



2019
DOCTORAL STUDENT
OPPORTUNITIES

UNC-Chapel Hill
Nutrition Research Institute



500 Laureate Way | Kannapolis, NC | 28081

UNCNRI.org | 704-250-5000

UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

ON THE NORTH CAROLINA RESEARCH CAMPUS

MISSION

The UNC Nutrition Research Institute is leading research in precision nutrition by developing an understanding of how our genes, the bacteria in our gut, and our environment create differences in our metabolism that affect our individual requirements for and responses to nutrients.

GUIDING SCIENTIFIC PREMISE

Each of us is metabolically unique. The NRI is dedicated to finding out how these differences affect an individual's health so that current one-size-fits-all dietary guidelines can be replaced with customized nutritional recommendations and actions to improve a person's health and quality of life. With NRI's discoveries, physicians and dietitians will soon be able to create diet and exercise plans customized to your unique needs.

Faculty members in the Department of Nutrition at UNC-Chapel Hill who are located at the Nutrition Research Institute have openings for outstanding doctoral students. This is an exceptional opportunity to conduct research in a state-of-the-art facility with cutting-edge scientific programs.

The UNC-Chapel Hill Nutrition Research Institute (NRI) (established in 2008) is one of seven North Carolina universities located on a 350-acre campus in Kannapolis, NC.

NRI faculty and their research teams are advancing the field of precision nutrition through developing and applying cutting-edge methods to determine why metabolism and nutrition requirements differ between individuals. They are conducting outstanding science that reveals how genetic, epigenetic, microbial, and molecular mechanisms link to individual variations in metabolism.

NORTH CAROLINA RESEARCH CAMPUS



The Nutrition Research Institute is proud to be part of the North Carolina Research Campus, a 350-acre Research Center located in Kannapolis, NC. Kannapolis is part of the Greater Charlotte Metropolitan area and is located just 30 minutes from the Charlotte Douglas International Airport and 2 hours from Research Triangle Park, NC. The Amtrak Station is a 10-minute walk from the NRI.

The UNC System General Administration created the North Carolina Research Campus to facilitate collaborations among seven North Carolina universities and lead industry partners. The brightest minds from across the globe are transforming science at the intersection of human health, nutrition, and agriculture.

The NRI research focus in Precision Nutrition includes studies on the role of nutrients in preventing disease, diet-related health behaviors and risk factors for

disease, the effect of the environment and genes on disease outcomes, and the impact of gene-nutrient interactions.

NRI scientists collaborate across the campus to study a wide range of problems impacting nutrition, such as the phytochemical diversity in commonly consumed foods; the impact of diet on exercise performance; and the use of advanced technologies and bioinformatics. The breadth of scientific knowledge contributes to new understandings of how nutrients, plant phytochemicals, the environment and lifestyle choices impact brain and fetal development, cancer, diabetes, obesity, heart disease, fatty liver, and other metabolic diseases.

RESEARCH AT THE UNC-CHAPEL HILL NRI

CREATING A HEALTHIER TOMORROW

The NRI studies nutritional individuality using new “omic” methods such as nutrigenomics, epigenetics and metabolomics. **Nutrigenomics** is the study of the interaction between genes and nutrition, and how together they affect human health. **Epigenetics** is the study of chemical marks on genes that turn them on or off, and are often affected by nutrition in early life. **Metabolomics** involves the simultaneous measurement of thousands of metabolites — in blood, urine or tissue— that are generated as a result of an individual’s metabolism.

Because most traditional approaches to nutrition only consider the “average person,” there is a lot of unexplained “noise” in experimental data. This noise occurs because we mix responders with non-responders in nutrition studies. By understanding why people have different nutrient requirements (e.g. identify responders from non-responders), we are able

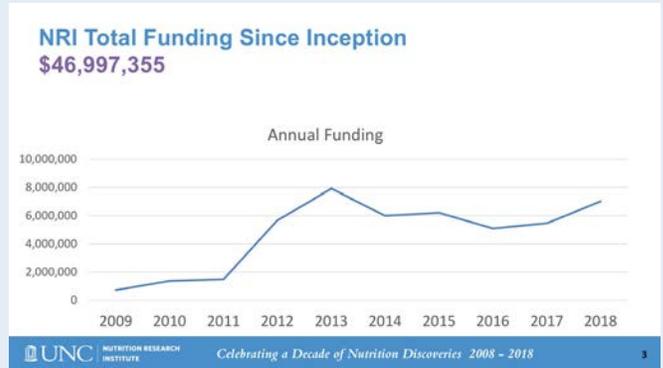


to replace a one-size-fits-all nutritional approach with one that considers individual differences in people’s metabolism.

