National Institute of Diabetes and Digestive and Kidney Diseases
Network of Minority Research Investigators Western Regional Meeting
Seattle Sea-Tac Airport Marriott
Seattle, Washington
November 5-7 2006

Introductions and Welcoming Remarks

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

Dr. Lawrence Agodoa welcomed participants to the first regional session of the Network of Minority Research Investigators (NMRI). He acknowledged and thanked Ms. Winnie Martinez, Program Officer for NMRI, and Dr. Bessie Young, the co-organizer of the regional meeting, for their help in developing and organizing this meeting. He thanked Dr. Frank Hamilton, Program Director for the Digestive Diseases Division at NIDDK, and Ms. Elizabeth Singer, Director of the Office of Communications at NIDDK for their participation. Dr. Agodoa explained that this meeting was designed in part to deliver NMRI's message to regions unable to attend the national workshop and to encourage investigators to join NMRI, which provides useful information and support to young investigators concerning starting and developing a successful academic research career. This morning's presentations explain the reasons that led to the creation of NMRI and why NMRI remains necessary.

Jesús M. López-Guisa, Ph.D., M.B.A.
Children's Hospital and Regional Medical Center
School of Medicine
University of Washington
Seattle, WA

Dr. Jesús López-Guisa welcomed participants and explained that after the first national meeting, NMRI organizers realized that more outreach was needed to expand the network, spread assistance, and create a network for support for young minority investigators. Especially given the current state of research funding, NMRI can provide valuable support and advice to young investigators. Dr. Lopez-Guisa thanked NIDDK, Dr. Agodoa, Ms. Martinez, and Dr. Smith for their help with organizing the meeting.

Bessie Young, M.D., M.P.H.
Epidemiologic Research and Information Center
Veterans Affairs Puget Sound Health Care System
University of Washington
Seattle, WA

Dr. Bessie Young welcomed participants and thanked them for their attendance. She thanked NIDDK for its help and for organizing this regional meeting in Seattle.

David Acosta, M.D., F.A.A.F.P.
Associate Dean for Multicultural Affairs
Office of the Dean
School of Medicine
University of Washington
Seattle, WA

Dr. David Acosta welcomed participants to the meeting and congratulated them on their career success. NMRI seeks to improve the recruitment and retention of minority students, overcome barriers, and increase the numbers of minority high school students pursuing careers in medical research. The message of NMRI and that of his office is the same: to encourage and facilitate participation of under-represented minority groups in biomedical research. The University of Washington School of Medicine (UWSOM) seeks to increase the diversity of its students and fellows and also to increase the numbers of minority faculty members. Diversity is critical—changes in the educational environment offer better opportunities for all and bring value to the school.

The UWSOM is a member of the Hispanic-Serving Health Professions Schools (HSHPS) (http://www.hshps.com/) that assists in the development and coordination of research initiatives, and faculty development. Investigators interested in performing research of any sort on Hispanic health issues can receive a 1-year fellowship from HSHPS providing up to $45,000 as a salary subsidy, to be used at the investigator's home institution. The HSHPS and the School of Medicine both offer grant-writing workshops for junior faculty.

The UWSOM's Native American Center of Excellence (NACOE), one of only four in the United States, helps build linkages between investigators interested in American Indian/Alaskan Native (AI/AN) health issues, the Native American Research Center for Health (Portland, OR), the Northwest Portland Area Indian Health Board, and the Seattle Indian Health Board's Urban Indian Health Institute (Seattle, WA). NACOE (http://uwnacoe.com) can provide funding and training for junior faculty members interested in issues of interest to the AI/AN communities.

To succeed in promoting the careers of young minority investigators, a structured mentoring support system and access to resources are needed. It is critical to build minority interest in the biomedical sciences as the number of minority researchers is at an all time low. Minority populations across the United States are growing—one in nine residents of Washington are Latino; by 2035, this figure will be one in four. Leaders from minority backgrounds are needed to prepare for these demographic changes, particularly research to address health disparities. The participants at this meeting are encouraged to join NMRI and serve as role models and mentors.

John Slattery, Ph.D.
Vice Dean for Research and Graduate Education
Department of Pharmacology and Medicine
School of Medicine
University of Washington
Seattle, WA

Dr. John Slattery welcomed participants on behalf of all the health science schools that work with NIDDK. He noted the historical and moral imperatives for this meeting. African Americans played critical roles in the founding of the United States and in the early years of this country's growth. Their efforts allowed the founders to devote attention to the national good. The Civil War was fought to secure the unity of the United States, resulted in freedom for African Americans, but did not fully enfranchise them as citizens. The Mexican-American War and the Westward Expansion increased the land size of the United States and also resulted in increasing numbers of non-white citizens living in the United States but, again, did not fully enfranchise them as citizens. The current responsibility and challenge is to address the needs of these citizens and work to fully incorporate them into life in the United States.

There also are scientific and medical reasons to promote inclusions of minorities. Firsthand knowledge of the populations affected by the diseases addressed by NIDDK's research portfolio and the impact of these diseases on these populations will be especially important for the success of translational research.

