



Nutrition Research
Institute

Nutrition Research Institute

FY26 Impact Report





(left to right) Ramine Alexander, PhD;
Madeline Childress, PhD; Wimal
Pathmasiri, PhD; Susan McRitchie, MA MS



**ONE INSTITUTE.
MULTIPLE DISCIPLINES.
ONE SHARED QUESTION.**

HOW DO WE MAKE NUTRITION PERSONAL?

At the UNC Nutrition Research Institute (NRI), scientists investigate how genetics, metabolism, microbiomes, behaviors, environments, and life stages influence the way our bodies respond to nutrition.

Our vision is to use scientific discovery to ensure optimal health through individualized nutrition.

Our mission? To understand how nutrition affects individual health through our leadership in precision nutrition research, establishing how differences in our genes, microbiota, metabolism, and environment shape our individual disease risk.

And our guiding scientific premise is that each of us is metabolically unique. The UNC Nutrition Research Institute 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 an individual's health and quality of life.

Our work matters because nutrition is personal, and the health of our communities depends on moving beyond general dietary advice to targeted, evidence-based recommendations. The NRI's research informs public health policy, advances medical practice, supports economic growth in North Carolina through jobs and innovation, and trains the next generation of scientists.

FROM THE DIRECTOR

Dear Friends of the NRI,

This year marks a meaningful transition for me. After serving as interim director, I am honored to step fully into the role of director of the UNC Nutrition Research Institute. I take this responsibility seriously, in large part because I believe so deeply in the questions we seek to answer.

Why does the same food affect two people differently? How do our genes, biology, behaviors, and environments interact to shape health throughout our lives? And how do we turn what we discover into better ways to help people live healthier lives?

These are big questions. Answering them requires many kinds of science and, just as importantly, many people.

Over the past year, I have had the privilege of seeing that combination at work every day at the NRI. I have watched our scientists uncover new insights into how fat tissue communicates with tumors, identify measurable signals of choline intake in the blood, and explore how experiences early in life can shape health years later. I have seen our clinical teams welcome nearly 850 participants into research studies, students discover the excitement of asking their own scientific questions, and researchers from around the world come together in Kannapolis to advance precision nutrition and exercise.

What has impressed me most is not simply the breadth of this work, but how connected it is. Our scientists approach nutrition from different disciplines and at different points along the research continuum, but we share a fundamental goal: to understand what makes each of us different and use that knowledge to improve health.

That goal is deeply personal to me. My own research has focused on translating science into interventions that actually reach people and meet them where they are. I believe discovery has its greatest impact when we can connect what we learn about individual biology and behavior to something that ultimately helps a person make a decision, prevent disease, or live a healthier life.

That is also where I see tremendous opportunity for the NRI. As director, I want us to build on the extraordinary scientific strengths already here while forging stronger

connections across disciplines, across the continuum from discovery to application, and with the people and communities our science is meant to serve. I want the NRI to be a place where bold questions are encouraged, talented people thrive, and discoveries move toward impact.

None of that happens through science alone. It happens because research participants give their time, students bring new ideas, colleagues challenge one another's thinking, staff make ambitious work possible, and friends and supporters believe in what we are building.

The pages that follow reflect what all of those people have made possible. I am enormously proud of what we accomplished this year, and even more excited about what we can accomplish together in the years ahead.

With gratitude,



Deborah F. Tate, PhD

*Director, UNC Nutrition Research Institute
Professor of Nutrition and Health Behavior*

"I want the NRI to be a place where bold questions are encouraged, talented people thrive, and discoveries move toward impact."





Robert Weimer
Metabolic Kitchen
Manager

WE STUDY WHAT MAKES US DIFFERENT.



Brooke Giles
Director of Marketing,
Communications and
External Affairs



Same food. Different biology. Different response.

Every person at the NRI serves a purpose. From an administrator calculating a budget, to our marketing team creating a graphic, to a lead scientist discovering a breakthrough — we're all here to lead the field of precision nutrition and change lives.

Big questions rarely have simple answers.

That is why NRI researchers approach nutrition from many directions. Our principal investigators study everything from genes and metabolism to behavior, brain health, chronic disease, and the earliest stages of development. Each brings a different scientific lens, but all are working toward the same goal: understanding why nutrition affects each of us differently.

Their discoveries are reshaping what we know about food, health, biology, and the possibilities of precision nutrition.