The NRI is equipped with state-of-the-art research laboratories, a whole-room calorimeter (capable of measuring calories burned to within 75kCal/d), a fully equipped metabolic kitchen, an outpatient clinical examination suite, a behavioral testing suite equipped with sophisticated instrumentation for the study of brain function, mass spectrometers and state-of-the-art genetics equipment.

FUNDED RESEARCH

Since its inception in 2008, NRI scientists have been awarded \$46,997,355 in grants and contracts from



not only the NIH and USDA, but also from other prestigious sources, including The Bill & Melinda Gates Foundation and industry partners with interests in nutrition. Our faculty are recognized by their presence on international review panels (e.g. NIH, MRC, BBSRC), as journal reviewers, as members of journal editorial boards, and as invited speakers at national and international conferences.

NRI researchers possess the broad range of expertise necessary for successfully competing for funding in the era of systems biology, including: metabolomics, transcriptomics, genomics, epigenomics, behavior and cognition, energy metabolism, gut metabolism, brain development, epidemiological and intervention research (including international locations such as the South African Republic, The Gambia, and Romania). This expertise is complemented by collaborations with other universities with a local presence (e.g. NC State, Appalachian, NCCU), and by collaborations within the main UNC-CH campus and with universities around the world.



BEING A STUDENT AT UNC-CHAPEL HILL

CONDUCTING GRADUATE RESEARCH AT THE NRI

All doctoral students in the Department of Nutrition at UNC Chapel Hill are offered the same courses and meet the same requirements. Faculty located in both Kannapolis and in Chapel Hill teach the required courses with students' classroom participation from both sites via high-speed videoconferencing.

Based on our location and common mission, graduate students work closely with their primary advisor, and with the post-doctoral fellows and professional staff working on similar projects.

While most classes can be taken by videoconferencing, a WiFi-equipped, free shuttle bus is available to transport students between NRI and Chapel Hill for campus meetings, other courses, and other events as needed. Parking is free at the NRI, and travel between the two campuses takes approximately 2 hours.

The nightlife, cultural events, professional sports arenas, and museums in Charlotte are a 30-minute drive from Kannapolis. Nearby Concord, NC is the home of NASCAR racing. Closely located are a wide variety of restaurants, a world-class discount mall, amusement parks, The U.S. National White Water Center, a large recreational lake, and an abundance of state and national parks.

Housing prices are lower in Kannapolis than in Chapel Hill, and NRI provides subsidized student housing. These newly renovated 2-bedroom houses are a 10-minute walk from the campus. Costs are approximately half of market rates, and space is filled on a first-come basis.

The public high school is nationally recognized for its academic programs.

STATE-OF-THE-ART RESOURCES AT NRI FACILITATE GRADUATE RESEARCH PROJECTS



BodPod



Fibroscan



Phlebotomy



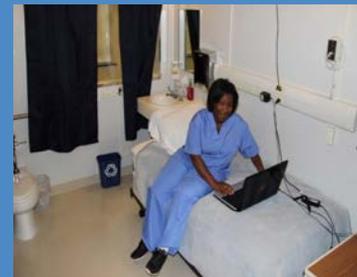
PeaPod



DEXA - Dual Energy X-Ray Absorptiometry



Whole Room Indirect Calorimeter



Dynamometer



State-of-the-Art Exposome and Metabolomics Analysis



Collaborative Cross & Diversity Outbred models



Metabolic Carts

FACULTY MEMBERS

SEEKING NUTRITION DOCTORAL STUDENTS ENTERING 2019

Please email faculty members directly to discuss your interest.