Several people who have made progress towards better inclusion of minorities in biomedical research were described:

- Dr. Richard Tapia is an applied mathematician at Rice University who promotes efforts to increase the number of undergraduates of color into his program.

- Dr. Freeman Hrabowski is the President of University of Maryland-Baltimore and sponsors the Meyerhoff Scholarship Program, which provides 50 "free ride" scholarships for undergraduate students of promise. These students are provided with mentoring and support and graduate with degrees in science, technology, mathematics, and engineering at a high rate—approximately 90 percent receive bachelor's degrees in these fields, the graduation rate of students in the program is nearly 100 percent, and nearly 75 percent of these students attend graduate school. This program has helped establish a cadre of minority students who act as a magnet for other minority students.

- Kathy Egan at Indiana University has developed an outstanding McNair Program, which is a "boot camp" that encourages minorities to attend college and several other innovations.

- Dr. Caty Pilachowski has developed a continuing research experience in astronomy that brings both students and faculty from Historically Black Colleges and Universities to campus over the summer to participate in research and to take a project home with them

to continue the work over the academic year. Similar programs in biomedical research are easy to envision.

These and others that could be listed are outstanding examples of mentoring and inclusion. "High touch" programs are needed to attract and retain students of color. Amalgamating scattered resources and following successful examples will help achieve these goals.

Keynote Address
Help Wanted: Minority Investigators
Jackson T. Wright, Jr., M.D., Ph.D., F.A.C.P.
Program Director, General Clinical Research Center
Director, Clinical Hypertension Program
Case Western Reserve University

Dr. Wright thanked Dr. Agodoa for the invitation to speak at this meeting. He stated that the United States needs minority investigators; people are suffering and dying because of a lack of minority biomedical researchers, which could be attributed to a lack of full understanding of the diseases that disproportionately affect African Americans and other minorities. He discussed issues that need to be addressed to establish research programs that focus on the needs of African Americans and other minority communities.

- In the United States, the numbers of minorities (mainly African Americans) attending medical school increased during the 1970s, but have recently leveled off. Currently, African Americans represent only approximately 5 percent of medical school matriculants.

- Only 4.5 percent of faculty members are under-represented minorities (3.1 percent African Americans). The demand for minority investigators is not being met.

- Life expectancies of African Americans are lower than those of whites. White women have life expectancies of 83 years, African American women 76 years, white men 76 years, and African American men less than 70 years.

- Many diseases have unequal distributions with respect to race. For example, the risk of kidney failure is 4.45-fold higher for African Americans than for whites. The risk of stroke also is substantially increased in African Americans compared to whites.

Dr. Wright noted that these data have prompted a career goal for many minorities of becoming care providers to "give back" to the community, and community practitioners provide valuable services. However, their contribution is generally limited to their individual patients and local communities. Those who decide to pursue a career in academic medicine potentially will impact the care of a much larger community.

Dr. Wright next described the impact of under-representation of African Americans in clinical trials on the development of drugs and treatment of a number of conditions.

- Most major clinical trials have enrolled few African Americans, although recently these numbers have increased.

- The decreased efficacy of β-blockers and angiotensin-converting enzyme (ACE) inhibitors in African American was not understood until 10 years after the introduction of these drugs. Data are still missing or uncertain for the effects of both these drugs on heart failure in African Americans. The efficacy of ACE inhibitors on renal disease also was not known in African Americans until 8 years after their proven effectiveness in other groups.

- Trials testing tamoxifen for breast cancer prevention enrolled few African American women, and, based on these scant data, initial guidelines recommended limiting use of this drug in African Americans.

- During the early days of the AIDS epidemic, the only effective treatments available required participation in research protocols, underscoring how the lack of participation in trials can limit access to effective treatments.

Dr. Wright presented data showing how drugs can have different effects and efficacies in different patient populations.

- Multiple studies have shown that ACE inhibitors are less effect in lowering blood pressure in African Americans than in whites.

- Ethnic reanalysis of the Studies of Left Ventricular Dysfunction trial showed that ACE inhibitors did not significantly reduce rates of cardiovascular death, hospitalization for congestive heart failure, or death or hospitalization for congestive heart failure for African Americans.

- β-blocking agents were associated with a 31 percent decrease in heart failure mortality in whites, but were less effective in African Americans

- The African American Heart Failure Study (A-HeFT) was the first outcome clinical trial of heart failure in African Americans. The trial showed that combined use of isosorbide dinitrate and hydralazine conferred a 43 percent improvement in survival.

Dr. Wright explained the impetus for these trials came from minority investigators concerned about health issues in their own communities. The trials could be performed only with adequate input from many minority investigators, which underscores the need to develop a critical mass of minority biomedical researchers. Minority researchers are more likely to push for studies addressing the health needs of their communities, which may have been historically neglected. Ethnic diversity in trials is essential, as well as focused studies to examine any population-based differences noted during clinical trials. Genetic studies will not supplant the need for population/ethnic-based research.

Dr. Wright next described the 42,000 participant ALLHAT trial, which enrolled more than 15,000 African Americans and showed that significant recruitment and participation of African Americans in clinical trials was possible. The study compared ACE inhibitors, calcium channel blockers and alpha blockers to diuretics for their effects on clinical outcomes in patients with hypertension.

