



Celebrating ten years of nutrition discoveries

Dear Friends,

With this report, I am pleased and proud to let you know that the UNC Nutrition Research Institute is celebrating its tenth anniversary this year. As we look back at the impact we have made in precision nutrition this past year – which your generosity has made possible – we also make note of our first decade of progress.

From inception to today, the NRI has been home to some of the most experienced and innovative scientists in the world who, daily, explore the human genome, brain, metabolism and environment in search of the how's and why's of individualized nutritional needs. Their discoveries in nutrition science are leading to successes in preventing or mitigating the negative effects of chronic diseases and aging, and in improving human development, even prior to conception.

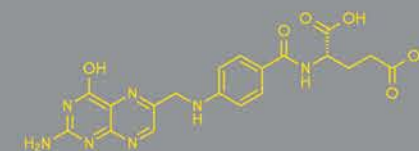
Use this report for a glimpse into the myriad ways in which your contributions to our institute are put to work advancing nutrition science for everyone. Thank you for your support.

Sincerely,



Steven H. Zeisel, MD, PhD

Director
Nutrition Research Institute
University of North Carolina at Chapel Hill



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.

Mission

The NRI 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.

NRI

FUNDAMENTALS

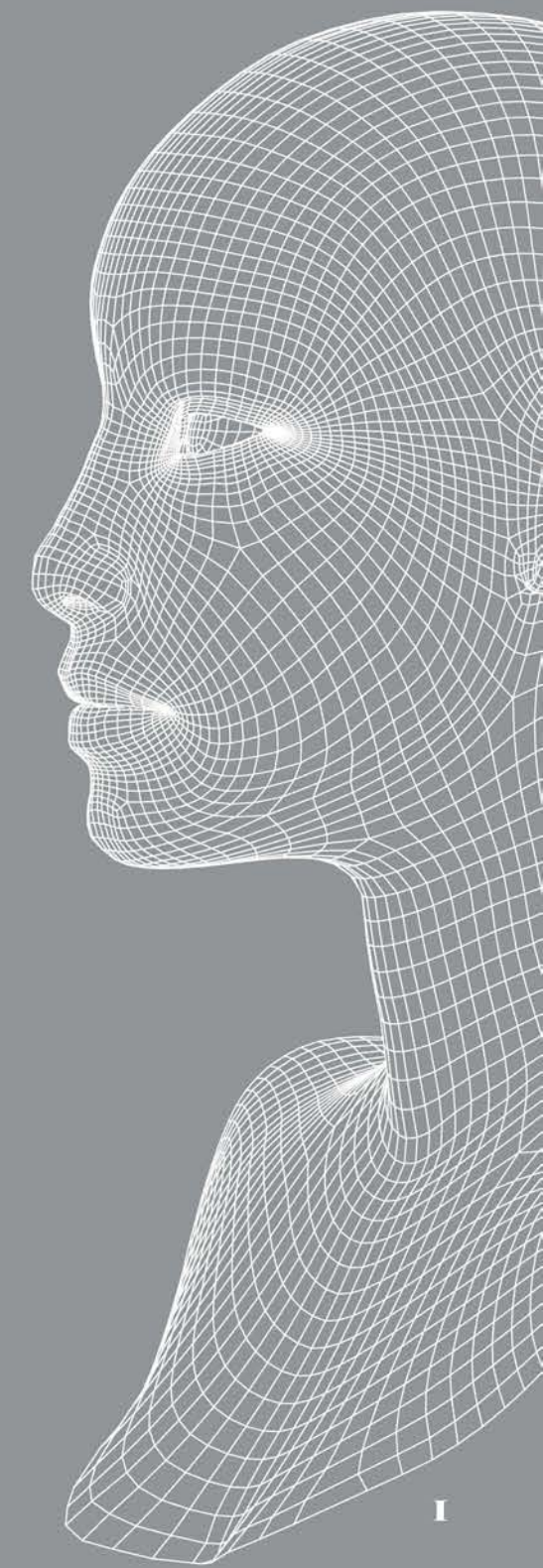
Nutrigenomics and Metabolomics

In Nutrigenomics, we study common variations in the spelling of our genetic code and in the "switches" that turn our genes on and off, and relate these to differences in our metabolism and nutrition needs. The gene tests we are developing will allow gene-guided recommendations for individual nutrition.

gene tests the ability to see what the changes in genes are doing to our metabolism, and use this to make metabolomic-guided recommendations for individual nutrition.