49

Research Staff

23

Administrators

17

Principal Investigators

10

Students

119

people asking better
questions about nutrition

6

Postdoctoral Associates

14

Interns



FACULTY

Blake Rushing, PhD
Assistant Professor of Nutrition



DEBORAH F. TATE, PhD

Director, Professor of Nutrition and Health Behavior

JOHN A. BATSIS, MD

CRC Medical Director, Associate Professor of Medicine and Nutrition

CAROL L. CHEATHAM, PhD

Associate Professor of Psychology and Neuroscience

RACHEL GOODE, PhD, MPH, LCSW

Associate Professor of Social Work and Psychiatry

STEPHEN D. HURSTING, PhD, MPH

Professor of Nutrition

NATALIA I. KRUPENKO, PhD

Associate Professor of Nutrition

SERGEY A. KRUPENKO, PhD

Professor of Nutrition

KATIE MEYER, ScD

Associate Professor of Nutrition

SANDRA MOONEY, PhD

Associate Professor of Nutrition

WIMAL PATHMASIRI, PhD

Assistant Professor of Nutrition

BLAKE RUSHING, PhD

Assistant Professor of Nutrition

NIPUN SAINI, PhD

Assistant Professor of Nutrition

SUSAN SMITH, PhD

Professor of Nutrition

SUSAN SUMNER, PhD

Professor of Nutrition and Pharmacology

ISIS TRUJILLO-GONZALEZ, PhD

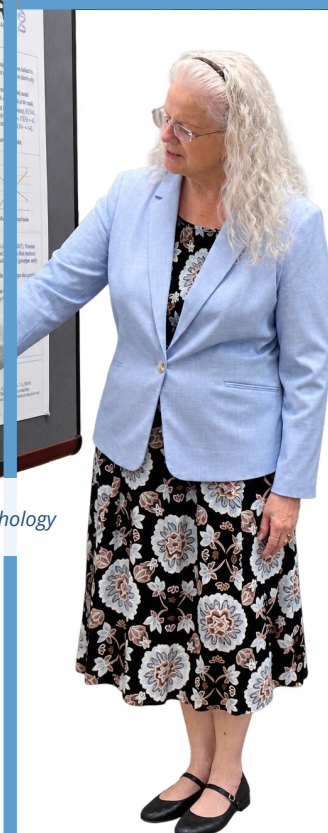
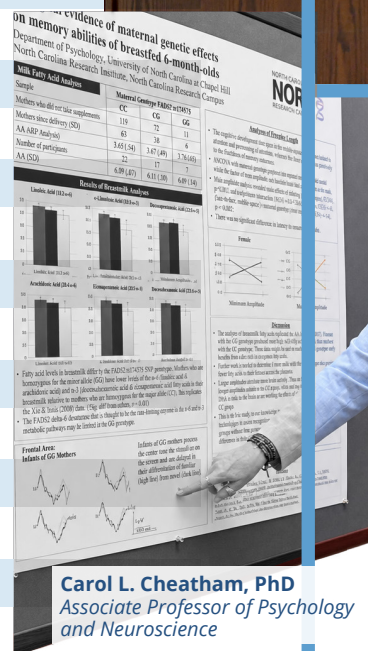
Assistant Professor of Nutrition

SAROJA VORUGANTI, PhD

Professor of Nutrition

STEVEN H. ZEISEL, PhD

Professor Emeritus of Nutrition and Pediatrics



Nipun Saini, PhD
Assistant Professor of Nutrition

featured PUBLICATIONS

Cusick SE, Mupere E, Bangirana P, Baluku RI, Kroupina M, **Cheatham CL**, Wozniak JR, Georgieff MK (2025). Supplemental choline to prevent and treat learning and memory deficits of early-life iron deficiency (The SupCHO Study): study protocol for a randomized, placebo-controlled trial in Ugandan infants with iron deficiency anemia. *Trials* 26:524.

Campos AP, **Robles J**, **Matthes KE**, Vu MB, **Alexander RC**, **Goode RW** (2025). Factors Influencing Health-Related Practices Among Hispanic Parents: A Formative Study to Inform Childhood Obesity Prevention. *Children (Basel)* 12:887.

Sprinkles JK, Howard AG, Hullings AG, Shetye A, Wilkins JT, Graff M, Shaikh SR, Avery CL, North KE, Gordon-Larsen P, **Meyer KA** (2026). Plasma lipidomics and 15-year risk of incident diabetes: a Coronary Artery Risk Development in Young Adults study. *Journal of Lipid Research* 67:100992.

Smith SM, **Munson CA**, **Flentke GR**, **Mooney SM** (2025). Prenatal Choline Attenuates the Elevated Adiposity and Glucose Intolerance Caused by Prenatal Alcohol Exposure. *Cells* 14:1429.

Abdellatef AA, **Rushing BR**, **Sumner S**, **Krupenko NI**, **Krupenko SA** (2025). Probing the metabolic regulator and candidate tumor suppressor ALDH1L1 as a target for non-small cell lung cancer gene therapy. *Molecular Therapy Oncology* 33:201038.

Fu G, **Rushing BR**, Graves L, Nieman DC, Pellegrini M, Soldano M, Thompson MJ, Sakaguchi CA, **Pathmasiri W**, **Sumner SJ** (2025). Multi-omics signature of healthy versus unhealthy lifestyles reveals associations with diseases. *Human Genomics* 19:101.

Valle CG, Nezami BT, O'Shea NG, Hatley KE, **Tate DF** (2025). Outcomes of a pilot microrandomized trial of just-in-time adaptive intervention messages nudging weight-related behaviors in young adults. *Digital Health* 11:20552076251353267.

Jeyaraj FT, **Vennam SS**, **Nelson K**, Watts K, **Goss LR**, Nance BC, **Mass BB**, **Voruganti VS** (2026). NAFLD-related SNPs are linked to changes in liver fat, as measured by the CAP score, and serum lipids in response to a 3-week sugar-sweetened beverage intervention: a pilot study. *Food & Function* 17:3115–3127.

Publication is a critical step in advancing science, giving researchers a way to share, validate, and build upon new discoveries.

Can Choline Help Protect a Developing Brain?

Iron deficiency during infancy can interfere with development of the hippocampus, a brain region essential for learning and memory, and treating the iron deficiency may not fully reverse damage that has already occurred. The SupCHO Study is testing whether choline can help. In a randomized, double-blind clinical trial in Uganda, 300 six-month-old infants with iron-deficiency anemia will receive standard iron therapy plus either choline or a placebo for nine months. Researchers will measure memory, attention, and overall cognitive development to determine whether choline provides added protection during a critical period of brain growth. If successful, this inexpensive, readily available nutrient could offer a practical way to improve treatment for iron deficiency and help protect the long-term cognitive development of children around the world.

Building Better Childhood Obesity Prevention

Preventing childhood obesity requires more than simply telling families what to eat or how much to exercise. Researchers spoke with Hispanic parents of elementary school-aged children to better understand the routines, beliefs, cultural influences, and real-world barriers that shape family health behaviors. Parents described efforts to encourage healthy eating and variety while also identifying challenges related to physical activity, screen time, access to healthy foods, and their surrounding social and physical environments. Four major themes emerged around parenting practices, perceptions of children's health and weight, activity and screen behaviors, and environmental influences. The findings provide a foundation for designing childhood obesity prevention programs that reflect families' actual experiences and priorities, helping researchers develop interventions that are not only evidence-based, but culturally responsive and practical to use in everyday life.

A Molecular Window into Diabetes Risk

What if molecules circulating in the blood could reveal diabetes risk years before the disease develops? Researchers examined blood samples from 1,094 adults in the long-running CARDIA Study and compared their plasma lipid profiles with those who developed diabetes over the next 15 years. During that period, 162 participants developed the disease. The study identified individual lipids and broader lipid pathways associated with future diabetes, adding to evidence that changes in fat metabolism may appear long before diagnosis. By identifying molecular patterns linked to disease years later, this work could help researchers better understand how diabetes develops and, eventually, contribute to earlier and more individualized approaches to identifying risk and preventing disease.

