work experience, and a global sphere of influence, it is important to understand that management and leadership training for future roles in academic medicine are important.

Selling Your Science

Eddie Greene, M.D., Associate Professor of Medicine, Mayo Clinic College of Medicine, Rochester, MN

Dr. Greene began his presentation by saying that selling your science is one of the keys to the whole scientific endeavor. Scientists need to sell their work locally at their own institutions, in abstracts and poster presentations, in oral presentations at meetings, to grantors, to journals and book publishers, and increasingly, to the general public.

When communicating about your research, it is important to stay focused and develop a cogent theme (sometimes called a Single Overriding Communication Objective or SOCO); to learn and know your audience; to know your research discipline and subject matter; to prepare your presentation or grant application well to avoid major pitfalls and gaffes; and not to oversell or exaggerate your work.

One of the most important audiences to whom scientists need to sell their work is study sections and other grantors. A detailed, well-designed project plan is needed to convince potential funders to provide resources. A grant application should include a title; background information; an explanation of the significance of the work; the hypothesis; the objective; a description of the experimental design; and discussions of statistical analysis, data interpretation, and limitations or alternative approaches.

To review a grant application, reviewers need to be able to judge the inherent quality of the ideas, the investigator's creativity and ability, the proposal itself, and whether the idea is workable. Reviewers are looking for a plausible, logical, and testable idea that will make a significant contribution to the scientific literature. To obtain funding, investigators need to sell all of these aspects of their work and should realize that grant reviewers are usually assigned to review 10 to 12 grant applications, often while they are working on their own grant proposals. They do not have much time to spend on each grant application, so clarity of presentation, focus, the use of appropriate graphical aids, and the ease of reading are crucial. Grant applications may be "triaged" (evaluated as being in the lower 50% and therefore not reviewed in detail) because they are not important/significant, not logical, in need of extensive revision, overly ambitious, unfocused, not supported by preliminary data, or in need of additional preliminary data.

Much of the same information included in grant applications also should be included in journal articles. The Introduction of a journal article should clearly state the hypothesis and objectives, while introducing the topic but not providing a detailed review. The Materials and Methods section should be very specific, to facilitate replication by other scientists. The Results section should report only the critical facts and use graphical representations when appropriate. The Discussion should summarize the work and show how it fits into the larger scientific field.

Dr. Greene noted that investigators should not be offended by criticisms and comments received from journal reviewers or other scientists but should consider them valuable pointers on how to improve their ability to sell their science.

LUNCH AND SENIOR MENTOR ROUNDTABLES

During lunch, workshop participants sat at a table of their choice to discuss specific topics of interest to them. The following topics were discussed by the listed topic leaders:

Selecting and Being a Good Mentor
Mario Ascoli, Ph.D., Professor, University of Iowa, Iowa City, IA
Virginia Sarapura, M.D., Associate Professor, University of Colorado Health Sciences Center, Aurora, CO

Picking and Building a Good Research Laboratory
Healani Chang, Dr.P.H., Adjunct Associate Professor, University of Hawaii, Manoa, HI
Dr. Isales

Academic and Research Administration 101
Sidney Golub, Ph.D., Professor Emeritus, University of California, Irvine, CA
Evangeline Motley, Ph.D., Associate Professor, Meharry Medical College, Nashville, TN

Networking/Collaboration
Dr. Norris and Dr. Orhan Öz, M.D., Ph.D., Associate Professor, University of Texas Southwestern Medical Center at Dallas TX

Finding Time for Family and Yourself
Daisy De Leon, Ph.D., Associate Professor, Loma Linda University, Loma Linda, CA, and Ricardo Loret de Mola, M.D., Chairman, Department of Obstetrics and Gynecology, Southern Illinois University, Springfield, IL

Developing an Academic Career
Dr. Azziz and Dr. Greene

Applying for Grant Funding/Interacting with NIH
Judith Podskalny, Ph.D., Program Director, NIDDK, Bethesda, MD, and Rebekah Rasooly, Ph.D., Deputy Director, Division of Kidney, Urologic, and Hematologic Diseases, NIDDK, Bethesda, MD

STATE-OF-THE-ART SCIENTIFIC SESSIONS

Recent Advances in the Genetics of Obesity and Type 2 Diabetes

Dr. Clifton Bogardus, Chief, Phoenix Epidemiology and Clinical Research Branch, NIDDK, Phoenix, AZ

Dr. Bogardus presented an overview of the NIDDK intramural laboratory and office in Phoenix. The Phoenix office was established as part of the NIDDK initiative to study the Pima Indians in the region. The Pima have the world's highest reported prevalence of type 2 diabetes (T2D); there is not a single reported case of type 1 diabetes (T1D) in this population. More than 50 percent of the population over 35 years of age is affected.

The most significant environmental factor for T2D among the Pima is the diabetic intrauterine environment. Studies conducted in the 1980s indicated that approximately 90 percent of the offspring of women with T2D go on to develop T2D. This creates a vicious cycle of women with diabetes having female offspring who go on to develop diabetes and have offspring who have an even greater risk of developing diabetes. Obesity also is a significant risk factor for T2D, and the Pima suffer from unusually high levels of obesity. There are major genetic determinants of obesity in this population.

At the beginning of the last century, studies using a human calorimeter conclusively determined that weight gain or loss is a function of the number of calories expended and the number of calories of intake. Since energy expenditure is highly correlated with body weight, people who weigh more burn more calories than those who weigh less. It is true, however, that there is significant biologic variation among individuals, and some people burn fewer calories than others of equal size. This variation in metabolism does not account for large variations in body weight, however.

Environmental differences can explain differences in weight between populations (e.g., Rwanda vs Finland or Tokyo vs Honolulu). Genetics, on the other hand, explain differences in weight within populations, as evidenced from studies of families, adoptees, twins, and monozygotic twins reared apart.

Genome-wide association studies (GWAS), making use of single nucleotide polymorphisms and linkage disequilibrium mapping, have made it possible to identify genes associated with complex diseases, such as obesity or T2D. Most of the GWAS have been conducted in Caucasians, and these results do little to elucidate genetic causes of diabetes among the Pima. Results from GWAS studies in the Pima have identified potential genetic differences that are associated with a higher risk of T2D, although more research is needed to develop practical applications of this knowledge to reduce an individual's risk of diabetes.

The fundamental problem of obesity and related diabetes is that they are conditions resulting from society having easy access to an abundance of food. It is difficult to stay in energy balance in this environment. Solutions include identifying genetic and molecular mechanisms of the inherent drive to eat; implementing early interventions in at-risk individuals with multifaceted

treatments (e.g., combined and more effective drug regimens, lifestyle coaching, and better coverage by health insurance); and changing the obesogenic environment through public policy.

Genetics of Kidney Disease
Dr. Rasooly and Michelle Winn, M.D., Assistant Professor, Center for Human Genetics, Department of Medicine, Duke University Medical Center, Durham, NC

Dr. Rasooly provided her perspective on the genetics of kidney disease to give a sense of why researchers study genetics and what things can be learned. There are two types of genetics: (1) Mendelian genetics, where a mutation in a single gene is the primary cause of a disease or disorder, and (2) complex genetics, where variants in multiple genes each contribute to a trait, with cumulative effects. The National Library of Medicine PUBMED Online Mendelian Inheritance in Man (OMIM: http://www.ncbi.nlm.nih.gov/omim/sites/entrez) website lists more than 100 genes associated with Mendelian kidney diseases. Some are relatively well-known (e.g., polycystic kidney disease [PKD]), while others are virtually unknown (e.g., familial nephropathy with gout). Some affect kidney function, whereas others affect both form and function.

The PKD story has validated the investments by NIH in genetic research on Mendelian diseases. Two of the more common of at least 57 inherited cystic diseases are Autosomal Dominant Polycystic Kidney Disease 1 and 2 (ADPKD1 and ADPKD2). The genes for ADPKD—*PKD1* and *PKD2*—have been known for more than 10 years; the gene products are found in cilia at the apical surface of renal tubule cells. Other cystic diseases also have been found to have cilia defects, such as nephronophthisis, a rare pediatric cystic kidney disease that is caused by mutations in one of at least seven loci. Studies in zebrafish have confirmed the association of cilia defects related to cystic disease. The cilia are sensory organelles that connect various stimuli to mechanisms of cell-cycle control and epithelial cell polarity. There now is a unifying theory for cystic kidney disease that suggests that it is caused by defects in primary cilia or associated structures or signaling from the cilia. Thus, genetics has provided new clues about disease etiology, including the timing of the defect, and leads for possible therapeutics.

As noted in the studies described earlier by Dr. Bogardus on diabetes, understanding complex genetic diseases is difficult, since many variants contribute. NIDDK supports many research consortia that are attempting to accrue enough patients with kidney diseases to identify the underlying susceptibility and progression genes. A better understanding of the genetics of kidney diseases and associated factors (such as hypertension) at the genetic level might increase the ability to reduce the disease burden on individuals and society. Many ongoing studies are using a variety of molecular and genetic strategies to identify the variants that predispose an individual to severe kidney disease. GWAS (Genome Wide Association Studies) is a new approach that offers more opportunities to identify genes for complex traits.

Dr. Rasooly finished by speaking about the importance of studying genetics in families with rare Mendelian forms of diseases that are generally common and complex genetically, such as families with rare inherited forms of high blood pressure or Alzheimer's Disease. She introduced Dr. Winn for a presentation on the genetics of one such kidney disease, with both common forms that are genetically complex and rare familial forms with Mendelian inheritance: focal segmental glomerulosclerosis (FSGS).