- As noted in other studies African Americans experienced a larger decrease in blood pressure in response to the diuretic compared to the ACE inhibitor; no difference between these drugs on blood pressure was observed in whites.

- The diuretic also was more effective in reducing risk of coronary heart disease, cardiovascular disease, end stage renal disease and stroke in African Americans compared to whites.

- African Americans had a higher risk of stroke (40%) and total cardiovascular events (20%) if treated with ACE inhibitor. African Americans also had a higher risk of developing angioedema when taking ACE inhibitors compared to the diuretic a higher risk of this side effect than in whites.

Dr. Wright also described the NIDDK-sponsored African American Study of Kidney Disease and Hypertension trial, which was developed to investigate the effects of specific classes of antihypertensive drugs (β-adrenergic blockers, calcium channel blockers, or ACE inhibitors) on the progression of hypertensive kidney disease in African Americans. This study showed that despite their reduced efficacy in lowering blood pressure in African Americans, ACE inhibitors are effective in decreasing the rate of progression of hypertensive renal disease in African Americans. These results were determined 8 years after studies showed that ACE inhibitors were effective in whites. Dr. Wright noted that the success of these investigations depended on bringing together minority investigators. The design and success of the study were realized because of the efforts of investigators and staff at the NIDDK, aided in large part by the presence of African American investigators on the Steering Committee who helped develop the study design to address ethnic differences in response to these medications. Nine of the 20 trial centers had African American principal investigators. This study enrolled a significant portion of participants who had less than a high school education (41%) and with low socioeconomic status (more than 50% earned less than $15,000 per year). In spite of contrary expectations, these participants had GRF adherence of 83 percent and visit adherence of 89 percent.

Dr. Wright concluded with ways that minority investigators can influence the way medical care and medical education are provided, such as:

- Selecting personal research topics that address the health needs of their communities;

- Serving on advisory boards for industry, government, and funding agencies;

- Serving on program committees on the boards of professional societies that set educational agendas.

Dr. Wright also noted that health disparities are an area of intense interest in both academic and public policy circles. Opportunities including health policy fellowships (see www.iom.edu/rwj and www.kaiseredu.org/policy_index.asp) and multidisciplinary clinical research training programs (Roadmap K-12) are available to investigators wishing to address these issues.

Dr. Wright concluded by noting that academic health centers and their minority faculty members represent a critical resource for the minority community. Minorities pursuing careers in academic medicine can play critical roles in advocating for health care resources for their communities.

NIH Funding Mechanisms
Frank Hamilton, M.D., M.P.H.
Branch Chief, Digestive Diseases Branch
NIDDK
NIH
Dr. Hamilton described the mission and goals of NIH and the resources and funding options available to investigators.

- NIH's mission is to uncover new knowledge that leads to better health for everyone. NIH's goal is to acquire knowledge to help prevent, detect, diagnose, and treat disease and disability. To this end, NIH supports peer-reviewed research, conducts research in intramural laboratories, trains new investigators, and develops and disseminates credible health information based on scientific discovery.

- NIH's budget for FY 2006 is $28.6 billion; $23.8 billion of this supports extramural research.

- NIH's Web site provides health information for researchers and the public. PubMed Central/Medline, supported by the National Center for Bioinformatics at NIH, provides online access to scientific journals.

Dr. Hamilton explained funding mechanisms available through NIH, described their differences, and provided strategies for maximizing success in obtaining funding. NIH funds research through grants, cooperative agreements, and interagency agreements. Grants are the most commonly used funding mechanism.

- The R-series awards include:

  - R01s: major research grant mechanism, budget is requested by the investigators, renewed in study sections in the Center for Scientific Review (CSR), renewable.
  - R21s: solicited by program announcements (PAs) or Requests for Applications (RFAs), fund exploratory research, institute-specific, budgets are usually limited to $275,000 over 2 years, reviewed in standard study sections in CSR, not renewable.
  - R03s: small grants, usually $50,000-$100,000 per year for 2 or 3 years, renewed in Institute study sections, not renewable (R03s are being phased out by some Institutes and Centers).

- Cooperative agreements (also called U01s) are large awards (up to $1 million per center) that involve multiple sites; NIH staff usually is involved in the design of studies funded through cooperative agreements. Internal NIH clearance and review is required for U01 funding.

Advantages and disadvantages exist for each funding mechanism:

- R01s (unsolicited): receipt dates are 3 times per year; funding is based on priority score/percentile rank, program relevance and balance, and "new investigator" status; multiple CSR committees review the applications; applications are tailored to the investigator's research interest; an investigator has 3 attempts to receive funding; highly competitive.

- RFAs: single receipt date, funding is based on funds available and the number of applications received; study sections are specific to the RFA; the RFA funds research of interest to the Institute (restricted areas of research); only one chance to be funded; competition depends on the number of applicants.

- PAs: receipt dates are 3 times per year; funding is based on priority score/percentile rank, program relevance, and balance; reviewed through CSR; funds research of interest to the Institute; funding is tied to the usual payline.