84
PUBLICATIONS

109
AUTHORSHIPS

Saroja Voruganti, PhD
Professor of Nutrition



Your Lifestyle Leaves a Molecular Fingerprint

Exercise, diet, and body composition influence health, but their effects reach far deeper than what we can see from the outside. Researchers compared 104 adults with distinctly different lifestyle patterns and examined their biology using metabolomics, proteomics, and epigenomics — measuring small molecules, proteins, and chemical changes that influence gene activity. They identified 96 biological pathways that differed between the two groups, including pathways involved in fat metabolism, antioxidant defenses, energy production, and processes associated with chronic disease. Together, these findings suggest that lifestyle leaves a measurable molecular signature throughout the body. Understanding that signature could help scientists uncover how everyday behaviors become biologically connected to health and disease, and ultimately provide new tools for more precise approaches to prevention.

Can a Text Message Arrive at Exactly the Right Moment?

Digital health programs often rely on reminders and prompts to help people build healthier habits, but timing may matter just as much as the message itself. In a pilot microrandomized trial, researchers tested “just-in-time” adaptive messages designed to nudge young adults toward weight-related behaviors when support might be most useful. By repeatedly randomizing whether participants received a message at different moments, the study allowed researchers to examine how people responded in real time rather than only looking at overall results at the end of an intervention. This approach could help scientists design digital health tools that are more responsive to individual behavior, moving away from one-size-fits-all reminders and toward support that reaches people when they are most likely to use it.

Scientific presentations extend the reach of our research by bringing new findings into conversations with experts, collaborators, and communities around the world.

Goode, R. *Eating Disorders in Marginalized Communities.* The Obesity Society Annual Meeting, Atlanta, Georgia. November 2025 [Invited Speaker].

Hursting, SD. *Preclinical evidence for the immune enhancing and anticancer effects of GLP-1 receptor agonists.* World Health Organization, International Agency for Research on Cancer, Lyon, France. September 2025.

Hursting, SD. *Tirzepatide Intercepts Obesity-Associated Cancers via Metabolic and Immune Reprogramming with Diminished Efficacy in Advanced Age.* Cancer Research UK/ American Cancer Society Cancer Prevention Research Conference, Atlanta, Georgia. June 2026.

Mooney, SM. *Biochemical and Metabolic Biomarkers in Fetal Alcohol Spectrum Disorder.* Research Society on Alcohol Annual Meeting, San Antonio, Texas. June 2026.

Rushing, BR. *The Chemistry of Health: How Metabolomics is Redefining Precision Medicine.* INFORMS Annual Meeting, Atlanta, Georgia. October 2025 [Invited Speaker].

Smith, SM. *Beyond the Brain: PAE, Chronic Disease, and Preserving the Health-Span.* 10th International Conference on Adolescents and Adults with Fetal Alcohol Spectrum Disorders, Seattle, Washington. April 2026 [Invited Speaker].

Sumner, S. *The Exposome and Precision Nutrition: Metabolomics and AI Approaches for Precision Health and Precision Medicine.* 22nd Annual Conference of the Metabolomics Society, Buenos Aires, Argentina. June 2026 [Invited Speaker].

Tate, DF. *How Precision Nutrition is reshaping how we understand health across the lifespan.* Carolina Women's Leadership Council Conference, Chapel Hill, North Carolina. February 2026 [Invited Speaker].

Trujillo-Gonzalez, I. *The Search for a Biomarker of Choline Intake.* International Vitamin Conference 2025, Technical University of Munich, Germany. September 2025 [Invited Speaker].

Voruganti, Saroja. *Genetic diversity and nutrient response in precision nutrition. NGx: Precision Nutrition for Exercise Across the Lifespan,* Kannapolis, North Carolina. May 2026 [Co-Organizer].

featured PRESENTATIONS



KEY FINDINGS

DISCOVERY ACROSS THE RESEARCH CONTINUUM

NRI researchers are uncovering new insights at every stage of discovery. From experimental models, to human studies, to research that bridges the two, these findings illustrate how science moves us closer to understanding individual differences in nutrition and health.

BENCH RESEARCH:

explores biological mechanisms in experimental models

Sandra Mooney, PhD

p9

The Developing Brain Gets a Double Hit

In experimental models, alcohol exposure during both prenatal development and adolescence produced greater difficulties in aspects of executive function than either exposure alone, suggesting that repeated exposure during two critical periods of brain development may create a distinct “double-hit” effect.



CLINICAL RESEARCH:

studies nutrition and health directly in people

Isis Trujillo-Gonzalez, PhD

p10

Can Blood Reveal a Hidden Nutrition Gap?

A rigorous, double-blind controlled feeding study found that blood levels of choline and betaine could distinguish low from adequate choline intake. The findings are a critical first step toward objectively identifying inadequate intake rather than relying only on estimates of what people eat.

TRANSLATIONAL RESEARCH:

connects laboratory discoveries with human health

Stephen D. Hursting, PhD, MPH

p11

A Closer Look at How Adipose Tissue Influences Tumors

By comparing colon cancer in experimental models with tumors and nearby fat tissue from people with colon cancer, researchers found shared inflammatory and metabolic patterns associated with obesity, providing new clues about how fat tissue may influence a tumor’s behavior.

The Developing Brain Gets a Double Hit

Research by: **Sandra Mooney, PhD**

Alcohol exposure during two vulnerable stages of development may compound effects on executive function

The Challenge

The brain does not develop all at once.

Before birth, billions of neurons are forming, moving, and organizing into complex networks. Years later, adolescence brings another period of rapid change as the brain refines systems involved in judgment, decision-making, impulse control, and adapting to new situations.

Both stages are periods of extraordinary development — and vulnerability.

Scientists know that prenatal alcohol exposure can produce lifelong changes in brain development and behavior. Alcohol exposure during adolescence can also affect the developing brain.

But what happens when exposure occurs during both periods? Does the second exposure simply add another layer of risk, or can the two interact in a way that produces a different, more severe effect?

The Discovery

NRI researchers and their collaborators tested what they call a developmental “double hit” of alcohol exposure.

Using experimental models, researchers compared animals exposed to alcohol prenatally, during adolescence, during both periods, or during neither.

They then examined executive function — the mental skills that allow us to regulate behavior, hold information in mind, change strategies, and make goal-directed decisions.

The researchers evaluated three areas:

- **Inhibitory control:** the ability to suppress or regulate a response.
- **Behavioral flexibility:** the ability to recognize that circumstances have changed and adjust behavior accordingly.
- **Working memory:** the ability to temporarily hold and use information.