The Nutrition Research Institute is an international leader in both of these new fields of science.

With Metabolomics, we can measure thousands of metabolites in blood or other tissues using a single, small sample. This makes possible a complete view of our metabolism that was not possible before. Now, we can add to



FACULTY



Precision Nutrition & Health/Disease

Emma H. Allott, PhD
Carol L. Cheatham, PhD
John E. French, PhD
Stephen D. Hursting, PhD, MPH
Natalia Krupenko, PhD
Sergey A. Krupenko, PhD

Philip A. May, PhD
Katie Meyer, ScD
Susan M. Smith, PhD*
Natalia Surzenko, PhD
Jomari Torres, MD
Manya Warriar, PhD

Nutrigenomics

Martin Kohlmeier, MD, PhD
Saroja Voruganti, PhD
Steven H. Zeisel, MD, PhD

*NRI Deputy Director for Science

Metabolomics

Wimal Pathmasiri, PhD
Delisha Stewart, PhD
Susan Sumner, PhD

Appointments

Carol L. Cheatham, PhD

- Member, External Advisory Committee, Division of Nutrition Sciences, University of Illinois, Urbana-Champaign, Champaign, IL
- Fellow, Frank Porter Graham Child Development Institute, University of North Carolina - Chapel Hill, Chapel Hill, NC

Martin Kohlmeier, MD, PhD

- Founding editor-in-chief of BMJ Nutrition, Prevention & Health, a new nutrition journal
- President, International Society of Nutrigenetics/Nutrigenomics
- Co-editor of *Principles of Nutrigenetics and Nutrigenomics*, published by Elsevier

Philip A. May, PhD

- Faculty member of Delta Omega, The Honorary Public Health Society, Theta Chapter, Gillings School of Global Public Health, University of North Carolina at Chapel Hill
- International Ambassador, National Organization for Fetal Alcohol Spectrum Disorders, Australia

Presentations

Carol L. Cheatham, PhD. "Assessing Neonatal Cognitive Development in the Human" (Summer 2017). Origins and Benefits of Biologically Active Components in Human Milk, FASEB Science Research Conference, Lisbon, Portugal

Carol L. Cheatham, PhD. "DHA and the Science of Delivering More to the Brain" (Summer 2017). Power of Three Congress: Leading the Future with Faster Learning, Manila, Philippines

Philip A. May, PhD. "FASD Prevalence in the U.S.A. and Maternal Risk Factors" webinar (June 2018). National Institutes of Health, (NIH) National Institute on Alcohol Abuse and Alcoholism (NIAAA)

Susan J. Sumner, PhD. "Technologies to Capture Influences of Exposome and Diet" (June 25, 2018). Precision Medicine Workshop, Metabolomics 2018, Seattle, WA

Steven H. Zeisel, MD, PhD. "Choline is an essential nutrient" (December 2017) Symposium Neonatology, Tübingen, Germany

Discoveries in the News

Stephen D. Hursting, PhD, MPH featured in "The connection between diet, obesity, and cancer: Nutrition experts explore the evidence" at MedicalXpress.com (March 2018)

Martin Kohlmeier, MD, PhD, quoted in "23andMe for Weight loss" in Prevention magazine (April 2018)

Philip A. May's findings that prevalence of fetal alcohol spectrum disorders may be as high as 5 percent in US communities covered by worldwide media including Forbes, Time, New York Times, and Daily Mail.

Prevalence of fetal alcohol spectrum disorders in 4 U.S. communities. May, PA, Chambers, CD, Kalberg, WO, Zellner, J, Feldman, H, Buckley, D, et al. *JAMA* 319:474-482, 2018. PMID: 29411031

Steven H. Zeisel, MD, PhD interviewed in Carolina Public Health magazine in "What's essential for the prenatal brain?" (October 2017)

DISTINCTIONS

Martin Kohlmeier, MD, PhD. "How to make the most of high-density genetic data for nutrition research" (October 2017). Keynote presentation at the IUNS International Congress of Nutrition, Buenos Aires, Argentina

Philip A. May, PhD. "The Prevalence and Select Characteristics of FASD in Four Regional Communities of the United States" (June 2018). FASD Study Group of the Research Society on Alcoholism, San Diego, CA

Steven H. Zeisel, MD, PhD featured in "Choline: The essential but forgotten nutrient" in The Seattle Times (November 2017)

KEY FINDINGS

NUTRITION, OBESITY AND CANCER

Obesity and diet are known to alter cancer outcomes, but exactly how is often not understood. Research conducted by NRI faculty is providing answers that will help in prevention and treatment.