Applicants can request more than one Institute to review their application, request a specific study section, indicate areas of expertise needed for adequate review, and indicate individuals or groups with a major conflict of interest. Applicants should never name desired reviewers.

Dr. Hamilton also described strategies to increase the chances of success in obtaining funding:

- Apply in response to an RFA, because these are "set-aside" funds and scores are not percentile ranked;

- Apply for small grants (R21s) because Institutes are more willing to take a chance if cost is not high, and fewer senior investigators apply for small grants;

- Apply for pilot and feasibility funds, if available;

- Apply as a co-principal investigator;

- Apply as part of a program project;

- Apply for non-NIH grants (private foundations, professional societies, drug companies, etc.).

Dr. Hamilton concluded with an overview of review criteria for a successful grant:

- The proposed study should address and important problem and advance scientific knowledge;

- Design and methods should be well-developed and appropriate, and problem areas addressed;

- Novel concepts or approaches should be included, and the aims of the grant should be original and innovative;

- The principal investigator should be appropriately trained;

- The scientific environment should contribute to the probability of success.

Dr. Hamilton encouraged participants to sign up for the NIH GUIDE ListServ at: http://grants.nih.gov/grants/guide/listserv.htm, which provides a Table of Contents with links to Program Announcements, Notices, and RFAs, updated weekly. He also referred participants to www.grantsnet.org, which provides information on sources of funding outside of NIH.

Scientific Presentation and Career Narrative
Beverly Torok-Storb, Ph.D., M.Ed.
Associate Head, Transplantation Biology Program
Fred Hutchinson Cancer Research Center
Seattle, WA

Dr. Torok-Storb described the progress of stem cell research over the past 50 years, along with her own experience as a woman scientist.

In 1947, stem cell research received interest as a consequence of the atomic bombs; hematopoietic cells are highly sensitive to radiation and determining ways to protect people from the effects of such bombs was a priority. By the 1950s, researchers had determined there was a cell-based mechanism for protection from the effects of radiation through reconstitution of hematopoietic cells. Implantation of marked bone marrow showed that certain cells can reconstitute the hematopoietic system; transplantation drove stem cell research as a way to protect against radiation injury. By the 1960s, colony-forming unit (CFU) assays had been developed, which allowed researchers to count stem cells. However, the cells identified at this time were not true stem cells, but instead were committed progenitors.

In 1957, the Soviet Union launched Sputnik, which spurred the United States to invest more heavily in science and technology and in education in the sciences. This led to federal funding for high schools to develop advanced science and mathematic courses at the time Dr. Torok-Storb attended high school. Thanks to the Pennsylvania Higher Education Assistancy Agency, Dr. Torok-Storb also received a scholarship to attend Edinboro State College.

In 1975, Dr. Torok-Storb was pursuing a Ph.D. at the University of Pittsburgh. She received funding from the Atomic Energy Commission. She was the only women in her graduate program. Her work focused on the biological effects of radiation. She became a postdoctoral

fellow at the University of Washington and in 1977 began her long and continuing interaction with NIDDK as a recipient of a National Research Service Award from what was then known as the National Institute of Arthritis, Metabolism, and Digestive Diseases.

At this time stem cell research was progressing as growth factors were purified from plasma and culture media and monoclonal antibody technology was developed, which aided in the identification and isolation of candidate cell populations as well as growth factors.

The early 1980s saw the development of assays, which helped to identify true stem cells, not just the progenitors. The Long-Term Initiating Culture (LTIC) assay was particularly important because it allowed analysis of the microenvironment and stromal cells; candidate stem cells could be placed in contact with stromal cells to determine if the cells could self-replicate and give rise to committed progeny. This work led to the conclusion that the microenvironment of bone marrow consists of a complex of cells and factors that interact to regulate the fate of stem cells and their progeny. Defining this stem cell 'niche' is an active area her current research.

During the late 1980s, recombinant growth factors could be made, rather than purified; these recombinant factors and monoclonal antibodies were used to study receptors and signaling pathways. Recently, technologies such as RT-PCR and microarrays allow in-depth profiling of gene expression using only a small number of cells.

A current controversy in the United States concerns the use of embryo-derived stem cells (embryonic stem [ES] cells) for research. Some contend that adult marrow-derived stem cells can serve the same purpose as ES cells. However, unlike ES cells, adult cells are not totipotent. To prove that adult stem cells are totipotent, they must be able to contribute to non-hematopoietic tissues, for example, muscle, brain, and liver. Analyses of these tissues in long term survivors of bone marrow transplant have failed to identify donor-derived (e.g., adult stem cell-derived), non-hematopoietic tissue. Dr. Torok-Storb's research currently seeks to characterize the early events of stem cell development; understanding the genes and properties of ES cells could allow researchers to activate these pathways in adult stem cells, creating an embryonic phenotype in the adult stem cells.