Rodents exposed to alcohol during both prenatal development and adolescence showed altered executive-function performance compared with those that had not been exposed or experienced only a single developmental exposure.

The clearest pattern emerged in behavioral flexibility. In both rats and mice, double exposure resulted in more errors and/or attempts before successfully adapting to changing conditions.

Researchers also observed evidence of impaired inhibitory control in double-exposed rats. Rather than reproducing the effects of one exposure or the other,

the combined exposure produced a distinct pattern of executive-function changes.



What surprised us was that an exposure with no measurable effect on its own could produce a striking negative effect when combined with a later exposure. It shows how experiences before birth may prime the body, shaping how we respond to challenges later in life.”

Sandra Mooney, PhD

Why It Matters

Executive function touches nearly every part of daily life. It helps us stop before acting impulsively, remember and use information, shift strategies when something is not working, plan ahead, and adapt to change.

Deficits in these skills are among the challenges that can affect people with fetal alcohol spectrum disorders.

This study does not tell us that the same outcomes will occur in people who experience prenatal and adolescent alcohol exposure. Instead, experimental models allow researchers to investigate a question that could never ethically be tested in humans: How do alcohol exposures during separate stages of brain development interact?

The findings suggest that developmental timing matters.

A brain affected by an earlier exposure may not respond to a later exposure in the same way as a brain encountering alcohol for the first time. Understanding those interactions could help researchers identify periods of heightened vulnerability and, eventually, opportunities to protect or support healthy brain development.

The larger lesson extends beyond alcohol itself: our developmental history may influence how the brain responds to what comes next.

Hannah Petry
Graduate Student
Sandra Mooney, PhD
Associate Professor of Nutrition

Kirkpatrick GE, Joshlin ZE, Munson CA, Trevathan HB, Giang SE, Side CM, Robinson DL, **Mooney SM**. Developmental alcohol exposure alters domains of executive function in rodents. *Physiol Behav.* 2026 Oct 15;315:115400. doi: 10.1016/j.physbeh.2026.115400. Epub 2026 May 29. PMID: 42217535; PMCID: PMC13322122.



Can Blood Reveal a Hidden Nutrition Gap?

Research by: **Isis Trujillo-Gonzalez, PhD**

Researchers identify two accessible blood markers that distinguish low from adequate intake of choline, an essential nutrient

The Challenge

Choline is an essential nutrient that helps the brain, liver, and muscles function properly. Most Americans consume less than the recommended intake, but identifying who is consuming too little remains surprisingly difficult.

Nutrition researchers often rely on people reporting what they ate through questionnaires, dietary recalls, or food records. These tools are valuable, but they have limitations. Our memories are not always as accurate as we think and estimates of what we eat do not always reveal what is happening inside the body. Unlike some nutrients, choline has not had a validated blood-based marker that can reliably distinguish low intake from adequate intake.

“

We took a critical first step toward identifying inadequate choline intake using accessible blood markers, supported by one of the most rigorous types of nutrition studies. **The long-term goal is to move beyond estimating intake and toward measuring biological response.** By combining these markers with factors such as genetics and hormonal status, we may eventually identify who is most vulnerable to inadequate intake and develop nutrition guidance that better reflects individual biology.”

Isis Trujillo-Gonzalez, PhD

The next logical step was to determine if different levels of choline intake leave a measurable signal in the blood.

The Discovery

NRI researchers tested this question using a double-blind, randomized crossover controlled feeding study. The research team provided every meal, drink, and snack, carefully changing the amount of choline while keeping the rest of the diet consistent.

Each participant completed three 15-day diets providing the recommended Adequate Intake of choline, half that amount, or one-quarter of that amount. The diets were given in random order and neither the participants nor most of the research team knew which diet was being provided. Because everyone completed all three diets, researchers could compare each person with themselves.

The team combined advanced nutrient-tracing methods with precise measurements of choline and related compounds in the blood. Two markers stood out: choline and betaine.

Blood levels of both markers change consistently with dietary choline intake. When considered together, they showed excellent ability to discriminate between the



Isis Trujillo-Gonzalez, PhD
Assistant Professor of Nutrition

lowest intake from the Adequate Intake. These findings provide strong evidence that low choline intake leaves a measurable signal in the blood.

Why It Matters

Choline is essential, but research cannot address inadequate intake if they cannot identify it.

This study provides strong evidence that two accessible blood markers can distinguish low from adequate choline intake under carefully controlled conditions. The next step is to validate these markers in larger and more diverse populations eating their usual diets.

The significance extends beyond choline. This research shows how rigorous nutrition studies can connect what people eat with objective signals inside the body. Building this evidence is fundamental to precision nutrition and could ultimately help researchers identify nutritional gaps and develop better-informed dietary guidance.

Trujillo-Gonzalez I, Horita DA, Stegall J, Coble R, Paules EM, Lulla AA, Baah E, Bottiglieri T, Sha W, Kohlmeier M, Friday WB, Zeisel SH. Choline and betaine concentrations in plasma discriminate levels of dietary choline intake in healthy adults: analysis of a double-blind randomized crossover controlled feeding study. *Am J Clin Nutr.* 2026 Apr;123(4):101236. doi: 10.1016/j.ajcnut.2026.101236. Epub 2026 Feb 11. PMID: 41687879; PMCID: PMC13084590.

A Closer Look at How Adipose Tissue Influences Tumors

Research by: **Stephen D. Hursting, PhD, MPH**

Researchers uncover a biological conversation that may help explain the obesity-cancer connection

The Challenge

Obesity is associated with a greater risk of developing several cancers and, for some cancers, poorer outcomes after diagnosis.

Knowing that an association exists, however, is not the same as understanding why. Body fat is not simply stored energy. Adipose tissue is biologically active, releasing hormones, inflammatory signals, and other molecules that communicate with tissues throughout the body.

For researchers studying obesity and cancer, that raises a critical question: Could fat tissue surrounding a tumor actually be communicating with the cancer and helping create conditions that allow it to progress?

Understanding that molecular conversation could reveal new opportunities to disrupt the connection between obesity and cancer.

The Discovery

Researchers examined that question from two directions at once: in an experimental model of colon cancer and in samples from people with the disease.

In the laboratory mouse model, diet-induced obesity was associated with shorter survival. Researchers then analyzed gene activity within the tumors to determine which biological processes were altered by obesity.