For example, folate (vitamin B9) is important in early pregnancy to prevent neural tube defects in babies because it is needed by rapidly dividing cells (e.g., those of a developing embryo) for DNA synthesis and cellular energy production. However, aggressive cancers are also defined, in part, by their rapidly dividing cells, and antifolate drugs such as methotrexate are first-line chemotherapeutics. Whether dietary folate, either through vitamin supplements or fortified foods, could contribute to cancer progression is unclear, as existing studies of the effects of low-folate diets on cancer have produced conflicting results.

Several NRI faculty collaborated to clarify the folate-cancer connection. Sergey Krupenko, PhD,

and Stephen Hursting, PhD, MPH, along with NRI visiting scholar Mirko Hennig, PhD, and their laboratories looked at the effects of folate restriction on the metabolic properties of three breast cancer cell lines (Ashkavand et al., 2017).

They compared macroscopic cell properties including proliferation, migration, and invasion, and also looked at cellular levels of specific metabolites in order to understand molecular changes within the cells that were caused by folate-restricted feeding. They found that folate restriction causes changes in certain metabolite levels and the expression of specific genes. Folate restriction also causes change in cellular energy metabolism, and decreases cells' invasiveness. Overall, folate restriction shifted cancer cells toward less aggressive phenotypes.

This study shows that folate restriction does alter the

properties of cancer cells, but that the specific cellular changes are dependent on the cancer subtype. This means that the decision to target the folate pathway, either through dietary or pharmaceutical means, will depend on the nature of an individual's cancer.

In another example, researchers in Hursting's laboratory (Bowers et al., 2018) sought to identify differences in tumors growing in normal-weight

versus obese mice in order to better understand how obesity contributes to breast cancer development. They profiled the tumors and identified groups of genes whose expression was markedly different between the two tumor types. Several of these gene groups that were related to tumor growth were also associated with obesity. Further analysis identified leptin as a master regulator of the metabolic pathways defined by these genes.

Leptin is a hormone that signals satiety. Resistance to leptin signaling is often found in obesity, and leptin levels are elevated in the obese. This study confirms a role for leptin in pro-tumorigenic potential, and through its use of RNA sequencing and pathway analysis, also identifies genes downstream of leptin that need to be investigated as more direct effectors of obesity-induced susceptibility to breast cancer, with the ultimate goal of identifying druggable targets (Smith et al., 2018).

Metabolic reprogramming by folate restriction leads to a less aggressive cancer phenotype. Ashkavand, Z, O'Flanagan, C, Hennig, M, Du, X, Hursting, SD, Krupenko, SA (2017). *Mol Cancer Res* 15: 189-200.

Leptin signaling mediates obesity-associated CSC enrichment and EMT in preclinical TNBC models. Bowers, LW, Rossi, EL, McDonnell, SB, Doerstling, SS, Khatib, SA, Lineberger, CG, Albright, JE, Tang, X, deGraffenried, LA and Hursting, SD (2018). *Mol Cancer Res* 16: 869-879.

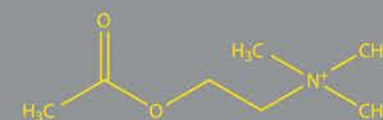
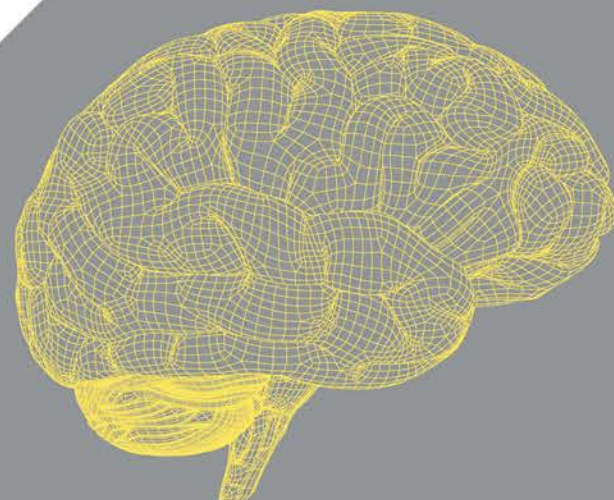
Translating mechanism-based strategies to break the obesity-cancer link: A narrative review. Smith, LA, O'Flanagan, CH, Bowers, LW, Allott, EH and Hursting, SD (2018). *J Acad Nutr Diet* 118: 652-667.