Diabetes and Nutrition
[NOTE: The leaders of this section decided to discuss challenges faced by young investigators instead of diabetes and nutrition]

Lydia Aguilar-Bryan, M.D., Ph.D.
Baylor College of Medicine
Houston, TX

Odilia Bermudez, Ph.D., M.P.H., L.D.N.
School of Medicine
Tufts University
Boston, MA

Challenges faced by investigators in the United States were discussed:

- In the United States, few tenure-track positions are available and in many institutions having tenure does not mean that much; when funding is lost, there is no subsequent support.

- Clinician-researchers have competing demands, such as time spent on patient care, which leaves them less time for research and grant-writing, interfering with their competitiveness for funding. If a young investigator does not dedicate at least 75% of their time in research, it will be very difficult for them to generate enough data to get funded.

Discussion and advice: Drs. Lydia Aguilar-Bryan and Odilia Bermudez, in response to questions raised by the participants.

- An important part of the career development is finding a good, supportive mentor, whether in one's home department or elsewhere. The mentor is more important than the project and good support will allow the investigator to grow and mature.

- Investigators should be aware of the grants available from all sources that pertain to their field of research and the stage at which they are academically (NIH, American Diabetes Association, Juvenile Diabetes Research Foundation). Competition for NIH grants and support from other foundations is stronger than ever; new investigators must ensure that their grants are excellent, focused, logical, timely, and describe appropriate approaches, along with alternatives.

- Toward the end of a postdoctoral fellowship, young investigators should compete for K awards, which will provide up to 5 years of funding and guidance before competing for an R01 grant. K awards study sections may be more open-minded and more likely to fund a start-up research project. K awards do require the awardee to be a permanent resident of the United States.

- Young investigators should carefully define their area(s) of research, and identify suitable sources of support and a good mentor to guide through the process. A focused, straightforward hypothesis that will generate good data and publications fairly quickly is key, but beware of good quality.

- Young investigators should ask colleagues to read and critique their grants. Reciprocation also is important, and by reading one another's grants and papers, the reader also gains knowledge.

- Informal gatherings, such as data clubs, can be useful for gathering input and criticism on a research proposal. These gatherings also can give investigators access to researchers in other fields who may offer important insight. These groups also can help investigators improve their critical thinking and the ability to self-critique. In addition listening to seminars at your University or Medical College is extremely useful.

- Young investigators must recognize possible deficiencies at their home institutions, seek outside assistance and interaction to remedy these deficiencies, and strive to improve their institutions. There is a lot more help out there than you can think, you just need to look.

- As you advance in your career, responding to RFAs may increase success, because awards are based on available money; a low response rate means a higher probability of success. NIH also is more likely to fund grants with co-investigators. Working with someone who is strong in your field can be a useful strategy, but young investigators must be careful to develop their own research niche and be seen as independent.

Grants: Going from an Idea to a Winning Proposal
Robert Ferry, M.D.
Health Science Center at San Antonio Medical School
University of Texas
San Antonio, TX

Dr. Ferry presented tips for developing a successful grant

- Be aware of and consider the many types of funding mechanisms available, both at NIH and at other funding agencies. Most societies provide links to search grant mechanisms (http://www.endo-society.org).

- A successful grant has a hypothesis that is important (clinically relevant), novel, clearly stated, testable, and supported by a clear rationale. Successful hypothesis development requires a solid knowledge base. Investigators should critically read and evaluate the primary literature, identify their strengths and weaknesses, discuss ideas with trusted colleagues, recruit collaborators (but beware of "parasites and predators"), and familiarize themselves with the federally funded research through Computer Retrieval of Information on Scientific Projects (CRISP) [http://crisp.cit.nih.gov/].

- When seeking funding from NIH, investigators should know their audience; NIH tends not to fund high-risk proposals. The proposed research should be feasible and ultimately make a difference in health care. Successful, annotated R01 grants can be viewed online (http://www.nlm.nih.gov/ep/Tutorial.html). Training grants and individual fellowships have alternate pages, but the research plan has the same style as an R01.

- Investigators should take time to determine the appropriate funding mechanism and NIH Institute to target, through discussions with colleagues as well as with NIIH program staff to determine areas of research in which an Institute may be particularly interested. Talk with people who have successfully garnered funding—too many folks are "interested" but not qualified to mentor or to provide you with practical advice.

- Grant development can take 6 to 18 months—plan ahead! Be particularly aware of the time it can take to address regulatory issues and obtain necessary institutional signatures.

Dr. Ferry outlined and briefly described the sections of a typical R01 grant:

- Abstract: CSR staff use abstracts to assign an application to an Institute and review group. Write the abstract last, but do not underestimate its importance. The cover letter can request assignment to a specific study section (review the rosters at http://www.csr.nih.gov).

- Biosketch: The biosketch defines the applicant. Include training and employment history; record of research productivity, such as first author and other high quality publications; any honors or activities relevant to the research; service to scientific and professional communities, and other sources of funding or support. Do not exaggerate.

- Budget: Seek help from administrative and budget staff at your home department, your department chair, your institution's grant management office, and NIH program staff. Spreadsheets can be useful and allow simultaneous development of the budget and research plan; as experimental designs change, the spreadsheet can recalculate costs. The budget covers personnel, equipment, supplies, travel, and some other expenses. Applicants also should be aware of indirect costs, which help fund the research infrastructure at your institution. Budgets also can provide another opportunity to emphasize the skills and knowledge of your personnel and the resources available at your institution.