Dr. Winn provided a pathological definition of FSGS and slides exemplifying characteristics of the condition. Subtypes of FSGS include primary (idiopathic), which is the most common; secondary, such as sickle cell disease, HIV, and heroin nephropathy; and familial. Among familial FSGS, autosomal dominant, autosomal recessive, and FSGS associated with congenital disorders (e.g., Charcot-Marie-Tooth and Laurence-Moon-Biedl syndromes) have been identified.

Based on the results of linkage studies, several gene regions appear promising for candidate gene analysis. For example, a mutation in the gene *TRPC6* was identified in a large family cohort with FSGS with a C-to-A heterozygous change in every affected individual but in none of the control individuals. The amino acid analysis indicated that proline had been changed to glutamine (i.e., Pro112Glu), and that a search of all available public single nucleotide polymorphisms (SNP) databases did not reveal evidence of this being a previously known variant. Subsequent studies of the TRP channel found that proline was conserved in various animal genomes and that subfamilies of TRP exist. In general, the gene is involved in protein-protein interactions. *TRPC6* is expressed in many tissues, including kidney.

Functional studies of *TRPC6* found that it is involved in calcium signaling and is responsive to angiotensin II (Ang II). Ang II, acting through its AT1 receptor, plays a critical role in the generation of proteinuria and progression of kidney injury, *TRPC6* is known to be modulated in a receptor-mediated fashion via DAG, and the AT1 receptor is known to activate DAG via the Gaq pathway. This results in increased calcium in the cell, which can be detrimental to cell health. Immunostaining indicates that there is more mutated *TRPC6* protein on the cell membrane than wild-type *TRPC6*, therefore allowing more calcium into the cell. Mouse models also have been developed to test the hypothesis that *TRPC6*-deficient mice will be protected from kidney injury because of a decrease in injurious intracellular calcium signaling. Initial results from these experiments found that *TRPC6*-deficient mice do not have albuminuria or glomerulosclerosis; the absence of *TRPC6* had no detectable effect on the severity of Ang II-dependent hypertension, proteinuria, or kidney injury; and *TRPC3* and *TRPC7* mRNA expression is increased in the kidney and podocytes of *TRPC6*-deficient mice. Overall findings from these investigations suggest the possibility that inhibitors of *TRPC6* might have some utility in preventing chronic kidney disease.

Nutrition and Obesity
Carolyn Miles, Ph.D., Director, Clinical Obesity and Nutrition Program, NIDDK, Bethesda, MD

Dr. Miles presented an overview of the increase in obesity from 1985 to 2005 using Behavioral Risk Factor Surveillance System (BRFSS) data from the Centers for Disease Control and Prevention (CDC). The increase has been staggering from a public health viewpoint, with increases in almost every state in the United States. Also troubling is the increase in obesity in children and adolescents. A number of Institutes at NIH have an interest in conducting research on obesity. The NIH Obesity Research Task Force, with representation from 24 NIH Institutes, Centers, and Offices, produced the trans-NIH Strategic Plan for NIH Obesity Research to focus on research on prevention and treatment of obesity and on obesity and its associated health conditions. A copy of the plan may be downloaded from the following website: http://obesityresearch.nih.gov**.**

Studies were presented that suggest that fetal programming may play a role in the development of obesity and diabetes. The Agouti mouse model shows the impact of epigenetic influences (i.e., lack of methylation) on obesity. Infancy and early childhood studies have reported that energy intake and sucking behavior during a test meal at 3 months of age predict increased body size at 2 years; early childhood temperament/decreased sleep are associated with overweight; and rapid weight gain during early infancy is associated with the increased likelihood of obesity at age 20.

Recent clinical trials have shown that lifestyle modifications that lead to weight loss can reduce the risk of diabetes. For example, the NIDDK-sponsored Diabetes Prevention Program (DPP) randomized clinical trial reported a reduction in diabetes of 58 percent among participants in the lifestyle arm of the study; this compared to a reduction of only 31 percent in the study arm receiving the diabetes drug metformin. Other similar lifestyle intervention clinical trials have been as encouraging as the DPP in reducing morbidities with weight loss.

Ongoing trials are asking important questions regarding diet, weight maintenance, and diabetes. These include:

- Does intentional weight loss in diabetics reduce CVD events? (Look AHEAD trial)
- How can adults maintain weight loss? Can modern technology (e.g., the Internet) be an effective tool? (Weight Loss Maintenance trial, POWER trials)
- What macronutrient composition is best for weight loss maintenance? (POUNDS Lost trial)

One of the few long-term studies of bariatric surgery is being conducted in Sweden. Publication of results after 15 years of follow-up indicates reductions in weight and all-cause mortality after various bariatric surgery procedures; these encouraging results suggest that bariatric surgery may be indicated for some obese/overweight individuals, but more studies are needed to confirm these findings. A U.S. population study by Adams and colleagues reported that there were dramatic decreases in diabetes-related mortality among subjects who underwent gastric bypass compared to those in a matched control group who did not have this surgery.

Currently, NIDDK is funding the Longitudinal Assessment of Bariatric Surgery (LABS) observational study to investigate the long-term outcomes of bariatric surgery, including the resolution of diabetes. Genetic studies will be carried out in the LABS cohort, and pre- and post-surgery blood serum and plasma samples will be available for ancillary studies. A parallel study in adolescents (TEEN-LABS) is being conducted in those 18 years and younger.

Dr. Miles discussed a recent program on *60 Minutes* describing bariatric surgery. A segment on the show indicated that bariatric surgery caused remission of diabetes in a high percentage of patients even before weight loss occurred. This is an area of future research interest for NIDDK and NIH. There are several theories generated from animal data on how bariatric surgery may affect diabetes, including one theory that proposes that the exclusion of nutrients from the proximal intestine exerts an antidiabetic effect (the Upper-Intestinal Hypothesis). There also is a Lower-Intestinal Hypothesis that proposes that bariatric surgery causes a quicker flow of nutrients to the distal intestine and causes a hyperstimulation of secretion of L-cell hormones. However, it is unclear how either of these bariatric surgery outcomes would affect diabetes.

These hypotheses are intriguing, and NIDDK would like to better understand how diabetes is reduced in some patients who undergo bariatric surgery.

NIDDK has issued a Program Announcement (PA)—The Role of Gastrointestinal Surgical Procedures in Amelioration of Obesity-Related Insulin Resistance and Diabetes Independent of Weight Loss (R01)—to stimulate research in the area of diabetes and bariatric surgery. The PA encourages mechanistic investigations on why bariatric surgery influences diabetes and why diabetes resolution occurs in some people after bariatric surgery but not in others.

Data from the CARDIA epidemiology study showed more frequent consumption of fast food during early adulthood to be associated with increased weight gain over 15 years, and a decrease in physical activity is also thought to play a role in the increase in obesity in the United States. Another factor in need of further research is lifestyle related to the built environment, and whether access to parks, bike trails, and mass transportation has any role in obesity prevention. The National Heart, Lung, and Blood Institute (NHLBI) has initiated the *We Can!* program to study 500 communities for prevention of obesity among children. Information on the program may be found at http://wecan.nhlbi.nih.gov.

Dr. Miles also listed NIDDK programs that are related to nutrition, which may or may not include an obesity component. The NIDDK Division of Nutrition Research Coordination (DNRC), which advises on nutrition research issues and coordinates nutrition research and research training initiatives, was also discussed. You can learn more about the activities of the DNRC at http://dnrc.nih.gov/.

CASE STUDY I: STEM CELL POLICY, POLITICS, AND DOLLARS

Stem Cells: Policy, Politics, and Dollars

Sidney H. Golub, Ph.D., Professor Emeritus, Department of Microbiology and Molecular Genetics, School of Medicine, University of California-Irvine, Irvine, CA

Regenerative medicine seeks to replace damaged cells and tissues with specific cell types derived from embryonic stem cells (or perhaps, in the future, with induced pluripotent cells from somatic cells). The use of embryonic stem cells is controversial because the cells are derived from human blastocysts (very early embryos) donated by couples using in vitro fertilization procedures that result in excess embryos destined for discard.

Science policy in the United States since World War II has been based primarily on a landmark report by Vannevar Bush, Ph.D., who had directed the U.S. scientific effort during the war. This report called for science to be supported throughout the country, for funding to be distributed by peer-reviewed merit, and for science to be insulated from political pressures. This has been the paradigm for science policy in America for about 60 years, but stem cell policy does not fit well into this paradigm.

In 2001, President Bush issued a well-known policy limiting federal funding for research using human embryonic stem cells to cell lines established before August 2001 (21 such lines are

currently available). There is little federal legislation related to embryonic stem cells, except for an amendment to the annual NIH appropriation, called the "Dickey-Wicker" Amendment, which prohibits NIH funding from being used to create or destroy human embryos for research.

Because embryonic stem cell research is an emotionally and religiously charged issue, creating agreed-upon standards has been difficult. However, a variety of groups, starting with the National Academy of Sciences and followed by some state, international, and professional organizations, have done so. These groups have agreed on local oversight administered by Stem Cell Research Oversight (SCRO) committees, the need for knowledge of the provenance of cells and tissues, the requirement that genetic materials be donated altruistically, the prohibition of reproductive cloning, and the prohibition of the breeding of chimeras of mixed human and non-human origins.

Legislation to expand the number of stem cell lines permitted in federally funded research has been vetoed by President Bush. However, the scientific consensus is that human stem cell research should be performed and that new cell lines are needed. Public polls have shown that those who would allow stem cell research outnumber those who would not. However, emotions run high and much lobbying occurs. Supporters of stem cell research argue in favor of it on classic utilitarian ethical grounds: good will come from it, therefore it is good. Opponents see it as a right-to-life issue.