Sergey A. Krupenko, PhD



Stephen D. Hursting, PhD, MPH



NUTRITION AND ALCOHOL DURING PREGNANCY

NRI scientists Susan Smith, PhD, Philip May, PhD, and Sandra Mooney, PhD, study how alcohol causes developmental disorders and the prevalence of fetal alcohol spectrum disorders (FASD).

Philip May's research group has studied the prevalence of drinking during pregnancy and its consequences in Knapolis and throughout the world. They have consistently found that, while most people know that drinking during pregnancy is bad for the future health of their child, drinking during pregnancy is still common and the number of children with the cognitive, physical, and behavioral deficiencies associated with FASD is much higher than thought, reaching as high as five percent in some American communities (May et al., 2018). These numbers are higher than previous estimates partly because of the more comprehensive data-gathering and analysis methods May's group uses, which include in-person interviews and school-based assessments. The results suggest that the societal costs of FASD will be higher than previously assumed, and highlight a need for new approaches to reduce alcohol consumption during pregnancy.

Research in the Smith and Mooney laboratories looks at how alcohol exerts its effects on growth and development and which other factors (e.g., diet) contribute to worsening or lessening these effects. While the link between alcohol consumption during pregnancy and FASD is unequivocal, the relationship between how much one drinks and how bad a child's FASD symptoms are is not straightforward. One potential cause of this discrepancy is maternal nutrition: A healthy maternal diet may protect an infant from the effects of alcohol, while a poor maternal diet worsens the effects of alcohol. But what, in terms of FASD protection, constitutes "healthy?"

Recent research (Helfrich et al., 2018; Huebner et al., 2018) suggests that sufficient iron consumption during pregnancy is protective against some alcohol-induced problems. Studies in animals find that when mothers have sufficient levels of iron and drink alcohol, their babies have better cognitive outcomes than babies whose mothers are iron deficient and drink alcohol (note that, regardless of iron levels, babies from mothers who drank alcohol had worse cognitive outcomes than babies from mothers who avoided alcohol). Iron is important in the fetal brain for development of cognitive functions, and alcohol diverts iron away from the brain. Thus, maternal alcohol consumption causes babies to become iron deficient, even if the mother consumes sufficient levels of iron. However, when mothers do consume sufficient iron, alcohol has less of an impact on the babies than if the mother is iron deficient.



Susan M. Smith, PhD



Philip A. May, PhD

Prevalence of fetal alcohol spectrum disorders in 4 US communities. May, PA, Chambers, CD, Kalberg, WO, Zellner, J, Feldman, H, Buckley, D, Kopald, D, Hasken, JM, Xu, R, Honerkamp-Smith, G, Taras, H, Manning, MA, Robinson, LK, Adam, MP, Abdul-Rahman, O, Vaux, K, Jewett, T, Elliott, AJ, Kable, JA, Akshoomoff, N, Falk, D, Arroyo, JA, Hereld, D, Riley, EP, Charness, ME, Coles, CD, Warren, KR, Jones, KL, and Hoyme, HE (2018). *JAMA* 319: 474-482.

Maternal iron nutrition as a critical modulator of fetal alcohol spectrum disorder risk in alcohol-exposed pregnancies. Helfrich, KK, Saini, N, Kling, PJ and Smith, SM (2018). *Biochem Cell Biol* 96: 204-212.

Dietary iron fortification normalizes fetal hematology, hepcidin, and iron distribution in a rat model of prenatal alcohol exposure. Huebner, SM, Helfrich, KK, Saini, N, Blohowiak, SE, Cheng, AA, Kling, PJ and Smith, SM (2018). *Alcohol Clin Exp Res* 42: 1022-1033.

2006



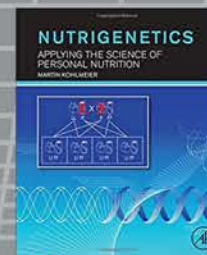
2011

Time quotes Dr. Oz calling NRI
“a leader in the growing field of
individualized nutrition.” “The Oz
Diet.” TIME 12 Sept. 2011:48-58



2013

Nutrigenetics by Martin
Kohlmeier, MD, PhD, the first
comprehensive textbook on
the topic, published



2015

90 participants from around the world attend first
NGx Workshop to learn the latest in nutrigenetics,
nutrigenomics and precision nutrition