- Specific Aims: Develop 3 to 5 highly focused, feasible, and significant Aims. Aims should be independent—the success of Aim 2 should not depend on the success of Aim 1. Alternative approaches should be discussed. Aims should define the research question and relate it to human health and state the overall hypothesis and goal of the proposed research. Each Aim should be stated clearly and concisely and should relate to the overall hypothesis and summarize the research model and approach.

- Background and Significance: Relate the proposed research to human health issues, summarize current knowledge and identify any deficiencies therein, illustrate your knowledge concerning the research topic, and define and justify the model system. Write clearly and concisely, but present adequate information—reviewers should not need to read the literature to understand the grant.

- Preliminary data: Use preliminary data to illustrate the feasibility of the proposed work and the capabilities of the PI. Incorporate high-quality figures and tables that can be copied clearly. Provide full-size copies of key figures, in color if necessary, as appendices. Contact NIH staff to provide additional copies of the full-color proposal, if needed. Append pertinent, significant publications.

- Research Design and Methods: Organize this section by Specific Aim, summarize the experimental approach, define and justify model systems, describe key experiments, indicate priorities, predict outcomes, and state anticipated pitfalls along with alternative approaches. Illustrate your strengths (your publications, contributions of co-investigators and collaborators, the strengths of your institution, letters of support and collaboration)

and highlight innovativeness. Describe how key observations will enhance the understanding of human biology, and briefly indicate how findings may impact future research.

- Resources and Environment: Discuss cores and support services, highlight institutional grants (SPORE and Center Grants, Training Grants and Programs), include letters of support from key Core Directors and collaborators. Any reagent required for the work must be documented by preliminary data and/or a letter of support.

Dr. Ferry briefly discussed the review process.

Staff at CSR assign the application to an Initial Review Group (IRG) and Institute. Applicants should craft the title and abstract of the grant to increase the chances of assignment to their preferred IRG and Institute. Applicants also can write a cover letter requesting a specific assignment, and, if the assignment is incorrect, applicants should call their scientific review administrator as soon as possible to request a possible change. At the IRG meeting, grants receive review and are discussed and scored. R01 review criteria include the significance, approach, and innovation of the grant, the capability of the investigator, and the investigator's research environment.

"Fatal flaws" in grant applications include a lack of originality or significance; lack of focus ("overly ambitious"); not "hypothesis driven" (descriptive rather than investigative research); lack of supporting preliminary data; success of the proposal hinges on a key experiment, reagent, or aim; or the PI lacks experience or knowledge to conduct the work. If the proposal is not funded, investigators should dispassionately study their critique and discuss the critique with colleagues, mentors, and NIH program staff. NIH allows 2 revisions—revise and re-submit. Investigators also can request new reviewers or assignment to a new IRG if the critique is flawed.

Administrative Issues: Being a Department Chair or Division Director
Stephan Fihn, M.D., M.P.H., F.A.C.P.

- Effective chairs have to be willing to solve other's problems, even under circumstances of limited resources.

- The Association of American Medical Colleges (AAMC) data show that few chairs of internal medicine departments are members of under-represented groups. AAMC data indicates 6 African American chairs (2 at historically black universities), 2 Asian chairs, and no Hispanic or Native American chairs. Although the response was limited, the Association of Chiefs of General Internal Medicine (ACGIM) survey found only 1 African American and 2 Hispanics in leadership positions.

- Department chairs need to learn the basics of administration, which are not taught in the laboratory or the clinic, including regulations, human resources, budgeting, and communication. Other important principles to learn include how to build a team and

delegate effectively, how to sensibly mange your own time, and how to maintain personal growth.

- Chairs must understand the culture of their organization, particularly how and where decisions are made, to get things done most effectively. They also must understand the management styles of their superiors, and identify who controls resources. Chairs must understand and be able to interact well with staff and faculty in their department. Chairs must be aware of rules, both written and unwritten, pertaining to institutional, programmatic, and legal manners.

- Managing budgets and human resources are other important areas. Chairs should learn the rules of hiring, advancement, discipline, and dismissal. A proactive, patient, realistic, and flexible approach, with high but reasonable expectations works best for managing personnel. Chairs also will need to learn to read, understand, and create budgets. Budgets can reflect the priorities of a department.

- A strategy for communication should discriminate between external and internal communication, and should involve meetings, email, and mailings; additionally, do not underestimate the effectiveness of communication through informal networks. Chairs will need to make decisions concerning their level of accessibility.

- Building a team and delegating effectively is essential for any department chair. Chairs should define the structure of the team and roles of team members, provide clear directions and expectations, have an accurate appraisal of team members' capabilities, assign responsibility commensurate with work, and expect and solicit "reverse assignments."

- To maintain personal growth, time management is essential. Chairs should know their limits and shortcomings, play to their strengths, build upon the accomplishments of their predecessors, and find mentors. Finding "protected time" is essential, but can require strict prioritization of activities.

