MINUTES OF THE NUTRITION COORDINATING COMMITTEE (NCC) MEETING, NATIONAL INSTITUTES OF HEALTH (NIH)
Rockledge 2, Conference Room 9100-9104, Bethesda MD
July 6, 2006 2:00- 4:00 PM

WELCOME

Dr. Van Hubbard, Director, Division of Nutrition Research Coordination (DNRC), convened the meeting at 2:01 PM and welcomed participants. Participating via phone were Dr. Deborah Galuska, CDC NCCDPHP; Shirley Gerrior, USDA CSREES; Dr. Elizabeth Maull, NIH NIEHS; Dr. Deborah Olster, NIH OBSSR; Dr. Daniel Raiten, NIH NICHD; Ms. Dorothea Vafiadis USDA CNPP; and Dr. Susan Welsh, USDA CRSEES. The agenda for the meeting is provided as Appendix A, and the list of attendees is provided as Appendix B.

APPROVAL OF MINUTES FROM THE MAY 4, 2006 NCC MEETING

Minutes from the May 4, 2006 NCC Meeting had previously been sent to NCC members via email. Dr. Hubbard asked if there were any other corrections to the minutes. There were none. Dr. Paul Coates, Office of Dietary Supplements (ODS), made a motion to approve the minutes, and Dr. Sharon Ross, National Cancer Institute (NCI), seconded the motion. The minutes were thus approved and will be posted on the DNRC website, http://www.dnrc.nih.gov, along with the minutes from previous NCC Meetings.

NUTRAGENOMICS AND METABOLOMICS AT UNC CHAPEL HILL: A NEW RESEARCH INSTITUTE

Dr. Steven Zeisel, Kenan Professor of Nutrition at UNC Chapel Hill, presented details about the new UNC-Chapel Hill Nutrition Research Institute (NRI), which will be completed in November of 2007. The campus will include not only the UNC NRI but also the NC State Plant Science and Ag Genetics Center, UNC Greensboro A&T – post harvest, NCCU - Zebrafish metabolism, the Duke Translational Medicine and clinic, a girl's science high school, as well as industry (biotech startups). The campus will be located in Kannapolis, North Carolina. The NRI has been funded by state funds as well as those contributed by David Murdock, owner of Dole Foods, Castle and Cook. Convinced that diet has kept him healthy, David Murdock is very interested in bettering health through nutrition and has been very generous in his contributions to the NRI.

The NRI will focus on using cutting edge genomic, proteomic, and metabolomic biotechnology to develop innovative approaches to understanding the role of diet and activity in normal brain development, the prevention of cancer, and the prevention and treatment of obesity. The NRI will advance the study of human nutrition by enhancing understanding of why individuals vary in their requirements for specific nutrients and how optimal nutrition improves health. Internationally recognized leaders in all areas of nutrition, partner University research programs in agricultural genetics, translational medicine, and food science, and a core facility with state of the art equipment for genomic and

proteomic and metabolomic analysis have already committed to this research campus. The NRI will provide a unique opportunity to:

1. Use genomic, proteomic, and metabolomic methods to characterize humans in a manner not previously possible – by identifying characteristics that predispose individuals to increased requirements for specific nutrients
2. Conduct focused research in model systems to understand the potential mechanisms and significance of these individual differences in metabolism
3. Use this new understanding of human metabolic individuality to develop highly targeted solutions that will include clinical and community-based interventions with the goal of optimizing brain development and function, as well as preventing cancer, obesity, and the many sequelae of obesity (e.g. diabetes).

Because of the opportunities listed above, the NRI may be of strong interest to NIH funded projects. For more details, please see Appendix C, which is the Planning Document for the center at Kannapolis. Also attached is the access information provided by Dr. Zeisel for the Nutrition in Medicine website. This can be found in Appendix D.

GOALS AND OBJECTIVES OF GENETIC METABOLIC DIETITIANS, INTERNATIONAL (GMDI): OPPORTUNITIES FOR RESEARCH AND CLINICAL PRACTICE

Ms. Kathryn Camp, a dietitian at the Walter Reed Army Medical Center, presented to the NCC an overview of a new professional organization, the Genetic Metabolic Dietitians International (GMDI). Due to the fact that providing clinical care and nutrition therapy for patients with rare inherited genetic disorders requires extensive knowledge and experience, there was a need for collaboration across state and national boundaries and for the education and mentorship of those new to the field. Responding to these identified needs, the GMDI was created by a group of experienced dietitians and was incorporated as a non-profit professional association in July, 2005. Their first Annual International Metabolic Nutrition Conference was held in April, 2006.