At the state level, policies vary greatly. Some states have legislation supporting human stem cell research, whereas others limit it or even impose criminal penalties. For example, experiments funded by the state of California could be prohibited and result in jail time for the scientist if performed in South Dakota.

Compromise will not be easily reached in development of a stem cell policy. The challenge of developing a policy is great because the science is rapidly evolving and because actions to regulate stem cell research are being taken at both the state and federal levels. Perhaps the most worrisome aspect of stem cell policy is that it represents a fundamental change in basic U.S. science policy. Since World War II, science policy has focused on determining the priorities to be funded. Now, with stem cells, there is a movement toward a new approach of legislating what types of science will be prohibited and punished.

PARALLEL INTERACTIVE WORKSHOPS—SURVIVING ACADEMICS

Surviving Academic Politics 101

Dr. Golub

Dr. Golub began the session by quoting a statement attributed to Henry Kissinger, among others: “Academic politics are so vicious because the stakes are so low.” Dr. Golub asserted that the quotation was wrong: the stakes are actually quite high. Among the things at stake are research resources (including money, space, and core support; access to trainees; and access to collaborators); time obligations (for teaching, clinical care, and committee service); and

decisions about the directions in which research programs will go. Surviving academic politics is very much a matter of interpersonal relations and skills, rather than following a guidebook.

Academics need to know who controls which resources at their institutions. Knowing the local culture is crucial; it can differ greatly among academic institutions. It is best to seek out those who really know the culture early in one's time at an academic institution and ask for their insights.

A researcher's natural allies in the hunt for resources include those who hired the researcher and the researcher's mentor, collaborators, and peers, both at the home institution and elsewhere. To use allies effectively, researchers need to find out who controls what resources, seek out those who can help, and ask advice —from those who control resources, from peers, and from mentors. Obtaining input from staff also is valuable.

Dr. Golub referred session participants to a thought piece titled "Collaborations: With All Good Intentions," by Heidi Ledford, published in *Nature* on April 10, 2008 (Vol. 452, pp. 682-684), which discusses the potential value of creating the equivalent of prenuptial agreements among collaborators and ways to make sure that collaborations work by planning them in advance. The topic of collaboration also arose during discussion. Participants observed that although collaborations can be very productive, they also present a risk of misunderstandings, especially in collaborations involving researchers in different disciplines, where the cultures greatly differ. Several participants emphasized that it is important to put details in writing to ensure that all collaborators share the same understanding of the working relationship.

Another focus of discussion was the issue of when it may be right to leave an institution rather than stay. Dr. Golub pointed out that if the climate and culture are not right, working somewhere else might be better. He noted that people often focus on how to make their current professional situation a success without giving sufficient thought to the idea that a different situation might be better.

Another theme of the discussion was the difficulties postdoctoral fellows face in making the transition to being independent researchers. It was noted that postdoctoral fellows commonly believe that if they do good work, they can stay indefinitely at their current institutions. In reality, if they do good work in their postdoctoral positions, they will be qualified for good jobs elsewhere, but not at their current universities. Fellows themselves often do not appreciate that this is the case and that they will need to move to different institutions to continue their careers.

Balancing Your Academic Career: Fulfilling Teaching, Research, Clinical, and Administrative Duties
Dr. De Leon

Success in academic careers requires many professional skills beyond the bench and/or bedside. Scientists who love teaching and who have a passion for pursuing their own independent research should consider a career in academia. Before deciding on the academic route, scientists need to explore how much ambition, motivation, determination, and stamina they have. Balancing the responsibilities of teacher, researcher, clinician, and administrator is as

challenging as it is rewarding. With these responsibilities come great demands, Dr. De Leon cautions, and potential academicians need to assess whether they are willing to pay the price. Academic scientists need to be capable of prioritizing and be able to penetrate into the heart of a problem. They must have high standards of professional integrity and be able to offer and accept criticism constructively. To be successful in academia, the scientist must be thick-skinned and be willing to persevere to achieve research goals.

Collaboration and teamwork are essential in an academic career. Faculty members need to be able to delegate assignments to others, even when it's hard to "let go" of projects. Sharing the credit for achievements with postdoctoral fellows and colleagues is integral to the mentoring responsibility. Dr. De Leon advises that the academic scientist must be a calculated risk-taker and be willing to seize opportunities. Whether presenting a poster, giving a lecture, or writing a scholarly journal article, academic researchers also must be effective communicators, able to explain concisely the results of studies. Writing grants that are funded and articles that are published in peer-reviewed journals are critical to success.

Creating a personal support team through networking enables young faculty to find resources and mentors. Dr. De Leon advised that finding a good mentor can mean the difference between success and failure.

Managing Your Academic Portfolio: Elements of a Good Dossier. A Pre-Tenure Check-up
Renty B. Franklin, Ph.D., University of Maryland, Dental School and Greenebaum Cancer Center, Baltimore, MD

Even though tenure is considered the big prize in academia, there are reasons not to be on a tenure track. Faculty may have greater professional mobility and be able to negotiate higher salaries if tenure is not being considered. Being on a tenure track can limit the development of teaching skills, as junior faculty are expected to concentrate on research rather than teaching. Tenure was originally initiated in the 1940s with the development of the American Association of University Professors. The purpose of tenure was to guarantee academic freedom and to make the profession of university-teaching attractive to promising young scholars. If an institution has a 6-year probationary period for the granting of tenure, the tenure clock is actually shorter; a faculty member's dossier must be ready within 4.5-5 years.

The holy trinity of tenure pursuit and granting, Dr. Franklin explains, is teaching, research/ scholarly activity, and service. Those pursuing tenure must always focus on optimizing their professional credentials. Obtaining extramural funding is important evidence of scholarly activity. Publishing manuscripts in high-impact scholarly journals is critical to achieving tenure. Dr. Franklin advises faculty to not become overly involved in teaching until their research programs are established and funded. As educational responsibilities gradually increase, tenure seekers should document teaching effectiveness by accruing peer and students' evaluations. Joining professional societies and becoming involved in department and campus committees increase the likelihood of gaining tenure.

The tenure dossier must document the faculty member's performance in scholarly productivity, teaching, and service. Strong recommendations from the department chair and the appointments,

promotions, and tenure committee; complete curriculum vitae; and an exhaustive statement of accomplishments are essential. Reprints of the most important journal articles published and objective measures of the articles' impact should be included. Evaluation letters from authorities in the same field, and evaluation forms from faculty colleagues and students, round out the dossier.

Academic Medicine Financing: How do we pay for it?
Dr. Azziz

Dr. Azziz noted that Cedars-Sinai Medical Center, where he is a professor, is the 10th largest independent teaching institution in the country, and he must understand a complicated financial system. He urged faculty to understand the financial frameworks of their academic centers and to follow where the money comes from. Medical schools' budgets have increased dramatically in the last several decades. In 1960, the average budget was $5 million, contrasting with the average medical school budget of $444 million in 2006. Today, academic medical centers are large financial enterprises supported by numerous funding streams, including federal and state monies, grants, technology transfer profits, and philanthropy.

As a result of the 1965 Social Security Act Amendments, which created Medicare funding for graduate medical education (GME), the number of medical schools increased from 86 to 125, and the number of full-time faculty increased from 11,000 to 90,000 between 1960 and 1995. The legislation reflected the belief that society should, in part, support the intellectual development of health care trainees. The most substantial funding is from Medicare's Direct Graduate Medical Education (DGME), which directly pays for resident and faculty salaries and covers about 60 percent of GME costs. Indirect Medical Education (IME) payments are calculated on an intern/resident-to-bed ratio and compensate teaching hospitals for higher inpatient operating costs due to unmeasured patient complexity and other costs associated with training the future healthcare workforce. Only hospitals are eligible for IME payments, so a medical school without a hospital, e.g., Case Western, cannot receive this funding.

Only the time that residents spend in patient care activities in the specific hospital may be counted for purposes of DGME and IME payments. The time that residents spend in didactic activities, such as attending lectures, or rotating through other hospitals cannot be claimed for reimbursement, creating a disincentive for allowing residents to train outside the academic medical center. Many teaching hospitals that care for a high proportion of uninsured and Medicaid patients receive an additional supplement, called the Disproportionate Share Hospital (DHS). States also support their medical schools but the funding is small, accounting for only 2-8 percent of budgets.

Other important sources of funding are medical students' tuition, federal and foundation grants, philanthropy, and royalties from patents held by faculty (technology transfer). Dr. Azziz advised the attendees to think about applying for patents as they conduct their clinical research. He relayed that an innovation developed at his institution, the Swan-Ganz catheter, is used to measure intracardiac pressures globally. The invention could have made the medical center millions of dollars in royalties. However, the investigators were so busy with their research that

they forgot about filing for the patent and so lost any possible royalties to themselves and their institution.

POSTER SESSION–INTRODUCTION AND OVERVIEW

Eva McGhee, Ph.D., Assistant Professor, University of California, San Francisco, CA, and Dr. Öz

Drs. McGhee and Öz encouraged participants to attend the poster session at the close of the meeting this afternoon.