Next, they compared those findings with data from 193 human colon tumors collected through the ColoCare Study. The same broad story appeared across species.

Obesity was associated with increased activity in inflammatory and metabolic pathways within colon

tumors, including genes involved in immune signaling and remodeling of the environment surrounding the tumor.

But the researchers went one step further. They also analyzed 188 human mesenteric adipose tissue samples (visceral fat located near the intestine), and examined paired fat and tumor samples. Their analyses identified obesity-associated signaling between molecules produced by adipose tissue and receptors within tumors.

The fat and the tumor did not appear to be functioning as completely separate tissues. The data suggest they may be engaged in a biological conversation.

Why It Matters

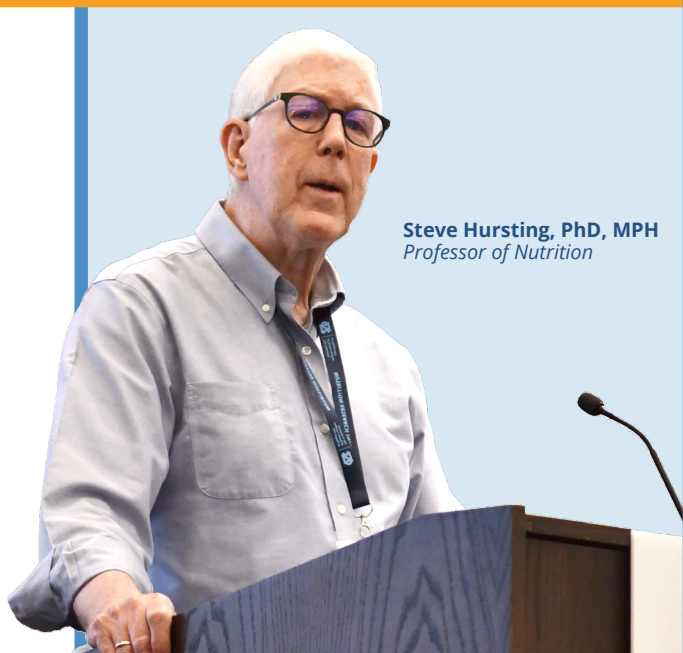
For years, researchers have known that obesity and cancer are connected. This study helps illuminate the molecular machinery that may connect them.

If scientists can identify the specific signals through which obesity alters tumor inflammation, metabolism, or the surrounding microenvironment, those pathways may eventually provide targets for prevention or treatment.

The study is also a powerful example of translational research. Findings observed in an experimental model were compared directly with human tumor samples, allowing researchers to ask whether biological patterns seen in the laboratory also appeared in people. They did.

That strengthens the evidence that obesity can fundamentally change the biology surrounding colon cancer and moves researchers closer to understanding not simply whether obesity affects cancer, but how.

And once researchers understand the conversation, the next question becomes whether they can interrupt it.



Steve Hursting, PhD, MPH
Professor of Nutrition

“

Seeing the same patterns in both mice and human tumors showed us that these changes are likely fundamental features of obesity-associated colon cancer, not just artifacts of an experimental model. It also points to fat tissue as an active contributor to tumor biology, **giving us new targets for disrupting that harmful connection.**”

Stephen D. Hursting, PhD, MPH

Glenny EM, Lin T, Bandera VM, Mirminachi B, Khumukcham SS, Gigic B, Warby CA, Aksonova O, Coleman MF, Carpanese A, Busch C, Himbert C, Ose J, Nix DA, Boucher K, Schirmacher P, Strehli I, Hardikar S, Cohan JN, Jedrzkiewicz J, Brobeil A, Schneider MA, Kahlert C, Siegel EM, Byrd DA, Toriola AT, Shibata D, Li CI, Figueiredo JC, Tan AC, Roper J, Ulrich CM, **Hursting SD**. Obesity promotes conserved inflammatory and metabolic transcriptional programs in colon tumors: evidence from mouse models and the ColoCare Study Patient Cohort. *Am J Clin Nutr*. 2025 Dec;122(6):1545-1556.

SCIENCE POWERED BY PEOPLE

Jamie Beach
Property Security Officer
Addison Lewis
Research Assistant, Tate Lab

What does participating in research look like?

Depending on the study, participants may provide blood samples, complete cognitive assessments, wear activity monitors, answer questionnaires, eat study-provided meals, or return for multiple research visits.

For participants, it is a chance to take an active role in discovery and gain new insights into their own health. For scientists, every visit, sample, and data point helps build the evidence needed to better understand how nutrition affects people and to improve health in the future.