These faculty members currently have openings for doctoral students. Funding for stipend, in-state tuition, reimbursement, and costs associated with research expenses and the dissertation project will be covered.

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Carol L. Cheatham, PhD
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UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

An important member of the UNC Nutrition Research Institute's research team, Carol L. Cheatham, Ph.D. focuses on how nutrition affects brain development and decline. Specifically, her team studies the importance of nutrients for the development of memory and attention abilities.

Broadly defined, Dr. Cheatham's research focuses on the relationship between an individual's genome and the metabolism of nutrients, and how this leads to differences in cognitive development. Specifically, she is interested in the development of memory and attention as they are the basis for learning, and therefore school readiness. For example, her research asks if the supplementation of children's diets with omega-3 fatty acids has an effect on their memory abilities over a determined period of time. Many different methods and tools are used in the Cheatham lab to assess abilities, including taking turns with the children building unique toys (elicited imitation) and the use of special equipment to read their brain activity while they are watching pictures on a computer screen (ERPs).



Natalia Krupenko, PhD
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UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

Dr. Krupenko joined the UNC Nutrition Research Institute in 2014 as Assistant Professor of Nutrition. Her research focuses on the role of folate (vitamin B9) in promoting health and preventing disease in humans. Folate deficiency has been connected with increased risk for neural tube defects, cardiovascular disease and cancer. Recently, however, concerns have been

raised regarding the adverse effects of over-supplementation with the vitamin. Dr. Krupenko's goal is to determine the best ways to utilize health-protective properties of folate and prevent the possibility of its adverse effects in humans. Dr. Krupenko's work is covered in 35 peer-reviewed publications in high impact journals and numerous presentations at national and international conferences and meetings. Dr. Krupenko earned her doctorate degree in bioorganic chemistry from the Institute of Bioorganic Chemistry, Byelorussian Academy of Sciences, in Minsk, Belarus. She was a recipient of the Rockefeller Foundation Fellowship in Population Sciences and served on the faculty of the Medical University of South Carolina. Currently, in addition to her role at the NRI, Dr. Krupenko holds her appointment as an Assistant Professor with the Department of Nutrition at the Gillings School of Global Public Health, UNC-Chapel Hill.



Philip May, PhD
 Professor, Nutrition
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UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

Dr. May, Ph.D., joined the UNC Nutrition Research Institute in 2011 as Research Professor. He is an expert in the field of Fetal Alcohol Spectrum Disorders (FASD) and the epidemiology of a number of health-related behaviors. He has conducted extensive research on the epidemiology and risk factors for FASD, including maternal and paternal alcohol use and abuse, childbearing variables, and maternal health factors such as socioeconomic status and dietary intake in

various populations. He has received funding from the National Institutes of Health (NIH), specifically the National Institute on Alcohol Abuse and Alcoholism (NIAAA), over the past 20 years. Dr. May was formally trained in demography, social epidemiology, and population studies and focuses much of his research on the epidemiologic discovery of etiology, targeted opportunities for community-wide prevention, and programs of intervention.



Katie Meyer, ScD
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UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

Dr. Meyer is a nutritional and cardiovascular disease epidemiologist. Her research focuses on diet-related health behaviors and nutritional risk factors for cardiometabolic disease. She is a recent recipient of a Research Scientist Development Award from the National Heart, Lung, and Blood Institute to study the gut microbiome, nutrient metabolites, and cardiovascular disease in the Coronary Artery Risk Development in Young Adults Study.



Sandra M. Mooney, PhD
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UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

Dr. Sandra Mooney joined the UNC NRI in August 2018 as an Associate Professor of Nutrition at the University of North Carolina at Chapel Hill. She received her Ph.D. from the University of Otago in New Zealand and comes to us from the University of Maryland, School of Medicine. Dr. Mooney’s research program investigates the effect(s) of environment and genes on brain development, with a focus on prenatal alcohol exposure. Her current studies use animal models to understand how nutritional needs change after alcohol exposure, thereby increasing

the chances that modifying (or personalizing) nutrition will optimize growth and development. This work is supported by the National Institute on Alcohol Abuse and Alcoholism (NIAAA).