2008

Grand opening with 2
faculty and 9 staff



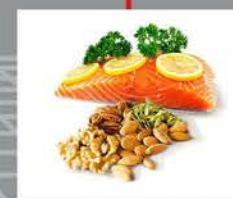
2010

Free, online “Nutrition in Medicine”
training modules launched, giving
physicians access to up-to-date
nutrition information



2016

FINDING: Omega-3 fatty acids
reduce the risk of developing
cancer and may prevent the
spread of some types



2018

Looking forward with 16 faculty and 68 science and admin staff



2009

2,300 elementary school students
participate in interactive science
projects at NRI



2012

FINDING: Maternal obesity
during pregnancy related to
permanent developmental delays
in children



2014

FINDING: Responsiveness
of gut microbes related to
heart health are influenced by
a person's genetics



2017

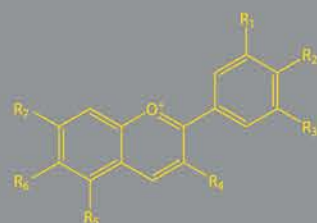
FINDING: Cognitive performance in children depends
on ratios as well as quantities of essential fatty acids



A DECADE OF DISCOVERY

UNC | NUTRITION RESEARCH
INSTITUTE

SELECTED PUBLICATIONS



BRAIN DEVELOPMENT & COGNITION

Latent profile and cluster analysis of infant temperament: Comparisons across person-centered approaches. Gartstein, MA, Prokasky, A, Bell, MA, Calkins, S, Bridgett, DJ, Braungart-Rieker, J, Leerkes, E, **Cheatham, CL**, Eiden, RD, Mize, KD, Jones, NA, Mireault, G and Seamon, E (2017). *Dev Psychol* **53**: 1811-1825.

Milk intake at midlife and cognitive decline over 20 years. The Atherosclerosis Risk in Communities (ARIC) study. Petruski-Ilyeva, N, Kucharska-Newton, A, Palta, P, Couper, D, **Meyer, K**, Graff, M, Haring, B, Sharrett, R and Heiss, G (2017). *Nutrients* **9**: 1134.

Reduced brain volume and impaired memory in betaine homocysteine S-methyltransferase knockout mice. Prieur, EAK, **Pjetri, E**, **Zeisel, SH** and Jadavji, NM (2017). *Appl Physiol Nutr Metab* **42**: 1228-1231.

CANCER & METABOLOMICS

Correlated metabolomic, genomic, and histologic phenotypes in histologically normal breast tissue. Sun, X, **Stewart, DA**, Sandhu, R, Kirk, EL, **Pathmasiri, WW**, **McRitchie, SL**, Clark, RF, Troester, MA and **Sumner, SJ** (2018). *PLoS One* **13**: e0193792.

Antibiotic-induced acceleration of type 1 diabetes alters maturation of innate intestinal immunity. Zhang X, Li J, Krautramer KA, Badri M, Battaglia T, Borbet TC, Koh H, Ng S, Sibley RA, **Li Y**, **Pathmasiri W**, Jindal S, Shields-Cutler RR, Hillmann B, Al-Ghalith GA, Ruiz VE, Livanos A, Wout A, Nagalingam N, Rogers AB, **Sumner SJ**, Knights D, Denu JM, Li H, Ruggles KV, Bonnneau R, Williamson AR, Rauch M, Blaser MJ (2018). *eLife* **7**: e37816.

NUTRIGENETICS

Guide for current nutrigenetic, nutrigenomic, and nutriepigenetic approaches for precision nutrition involving the prevention and management of chronic diseases associated with obesity.

Ramos-Lopez, O, Milagro, FI, Allayee, H, Chmurzynska, A, Choi, MS, Curi, R, De Caterina, R, Ferguson, LR, Goni, L, Kang, JX, **Kohlmeier, M**, Marti, A, Moreno, LA, Perusse, L, Prasad, C, Qi, L, Reifen, R, Riezu-Boj, JI, San-Cristobal, R, Santos, JL and Martinez, JA (2017). *J Nutrigenet Nutrigenomics* **10**: 43-62.

Serum lipid concentrations and FADS genetic variants in young Mexican college students: The UP-AMIGOS Cohort Study. Vazquez-Vidal, I, Voruganti, VS, Hannon, BA, Andrade, FCD, Aradillas-Garcia, C, Nakamura, MT and Teran-Garcia, M (2018). *Lifestyle Genom*: 11:40-48.

Introduction to mammalian genome special issue: The combined role of genetics and environment relevant to human disease outcomes. Rusyn, I, Kleeberger, SR, McAllister, KA, **French, JE** and Svenson, KL (2018). *Mamm Genome* **29**: 1-4.