DINNER ADDRESS

Introduction of Dr. Vanessa Northington Gamble

Bessie Young, M.D., M.P.H., Associate Professor, Division of Nephrology, Department of Medicine, University of Washington, Seattle, WA

Dr. Bessie Young introduced Dr. Vanessa Northington Gamble, the dinner speaker at the NMRI Workshop. Dr. Gamble received her M.D. in 1983 and her Ph.D. in history and sociology of science in 1987, both from the University of Pennsylvania. She is currently University Professor of Medical Humanities at George Washington University in Washington, DC. In 1997, she was appointed to the Tuskegee Syphilis Study Legacy Committee. In 1999, she received the Robert Wood Johnson Investigator in Health Policy Award. From 1999 to 2002, she was Head of the Association of American Medical Colleges Division of Community and Minority Programs. In 2004, she became Director of the Tuskegee University National Center for Bioethics in Research in Health Care.

Dr. Gamble is the author of numerous articles and books, including *Making a Place for Ourselves: The Black Hospital Movement, 1920-1945*. Her research interests include the history of race and racism in American medicine; racial and ethnic disparities in health and health care; cultural competence; diversity; and bioethics

What Can Researchers Learn from the United States Public Health Service Study at Tuskegee?

Vanessa Northington Gamble, M.D., Ph.D., Professor of Medical Humanities, George Washington University, Washington, DC

Between 1932 and 1972, the U.S. Public Health Service conducted a study of untreated syphilis that was the longest non-therapeutic trial in history. The study involved 300 black men with syphilis living in Macon County, Alabama, who were not treated for their disease even though treatment existed in 1932, and highly effective treatment with penicillin became available during the 1940s. The researchers did not tell the participants that they had syphilis; instead, their illness was described as “bad blood.” The participants were given sham treatments, misled into thinking that some diagnostic and research procedures were actually treatments, and prevented

from being treated for syphilis by other health care workers (for example, this occurred when some registered for the draft during World War II). The participants did, however, receive effective treatment for other ailments. The study ended in 1972, after a physician who had questioned the study in 1969 and received unsatisfactory answers from the government told the story to the news media. Even before that, the study was no secret; publications about it appeared in the scientific literature as early as 1936.

Lessons related to ethics and cultural competence can be learned from this study. The syphilis study researchers used incentives that were culturally competent and culturally sensitive. The study shows that although competence can enhance research, it also can be used against people, which is not acceptable. Dr. Gamble stated that, in her opinion, the study was unethical from the start. Some have argued that the study only became unethical when penicillin was introduced, but Dr. Gamble contended that it was always unethical because treatments for syphilis were available when the study began.

Lessons also can be learned about how people view their own—or their own culture's—actions as compared to those of others. After the Nuremberg War Crimes Trial following World War II, the Nuremberg Code was developed, which set standards for medical research, including voluntary consent, benefits outweighing risks, and the ability of subjects to terminate participation. The syphilis study was clearly in violation of this code, but those running it did agree. When physicians involved in the study were later asked about whether Nuremberg made them reconsider the ethics of their own study, they responded, "They were Nazis. We are not Nazis."

The syphilis study also was in violation of ethical principles promulgated in the 1964 Declaration of Helsinki, which stated, "Concern for the interests of the subject must always prevail over the interests of science and society." Nevertheless, as late as February 1969, a panel from what was then called the Communicable Disease Center (CDC; now the Centers for Disease Control and Prevention) voted to continue the study on the grounds that there would never again be a chance to have such a study.

Positive outcomes of the syphilis study include the development of the 1974 National Research Act, which required the formation of Institutional Review Boards, and the 1979 Belmont Report, which called for autonomy, beneficence, and justice in medical research.

One disputed legacy of the syphilis study is its role in creating distrust of the medical profession and public health among African Americans and members of other minority groups. Historical research has shown that an attitude of distrust prevailed even before the study. For many African Americans, the syphilis study has become a shorthand reference for how they are treated today and were treated in the past; it authenticates long-held and entrenched feelings about medical racism.

In 1996, the Tuskegee Syphilis Study Legacy Committee was formed. Its goals were to persuade President Bill Clinton to publicly apologize for past government wrongdoing and to develop a strategy to redress the damages caused by the study and transform its damaging legacy. In 1997, President Clinton apologized on behalf of the nation in a ceremony at the White House attended

by some of the eight surviving participants in the study. The last surviving participant died in 2004.

Dr. Gamble ended her presentation by emphasizing that the participants in this study, as in all human studies, were not merely research subjects; they were people with lives, families, jobs, and roles in their communities. This crucial fact was overlooked by the researchers who conducted the syphilis study.

FRIDAY, APRIL 25, 2008

REVIEW OF DAY'S PROGRAM

Sylvia Rosas, M.D., M.S.C.E., Assistant Professor, University of Pennsylvania, Philadelphia, PA, and Dr. Agodoa

Dr. Rosas announced the winners of the Poster Session. She thanked everyone who participated in the event, as well as the judges who gave their time and expertise and did such an excellent job. She welcomed Dr. Jennifer Deal to give the keynote address for the second day of the NMRI Annual Meeting.

RETIRING THE GENERATION GAP

Jennifer Deal, Ph.D., Senior Research Scientist, Center for Creative Leadership, San Diego, CA

Dr. Deal began her presentation on generation gaps by posing the question of which generation did participants think would like to be employed in a job with the following criteria:

- You are well paid
- You do interesting work
- You have the opportunity to advance
- You have the opportunity to learn and develop
- You have a supportive boss
- You work with peers and subordinates you trust
- You are treated with respect
- You have leaders who are credible and trustworthy

After providing data on generations, she said she would answer the question at the end of the presentation. Generations were surveyed using the categories of: Silents (born 1925-1945); Early Boomers (born 1946-1954); Late Boomers (born 1955-1963); Early Xers (born 1964-1976); and Late Xers (born 1977-1986). More than 6,000 survey participants were included. Dr. Deal characterized each generation by number of Americans in the group (Baby Boomers combined are the largest generation and the Silents are the smallest). It is likely that Generation Y (born 1987-2008) will surpass the Baby Boomers as the largest generation.

Ten principles drive motivation in every generation. These are:

Principle 1: All Generations Have Similar Values; They Just Express Them Differently
Principle 2: Everyone Wants Respect; They Just Don't Define It the Same Way
Principle 3: Trust Matters
Principle 4: People Want Leaders Who Are Credible and Trustworthy
Principle 5: Organizational Politics Is a Problem—No Matter How Old or Young You Are
Principle 6: No One Really Likes Change
Principle 7: Loyalty Depends on the Context, Not on the Generation

Principle 8: It Is as Easy to Retain a Young Person as an Older One — If You Do the Right Things
Principle 9: Everyone Wants to Learn—More Than Just About Anything Else
Principle 10: Everyone Wants a Coach

Dr. Deal focused on Principles 1, 2, and 4 to show that the generations are no different in their values but that each generation expresses themselves differently. For example, for Principle #1, the survey found that members of each generation valued family as the most important value from a list of 10 values. Policies that reinforce and align with the Top 10 Values can help improve employee satisfaction. It is important to remember that values and behaviors are not the same thing—someone can behave very differently from you and still hold the same values. This was clearly seen in Principle #2. Each generation wants respect, but it is expressed differently by each generation. Younger generations find respect is listening to what they say; older generations find that respect is having someone do what they are told to do without question. Each generation finds it important to be respectful, but expresses it differently.

An interesting insight from the survey was the answer to the question about whether older and younger people want different characteristics in their leaders (Principle #4). The survey found that each generation wanted leaders who were credible, trustworthy, encouraging, and farsighted and who listened well. It is important that leaders have most of these traits, and organizations would do well hire employees who exhibit these qualities.

In conclusion, the criteria listed above are attributes of a job people of all generations want. The results of the study show that the generation gap is in large part a creation of a media that does not understand that differences in expression of values do not mean that different groups have different values.

Dr. Deal encouraged participants to take part in the next phase of the survey by visiting the following URL: https://surveys.clearpicture.com/ccl.

THE ROLE OF SCIENTIFIC SOCIETIES AND PROFESSIONAL ORGANIZATIONS IN PROMOTING MINORITY RESEARCH AND MINORITY INVESTIGATORS

Endocrine Society

Mark Lawson, Ph.D., University of California, San Diego, CA

The Endocrine Society seeks to promote diversity in the scientific workforce by providing assistance at all career levels. The Minority Affairs Committee (MAC) was commissioned in 1997 to specifically advocate ethnic and cultural diversity in the field of endocrinology by promoting the participation, visibility, and advancement of underrepresented minorities. The MAC advocates for ethnic diversity in both the membership and leadership of the Endocrine Society, develops targeted programs to increase the recruitment and retention of underrepresented minorities in the field of endocrinology, promotes the visibility and participation of underrepresented groups within Society programs and services, recommends and monitors appointment of underrepresented minority group members to serve in Society

leadership positions, and encourages and supports initiatives that address diversity-related issues, such as health disparities, throughout the Society.

The Endocrine Society has developed a number of programs to increase ethnic diversity in the field of endocrinology. The Minority Access Program Pilot Initiative seeks to increase the numbers of minority researchers in the Society and in endocrine research by identifying students early in their undergraduate careers and encouraging them to participate in summer research opportunities at research institutions. MAC also provides support for travel to scientific meetings and mentorship opportunities at the annual Endocrine Society meeting. Exposing students to science early in their undergraduate careers is essential for building interest in pursuing graduate studies in the basic sciences. Through summer research opportunities, which are supported directly by the Endocrine Society, students are exposed to the field of endocrinology and to the Endocrine Society itself.

The Summer Research Opportunities Program, conducted in partnership with Federation of American Societies for Experimental Biology Minority Access to Research Careers, provides summer research opportunities to students who wish to participate in research but not necessarily in Endocrine Society educational programs. Whereas the Minority Access Program has students choose mentors from a defined group of training and recruiting institutions, the Summer Research Opportunities Program permits students to choose any investigator in the United States as a mentor.