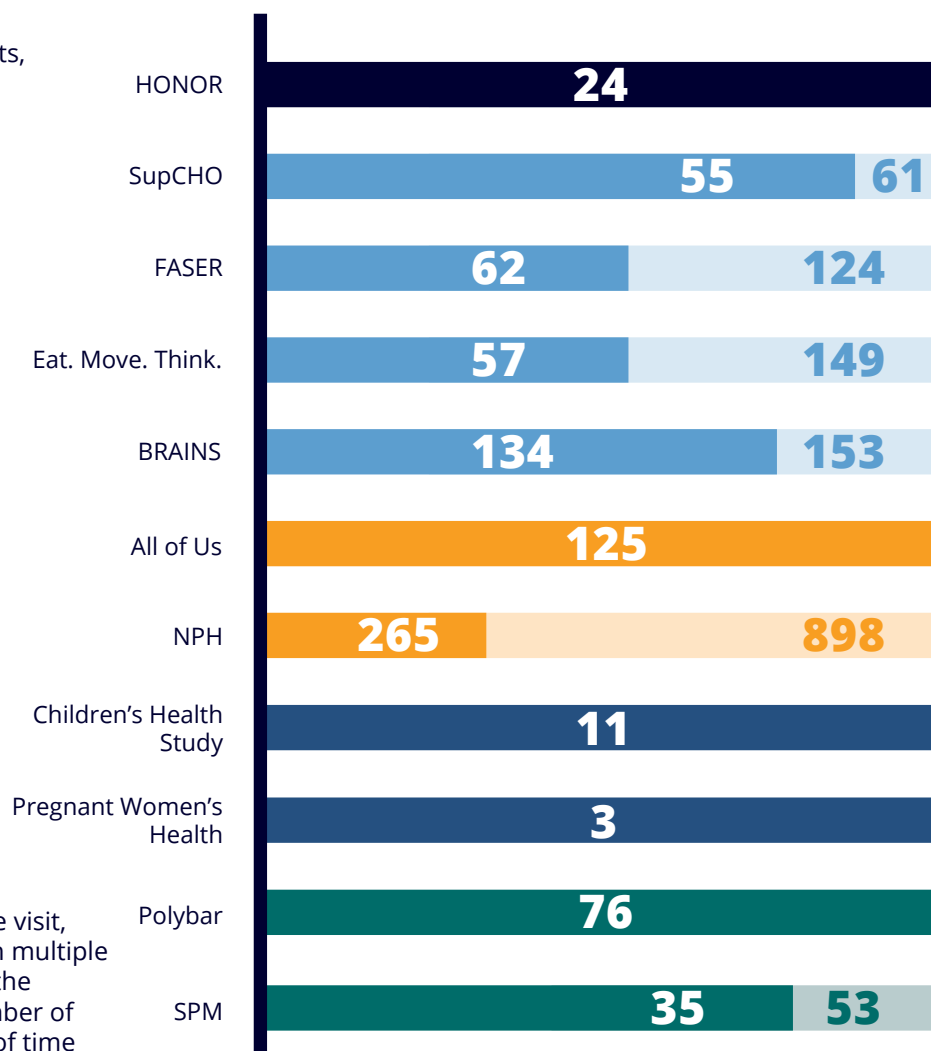


11
STUDIES

847
PARTICIPANTS

1,677
STUDY VISITS

Some studies can be completed in a single visit, while others require participants to return multiple times. The **chart to the right** compares the number of participants with the total number of study visits, illustrating the varying levels of time and participation required across NRI studies.



Goode Cheatham Tate
Voruganti External

Carol L. Cheatham, PhD

SupCHO

Testing whether daily choline supplements alongside standard iron treatment can improve learning, memory, and brain development in Ugandan infants with iron deficiency anemia, and whether this intervention can reduce lasting effects on the developing brain.

Eat. Move. Think.

Investigating whether eating blueberries and getting regular light exercise can work together to support brain health and slow age-related memory decline in adults ages 65–85. Researchers are also exploring the biological mechanisms behind these benefits, including the role of the gut microbiome.

**in collaboration with lead PI, Mary Ann Lila, PhD (NC State) and David Nieman, DrPH (App State)*

BRAINS

Examining how a mother's diet during pregnancy and breastfeeding may influence her baby's growth and brain development. Specifically, researchers are studying whether eating avocados affects breast milk composition and infant cognitive development.

FASER

FASER is developing a more comprehensive way to identify a child's risk for fetal alcohol spectrum disorders by examining not only prenatal alcohol exposure, but also maternal mental health, paternal alcohol use, and other family risk factors. The goal is to improve early identification and ultimately help prevent or lessen the effects of FASD.

Saroja Voruganti, PhD

Children's Health Study

Identifying genes and lifestyle factors that affect children's health status and overall well-being.

Pregnant Women's Health

A community-based study looking to understand how genetic and lifestyle factors affect nutrient metabolism, particularly in glycine, purine, and folate metabolism.

Rachel Goode, PhD, MPH, LCSW

HONOR

Testing a medication-free, digital program designed to help adults with type 2 diabetes who feel out of control around food improve their eating behaviors and diabetes self-management. Researchers want to learn whether this approach can better support both metabolic health and a healthier relationship with food.

Deborah F. Tate, PhD

All of Us

Building a large, diverse health database to help researchers understand how differences in biology, lifestyle, and environment influence health and disease. By identifying patterns across people from many backgrounds, the program aims to advance more individualized approaches to disease prevention, diagnosis, and treatment.

Nutrition for Precision Health

Investigating why people respond differently to the same foods by examining factors such as genetics, the gut microbiome, lifestyle, and environment. The goal is to use those differences to develop more personalized dietary recommendations that can improve health and help prevent chronic disease.

External Studies

The Clinical Research Core at the Nutrition Research Institute also supports studies led by external partners. In FY26, NRI staff conducted two external studies using NRI facilities and resources to recruit participants and carry out study measurements.

POLYPRO | *Plants for Human Health Institute*
Slavko Komarnytsky, PhD

Examined how protein source and the interaction between protein and plant-derived polyphenols in nutrition bars may affect metabolic health.

SPM | *UNC-Chapel Hill, Department of Nutrition*
Raz Shaikh, PhD

Investigated how supplementation with SPM Active® influenced levels of omega-3-derived compounds in adults with obesity.



Samantha Carroll, BSN
Clinical Research Core Manager

Sherry Irvin, LPN
Clinical Research Core Nurse

BEYOND THE LAB

Connecting Science and Community

Appetite for Life (AFL)

For more than 15 years, the NRI's Appetite for Life series has connected the public directly with researchers and the latest nutrition science. Free and open to everyone, the series translates complex research into accessible conversations about questions that affect everyday health.

In FY26, six programs explored topics including metabolism, ultra-processed foods, folate, nutrition myths, and healthy cooking. Virtual and in-person formats allowed the series to reach audiences both within the Kannapolis community and well beyond it.



Sherry Irvin, LPN
Clinical Research Core Nurse

“

I came last year, so when I saw STEM Night was back, I got tickets for my nephews right away. The bucket launch was our favorite part!”

Lauren, Local Community Member

STEM Night at the Ballpark

For the second year, the NRI transformed Atrium Health Ballpark into a celebration of science, discovery, and community.

More than 2,000 fans explored hands-on STEM activities, watched large-scale science demonstrations between innings, and interacted with scientists and educators from across the North Carolina Research Campus. **750 STEM kits** were

put into action, while **100 free tickets** helped local students join the experience. Volunteers (real scientists) led kids through hands-on STEM kits that turned scientific concepts into something they could build, test, and take home. Activities included decoding initials with binary code, uncovering real fossils, engineering flying machines, and using solar energy to bring “critters” to life. The event also grew its reach across the North Carolina Research Campus, bringing together academic partners from across the state to showcase the breadth of science happening in Kannapolis. STEM Night is becoming an annual tradition—one the NRI plans to continue growing as a way to spark curiosity, introduce young people to science, and strengthen connections between the research community and the families it serves.