OUR TEAM



The NRI's 13 administrative staff members support the institute and its scientific staff—from operations and personnel to finance and fundraising—throughout the year. Also supporting our 18 faculty members in FY18 were 3 research scientists, 3 research associates, 10 postdoctoral fellows, 12 research associates and technicians, 5 doctoral students, and 4 interns.

NRI employees come from all over the country and across the globe to pursue their passion for the study and understanding of precision nutrition. All are employees of the University of North Carolina at Chapel Hill.

Administration



Eduardo Serrano
Deputy Director for
Research Administration



Suzanne Dane
Director of Development
and Community Outreach



Ryan Dayvault
Facilities and Special
Projects Coordinator



Brandi Childers
Assistant Director for
Training, Programs and
Partnerships



Scott Jaworski
Applications Analyst and
IT Consultant

EDUCATION & ENGAGEMENT

Defining Precision Nutrition Symposium 2018

On May 1 and 2, 2018, the NRI hosted 96 participants at a Defining Precision Nutrition Symposium. Eight expert speakers from universities across the country and around the world delved into the tools and approaches needed to study and practice Precision Nutrition—from early discoveries based on genetics to powerful new methods like



metabolomics, and developments in our understanding of gut microbes that absorb and metabolize nutrients.

Results of their work in these fields were brought together for examination and instruction.

Nutrigenetics, Nutrigenomics and Precision Nutrition Short Course

The NRI is dedicated to answering questions of how our genes and diet interact (the science fields of nutrigenetics and nutrigenomics), and how we can use these answers to develop a precision nutrition approach that maximizes each individual's health. Such "NGx" research spans scientific concepts ranging from cell biology to dietetics. Staying abreast of current developments in all of these various fields is difficult for researchers and practitioners, creating barriers that impede translation of research results from laboratories to populations.

The NRI's third annual NGx Workshop, June 4-7, 2018 enabled interdisciplinary communication in Nutrigenetics, Nutrigenomics, and Precision Nutrition by bringing together graduate students, health professionals and nutrition scientists from academia and industry. Sixteen presenters led 76 participants through the 4-day short course, which provided fundamental concepts through cutting-edge presentations and hands-on experiences using the latest tools to analyze participants' genetic data and understand their nutrigenetic profiles.

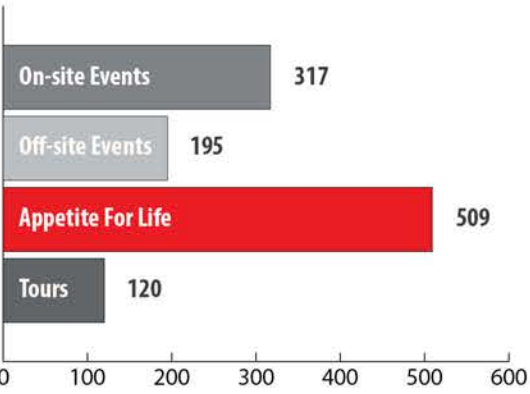
Professor Jeremy Nicholson of Imperial College London delivered the keynote address, "Understanding Gene-Environment-Diet and Lifestyle Interactions in Human Health." Presentations included "Metabotyping for Optimal Nutrition" and "Genetic Testing for Personalized Nutrition."



Scientists and nutrition and medical professionals from academia, government, and industry attended. A panel of government and industry leaders discussed "The Future of Precision Nutrition."

The NRI organized and produced this symposium because, says Director Steven H. Zeisel, MD, PhD, "We predict Precision Nutrition will become the standard for evidence-based professional practice of nutrition and it is important for health practitioners to understand responses to nutrition interventions."

FY18 Engagement



TOTAL PEOPLE ENGAGED: 1,141

APPETITEFORLIFE

Our research is complex but our purpose is very human. To help make NRI science accessible and relatable, we offer opportunities for community involvement because, ultimately, our science is about you. Free Appetite For Life programs provide helpful information through educational and interactive lectures, demonstrations and events. Speakers, experts in their fields, present programs to help you understand what precision nutrition is and the advanced methods of research we are using to investigate how your genetics and metabolism play critical roles in your health.