Dr Mooney was the first to show that the timing of alcohol exposure defines the social behavior deficit, and that outcomes were sex- and age-dependent. These findings help to explain the spectrum of outcomes seen in the human population. Her lab is exploring potential rescue therapies to ameliorate the effects of alcohol. Importantly, the focus is on therapies that are used after birth and could be translated into treatments for humans with Fetal Alcohol Spectrum Disorders.



Susan Smith, PhD
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Dr. Smith is a nutritional biochemist who uses systems biology to investigate how genes and gestational stressors modify nutritional needs and infant health. Using a common stressor of human pregnancy – prenatal alcohol exposure – scientists in her lab uses integrative –omics to identify key regulatory interactions between maternal-fetal compartments, and how (mal) adaptations to stressors impact fetal nutrition and health. We characterize organ-specific metabolomes to elucidate network interactions that govern maternal-fetal nutrient flow, and

how those networks are disrupted by stressors such as alcohol and nutrient deficiency. We generate transcriptome profiles (mRNAs, miRNAs) to elucidate mechanisms underlying those metabolic changes. Parallel research using the Collaborative Cross mice – a unique set of inbred strains that recapitulate human diversity – identifies genetic polymorphisms that modify nutrient needs during pregnancy and gestational stress. Our long-term goals are to use personalized nutrition to improve gestational health, and to capture biomarkers that predict nutritional stress.

Dr. Smith is an expert on nutrient – pregnancy interactions. Her research on molecular mechanisms underlying fetal alcohol syndrome was recognized by a prestigious MERIT Research Award from the National Institutes of Health. She serves on the Advisory Council for the National Institute on Alcohol Abuse and Alcoholism, served on the fetal alcohol expert panel for the American Academy of Pediatrics, and chaired the NIH study section Neurotoxicology and Alcohol. Before relocating to the NRI, she was a professor at the University of Wisconsin-Madison, where she also taught nutritional biochemistry and investigated dietary agents that adversely affect fetal development. She receives extensive research support from the NIH, USDA, and March of Dimes, among others.



Delisha Stewart, PhD
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UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

Dr. Stewart received her PhD in Biochemistry from the University of Alabama at Birmingham. After completing a postdoctoral fellowship at UNC-Chapel Hill in 2013, using genomics to investigate stromal immune factor contributions within the tumor microenvironment on breast cancer subtype aggressiveness, she joined the NIH Eastern Regional Comprehensive Metabolomics Resource Core (ERCMRC) as a post-doc at RTI International to learn metabolomics. She uses genomics, metabolomics and high-throughput molecular bioassays to study the interplay between the immune system and malignancy, metabolic dysfunction in cancer and immunological diseases and the influence of nutrition on cancer health disparities. She joined the Nutrition Research Institute in March 2017 as an Assistant Professor, relocating with the ERCMRC and continues to lead all cancer and immunology-focused studies. Her research aims to better characterize etiological and progressive microenvironments of breast and other types of cancers, identify diagnostically and therapeutically relevant biomarkers and determine the role of altered nutritional states on cancer health disparity treatment outcomes.



Susan Sumner, PhD
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UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

Dr. Sumner is a Professor in the Department of Nutrition at UNC-Chapel Hill, and her research laboratory is located at UNC Chapel Hill's Nutrition Research Institute on the North Carolina Research Campus in Kannapolis, NC. The Sumner Lab is working to make precision nutrition a reality through assessing differences in the metabolic profiles of individuals that correlate with states of wellness, disease, or responsiveness to interventions. Her laboratory has developed state-of-the-art analytical methods for the detection of tens of thousands of signals in biological specimens collected from humans and from model systems, and uses biostatistics and Big Data analytics to reveal biomarkers and provide mechanistic insights. The Sumner Lab conducts research in areas of liver injury, infectious disease, steroid sensitivity, drug abuse, kidney disease, diabetes, obesity, and hypertensive disorders of pregnancy. Many of these studies are designed to link exposure (e.g., medication, drugs, nutrients, chemicals) to the early onset of disease. The overarching goal of the Sumner-Lab is to reveal metabolic perturbations that are associated with adverse health outcomes that can be mitigated through nutrition.