- Serving as a department chair also can provide joy, as in the satisfaction of building and advancing the careers of others. It also provides satisfying opportunities for problem solving.

Mentor: Finding or Being a Great One
Janis Abkowitz, M.D.
Professor of Medicine and Section Head, Division of Hematology
University of Washington Medical Center
Seattle, WA

Dr. Abkowitz opened by describing what a mentor is NOT:

- A parent-child relationship
- A role model

- Always positive or supportive
- Time-sensitive but not time-limited

Having a mentor is important. When finding and choosing a mentor, young investigators should consider the potential mentor's track record, availability, priorities, and personality. Mentors should offer guidance, but not micromanagement, as well as honest assessments, insight, and perspective. Mentors can provide an introduction to science and colleagues and can be an advocate for the mentee.

Unique considerations for minorities include deciding whether the mentor needs to be like you and have shared experiences or comparable values. Mentors also should help minority mentees protect their time for career advancement in the face of teaching and patient care requirements, as well as requests to serve on committees. Mentors also may be able to help minority mentees cope with the pressure of being a role model.

Selling your Science—Getting Published
Keith Norris, M.D.
Vice President for Research, Clinical Research Center
Charles R. Drew University of Medicine and Science
Lynwood, CA

Dr. Norris explained that a strong publication record is important for obtaining funding. NIH is answerable to Congress concerning how its funding is spent; publications and program highlights help provide evidence of progress. Dr. Norris outlined reasons for publishing; reasons for failure; development and review of publications; and strategies for success.

The main goal of publishing is to share research of value that ultimately will improve health care and advance understanding of biomedical science—good science will be published. Common reasons for failure include a weak hypothesis, lack of originality, poor study design and statistical analysis, a conclusion that does not match results, and lack of a clear indication that the research is important and will advance the field. Otherwise good articles may fail to be published because they were submitted to an inappropriate journal, are poorly written (grammar and spelling errors, inconsistencies), have outdated references, or do not follow journal guidelines. Bad research is almost always rejected, sensational research is sometimes accepted even if badly written, but most research falls into a gray zone; thus, a well-written article increases the chances that the research will be published.

Journal articles usually are composed of an abstract, introduction, methods section, results, and discussion:

- Abstract: The abstract may be all that most people read; it should tell the whole story, influence the editor and reviewer, and set the tone for the entire article.

- Introduction: The introduction should include reasons the study is important, a selective review of pertinent literature, and a sharply focused hypothesis. The introduction can

indicate if the research is novel or confirmatory, and if confirmatory, explain why the research may fill a gap in the existing knowledge base.

- Methods: The methods should specifically describe what was done, in a level of detail that allows replication or assessment of the validity of the findings. Any statistical analyses should be described precisely and completely. If new or extensive measures or procedures are used, these can be described in detail in the appendix.

- Results: The results section should begin with an overview of the findings and move on to more detailed sub-analyses. Any tables should be understandable without reference to the text. Figures should highlight key findings.

- Discussion: This section should succinctly restate the main findings and then move quickly to broader conclusions. Details around the major findings should be provided and related to the existing literature. Any limitations of the study also should be discussed in this section. The discussion section should be restricted to interpretation, not overstatement, of the results and should include implications for practice or research.

Tips for success include seeking input and criticism from co-authors, colleagues, and mentors. A well-written cover letter to the editor can help explain why a paper is significant, and important gaps in research that the data may fill. Authors also can suggest potential reviewers; authors should cite potential reviewers when appropriate and should be aware of who may have published recently in the journal on a related topic. If a paper is rejected, respond to reviewers' comments promptly and address suggested changes.

Dr. Norris also provided tips for serving as a reviewer. A good review should provide clear, concise, consistent, useful, and constructive recommendations to the author and the editor of the journal. Reviewers should read the manuscript carefully, note its potential value and strengths, and describe any concerns. Reviewers should agree to review only those manuscripts they can complete on time, maintain confidentiality, review manuscripts in their own area of expertise only, and review manuscripts in a constructive and collegial manner. Plagiarism, conflicts of interest, and biases should be avoided.

Communicating Results of NIH Research to the Public
Elizabeth Singer, M.S.
Director, Office of Communications and Public Liaison
NIDDK
Bethesda, MD

Ms. Singer described efforts at NIDDK and NIH to communicate NIH activities to the public. NIH has a number of audiences, including patients, health professionals, science reporters, Congress, and voluntary and professional organizations. NIH communicates with these audiences through publication of research results in scientific and medical journals, but also uses social marketing approaches to reach consumers with information they can use to improve their health. The three pillars of this approach are the mass media, partnerships in the public and private sectors, and community outreach programs. She added that participants in today's

meeting can play a valuable role as ambassadors bringing health care information to their friends, families, patients, and co-workers.

Four NIDDK information dissemination programs have specific Congressional authorization: The **National Diabetes Information Clearinghouse, the National Digestive Diseases Information Clearinghouse, the National Kidney and Urologic Diseases Information Clearinghouse and the Weight-control Information Network.** Each program answers inquiries from health consumers, patients, health professionals and the public. Together, the in-house team and contract staff answer about 184,000 inquiries and distribute 1.7 million publications each year. WIN sponsors the campaign, *Sisters Together: Move More, Eat Better*, which reaches out to African American women through traditional channels and non-traditional channels such as local hair salons.