GMDI's mission is to provide standards of excellence and leadership in nutrition therapy for genetic metabolic disorders through clinical practice, education, advocacy, and research. Benefits of this organization include a central location for dietitians and metabolic physicians with expertise in metabolic nutrition, management of patients across the lifespan by helping to transition care into adulthood, partnership with a variety of institutions, and an international membership. They also offer researchers a better understanding of metabolic pathways.

More information can be found in the attached GMDI History and Fact Sheet (See Appendix E).

HNRIM: DATA AND DIRECTIONS

Mr. Jim Krebs-Smith, DNRC, provided the NCC with a detailed presentation on the origin and purpose, database structure, trends, and access capabilities of the Human Nutrition Research Information Management System (HNRIM). The database has been operational since 1985 and is maintained by the HNRIM staff at the DNRC. Federal Agencies represented in the database include the Department of Health and Human Services, the U.S. Department of Agriculture, the Agency for International Development, the Department of Veteran Affairs, the Department of Commerce, the Department of Defense, the National Aeronautics and Space Administration, and the National Science Foundation.

Components of HNRIM include a definition of human nutrition, a classification (coding) system to permit an aggregate overview of research, and the data elements pertaining to specific project information. Data is used to prepare reports, provide information for congressional testimony, provide final confirmed obligations for Institute nutrition-related research and training activities, and to cooperate with the ODS to identify and capture relevant dietary supplement research and provide a subset of HNRIM data for the CARDS database. It can also be used to show trends in nutrition-related research over time as well to identify the most commonly used codes in a given year. In 2005 the top 5 codes were Obesity, Anorexia and Appetite Control (n=1,225), Cancer and Nutrition (n=1,147), Other Diseases and Nutrition (n=1,109), Prevention and Nutrition (n=921), and Cardiovascular Disease and Nutrition (n=844).

HNRIM data and related reports can be accessed on the public website, http://hnrim.nih.gov, or on the update website, http://hnrim.nih.gov/update, with an NIH password. The update site enables an individual to login to a particular Institute's or Agency's data where financial information can be accessed. Next steps for the database include possible code revisions, new approaches to expedite data updates and approvals, and Knowledge Management for Disease Coding.

For more information or further tutorial, contact Mr. Jim Krebs-Smith (Jim.Krebs-Smith@nih.hhs.gov) or Ms. Karen Regan (Karen.Regan@nih.hhs.gov) at the DNRC.

UPDATE ON EVIDENCE-BASED REVIEWS IN DIET AND NUTRITION

Dr. Paul Coates, ODS, provided a follow-up to the discussion of Evidence-Based Reviews at the last NCC meeting in May. Since then, a meeting of interested NIH staff was convened in June to discuss next steps. Among these will be to plan a workshop that brings together systematic review experts and the Federal nutrition community to address the specific needs and challenges of evidence-based reviews in this field.

Related activities have included a meeting convened at the end of May by USDA's Center for Nutrition Policy and Promotion and DHHS's Office of Disease

Prevention and Health Promotion to inform Federal staff about the processes involved in several examples of evidence-based review. The meeting included presentations by the Cochrane Collaboration, the American Dietetic Association, the US Preventive Services Task Force, and the US Guide to Community Preventive Services. Another meeting convened by ILSI Research Foundation in June explored approaches and challenges for evidence-based reviews in nutrition with Federal representatives, academia, and the private sector.

The Office of Dietary Supplements (ODS) has sponsored an evidence-based review on vitamin D, which will appear in late 2006. The focus of the review will be on research needs. Once it appears, ODS and other Federal partners expect to convene a workshop that will address issues posed by the review and that will build on the review for the purpose of informing other needs for vitamin D (such as Dietary Reference Intake recommendations and Dietary Guidelines).

Comments from members of the NCC on any aspect of the evolving initiative are welcome. Please contact Paul Coates (ODS) or Rachel Ballard-Barbash (NCI).

UPDATE FROM THE DHHS OFFICE OF DISEASE PREVENTION AND HEALTH PROMOTION (ODPHP)

Ms. Kathryn McMurry provided the NCC with several updates from ODPHP:

- The Dietary Reference Intake Research Synthesis Workshop was held on June 7th and 8th at the Keck Center of the National Academies. Ms. McMurry remarked on the high caliber of individuals involved with the workshop. A summary report will be available at the end of September.
- Healthy People 2010: The Nutrition and Overweight chapter will soon be sent to the workgroup for final review. The Progress Report will be held in December 2007.
- National Prevention Summit: The Summit will be held on October 26-27 at the Hyatt Regency Washington on Capitol Hill. The planning committee is currently reviewing abstracts that have been submitted.
- Ms. McMurry announced that CAPT Penny Royall has been assigned to lead the Secretary's Prevention initiative as part of one of the 9 HHS priorities for America's Health Care announced in May by Secretary Leavitt. It will address the key areas of the President's HealthierUS initiative, including nutrition, physical activity, preventive screenings, and avoiding risky behaviors. More details will be provided at the next meeting.
- The National Obesity Action Forum was held on June 5th and 6th, 2006. The event provided opportunities from speakers across the various regions to highlight examples of successful community, state, and regional programs related to obesity. Ms. McMurry has received very positive feedback from the event. A summary is being prepared by DNRC and will be available at a later date.