In the past year, audiences learned about:

Vitamin D and Human Health
from Folami Ideraabdullah, PhD

Navigating Holiday Cooking
from Susan M. Smith, PhD

Whole Foods and Nutrient Synergy
from Carol L. Cheatham, PhD

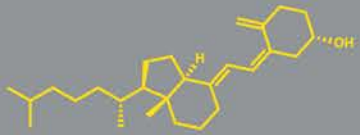
Effects of Genes and Environment on Our Health
from John E. French, PhD

Using Biochemical Fingerprints to Understand Individual Health and Response
from Susan J. Sumner, PhD

Diet and Prostate Cancer
from Emma H. Allott, PhD



Appetite For Life at Restaurant Forty-Six in Kannapolis



In our partnership with **Johnson & Wales University** in Charlotte, North Carolina, two Appetite For Life programs featured cooking demonstrations and nutrition talks focusing on fall and spring cooking to promote good health.



Johnson & Wales University - Charlotte

NRI SEMINAR SERIES

The NRI invites faculty from UNC-Chapel Hill, across the U.S. and around the world to give lectures on their research discoveries to faculty at the NRI. Guest speakers presented seven seminars this past year on such topics as:

Glucose and amino acid metabolism in cancer.
Jason Locasale, PhD, Duke University

MicroRNA mediators of prenatal alcohol effects: From bench to bedside and back
Rajesh Miranda, PhD, Texas A&M University

Polyphenols and health: the good (science), the bad (science), and the ugly (truth)
Daniel Del Rio, PhD, University of Parma, Italy

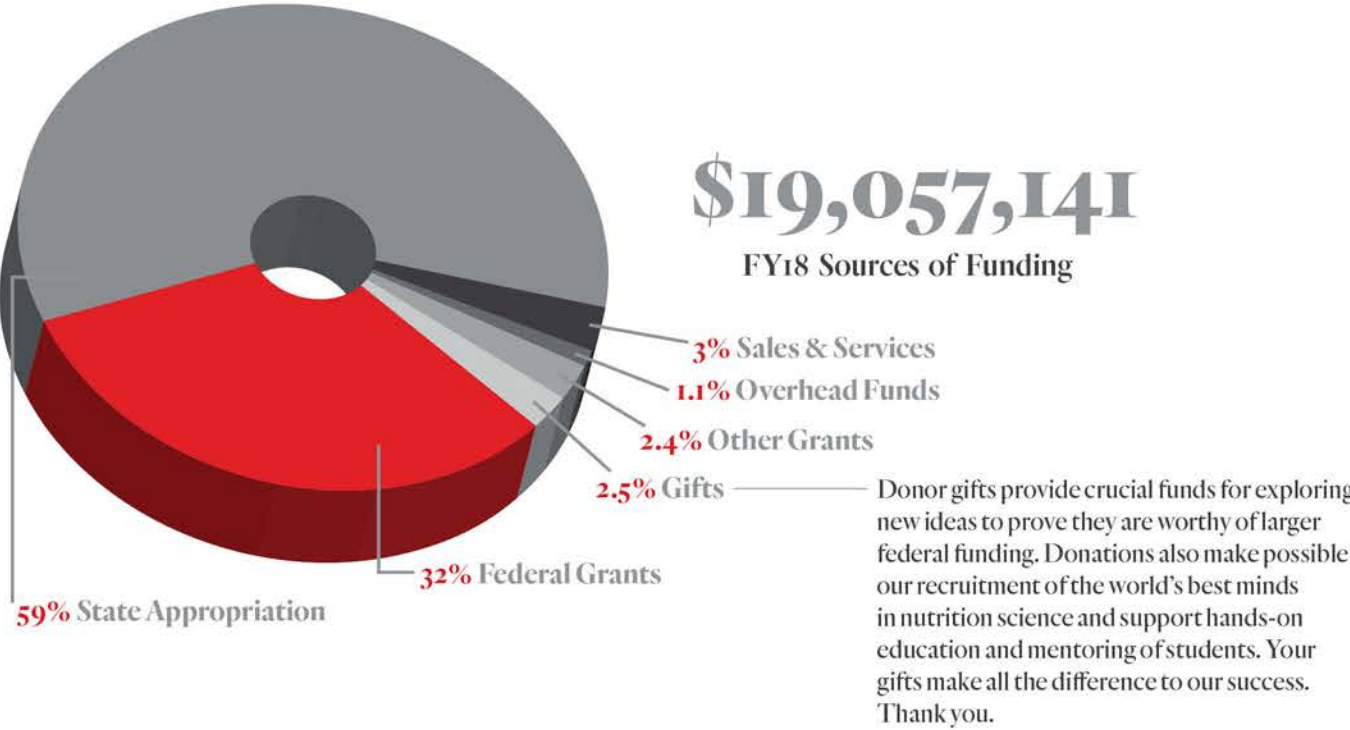
N-3 fatty acid derived metabolite deficiencies impair immunological and metabolic responses in obesity
Raza Shaikh, PhD, UNC-Chapel Hill

Assessing neonatal brain and cognitive development in the preclinical piglet model
Ryan Dilger, PhD, University of Illinois

FUNDING FY18

"I work as an obesity medicine physician and also as a hospice physician. I am also a rheumatologist. I see the role nutrition has to play in people's health and disease, and I support your efforts to help change people's lives for the better."