The Clinical Practice Internship Program was launched in Fall 2007. Its goal is to provide medical students with opportunities to work in practice settings, particularly those in underrepresented communities, to encourage them to focus on endocrinology as a field of research or practice. A mentor database available on the Endocrine Society Web site assists students with identifying a clinical practice and mentor willing to work with them for a summer internship.

The Society also promotes the visibility of minorities in leadership roles. MAC has worked successfully to increase the number of minority speakers at the Endocrine Society annual meeting. MAC suggests minority members for Society Laureate Awards, encourages student to apply for awards programs, and helps host the Student Day program, which invites undergraduate students living in the annual meeting host city to attend the meeting. In addition, the Endocrine Society holds a minority mentoring reception to provide an opportunity to network with experienced faculty members and attend workshops. A minority trainee poster session and reception is held. The Clinical Endocrinology Update (CEU) Student Day Program at CEU meetings hosts high school students interested in science.

MAC can nominate investigators for leadership positions for various committees, offices, and councils. MAC's direct line to the leadership of the Endocrine Society allows the committee to promote the presence of underrepresented minorities and to protect the interests of these groups within the Society. MAC also has input into the development of the Minority Health Disparities Symposium, which is held annually and specifically addresses issues of health disparities in endocrinology. This symposium has successfully called attention to social and scientific issues related to the practice of endocrinology.

The Endocrine Society can provide young investigators with the opportunity to serve on Society committees and network with others in the field. The Society also provides travel grants and awards recognition to help investigators attend its annual meeting. At the mid-career level, the Society provides opportunities to mentor young scientists, and at the senior level, promotion of diverse leadership within the society will help achieve the goals of MAC and the Endocrine Society in increasing diversity among endocrine researchers.

American Heart Association
Daniel Lackland, Dr.P.H., Professor of Medicine and Epidemiology, Medical University of South Carolina, Charleston, SC

The American Heart Association (AHA) seeks to fund a broad range of successful research. The AHA has a national group and eight affiliates, each of which offers research funding. Funding research is a significant part of the budget at both the national and affiliate levels. The national group and two of the affiliates have two funding cycles per year and the other 6 affiliates have 1 cycle per year.

AHA focuses on funding young investigators with an interest in cardiovascular or cerebrovascular diseases, beginning with predoctoral funding (Ph.D. or M.D.); traditional postdoctoral funding also is available. The Beginning Grant-In-Aid provides funding to help promising young scientists from their first faculty appointment through assistant professorship. The Scientific Development Grant provides funding to bridge the gap between working as a trainee and working as an independent investigator; this grant is available to scientists who are no more than 4 years past their first faculty appointment. The Established Investigator Award supports mid-career scientists, from 4 to 9 years past their first faculty appointment through the assistant faculty level. The Fellow-to-Faculty Transition Award funds investigators during the transition from completion of research training to the early years of the first faculty/staff position; it is intended for investigators with no more than 5 years postdoctoral experience. The traditional Grant-In-Aid awards fund innovative research by faculty or staff pursuing independent investigations.

The AHA has recently initiated the Clinical Research Program, which focuses on translational research. This program encourages early career investigators to engage in introductory and pilot clinical studies of strategies to reduce cardiovascular disease and stroke. The program seeks to foster new research in the clinical and translational sciences and encourages community- and population-based activities. The program can provide basic researchers with the opportunity to develop translational research activities. Another new grant, the Innovative Research Grant, can support innovative, high-risk/high-reward cardiovascular or stroke research; this grant is available to postdoctoral researchers at all career levels.

AHA also partners with a variety of minority organizations to increase minority participation in research. AHA has committed $236 million to minority research awards. The National Goal of the AHA is to allocate approximately 6 percent of unrestricted dollars to members of groups underrepresented in the medical sciences. AHA plans to develop minority supplements, similar to those available from the NIH, and encourages minority investigators to participate in its

review of the grants it funds. The AHA Web site can provide information on available grants at both the national and affiliate levels.

The Minority Mentoring Program is designed to help early career minority clinicians and scientists in their professional careers; promote high quality science and practice in cardiovascular and cerebrovascular disease by encouraging participation by junior minority scientists and clinicians; and increase collaboration among basic, clinical, population, outcomes, and translational research in cardiovascular and cerebrovascular disease. This program provides junior investigators with opportunities to collaborate with senior investigators in the field. It also provides junior investigators with the chance to participate in the AHA and its leadership, including a 1-year Early Career Membership in AHA, complimentary registration for the annual meeting, and the opportunity to apply for travel awards. AHA matches applicants with mentors who will introduce them to other senior investigators and members of the AHA leadership. Ten junior investigators participated in the program in 2007, and AHA hopes to expand the program in the future.

American Society of Transplantation
Jerry McCauley, M.D, M.P.H., Professor of Medicine, University of Pittsburgh, Pittsburgh, PA

The American Society of Transplantation (AST) began in 1982 with the goal of including researchers in diverse fields who are interested in transplantation work. AST is an international organization of transplant professionals dedicated to advancing the field of transplantation through promotion of research, education, advocacy, and organ donation to improve patient care. AST includes cardiologists, transplant cardiologists and nephrologists, endocrinologists, immunologists, and others working on transplantation. Nurse coordinators are invited to AST meetings, and a parallel session for patients is held during the AST annual meeting.

AST has modest grants available for young investigators. Funding for research comes largely from pharmaceutical companies, foundations, grants, or patient donations. The grants are targeted and directed toward a perceived need, which is determined by the development committee. Grants are aimed at fellows and junior faculty members. They provide approximately $40,000 for 2 years. AST provides bridging grants for young faculty members who had an R01 but lost it because of strong competition for these grants. These AST grants are designed to help these faculty members continue their work and apply for another R01; particularly for physicians, who must take time from their research to provide patient care if they do not have research funding, these grants help investigators continue with their research. AST also partners with other foundations such as CHEST to provide research grants. Ongoing clinical science and basic science grants are offered every year. A women's and minority research grant was previously offered by AST, but AST received few applications for this grant, likely due to ineffective marketing efforts. If there is interest in such a program, AST may be able to offer these grants in the future.

The objective of all AST grants is to keep people working in research, specifically transplant research. A survey of AST grantees has shown that these grants are successful in allowing investigators to continue their research. The most recent survey of 117 fellowship and faculty grantees awarded since 1995 found that of the 87 who responded to the survey, 61 (70 percent)

of these investigators continue to be active in the transplant field. Of these, 37 (61 percent) continue to work in basic research and have more time for research because of a lighter clinical care workload. Seven of these researchers work solely in clinical science, and 15 work in both clinical and basic science. Of the 61 respondents, 15 (21 percent) have received NIH funding. AST has successfully supported research in a specific area, but considers a broad range of projects for funding; for example, a connection to transplant science can be made for research in areas such as diabetes or health disparities research.

American Diabetes Association
Scott Campbell, Ph.D., Vice President, Research Programs, Alexandria, VA

The ADA focuses on a chronic disease that is disproportionately represented among minority communities. The role of the ADA is to fund research and also to involve the minority community in the organization itself. ADA provides volunteer leadership opportunities to the minority community and seeks to develop diversity on ADA national boards and committees, including grant review committees.

ADA seeks to strengthen math and science education in the United States. Recently, ADA has permitted any investigator with an ADA grant to request a student stipend that provides students with the opportunity to work in a diabetes research laboratory in the summer. This program is aimed at undergraduate students who are minorities, which ADA defines as Hispanic, Latino, African American, Native American, Native Alaskan, or Pacific Islander.

ADA also seeks to encourage minority investigators to pursue diabetes research, especially because this condition disproportionately affects minority communities. Involving minority investigators provides role models for the community. In addition, most diabetes clinical trials have not enrolled significant numbers of minority participants, and thus it is important to increase minority representation in the clinical trial research community. ADA provides training awards such as the Clinical Scholar Award, which provides medical, pharmacy, and other clinically oriented graduate students with a year to learn more about diabetes research. The Clinical Scientist Training Program provides 3 years of funding that can be used to earn a degree in an area complementary to the grantee's clinical degree, with the goal of developing translational researchers.

The ADA mentor-based minority fellowship program limits funding to minority fellows and their mentors who are U.S. citizens or permanent residents. This is an undersubscribed program, with only one-half of the funds available awarded. In contrast, ADA's regular mentor-based fellowship program provides grants to mentors, who may use this grant to fund foreign or domestic fellows. This will help develop an international cadre of diabetes researchers. Career development awards are available for junior faculty and investigators transitioning to true independence. The ADA is particularly interested in supporting physicians and clinicians who work with minority populations because diabetes is especially prevalent in some of these groups.

ADA has primarily funded basic science but seeks to increase its awards for clinical, epidemiology, and health care disparities research. To promote this, ADA has doubled the grant amount for clinical research awards to $200,000 per year for 3 years. Innovation awards, which

provide $50,000 per year for 2 years, are available for pilot research and do not require large amounts of preliminary data. ADA basic science grants are aimed at young investigators. As a result of budget constraints, ADA's Research Policy Committee recently decided that ADA funding would not be available to investigators with $500,000 or more of individual funding. This is an interim measure until budget difficulties at the NIH are alleviated.

ADA provides opportunities for minority investigators through its undergraduate student stipend and minority mentor awards. ADA spent slightly more than $43 million on research in 2007 and has a new strategic plan to raise additional funds for research. In addition to its focus on young investigators, ADA has decided to increase its translational research portfolio.