- Ms. McMurry introduced Ms. Holly McPeak to the NCC. Ms. McPeak joined the ODPHP staff as a Nutrition Advisor in May and is working with Ms. McMurry on Dietary Guidance Reviews, as well as several other projects. Ms. McPeak is a nutrition scientist who has worked in several areas of the Department of Agriculture, including development of national nutrition policy, implementation of the *Dietary Guidelines for Americans*, food service management systems, food assistance programs, food safety education, as well as being a member of the *Healthy People* Food Safety Work Group.

NIH OFFICE OF DIETARY SUPPLEMENTS (ODS)
Dr. Paul Coates provided the NCC with several updates from ODS:

The next meeting of the Trans-Agency Working Group on Dietary Supplements will be held on October 19, 2006 at the Neuroscience Center, 6001 Executive Blvd. Among the topics will be follow-up activities and actions related to ODS-sponsored evidence-based reviews including the series on omega-3 fatty acids.

The recent State-of-the-Science Conference on Multivitamins/minerals and Chronic Disease Prevention is followed up with:

- The Expert Panel summary, which is present in draft form on the Office of Medical Applications of Research website (http://consensus.nih.gov/2006/MVMDRAFT051706.pdf).
- The evidence-based review that supported the conference is on the Agency for Healthcare Research and Quality website (http://www.ahrq.gov/clinic/tp/multivittp.htm).
- Proceedings of the conference, including all papers presented, which will appear as a supplement to American Journal of Clinical Nutrition in December 2006.

UPDATE OF DNRC ACTIVITIES

OPSAI Presentation
Dr. Van Hubbard briefed the NCC members on a presentation of OPASI (Office of Portfolio Analysis and Strategic Initiatives: http://opasi.nih.gov/) that took place on June 16th. Three trans-NIH committees (the Prevention Research Coordinating Committee (PRCC), the Nutrition Coordinating Committee (NCC), and the Behavioral & Social Sciences Research Coordinating Committee (BSSR-CC)) put together an audience for the NIH Deputy Director, Dr. Raynard Kington, who provided the status and direction of the new OD office. Analogous to Roadmap, OPASI will provide NIH Institutes and Centers with the methods and information necessary to manage their large and complex scientific portfolios. It will identify – in concert with multiple other inputs – important areas of emerging scientific opportunities or rising public health challenges, and will assist in the

acceleration of investments in these areas, focusing on those involving multiple ICs.

Once announcements are made for submissions, Dr. Hubbard asked the NCC to bring ideas to the DNRC. He pledged assistance of the DNRC staff to aid in the generation and initiation of proposals. However, once developed, the proposed initiative would need to have an Institute or Center identified as the lead for submission to OPASI. Dr. Hubbard expressed the importance of stimulating research that would otherwise not have a firm home in any one particular Institute or Center.

Nutrition Education Subcommittee (NES).
Dr. Jean Pennington, DNRC, provided an update of the activities of the NIH NCC NES. For the calendar year 2006, the NES has received 19 documents for review including two from NIH, nine from other DHHS agencies, and eight from USDA. Materials reviewed or under review since the last NCC meeting are:

- *Women's Health USA 2006* (Maternal and Child Health Bureau, HRSA)
- *Summer Spotlights* (Centers for Disease Control and Prevention (CDC), DHHS)
- *MyPramid Menu Planner* (Center for Nutrition Policy and Promotion, USDA)
- *Rethink Your Drink* (CDC, DHHS)
- *How WIC Helps* (Food and Nutrition Services, USDA)

A listing of reviewed and published NIH nutrition education materials is provided on the DNRC website. Updates from NCC members should be communicated to the DNRC.

REPORTS FROM NCC MEMBERS AND LIAISIONS

Dr. Dan Raiten, NICHD, announced that the WHA (World Health Assembly) recently passed a resolution regarding Nutrition and HIV/AIDS. He also described a recent proposal entitled, "Development of Evidence Base for Interventions to Ameliorate Micronutrient (MN) Insufficiencies in Resource-limited Settings." If anyone is interested in being involved in this effort, please contact Dr. Raiten at raitend@mail.nih.gov.