An extensive inventory of fact sheets, brochures, and pamphlets are available to the public through the NIDDK website http://www.niddk.nih.gov/health/health.htm and in printed form. All materials undergo extensive pre-testing with target audiences and scientific review by program staff and outside experts before production and posting on the NIDDK website. Each program has a toll-free telephone number, exhibits and promotes its products to targeted audiences. Each program also meets regularly with a formal group of experts and members of voluntary and professional organizations to review and coordinate programs and initiatives.

Following results of NIDDK's Diabetes Control and Complications (DCCT) clinical trial, NIDDK established the **National Diabetes Education Program (NDEP)** to reduce the impact of diabetes and its complications by changing the way diabetes is treated. *Control Your Diabetes. For Life* is a mass media campaign designed to convey the importance of controlling A1C levels, blood pressure and cholesterol and a variety of actions people with diabetes can take to control their diabetes and prevent its complications. NDEP designed individual campaigns for African Americans, Hispanic/Latinos, American Indians, Asian American/Pacific Islanders and older Americans with major assistance from NDEP Work Groups for each audience.

The results of the Diabetes Prevention Program (DPP) in 2001 provided strong evidence for the prevention of type 2 diabetes, and translation of this evidence added momentum to the NDEP. Techniques used include system level changes to improve diagnosis, treatment and prevention. Incidence and prevalence data and marketing research drive the design of tailored messages and campaigns for specific audiences of health professionals and at-risk populations. *Small Steps. Big Rewards.* is the theme of NDEP campaigns for prevention of type 2 diabetes. NDEP designed individual campaigns for ethnic minority audiences, women with gestational diabetes and older Americans with the help of NDEP Work Groups. http://ndep.nih.gov/

The Centers for Disease Control and Prevention in Atlanta co-sponsors NDEP with NIDDK. An extensive partnership organization and a national network of CDC Diabetes Control and Prevention Programs in states and territories ensure broad and meaningful input in NDEP's design, effective implementation and wide dissemination and promotion of its messages.

NIDDK clinical trial results demonstrated the effectiveness of treating kidney disease to prevent or slow the progression to kidney failure. The **National Kidney Disease Education Program**

(NKDEP) implements strategies to reduce the morbidity and mortality of kidney disease and its complications by getting the results of research into the medical community. Systems changes such as NKDEP's Creatinine Standardization Program are integral to improving health outcomes. Health communication strategies and social marketing campaigns drive the design of education tools for patients, people at risk and health care providers. http://nkdep.nih.gov/

NIDDK also is part of the trans-NIH Strategic Plan for NIH Obesity Research, which calls for basic, clinical, translational, and behavioral research addressing obesity. In addition to supporting WIN, NIDDK joined with other NIH Institutes to fund ***We Can! Ways to Enhance Children's Activity and Nutrition*.** More than 100 locations in the United States, such as community programs, doctor's offices, parks and recreation departments, and the YMCA, receive technical assistance and materials to support programs for parents and children to promote the goals of enhanced physical activity and better understanding of nutrition.

This information is available under the Health Education section of NIDDK's website, http://www2.niddk.nih.gov/, and at the NDEP website, www.ndep.nih.gov.

NMRI Update
Carlos Isales, M.D.
School of Medicine
Medical College of Georgia
Augusta, GA

Dr. Isales reiterated that the purpose of NMRI is to help minority investigators network, apply for funding, and succeed in their careers in academic medicine. The mentoring process is important; this meeting, for example, provided an opportunity for young investigators to network with junior and senior faculty members who will be able to provide assistance at all stages of the career pathway. For NMRI to achieve its goals young investigators need to provide feedback on their needs, relevant activities NMRI could sponsor, and how to increase minority investigator participation; Dr. Isales urged participants to complete the meeting evaluation forms. NMRI sponsors three large initiatives. The national meeting will provide a venue for discussion of senior member promotion and junior member funding issues; suggestions are currently being accepted for topics to address at this meeting. The meeting will have speakers providing information on funding, grant and publication writing, and making contacts at other institutions. Regional meetings similar to this meeting will be held in the West, South, East, and Mid-west. Lastly, the NMRI quarterly newsletter provides another way for participants in NMRI to maintain contact with one another.

Wrap-up
Dr. Agodoa

Dr. Agodoa reminded participants that NIDDK and NIH are committed to their success in research and are available to provide assistance. NMRI also seeks to provide young minority investigators with additional mentors outside of their home institutions. Dr. Agodoa asked participants to consider how they may help or serve as mentors for high school and undergraduate students interested in pursuing a career in biomedical research.

Dr. Agodoa thanked the local organizers or the meeting, senior NMRI members, the meeting speakers, and his colleagues at NIDDK, particularly Ms. Martinez, for their efforts in making this meeting a success.

Adjournment
The meeting adjourned at 4:45 p.m.