—Dr. Sally Nicks



Corporate & Foundation Funding



THE CANNON FOUNDATION



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Marshall University School of Medicine
Medical University of South Carolina
William Carey University
LECO Corporation
Farmers & Merchants Bank
International Life Sciences Institute
Gerstel
Brothers Tire Sales
LSU Health New Orleans
Stanford University
Arcadia University

Welcome and thanks to our new friends in FY18!

Carolyn G. Carter
Donna and Jeff Childress
LaDaniel Gatling II
Roseann Horan

Basia Jenkins
Pamela K. Lockard
Eileen Myers
Rosalind Pappas

Diane and Jon Post
Dican and Jay Rovenstine
Marianne Scully
Eduardo Serrano

Susan Y. Smith
Joseph W. Taylor
Michael R. Wilson
Brian Zito

PHILANTHROPY 2008 - 2018

Thank you to those who have supported our research over the last decade, helping make precision nutrition discoveries possible.

\$100,000+

Alan and Mary Anne Dickson
Diane Laval
Tom E. Smith

\$20,000 - \$99,999

Jana Harrison and Jeffrey Hughes
Fred and Alice Stanback
Steven and Susan Zeisel

\$10,000 - \$19,999

Gregory and Melissa Alcorn
Byron L. Bullard

\$5,000 - \$9,999

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\$500 - \$999

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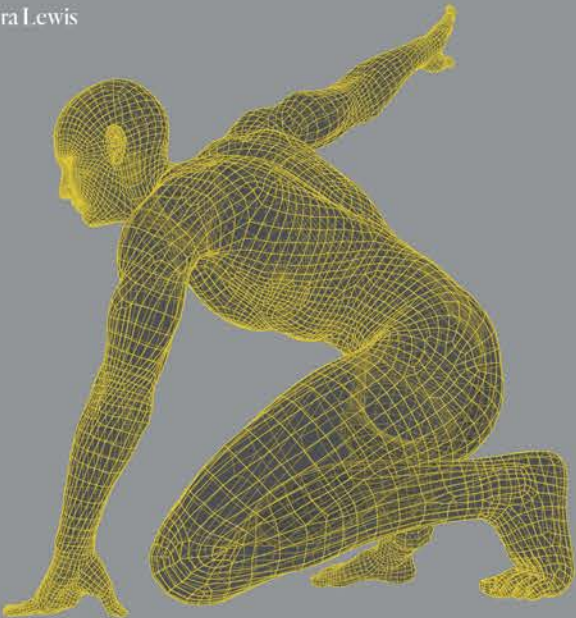
\$250 - \$499

Ilie and Diane Agopian
Terry and Stacey Barnhardt
Andy and Angela Basinger
Claude Burnham
Donald and Beverly Cameron
Carol L. Cheatham
Suzanne G. Dane
Troy and Pauline Day
Arun Dubey
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R. Christopher Lawing and
Matthew Robbins
Sharon Sloop Leininger
Harry Lerner
Brien and Laura Lewis

Thomas and Cynthia Marshall
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Evan Miller
Jorge Mora
David R. Patterson
Paul Richardson
Brenda Roman
Don and Kay Scott
David and Kirby Sheridan
Frank and Melanie Spencer
Charles D. Taylor Jr.
Mildred P. Turner
Tyler Warmack
Jack E. Wilson
Keri Young

"I continue to be inspired with the research and work being done at NRI. Supporting their mission to understand the benefits of personalized nutrition will help to ensure their contributions to improving health and changing lives for the better."

— Rina K. Shah



EAT **UNIQUELY**

Front cover molecule
legend, top to bottom:

Anthocyanins
Vitamin E
Uric Acid
Acetylcholine
Folic Acid
Vitamin D3

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James H. Woodward, PhD



**NUTRITION RESEARCH
INSTITUTE**

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