Dr. Kathy Ellwood, FDA, announced an upcoming meeting hosted by FDA and the Montreal Heart Institute on Biomarkers and Surrogate Endpoints. It will take place on September 18-20, 2006 at the Bethesda Marriot North. Information will be available at http://www.cfsan.fda.gov/.

Dr. Joan McGowan, NIAMS, announced that The American Society for Bone and Mineral Research (ASBMR) is convening a meeting on **Contemporary Diagnosis and Treatment of Vitamin D-Related Disorders**, **December 4-5, 2006**, at the Crystal Gateway Marriott in Arlington, Virginia, USA. Information is available at: http://www.asbmr.org/vitamind.cfm.

NEXT NCC MEETING
There will not be a meeting in August or September. The next meeting will be October 5, 2006.

ADJOURNMENT
The meeting was adjourned at 4:10 PM.

LIST OF APPENDICES
Appendix A - NIH NCC Meeting Agenda for July 6, 2006
Appendix B - NCC Meeting Attendees for July 6, 2006
Appendix C – Planning Document: UNC-Chapel Hill Nutrition Research Institute at Kannapolis
Appendix D – NIM (Nutrition in Medicine)
Appendix E – Genetic Metabolic Dietitians International (GMDI) History and Fact Sheet

APPENDIX A

NIH Nutrition Coordinating Committee Meeting
Agenda

Thursday, July 6, 2006
2:00-4:00pm
Rockledge 2, CR#9100-9104

1. **Welcome**……..……..……..……Van S. Hubbard

2. **Approval of Minutes of May 4, 2006 Meeting**……....Van S Hubbard

3. **"Nutragenomics and metabolomics at UNC Chapel Hill: new research institute** "…….Steven Zeisel, MD, Ph.D.
   Associate Dean for Research
   School of Public Health
   UNC - Chapel Hill

4. **"Goals and Objectives of Genetic Metabolic Dietitians, International (GMDI): Opportunities for Research and Clinical Practice"**……..Kathryn Camp, MS, RD, CSP - WRAMC, D.C.

5. **HNRIM: Data and Directions**……..……..Jim Krebs-Smith

6. **Update on Evidence-Based Reviews in Diet and Nutrition**……....….Paul Coates, ODS & Rachel Ballard-Barbash, NCI

7. **ODPHP Update**……..……..……Kathryn McMurry
   ODPHP/OS/HHS

8. **ODS Update**……..……Paul Coates, ODS

9. **Current DNRC Update of Activities**…....……..……...DNRC Staff
   - OPSAI Presentation ……..……..Van S Hubbard
   - HNRIM Update…….....…….....Jim Krebs-Smith
   - Nutrition Education Subcommittee Update…..……...Jean Pennington*****
   - International Committee Information..……..….Pam Starke-Reed/Dan Raiten *****

10. **Reports from NCC Members and Liaisons**……..NCC Members

11. **Next Meeting**: October 5, 2006

12. **Old Business**

**** Updates will only be included in the minutes of the meeting.***

APPENDIX B. NCC MEETING ATTENDEES FOR JULY 6, 2006

	Members Present	Members Absent	Alternates Present
Chairperson:	V Hubbard		P Starke-Reed
NIH Members:			
NCI		J Milner	S Ross
NHLBI	D Danford		
NIDCR		R Nowjack-Rayner	
NIDDK	C Miles		
NINDS	M Mitler		
NIAID		M Plaut	
NIGMS		S Somers	
NICHD		G Grave	D Raiten
NEI		N Kurinij	
NIEHS	E Maull		
NIA	J Hannah		
NIAMS		J McGowan	
NIDCD		B Wong	
NIMH		P Muehrer	
NIDA		G Lin	
NIAAA	R Breslow		
NINR		Y Bryan	
NCCAM		M Klein	
NCRR		L Yager	
FIC		J Herrington	
NHGRI			
NIH Liaison Members:			
CC	N Sebring		
CIT		J Mahaffey	
CSR	S Kim		
NLM		S Phillips	
OBSS	D Olster		
OC		M Stern	
ODS	P Coates		B Costello
OD/ODP	B Portnoy		
OLPA			
ORWH			
PRCC		M Vogel-Taylor	
Agency Liaison Representatives:			
CDC/NCCDPHP	D Galuska		
CDC/NCHS		V Burt	
FDA	K Ellwood		
HRSA		M Lawler	
IHS		T Brown	
ODPHP	K McMurry		
USDA		M Kretsch	D Klurfeld
DOD		K Friedl	
OPHS		M Terpeluk	

DNRC: R Fisher, W Johnson-Taylor, J Krebs-Smith, C McDade-Ngutter, K Regan, L Somuah