Discussion

There is an ongoing discussion among researchers about the definition of translational research. Dr. Campbell recognized that it probably differs across the four groups represented in this session. Two divergent views define the translational research enterprise as "bench to bedside," or more troubling, "clinical trials into practice." The latter is where the most significant disconnect is seen. Even though clinical data on diabetes treatment exists, and the ADA publishes clinical recommendations and guidelines every year as a supplement to *Diabetes,* only 50 percent of the people are being treated to the goal. To ADA, translation would be both bench to bedside and also health care delivery/disparity.

Dr. Lackland responded that AHA tracks translation quite intensely, because it is important to direct translation activities for NIH funding. AHA looks at those types of success rates of people who not only have chosen research careers but also have successfully competed for NIH funding.

The ADA's relatively new efforts on mentoring are being promoted through word of mouth, its websites, and through informing its funded investigators. Dr. Lackland said he would be interested in partnering with NIDDK for disseminating information to the community. Although the ADA has discussed its mentoring efforts with several Historically Black Colleges and Universities (HBCUs) and groups such as the Association of Black Cardiologists and the National Black Hispanic Medical Association, ADA's efforts are insufficient. Ideas about how better disseminate this information are welcome.

Dr. Lawson said the Endocrine Society's Access Program began with campus visits to HBCUs and Hispanic colleges and universities to build interest in the program among minority students. The Society will provide support for minority students in the Program for at least 3 years by enabling their participation in society meetings and summer programs designed to build their interest in attending graduate school.

A participant pointed out that the definition of "minority" varies greatly. About 80 percent of ADA's minority support goes to Asian student, who are not disadvantaged in research. Dr. Campbell responded by explaining that the ADA is considering how best to address the high numbers of Asians who successfully apply for and receive research funding. One option would be to limit funding to U.S. citizen/permanent resident Asian Americans. Dr. Lackland added that this has been recognized at the AHA and there is a desire to find ways to ensure that research

grants and mentoring opportunities exist for underserved minorities. Dr. Lawson said the Endocrine Society uses the NIH guidelines to define underserved groups. For example, Pacific Islanders, especially in the West, are considered to be underserved.

PARALLEL INTERACTIVE WORKSHOPS—OBTAINING GRANT FUNDING

Grant Opportunities within the NIDDK: Some Old, Some New

Dr. Podskalny

Dr. Podskalny presented information on new grant opportunities at NIDDK. Individual F30 predoctoral fellowships have been used by other Institutes within the NIH but are new to NIDDK. Students who are enrolled in a combined M.D./Ph.D. program and who are not supported by National Institute of General Medical Sciences (NIGMS) training programs can apply for these grants, which provide up to 6 years of funding for stipends, tuition, and fees; the medical school also is covered if the students are earning a combined degree. Of approximately 25 applications this year, about 20 will be funded.

Another grant new to NIDDK is the U34 (U indicates a cooperative agreement, which involves NIH staff more than R series grants). These are grants for planning large-scale clinical trials for which plans are already fairly well developed. The U34 provides funds for the planning stage so that the U01 grant, if approved, can avoid a long pre-recruitment phase. A U34 requires pre-approval; it precedes, but is not required for, a U01. The funds provided by a U34 can be used to create a research team, establish data management and oversight, define recruitment strategies, finalize investigators' brochures, write a manual of operations, establish a data safety monitoring plan, begin the institutional review board approval process, and work with the Food and Drug Administration if an Investigational New Drug (IND) application is involved. Funds cannot be used to gather preliminary data, conduct pilot studies, or design the trial. One advantage of the U34 program is that it addresses the problem that grants are generally only awarded for 5 years, yet many clinical trials, including the planning stages, take longer. If the early phases of the trial are performed under the U34, the trial can likely be completed with 5 years of U01 funding.

R34 clinical trial planning grants are being awarded by NIDDK only for translational research for the prevention and control of diabetes and obesity. This grant is appropriate for researchers interested in community outreach, promoting healthy lifestyles, childhood obesity treatment, diabetes education and self-management, and health care management in underserved populations. It has been available for about 1 year, and several projects have been funded.

NIDDK has reduced its use of R21 exploratory/developmental grants. Instead, five NIDDK-specific program announcements (PAs) for pilot-feasibility grants in specific divisions are being funded.

Only two types of R03 small research grant applications are accepted: from those who have K03 or K23 grants (and this may be opened up to K1s this year) and for endoscopic clinical research in pancreatic and biliary diseases.

R56 grants cannot be applied for. However, some R01 applicants who narrowly failed to qualify for R01 funding may be awarded these grants to provide an opportunity to complete additional work that would make their R01 eligible for funding. Applicants must re-submit their R01 applications.

Old (but continuing) mechanisms include : F31 postdoctoral fellowships for minority students, F32 individual postdoctoral fellowships, T35 and T32 short-term training grants for medical students between their first and second years of medical school, the Medical Student Research Training program for medical students who want to take a year off from school to conduct research, K01 grants for Ph.D.s, K08 grants for physicians, K18 grants for stem cell researchers, K23 grants for clinical research, K24 grants for mid-career researchers, and K25 grants for mathematical or nonbiomedical researchers to apply their skills to a biomedical field. K99 grants, which fund work for a shorter period of time than the other K series grants, are the only grants for which non-U.S. citizens can apply.

Participants discussed R15 grants, which are academic research enhancement awards; these small grants are designed to fund research projects that involve undergraduate students and encourage them to continue to graduate school.

In response to a participant's question, Dr. Podskalny stated that most recipients of R01 awards have not received a K award; lack of a K award should not discourage investigators from applying for an R01 award. Dr. Podskalny added that participants could use CRISP (Computer Retrieval of Information on Scientific Projects) to learn about the types of projects that have been funded by NIDDK.

A participant asked about the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. Both programs provide research grants to small businesses for any project related to biomedical research. Many have involved the development of devices. The STTR program requires that the business partner with a university.

In response to a participant's question about the criteria for K24 mid-career grants, Dr. Podskalny listed a track record of mentoring, an ongoing patient-oriented research program, and national recognition as criteria; recipients must be associate or full professors. Most K24 recipients have never received an R01 grant, but many are awarded R01 grants while they have the K24 because they have time to write good grant proposals.

Taking Your Research from Scientific Curiosity to Grant Funding
Dale Abel, M.D., Ph.D., Associate Professor of Medicine and Biochemistry, University of Utah School of Medicine, Salt Lake City, UT

Dr. Abel took the viewpoint of a grant application reviewer in his presentation, pointing out features of an application that would make a good or bad impression on a reviewer.

Because of the current restricted funding situation, grant reviewers are placed in the position of having to distinguish outstanding grants from those that are merely good, and the latter will not be funded. Dr. Abel emphasized that preparing a grant application exceptional enough to have a

chance of being funded takes time and advanced planning. Reviewers can identify hastily prepared applications and will not view them favorably.

High-quality preliminary data is important. There must be some basic data to support and justify the hypothesis. In some instances, there may be just one key observation, but it needs to be work that the applicant has performed, not just the work of others. Tables and figures should include appropriate footnotes and legends that provide the reviewer with adequate information for understanding the work.

Applicants need to know the funding interests of a particular funding agency to avoid wasting time on an application that will not be of interest to that funder. Dr. Abel recommends that applicants should review the funder's Web site to find the list of projects currently being funded, contact some of the researchers who are conducting those projects, and inquire about whether their own proposed work would be of interest to the funder.

The specific aims are the most important part of a grant application. If they make sense, the reviewer will want to continue reading. However, if the reviewer cannot understand them, or if the second and third aims are contingent on the success of the first, the application will receive a lower score. The aims should be hypothesis driven, and each should address a specific question. The aims should be related to each other, but each also should stand on its own.

The design of the experiment also is a crucial part of the application. If the approach is such that it will provide a definitive answer at the end, the project is more likely to be funded.

Dr. Abel recommends avoiding excessive jargon and abbreviations, and explaining things as clearly as possible. Sometimes, grant applications are reviewed by scientists who may be involved only tangentially in the applicant's field. Grant applications must be written to demonstrate clearly to non-experts that the project is compelling, its results would fill an important gap in knowledge, and the applicant is capable of completing it.

Preparing an NIH Grant Application and Budget
Lewis Roberts, M.B.Ch.B., Ph.D., Assistant Professor of Medicine, Mayo Clinic, Rochester, MN

For many investigators, especially junior investigators, preparing a grant application seems daunting. Reviewers will ask tough questions about grant applications, particularly with regard to the innovation and significance of the proposed work, how the researcher proposes to conduct the experiment, the logical flow, and the feasibility of the proposed work, including both the available resources and the qualifications of the researchers. In addition, reviewers want to know that new principle investigators have recruited collaborators with appropriate expertise.

To prepare a grant application, it is necessary to find the time to plan, think, and write. Since the instructions for grant applications change from cycle to cycle, it is important to read them carefully. One good way to get started on a grant application is to put together a draft hypothesis, specific aims, and key preliminary data and show them to mentors for input. Often, mentors will tell a new investigator that the proposal is too ambitious and needs to be scaled down. Support

staff can work on ancillary materials and the university's research services office can work on the face pages and budget while the investigator prepares the rest of the grant application.

The hypothesis is the driving force of a strong application. It is important to show how the proposed research will fill a critical knowledge gap. The hypothesis should be intimately connected to the aims of the work and should be kept simple and clear for the reviewer.

The abstract should be a well-written, self-contained summary. Dr. Lewis Roberts recommended writing or revising it last, even though reviewers will read it first, as ideas may have changed as the investigator prepared the application.