7
EVENTS

2,753
ATTENDEES

469 virtual + 2,284 in person

Carolina Women's Leadership Council Conference

At the Carolina Women's Leadership Council Conference, NRI scientists shared their research with approximately 150 Carolina alumnae and parents through a panel conversation featuring Deborah Tate, Rachel Goode, Isis Trujillo-Gonzalez, and Hannah Petry. The discussion sparked continued interest in the NRI, including new connections, visits, and philanthropic engagement. It also offered a valuable opportunity to introduce the NRI's work to an audience deeply connected to Carolina and invested in its future through science, service, and shared purpose. The panel highlighted the breadth of research underway at the NRI while giving attendees the chance to hear directly from the scientists behind the work.



Sarah Maddison, MD; Rachel Goode, PhD, MPH, LCSW;
Isis Trujillo-Gonzalez, PhD

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A LITTLE BIT OF LUCK, A LOT OF PURPOSE

Rina Shah, Board Chair

I sometimes think a little bit of luck played a role in becoming involved with the NRI. Nearly ten years ago, an opportunity to serve on the Advisory Board came my way at just the right moment. I was looking for a way to channel my professional experience and passion for healthcare into something meaningful, and I said yes. **What may have started as a fortunate circumstance has, over time, become a deeply purposeful commitment.** I continue serving because I strongly believe in the work the NRI is advancing and the essential role science and research play in improving human health.

My career in healthcare has given me a front-row seat to the challenges of improving our healthcare system. I have spent much of my professional life working to solve problems and find ways to make healthcare better. But over time, I have come to appreciate that **lasting progress depends on going deeper: to understand why things happen and to continually challenge what we think we know.** Before we can change health outcomes, we need to discover new knowledge. That is why we must have basic science and research, which provides the building blocks for discoveries that can ultimately change how we understand, prevent, and treat disease. **Many of the advances we take for granted today began with scientists asking fundamental questions that did not have an obvious or immediate clinical application.** While we cannot always know where a question will lead, we cannot make the discoveries that change lives if we stop asking the questions.

Fueling discovery is particularly important today. At a time when science, research, and evidence-based inquiry are facing increasing challenges, we have an even greater responsibility to support the pursuit of knowledge. The NRI is not only conducting important research, it is also training the next generation of scientists — from tenured professors to PhDs to high school students — who will carry that work forward. **We must create conditions that allow excellent scientists to do their work,** and serving the NRI grants me that opportunity.

The NRI is a leader in advancing the concept of precision nutrition. This is the recognition that our bodies, metabolisms, and responses to the foods and nutrients we consume are not all the same. Understanding those differences could allow us to move toward more individualized approaches to nutrition and, ultimately, better health outcomes.

The NRI's research also focuses on areas that touch all our lives, including brain health, fetal and maternal health, cancer, and metabolism. These are not abstract areas of research to me. They affect my family, my friends, and the communities in which we live.

Ultimately, I serve because I believe in the power of science to improve lives. I believe in asking difficult questions, following the evidence wherever it leads, and supporting the scientists who are working to turn new knowledge into better health. What began with a bit of luck has given me nearly a decade of purpose, and I am very fortunate to be part of the NRI's ground-breaking work.

HONORS and APPOINTMENTS

Recognition from national organizations, journals, and scientific societies reflects the trust placed in NRI faculty to lead, advise, evaluate, and advance the science of nutrition.

Stephen D. Hursting, PhD, MPH

Named **2026 Excellence in Nutrition Fellow**, American Society for Nutrition.

Natalia Krupenko, PhD

Named **2026 Excellence in Nutrition Fellow**, American Society for Nutrition.

Blake Rushing, PhD

Received the **E.L.R. Stokstad Award**, American Society for Nutrition.

Received the **Best Poster Presentation Award for Service Cores**, Metabolomics Association of North America.

Katie Meyer, ScD

Joined the **Editorial Board of The American Journal of Clinical Nutrition**.

Sandra Mooney, PhD

Served on the **Neuroscience Editorial Board of Experimental Biology and Medicine**.

Saroja Voruganti, PhD

Inducted into **Delta Omega Honorary Society for Public Health**.

Served as **Chair of the Metabolism and Integrative Physiology Track** for The Obesity Society's 2026 Annual Program Committee.

Susan Sumner, PhD

Named a **2026 HHS Ambassador to Women's Health**.

Served on the organizing committee, as a **session chair, and panelist for the National Academies Precision Medicine Workshop Series**.

Wimal Pathmasiri, PhD

Participated in the **NMR Working Group of mQACC and MANA's NMR Special Interest Group**, contributing to international efforts to strengthen standards and reproducibility in metabolomics

TWO NRI SCIENTISTS. ONE NATIONAL HONOR.

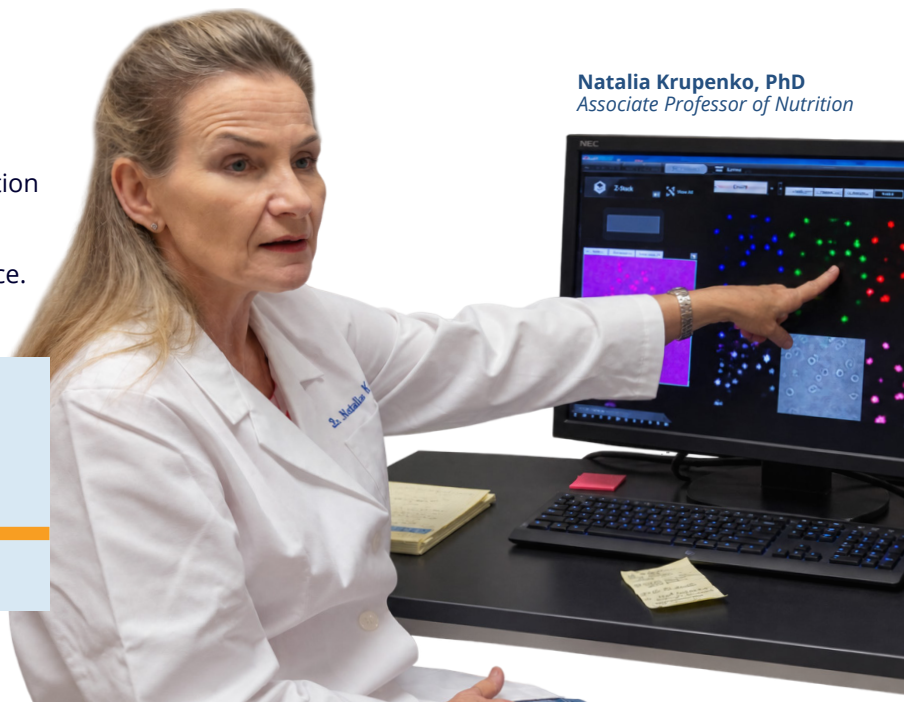
In 2026, Stephen D. Hursting, PhD, MPH, and Natalia Krupenko, PhD, were both named Excellence in Nutrition Fellows by the American Society for Nutrition. The designation recognizes distinguished careers and significant contributions to the field of nutrition science.