Guests: K Camp (Walter Reed Army Medical Center), T Collins (NCI), P Cotton (NINR), C Davis (NCI), W Kessel (ODPHP), A Ershow (NHLBI), S Gerrior (USDA, CRSEES), Y Kim (NCI), M McDowell (CDC, NCHS), H McPeak (ODPHP), M Mitler (NINDS), S Murphy (ODPHP), R Troiano (NCI), D Vafiadis (USDA, CNPP), S Welsh (USDA, CRSEES), and S Zeisel (UNC, Chapel Hill)

APPENDIX C

Version 6.27.06

Planning Document

UNC-Chapel Hill **Nutrition Research Institute** at Kannapolis

1. Summary

We are creating a new UNC-Chapel Hill Nutrition Research Institute (NRI) that focuses on using cutting edge genomic, proteomic and metabolomic biotechnology to develop innovative approaches to understanding the role of diet and activity in normal brain development, the prevention of cancer, and the prevention and treatment of obesity. This Institute will result in breakthroughs in how we use nutrition to enhance human health--using individual metabolic variations to develop nutrition solutions that target individual susceptibilities and differences. Until now, nutritionists have had to rely on generic advice, but new technology increasingly makes it possible to understand metabolism at the level of the individual. The creation of the Institute will enhance the resources already committed by industry and universities, thereby accelerating progress in this critical area.

Located in Kannapolis, North Carolina, the NRI will advance the study of human nutrition by enhancing understanding of why individuals vary in their requirements for specific nutrients and how optimal nutrition improves health. Internationally recognized leaders in all areas of nutrition; partner University research programs in agricultural genetics, translational medicine, and food science; and a core facility with state of the art equipment for genomic, proteomic and metabolomic analysis have already committed to this research campus, which makes it a unique opportunity to:

1) Use genomic, proteomic and metabolomic methods to characterize humans in a manner not previously possible -- by identifying characteristics that predispose individuals to increased requirements for specific nutrients that are known to be associated with brain development and function, protection against cancer, and maintenance of normal body weight;
2) Conduct focused research in model systems to understand the potential mechanisms and significance of these individual differences in metabolism; and
3) Use this new understanding of human metabolic individuality to develop highly targeted solutions that will include clinical and community-based interventions with the goal of optimizing brain development and function, as well as preventing cancer, obesity, and the many sequellae of obesity (e.g., diabetes).

2. Statement of Need

Everyday, researchers uncover new, compelling evidence of the link between nutrition and health. Yet, we do not understand why individuals vary widely in their dietary requirements. For this reason, recommendations on diet and dietary interventions are broadly targeted and designed to meet average needs. We believe that human nutrition science is on the verge of a breakthrough in understanding the complex components of the foods we eat, as well as our understanding of the complex genetic and metabolic differences that exist between individuals. This breakthrough is possible because new biotechnology will allow us to simultaneously identify thousands of chemicals that represent the products of metabolism in a single sample of human blood. These "metabolomic" techniques, combined with rapidly advancing methods for the study of individual genetic differences, offer unique new opportunities to individualize our recommendations for humans to maximize health. By treating everyone the same way, we often fail to deliver effective interventions for specific individual's needs. The proposed UNC NRI will have special expertise in the application of this new individualized approach to optimize brain development and function and to prevent cancer and obesity. Where we cannot prevent obesity, we will develop and apply optimal treatments. The NRI will have unique capabilities to translate bench basic science into intervention applications in

communities. In addition, the NRI will have capabilities to use population-based studies to identify risk factors for chronic diseases. Based on new capacities to identify the causes of individual variation in nutrient requirements, we expect to make significant new discoveries about underlying mechanisms whereby nutrients influence health, about human metabolism, about how nutrients influence cognition, and about how to work with communities to design and deliver interventions that improve health of populations. The NRI has the potential to become the top site in the world for the study of nutrition and its applications to improved human health.

3. The Nutrition Research Institute at Kannapolis

The NRI at Kannapolis will be a constituent part of the University of North Carolina at Chapel Hill. The director of the NRI will report to the Dean of the School of Public Health. It is anticipated that the State of North Carolina will provide approximately $11 million/year in funding to be used for rent, operations, faculty salaries, equipment and research support. This will be complemented by grant funds competed for by faculty in the NRI. Initially, 20 faculty members and their research teams will be recruited. All will work at Kannapolis, but hold appointments at appropriate UNC Chapel Hill departments. It will occupy 96,000 square feet of a new state-of-the-art 120,000 square foot research building to be completed in November 2007.