The list of specific aims is another key part of the grant application. It should consist of one page, with the aims (usually no more than three) organized in a sequential, numerical format. Limiting the focus of the aims is desirable; one common complaint about grant applicants is that they try to be too ambitious. In the description of the aims, preliminary findings should be directly related to testable hypotheses. Ideally, reviewers should think, "I wish we knew X," where X is what the investigator is proposing to do.

With regards to the Methods section, Dr. Roberts advised not including so much detail that reviewers lose sight of the aims. Methods should not be substituted for the hypothesis. With regard to the publication list that is included in a grant application, Dr. Roberts advised emphasizing original published or accepted manuscripts where the applicant was the first or senior author and only including publications relevant to the topic of the grant.

Obtaining Grant Funding from Foundations
Jeremy T. Miner, M.A., St. Norbert College, De Pere, WI

Grants are sponsored by federal, foundation, corporate, and individual entities, amounting to more than $300 billion of funding annually. From the private foundation's perspective, funding grants is an investment to close the gap between "what is" and "what ought to be." Foundations fund grants in an effort to solve specific problems, injustices, or inequities to fulfill part of their organizational missions. Grantees are seen as the means by which a foundation can achieve the ends that it cares about.

To establish a shared partnership with a foundation, the grantseeker should strive to understand the sponsor's values. The single best repository of information about all private foundations is www.FoundationCenter.org. With more than 90,000 foundations in the United States, this is a valuable tool for identifying funding resources. Another resource is FCOnlineFDNCenter.org, which requires a paid subscription. Every state has its own Foundation Center Cooperating Collection, which function as libraries of fund-raising resources. Other subscription databases include the Illinois Research Information System (IRIS), Sponsored Programs Information Network (SPIN), and the Community of Science (COS).

Using the key word "diabetes," a FoundationCenter search yielded 357 foundations, with 52 foundations awarding more than $1 million. Of the 90,000 American foundations, 25,000 are considered large grantmakers. Within the last several years, there has been a dramatic increase in

the number of foundations, with family foundations accounting for most of the growth. Baby Boomers who have amassed large sums of wealth and are close to retirement are creating family foundations to give back to their communities. According to Mr. Miner, many of these smaller family foundations have informal peer review processes, and are run by bank trust attorneys. Only 15 percent of all foundations have paid staff, which explains the lack of Internet addresses and websites for many.

Certain sponsors are focused on institutions, such as hospitals, health care facilities, or universities. A FoundationCenter search using the key word “hospital” found 6,409 foundations, with 914 of these awarding more than $1 million in grants. The Robert Wood Johnson Foundation is the largest private funder of health care in the United States.

A four-step process for pre-proposal contact is the most important strategy to improve the odds of being funded. Before the planning and writing stages, the grantseeker needs to understand the sponsor’s values and priorities. Assuming no prior relationship exists with a sponsor, the first step calls for writing to the foundation’s program officer to request application forms and guidelines, a list of past grant winners, and a list of past grant reviewers. A letter sent on organizational letterhead is more likely to establish a relationship with the program officer than an e-mail or telephone call. The grantseeker can be oriented to a sponsor’s expectations by calling a past grant winner and discussing their experiences with a particular grantmaker. Contacting a past grant reviewer and asking about the most common mistakes seen in previous grant proposals is the next step. Finding out specific details about the foundation’s process for proposal evaluation also is useful.

A study of federal proposals revealed the most common reasons for proposal rejection are absent abstract or table of contents, no project evaluation plan, no resumes of proposed consultants or principal investigator, and un-numbered pages. Sponsors receive many more proposals than they can possibly fund. Unfortunately, the intellectual merits of many proposals are never even evaluated when they end up in the reject pile for failure to follow the foundation’s instructions.

The last step in the pre-submission process is to call the program officer for information on the total budget, application/award ratio, recommended proposal model, and whether the grantseeker’s project meets the foundation’s current priorities. In the current competitive environment, proposals must be powerfully persuasive, addressing the sponsor’s logical and psychological needs. Successful grant writers understand the sponsor’s values and express that view in the proposal. Proposals that convince the sponsor that the grantseeker will be a good steward for their mission are more likely to get funded. Following submission, grantseekers should anticipate questions from the grant reviewers and be prepared to answer them. Grantseeker Tips are available on a complimentary, biweekly, online newsletter available at www.MinerAndAssociates.com.

LUNCH LECTURE—DEVELOPING A RESEARCH PROGRAM
CASE STUDY II: BASIC RESEARCH

Karl Nath, M.B., Ch.B., Professor of Medicine, Mayo Clinic College of Medicine, Rochester, MN

NOTE: Dr. Nath presented research findings that currently have been submitted to a peer-reviewed journal. He requested that his presentation not appear in this report until the manuscript has been accepted and published. At that time, a link will be added to this report for readers to access this information.

MOCK STUDY SECTION REVIEW

During a breakout session, participants attended one of the Mock Study Sections. Leaders of the session were provided with sample grant applications (some from meeting participants) to review and provide critical feedback. The Scientific Review Officer (SRO) led a discussion of the feedback sessions. One of the most useful activities during the session was the grading of the sample applications by "study section" participants, with direct feedback on why they would have scored the application as they did. The four study sections were comprised of the following Chair and SRO.

Mock Study Section 1
SRO: Michele Barnard, Ph.D., Scientific Review Officer, NIDDK, Bethesda, MD
Chair: Dr. Isales

Mock Study Section 2
SRO: Michael Edwards, M.D., Assistant Professor, Division of Gastrointestinal Surgery Department of Surgery, Medical College of Georgia, Augusta, GA
Chair: Dr. De Leon

Mock Study Section 3
SRO: Maria Davila-Bloom, Ph.D., Scientific Review Officer, NIDDK, Bethesda, MD
Chair: Dr. Franklin

Mock Study Section 4
SRO: James Hyde, Ph.D., Senior Advisor, Research Training and Career Development Programs, Division of Diabetes, Endocrinology, and Metabolic Diseases, NIDDK, Bethesda, MD
Chair: Dr. Azziz

PARALLEL INTERACTIVE WORKSHOPS–HIGHER ADMINISTRATION

Hiring Decisions, Human Resource-Related Issues, and Conflict Resolution

Dr. Azziz

Dr. Ricardo Azziz began his presentation by noting that dealing with human resource-related issues is often among the last skills that academics learn in their careers, but it is crucial to success. Management, including management of people, is the fourth leg of academics—in addition to medicine, research, and teaching.

Hiring needs to be performed with care. Often, people become overanxious about hiring because they think that any employee is better than none, but in fact this is not true. Having no employee is worse than having a bad employee because having no employee just slows your work down; having a bad one can set the work back.

To hire well, it is important to define the job clearly and in detail. For example, it is important to establish whether the employee must function independently, whether the employee needs to work with or lead others, and what skills the employee will need. Investigators should recognize whether they can train the employee or whether the employee must already possess the necessary skills.

The interview process is a key to successful hiring. Interviews have two purposes: to sell yourself and your laboratory, and to determine whether the candidate would be a suitable employee. The process must be structured, with the same questions for all candidates. Behavioral questions are useful. Candidates should be asked how they have handled particular situations at work, such as personal conflicts. Practical demonstrations of skills are sometimes appropriate. A potential technician can be asked to perform a task in the laboratory; a person interviewing for a position that involves writing can be asked to write something within a time limit. At some point during the hiring process, previous employers should be contacted, including the candidate's current employer (although this last contact can be left until the end of the process if necessary).

Researchers should remember that they are not actually employers. They are employees who supervise other employees; the university/academic medical center is the employer. Thus, it is important to work with the human resources department, to learn about human resources policies and procedures, and to never attempt to handle personnel problems alone.

Retention of good employees is critical to success. It is much more difficult to recruit and train good employees than to retain them. Money is important for retention. It is easier to keep good employees if you pay them for good performance. Understanding employees' goals, priorities, and family needs, without becoming overly familiar with the employee, is also helpful. Researchers who become too familiar and friendly with their employees may lose their respect; this is especially a problem for young researchers, who may be the same age or younger than their employees. Employees should be given feedback, both positive and negative, on their work. Dr. Azziz recommends always following up on feedback in writing for the protection of both parties.

The Basics of a Mentoring Program
Dr. Loret de Mola

Dr. Loret de Mola observes that medical and scientific educators rarely receive training on mentoring. Yet a good mentoring relationship in the early years of a researcher's career is a critical element for success. Studies have shown high predictability of professional success depending on the presence of a mentor.

In the traditional closed system of mentoring, the one-on-one relationship is somewhat isolating and does not allow the influx of external influences. In an open system of mentoring, the relationship is inverted and focused on the protégé, who engages in relationships with a series of mentors, defined as a mentorage. The open system empowers the mentee to establish relationships and is more conducive to the evolution of a career.

Mentoring myths in medicine are that the relationship is one-way, mandatorily face-to-face, and time consuming. The relationships frequently grow into collaborative ones with the mentors learning from their protégés. With the Internet, videoconferencing, and conference calls, long distance mentoring can be equally as effective as being located down the hall. The assumption that the most senior members of a department are the best mentors is not always true; colleagues who have recently overcome contemporary professional obstacles may be more useful to the young researcher.

In the process of advising the trainee, the mentor gains new knowledge and lays the groundwork for future collaboration. Dr. Loret de Mola recalled his experience as a postdoctoral fellow when he introduced differential display into the laboratory, a technique completely new to his mentor, the principal investigator.