Saroja Voruganti, PhD
 Assistant Professor, Nutrition
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UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

Dr. Voruganti joined the UNC Nutrition Research Institute in 2013 as Assistant Professor of Nutrition. Her lab studies the effects of gene-nutrient interactions on hyper- and hypouricemia and associated cardiovascular, renal and neurological diseases with emphasis on individual differences. Dr. Voruganti earned her B.Sc. degree with honors in Foods and Nutrition at The University of Delhi, India, and a post-graduate diploma in Dietetics and Hospital Food Service. She received a Ph.D. in Nutritional Sciences from the University of Texas at Austin, and did post-doctoral work in Genetic Epidemiology at the Texas Biomedical Research Institute. She has published or has in press more than 110 scholarly papers and works with several minority populations such as Mexican Americans, American Indians, Western Alaska Natives, Parsi Zoroastrians and Hispanic children. Her team's immediate goal is to identify genetic variants that have the potential to be targets for nutritional interventions for lowering the hyper – or hypouricemia-associated disease risk.

FACULTY MEMBERS

WHO ENRICH YOUR EXPERIENCE

The following faculty members are not seeking students in 2019, but add to the intellectual environment.

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Stephen D. Hursting, PhD, MPH

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UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

Epidemiologic and experimental studies have established that obesity is an important risk and/or prognostic factor for most cancer types, but the mechanisms underlying the obesity-cancer link have not been clearly elucidated. This knowledge gap is hampering efforts to develop mechanism-based strategies to more precisely intervene to prevent and control obesity-related cancers. Given the rising rates of obesity and cancer worldwide, and the challenges for many people to lose excess weight, we are taking an integrated multilevel approach to address four critical questions that will lead to new, effective mechanism-based interventions to offset obesity-associated increases in cancer burden: i) Does moderate weight loss alone, or in combination with other mechanism-based interventions, reverse the pro-cancer effects of obesity? ii) What are the mechanisms of (and solutions to) obesity-induced chemotherapeutic resistance? iii) What are the targets and strategies for offsetting the pro-metastatic effects of obesity? iv) What new targets for offsetting the effects of obesity can be identified by deconvoluting (and ultimately disrupting) the reciprocal crosstalk between adipocytes, macrophages and epithelial cells? The overarching goal is to capitalize on our expertise in energy balance and cancer research (including well-characterized preclinical models of breast, colon and pancreatic cancer and well-established collaborations spanning molecular/cellular biologic approaches to clinical trials and epidemiologic studies) to elucidate mechanistic targets, identify new biomarkers that can be used in parallel human and animal studies, and develop effective interventions to break obesity-cancer links and reduce the burden of cancer in obese people.



Martin Kohlmeier, MD, PhD

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UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

Martin Kohlmeier's expertise is in laboratory diagnostics, nutritional genetics and the use of computers for professional and lay nutrition education, with doctorates in medicine, biochemistry and clinical biochemistry from the universities of Heidelberg and Berlin. He is director of the Nutrition in Medicine project, which provides comprehensive online nutrition education to medical students, physicians and other healthcare providers worldwide. Dr. Kohlmeier searches for small genetic differences that change how much of a nutrient people need for optimal health. He is developing online computer programs that use genetic and other personal information to guide individual food choices in a safe and effective way. He expects that personalized nutrition can make a major impact on the big killer diseases, such as reducing breast cancer risk by a third or more.



Sergey A. Krupenko, PhD

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UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

Dr. Krupenko joined the UNC Nutrition Research Institute in 2014 as Professor of Nutrition. His research focuses on vitamin folate and its role in liver function and cancer disease. His goal is to understand how we can fight cancer by controlling the diet and nutrient supplements. "There are molecular strings in the human organism, which can be pulled by right combinations of nutrients to activate resistance to tumor formation or to slow down cancer development. We have to identify these links and make them work," he said. Dr. Krupenko received his Bachelor's Degree in Biochemistry from Byelorussian State University and Ph.D. in Biochemistry at the Byelorussian Academy of Sciences. Before joining the NRI, he was a faculty member in the Department of Biochemistry at the Vanderbilt University School of Medicine, and in the Department of Biochemistry and Molecular Biology at the Medical University of South Carolina. He has a joint appointment as a Professor of Nutrition at the Gillings School of Global Public Health, UNC-Chapel Hill.