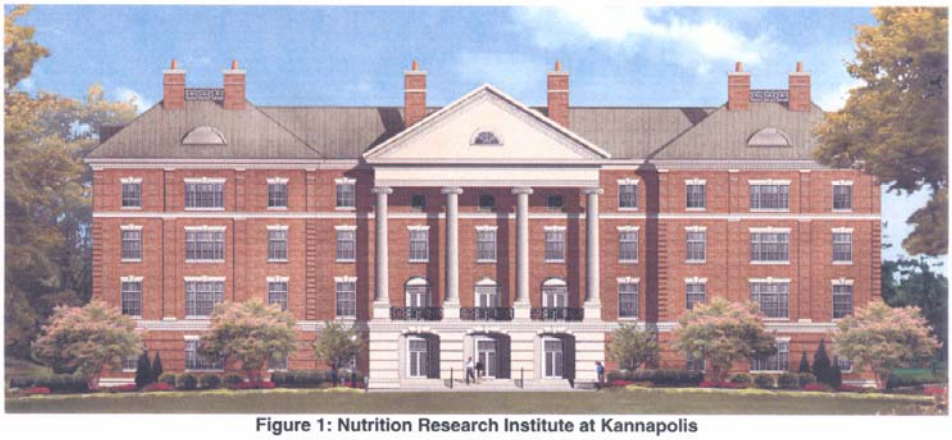

Figure 1: Nutrition Research Institute at Kannapolis

The first floor of the NRI building will contain a café, a metabolic kitchen and an outpatient clinical examination suite that will facilitate the conduct of feeding studies. Conference facilities for midsized seminars (50-100 people) will be located on the second floor, as will administrative functions for the NRI) In addition there will be a behavioral testing suite designed to study brain function in people. On all four floors there will be wet land dry laboratory facilities in approximately equal space allocations. Also located in the NRI building (24,000 square feet) will be programs that directly relate to the mission to understand nutrition including a program on zebrafish metabolism (NCCU); and on post-harvest food science (NC A&T and Greensborough) The NRI building will be situated adjacent to the core laboratory facility (which will make available large shared equipment and mouse facilities), and to research facilities focusing on agriculture (NC State) and translational medicine (Duke) (see later). Nearby on the campus will be incubator facilities for science companies (Mr. Murdock has created a venture capital company to help finance these) as well as facilities for well established companies like Lab Corp of America and Dole Nutrition.

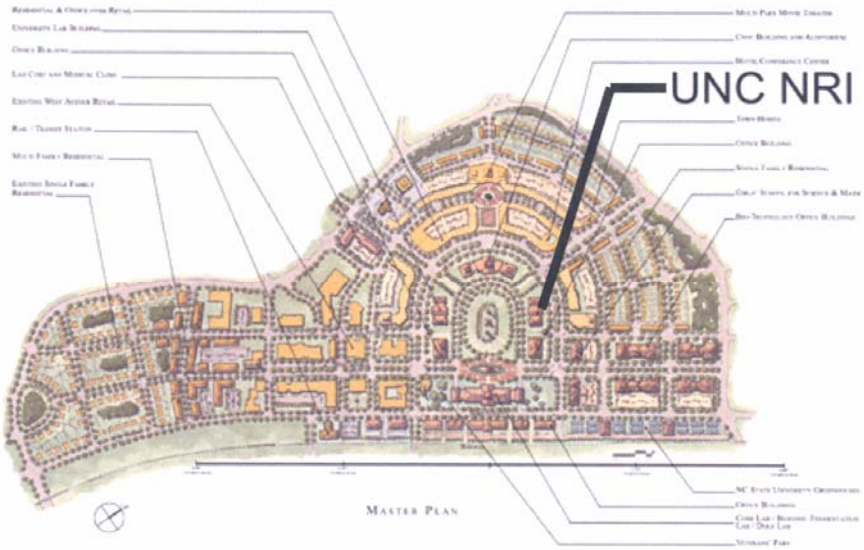

Figure 1: Masterplan for Kannapolis campus

4. Institutional Uniqueness

The NRI at Kannapolis will be complemented by the world-class Department of Nutrition at UNC-Chapel Hill. This department is "one of a kind" in that faculty are drawn from schools of public health and medicine. Its faculty members are leaders in the application of genetics and metabolomics to nutrition, brain development and function, cancer, and obesity and attract almost $20 million/yr in external research funding.