Mentors need to be non-judgmental and unbiased and be able to give constructive criticism and feedback. Mentors should strive to instill self-confidence in their protégés. Mentees should establish timelines for goals and seek guidance regularly. Other necessary qualities in the mentoring relationship are open communication, mutual respect, and acceptance of diversity and differing opinions. A mentor should regularly review the mentee's curriculum vitae, research activities, and schedule. Checking to see that the protégé is writing journal manuscripts from abstracts presented at scholarly meetings is another responsibility. The mentor should be available to meet with the mentee four times a year, for at least one hour.

Honing and Fine-Tuning Leadership Skills
Dr. Golub

At all levels of leadership, there are consistent leadership themes: defining objectives, developing process, building consensus, implementing change, and assessing results. Others evaluate a leader in terms of how well he or she performs these functions. Descriptors of good leaders include "fair," "accessible," "innovative," and "a person of integrity." In contrast, descriptors such as "self-serving," "isolated," "rigid," and "plays favorites" are indicative of very poor leadership.

Leadership styles vary, as do the ways they are described. A leader might be defined as flexible or indecisive, or as determined or obstinate, depending on the speaker's perspective. A key issue is to find out one's own leadership style and discover how it fits on the spectrum of styles.

Dr. Golub emphasized the need for leaders to learn leadership skills by doing. Managing budgets carefully, with attention to detail, is essential. Good leaders should delegate to others, rather than attempting to do everything themselves. Obtaining input from others, even on small projects, is crucial. Using a collaborative process is crucial, particularly in an academic environment. Leaders must find out how the process works at their particular institution and use that process. In academia, people will complain about a perfectly reasonable outcome if they think the process of reaching it was flawed. Accomplishing tasks on time also is an important leadership skill, as is being appreciative of those who contributed.

During discussion, participants mentioned the difficulties in leading large groups. Dr. Golub noted that once groups get beyond a certain size, bureaucracy develops, with rules that seem to hinder rather than promote the attainment of goals. The larger the bureaucracy, the more this is the case.

In response to a slide listing different types of leaders (manager, visionary, change agent, and problem solver), a participant asked how a leader decides which style to follow. Dr. Golub noted that this is a matter of judgment, with no specific formula. Another participant suggested that all of these types of leadership are required at different times, in different situations.

Sometimes, efforts are made to turn outstanding researchers into leaders. Dr. Golub pointed out that this, however, is not necessarily the ideal course of action. The best scientific investigators may not make the best leaders because leadership and research require different skill sets.

Institutions find leadership that matches their needs at a given time. An institution that needs consensus seeks different leaders than one that seeks change. Problems can develop when the leader's style does not match the situation, such as when a leader proposes massive changes at a time when everything is running smoothly.

When Dr. Golub asked for examples of leadership failure, one example cited by participants was self-serving leaders with their own agenda. Failures in financial management also were mentioned.

Developing Time Management Skills
Ms. Patricia Rush, President, Organization Twenty-One, Inc., McLean, VA

A model for time management takes into consideration overlapping categories: managing the work environment and activities, managing one's thinking and reasoning, and managing relationships and communications. Research by cultural anthropologist Edward T. Hall examined how different cultures perceive time. Some view time as linear and monochronic, divided into tangible, finite sections; others take a polychronic perspective that time is relative—like a flowing river; what is not done today can be done tomorrow because the river will still be there. Questions such as "How long does it take to fall in love?" or "How long does it take to become a

good researcher or a good parent?" are framed in the polychronic dimension. Conflict arises when people are placed in polychronic situations with monchronic expectations—for instance, "Think outside the box, be creative NOW, because the deadline is tomorrow."

Steven Covey's book, *First Things, First*, gives guidance on how to better manage time. Identifying and recognizing (owning) the problem is a good start. Time researchers have determined that, on the average, people spend 45 minutes a day looking for lost paper. Ms. Rush recommended being diplomatic, yet assertive, when regularly interrupted by co-workers. By role-playing, participants demonstrated how non-verbal cues can effectively convey the desire to return to productive work.

Ensuring that all meetings have a specific agenda and purpose and allowing attendees to leave if their expertise is not needed throughout the entire meeting are suggestions for freeing up time. Workers can modify phone and e-mail practices to improve time management. Extra time should be added for the unexpected when estimating a job's scope. Another key to effective time management is keeping a diary and "to-do" list.

Covey's "Time Management Matrix" spells out how to prioritize the allocation of time. People often focus only on completing tasks that are urgent, while tasks that are important but not urgent are frequently postponed. This can cause problems down the road. Covey suggests that we consciously balance our time between handling the urgent and handling the important. The zone in which activities are neither important nor urgent is where time is frequently wasted. Ms. Rush advised researchers to break daunting tasks into smaller pieces and learn to delegate.

BUSINESS MEETING AND COMMITTEES REPORTS

Dr. Azziz asked participants in the grant review sessions to send feedback to Dr. Young on her racial disparities grant and to Dr. Leah Tolosa for the grant on protein signaling.

He also stressed that something that many participants, especially young investigators, need to understand is that management skills are the fourth leg of academics.

Dr. Azziz recognized the NMRI Planning Committee for its work in producing the workshop and creating an exciting agenda for this annual meeting.

Oversight Committee Report
Dr. Sarapura

Dr. Bessie Young presented for Dr. Sarapura on the Oversight Committee meeting held at the workshop, and activities of the committee since the 2007 NMRI Annual Meeting. The mission of the Oversight Committee is to:

- Promote mentoring relationships;
- Identify new members and conduct outreach to societies;
- Establish groupings of NMRI members by interest and location;

- Organize informal gatherings at meetings or conferences of other organizations;
- Evaluate the effectiveness of the NMRI;
- Confirm that NMRI members are working in areas of interest to NIDDK.

Given this mission, the committee has determined that there is a need for a membership database with information to support the network, including areas of interest for members and society affiliations. This will allow the establishment of mentor-mentee pairs to work on specific objectives, with the ability to track outcomes, as well as for NMRI to obtain feedback on the effectiveness of the network. In order to gather information for this database, the committee circulated a survey to NMRI members. The NMRI Member Survey will include the following items:

- Level of training or position title;
- Attendance at NMRI meetings, motivation to attend or not;
- Interest in mentoring or being mentored;
- Research interest or expertise willing to share or areas needing assistance; and
- Other national or regional meetings attended.

The committee also developed a Mentor Agreement Form for mentors and mentees to establish objectives and track outcomes. Dr. Sarapura showed examples of the mentor-mentee agreement form, which is to be completed before beginning the mentoring process. The form, which is more like a memorandum-of-understanding rather than a contract, sets out a structure to clarify expectations and promote success in the mentor-mentee relationship.

Future activities of the Oversight Committee include the following:

- Identify other meetings attended by several NMRI members and encourage informal gatherings and outreach;
- Establish groups of NMRI members with similar interests and encourage collaborations; and
- Obtain feedback from mentors and mentees regarding the effectiveness of the program and the Mentor Agreement Form as a tool.

During discussion, it was pointed out that the mentor-mentee formalized system (i.e., form and tracking) will involve considerable work for senior investigators. It may be beneficial to consider compensating them for their efforts. The compensation could be more time to submit grant applications or another non-monetary benefit.

Dr. Azziz pointed out that after 7 years, NMRI should probably be evaluated to allow a review of the purpose and future plans of NMRI. One problem seen lately is the paucity of young investigators participating in NMRI. This may be an opportunity for concentrated recruitment and to develop programs that may be of more interest to this population.

There also was discussion of producing a NMRI newsletter to keep members and potential new members apprised of ongoing activities and to highlight successes of NMRI members. This would be a place to show how mentors and mentees are benefiting from their relationship.

Dr. Agodoa suggested that consideration should be given to expanding NMRI to other NIH ICs, such as NHLBI. There are many investigators at this meeting who work on diseases or conditions that cross over to various NIH ICs.

Planning Committee Report
Dr. Azziz

Dr. Azziz welcomed Dr. Greene, who will assume the Planning Committee Chair position for the next year.

Suggestions from the Planning Committee include the following:

- The meeting agenda this year seemed to be full, which is good for the interests of members, but it may be possible to schedule the agenda next year with fewer sessions and a greater opportunity to network;
- For the mock review sessions, it may be beneficial next year for NIDDK to assemble grants from NMRI members and receive permission to use them in training sessions at the workshop. Along with this, it would help to distribute the grants to members earlier so they have more time to review them before the meeting;
- Consideration should be given to webcasting some sessions of the NMRI Annual Meeting to allow greater distribution of the network to those who cannot attend the meeting;
- There needs to be more presentation on American Indian and Hispanic health issues;
- If possible, some time during the meeting should be allocated for mentors and mentees to meet.

WRAP-UP, NEXT STEPS, AND ADJOURNMENT
Dr. Azziz and Dr. Agodoa

Dr. Agodoa thanked Dr. Azziz for his stewardship of NMRI during the past year as Chair of the Planning Committee. He presented him a plaque in recognition of his hard work and for making the annual meeting successful.

Dr. Greene, the new Chair of the Planning Committee, thanked everyone for the opportunity to serve in the position and said that he would listen to suggestions about the format and content of the 2009 Annual Meeting. The date of the meeting is April 23-24, 2009, and it will be held in the Bethesda area.

Dr. Greene also announced that the next NMRI Regional Meeting will occur on November 12-14, 2008, in Chicago. Information on this meeting will be circulated soon.

In closing, Dr. Greene asked members to make a concerted effort to recruit new members to NMRI; this should be the goal for the coming year.

The meeting adjourned at 5:00 p.m.