Wimal Pathmasiri, PhD

Assistant Professor, Nutrition

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UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

Dr. Pathmasiri joined the University of North Carolina at Chapel Hill Nutrition Research Institute in March 2017 as a Research Assistant Professor. He is interested in identifying biomarkers for the early detection of disease, and monitoring nutritional intervention. His efforts at UNC NRI will focus on understanding the impact of diet and naturally occurring molecules in diet on gut microbiome related metabolism.

Dr. Pathmasiri earned his B.Sc. and M.Phil. from the University of Colombo, Sri Lanka, and a Licentiate of Philosophy from the Uppsala University, Sweden. He received his Ph.D. in Chemistry from Uppsala University and conducted postdoctoral research at UNC Chapel Hill, and at RTI International.

Dr. Pathmasiri is an active member of the NIH Common Fund Eastern Regional Comprehensive Metabolomics Resource Core (ERCMRC), where he has served as a research biochemist for the past 5 years. As a metabolomics scientist, he has contributed to research in the areas of cancer, childhood obesity, early life exposure to antibiotics, environmental exposure, kidney disease, osteoarthritis, rare diseases, and toxicology.



Natalia Surzenko, PhD

Assistant Professor, Nutrition

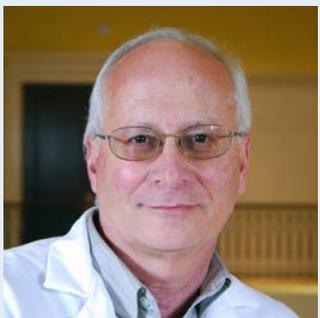
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UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

Dr. Surzenko joined the University of North Carolina at Chapel Hill Nutrition Research Institute in August of 2013 as a Research Scientist. Dr. Surzenko's studies focus on understanding how nutrient availability affects brain and eye development. She studies how choline and other nutrients influence generation of different types of neural cells that make up the brain and the light-sensing structure of the eye, the retina.

Dr. Surzenko received her Ph.D. in Neurobiology from the University of North Carolina at Chapel Hill in 2010. Her graduate research focused on elucidating the mechanisms by which certain genes and proteins regulate neuron generation in the developing central nervous system. During her postdoctoral training at the Department of Genetics at Harvard Medical School, Dr. Surzenko worked to understand the process by which the precise ratios of diverse neuronal cell types are produced and arranged during development, so that the fully developed central nervous system functions properly.

At the NRI, Dr. Surzenko utilizes mouse models and a variety of molecular techniques to assess how different nutrient molecules affect production of new neurons during development and in the adult brain.



Steven H. Zeisel, MD, PhD

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Director, UNC Nutrition Research Institute

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UNC-CHAPEL HILL NUTRITION RESEARCH INSTITUTE

Dr. Zeisel and his research team focus on the essential nutrient choline and why there are individual differences in nutrient metabolism, using new approaches in nutrigenomics and in metabolomics. The team works with humans, mice and cell culture model systems. Using our human studies we discovered that there are very common single nucleotide polymorphisms (SNPs; gene misspellings) that make humans require more dietary choline and that one of these is in the gene PEMT and prevents estrogen from inducing the gene. We are collaborating in a number of epidemiology studies that examine the relationship between diet, these gene SNPs, and risk for disease. After identifying a SNP of interest in humans we make a mouse model and now have three such knockouts. One of them develops mitochondrial abnormalities and has immotile sperm. We are conducting studies in humans on this SNP. In another study, we examine choline's role in brain development and discovered that choline is critical for cortical and hippocampal development. We study mouse models and neural progenitor cells in culture to identify the molecular mechanism for choline's effect on brain.

NORTH CAROLINA RESEARCH CAMPUS

KANNAPOLIS, NC



-  **Campus Buildings**
-  **Student Housing**
-  **Parking**
-  **Downtown Kannapolis**

UNC Nutrition Research Institute
500 Laureate Way
Kannapolis, NC 28081