The NRI will benefit from partnering with other institutes and programs on the Kannapolis campus. These programs will co-locate scientists with expertise that spans understanding about how to create plants with more healthful ingredients, how to use these plants to create foods for healthier diets, how to assess metabolic individuality, and how to conduct human studies in clinics and in communities to develop new approaches to improving health through better nutrition. The Kannapolis North Carolina Research Campus will house groups of scientists from North Carolina State, Duke, UNC-Charlotte, UNC-Greensboro, North Carolina A & T, North Carolina Central, as well as scientists from industry. Thus, there will be a unique integration of world-class expertise in plant genetics, food science, and translational medicine that complements the expertise in genetics, metabolism, nutrition, medicine and public health that will exist at the UNC-Chapel Hill NRI. On the same campus, a state-of-the-science core facility has been endowed that will contain tens of millions of dollars of equipment (including a 9 tesla NMR, multiple mass spectrometers, gene sequencing, SNP analyses, bioinformatics, etc.), the building blocks needed to conduct metabolomic, genomic, proteomic research and biochemical analyses on plant, animal and human tissues. This core facility will also contain mouse facilities and facilities for human clinical studies. The construction and operations of the core facility are assured by an endowment from David Murdock ($150 million). Finally, this campus will provide an exceptional opportunity for translation of science into application, as Dole Nutrition, LabCorp, and multiple biotechnology companies will be housed on the campus, along with a state-of-the-art health department located nearby.

Thus, the NRI will be situated in an exceptional nexus of intellectual mass and new technology that will enhance the opportunity for significant breakthroughs in nutrition sciences. At a time when federal research dollars may well plummet, the resources provided to launch the NRI will permit major scientific advances in North Carolina, while other scientists are precluded from investing in new research technologies due to lack of funds.

5. Partner programs in the Kannapolis Research Campus with which the NRI will collaborate

As noted above, the UNC-Chapel Hill NRI is enhanced by complementary research programs on the Kannapolis North Carolina Research Campus. Some of these programs are still being planned, but the following descriptions present the anticipated programs and how they relate to the NRI. Together, the programs create the perfect transition from basic biological research using plant and animal models to laboratory extensive studies to characterize predisposition to obesity and a deeper understanding of how the body responds to certain nutrients, then to developing improved foods and strategies to prevent obesity and testing them in human populations. Finally, we also will have the capacity to translate these prototype programs into scalable interventions for greater population impact, including through the creation of drugs and devices to improve health, as well as programs that can be applied at community levels to have substantial reach and impact.

North Carolina State University will establish an Institute for Fruit and Vegetable Science (IFVS). This institute will extend the university's outstanding programs bridging basic life science research to real world agricultural applications by establishing the world's first institute dedicated to the use of genomics, bioinformatics, and systems biology to enhance plant breeding. The major focus of this institute will be to increase the yield of vegetable crops in diverse growth environments, while at the same time improving nutritional quality. Crop scientists will continue to train the next generation of plant breeders, working with geneticists who have been responsible for the development of many of the most basic biological and statistical tools for mapping genes that influence horticulturally important traits. Plant pathologists will work with geneticists to devise genetic systems for avoidance of plant diseases and insects, reducing farmers' dependence on pesticides. They will be aided by state-of-the art facilities to determine the structures of proteins that mediate growth, resistance, and nutrient production, and for molecular imaging of cellular function. The work of the NC State program directly complements genetic and metabolomic research at the NRI, using similar methodologies. The NRI will assist with identifying research programs in plants that could address nutrition problems that we plan to study. The IFVS could play a major role in global health through improving nutrition.

North Carolina Central University will build upon its unique basic biological strengths by extending its groundbreaking work on zebrafish models to human nutrition questions at the cellular, genetic level. The zebrafish model can be used to assess effects of nutritional requirements on brain development, cardiovascular disease, obesity and neurological disease (such as Alzheimer's disease) in the adult. The model can be used to study the effects on prenatal nutrition requirements based on genetic differences. In addition, NCCU will investigate the molecular mechanisms of cancers and the development of effective functional foods to prevent cancer. NCCU is also developing a chemical genomics program, which will help to identify essential components from fruits and vegetables, which can prevent cancer, slow down the aging process (illnesses such as Alzheimer's, osteoporosis, diabetes) and bolster the immune system against infections. Another aspect of NCCU's program will be the development of highly sensitive biosensor devices, microfluidic biosensing system integrated with nanotechnologies for applications in biological/chemical detection (Lab-on-a-chip). This technology can be applied to food safety and environmental monitoring and other areas. NCCU is

also in the process of establishing a transgenic plant core facility. Plans include using tobacco plants as robust vehicles for large production of proteins.

UNC-Charlotte will establish a program in bioinformatics to develop methods to analyze the very large and complex information generated from gene and metabolomic studies. These new technologies can generate tens of thousands of bits of information from every experiment performed, resulting in information overload for scientists. Computer scientists, biostatisticians and biological scientists collaborate to create computer-assisted methods, called bioinformatics, which help analyze and make sense of this information. This proposed program will work closely with both the NRI and the Institute for Fruit and Vegetable Science to supply analytical capacity needed to understand data generated at both institutes.

NC A&T and UNC-Greensboro will pursue programs in post-harvest technologies and food science related to nutrition and health concerns. Once a plant is harvested, storage and processing can change the bioactive properties and constituents within them. In addition, these plants need to be transformed into foods that people want to eat. These programs will develop the science needed to accomplish these goals and will form an important bridge between the activities of the NC State Plant Institute and the UNC-Chapel Hill NRI (NC State's Institute for Fruit and Vegetable Science will develop plants with unique constituents and the NC A&T and UNC-Greensboro programs will convert these plants to food products and will identify the bioactive agents and functions of these foods, and the NRI will use these foods in human studies designed to improve health). NC A&T's research will focus on health-promoting food components from fruits and vegetables, food safety issues, storage stability related to shelf-life and quality, and value-added product development for food and non-food products.

Duke University will establish an Institute for Translational Medicine that will take new discoveries in biological sciences and translate them into drugs that can be used to improve health. The NRI plans to collaborate with the Duke program in designing and implementing some of our human clinical studies in nutrition.

APPENDIX D

NIM Start-up Info July 2006

Finding the website:
Go to www.nutritioninmedicine.org and select "**Webcourses Login**" in the right-hand column; this will take you to the login page.

Login as a current or new user:
If you have previously registered, simply login OR begin registering for a user login and password by clicking on **Sign up now** at the bottom of the page. Enter a login name of your choice (6-10 letters or numbers), your e-mail address and your name. Within minutes you will receive via e-mail a temporary password and a link. Copy or memorize the password, then click on the link in your e-mail message to activate your account and bring up the login page. Enter the selected login name and the password sent by e-mail. Select your affiliation and change your password to something you'll easily remember. You are now ready to use the site.
Alternatively, you may use the generic login for users at the NIH:
login id: nihreviewers password: nih2006

Select a module:
When you are on the **Current Course Listings** page, select **National Institutes of Health** to see a listing of courses.You will be asked to enter an access password for a selected module. The password for all modules in the NIH folder is: nim.
Please do not give this password to users outside the NIH. We prefer that they contact us directly for access information.

Content navigation:
Once you have selected a module to view, a list of folder topics will appear. The **Getting Started** folder in the 1st module of each course contains instructions for navigation. This information can also be accessed in any module via the **Help** function on the top navigation bar.

User notes and feedback via email:
As you go through the module, you may wish to take notes. Click on the tab **User Notes** under the top navigation bar and start typing. The notes window recedes without losing its content; you can add to your notes any time. Notes are NOT saved when you quit; you should print or email them **before** you quit. Use the email function to provide us with direct feedback if you like.

Clear the cache in your browser:
If you have viewed NIM web courses in the past, you'll need to open your browser and clear the cache. In Explorer, go to Tools>Internet Options> Delete temporary internet files.
In Mozilla go to Edit>Preferences>Advanced>Cache>Clear cache.

APPENDIX E

GENETIC METABOLIC DIETITIANS, INTERNATIONAL (GMDI)
HISTORY AND FACT SHEET

Dietitians are providing clinical care and nutrition therapy for patients with inherited genetic disorders practice in a specialty area that requires extensive knowledge and experience. Because of the rarity of these disorders, there is also a need for collaboration across state and national boundaries and for education and mentorship of those new to the field.

Responding to these identified needs, a group of experienced dietitians from across the US and Canada accepted responsibility for developing a professional organization to enhance and support the practice of genetic metabolic nutrition. Beginning in 2005, this founders group has met regularly to develop a mission statement and goals for the organization, establish by-laws and a code of ethics, define membership requirements, elect an initial slate of officers, and plan an inaugural conference.

GMDI is now incorporated as a nonprofit professional organization specifically for nutritionists and other health care practitioners working in the specialty area of nutrition management for inherited metabolic disorders. The mission of GMDI is to provide standards of excellence and leadership in nutrition therapy for genetic metabolic disorders through clinical practice, education, advocacy, and research. Education and practice needs will be identified, and standards of practice and training opportunities will be developed. Membership will provide opportunities for professional education, research, networking, training, and peer support.

Full membership in GMDI is available to Registered Dietitians, or members of other appropriate international credentialing organizations, who provide nutrition services to persons with genetic metabolic disorders. Other membership categories are available, including associate membership for non-RD health care professionals interested in metabolic nutrition and student membership for those enrolled in accredited training programs.

GMDI is an independent organization but includes professionals from multiple medical organizations, including the American Dietetic Association, The Society of Inherited Metabolic Disorders, Society for the Study of Inborn Errors of Metabolism, American College of Nutrition, and the American College of Medical Genetics.

For more information about GMDI, applications for membership, or to obtain more information about the first GMDI conference, visit www.gmdi.org or contact:

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