“

People process nutrients differently. By understanding how genetics affects those differences, we can move toward more precise recommendations for nutrients like folate.”

Natalia Krupenko, PhD

Natalia Krupenko, PhD
Associate Professor of Nutrition



POWERING the next question

External funding fuels the research happening across the NRI, supporting projects that investigate some of the most complex questions in nutrition, metabolism, development, and disease.

These three awards represent the breadth of that work, from improving how diet is measured, to building new resources for cancer research, to understanding how prenatal alcohol exposure affects development.



Susan Smith, PhD
Professor of Nutrition

DNA and Metabolomic Markers of Diets Rich in Polyphenols or Processed Foods

KATIE MEYER, ScD

Accurately measuring what people eat is one of nutrition research's persistent challenges. This project is testing whether fecal DNA sequencing and metabolomics can provide objective biological markers of foods in the diet. Using controlled diets featuring processed foods, blueberries, and chocolate, researchers aim to develop more reliable tools for assessing dietary intake and reduce dependence on self-reported food records.

\$529,665 in FY26

2026 - 2031



Creation of the Human Cancer Metabolome Atlas

BLAKE RUSHING, PhD

Cancer cells alter their metabolism to support tumor growth, survival, and resistance to treatment, but those metabolic patterns can vary widely among tumors and patients. This project is creating the Human Cancer Metabolome Atlas, a publicly available resource built from metabolomic analysis of more than 2,000 patient-derived tumor models. Researchers will connect metabolic data with genetic, clinical, and survival information to uncover patterns that could advance cancer research and treatment.

\$647,956 in FY26

2024 - 2029



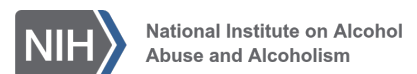
Craniofacial Morphogenesis in Prenatal Alcohol Exposure

SUSAN SMITH, PhD

Prenatal alcohol exposure can cause lasting changes in brain and facial development, but researchers are still uncovering the biological mechanisms behind those effects. This project examines how alcohol disrupts the metabolism of neural crest cells, which play a critical role in craniofacial and neural development. By identifying why these cells are particularly vulnerable, the research could deepen understanding of fetal alcohol spectrum disorders and alcohol's effects during early development.

\$641,560 in FY26

1996 - 2029



investing in our FUTURE

The NRI supports the next generation of scientists at every stage, from their first exposure to research through VIP, to learning in the classroom, to advancing their expertise through graduate and postdoctoral training at NGx.

In the Classroom
NRI scientists do more than conduct research—they bring that expertise directly to students. In FY26, 13 faculty members taught, guest lectured, or mentored students across undergraduate and graduate courses at UNC-Chapel Hill, helping translate current science into the next generation of discovery while building knowledge, skills, and confidence.

13
FACULTY

454
STUDENTS

13
COURSES

Discovery is only part of the mission.

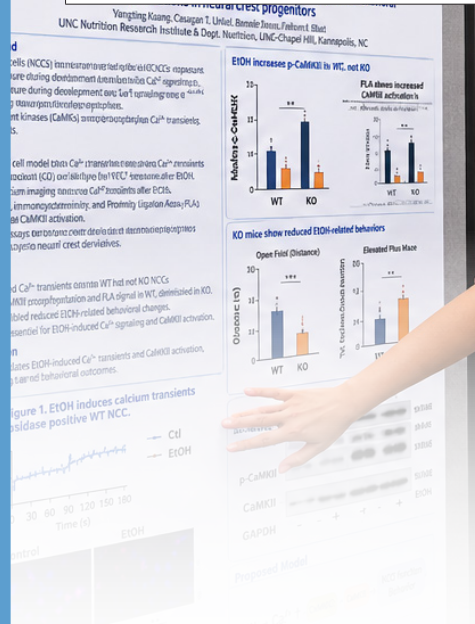
Virtual Internship Program (VIP)
In 2026, 54 high school students selected from 265 applicants spent four weeks exploring nutrition research, investigating a nutrient, evaluating scientific evidence, and working with a partner to create and present a professional research poster. Along the way, they connected with scientists and learned how interests in nutrition, medicine, public health, and research can become real career paths.

THE SPARK OF CURIOSITY: “It made me realize how exciting it can be to dive deeper into a specific topic and see how much there is still to learn,” said one student on the post-program survey.

VIP gives students more than a glimpse of science, it gives them a chance to see themselves in it.

Featured classes:

Nutritional Epidemiology	Meyer
Human Metabolism: Macronutrients	Saini
Human Nutrition	Mooney, Saini
Intro to Nutritional Biochemistry	S. Krupenko
Micronutrients	N. Krupenko, Trujillo-Gonzalez
Nutritional Biochemistry, Metabolism and Health	Sumner, Rushing
Nutrigenomics and Precision Nutrition	Hursting, Voruganti



Yanping Huang, PhD
Postdoctoral Associate,
Smith Lab

NGx: Precision Nutrition for Exercise Across the Lifespan

NGx takes training beyond the classroom by placing emerging researchers in the middle of a rapidly evolving field. In 2026, 70 participants joined 16 speakers for four days focused on precision nutrition and exercise across the lifespan. Through lectures, discussion, networking, a research poster competition, and hands-on exposure to tools such as DEXA and FibroScan, attendees explored both the science shaping precision nutrition today and the questions that will drive its future. Sixteen students and trainees presented their work, discussed their findings with scientists and clinicians, and received feedback from the broader NGx community.

IN THEIR WORDS: “I learned, connected with others in the field, and was honored to receive first place in the poster competition,” said Abigail Zirbel, MS Student at the University of Arkansas.

Celebrating our Graduates

In FY26, two graduate students completed their PhDs at UNC-Chapel Hill after conducting their doctoral research at the NRI. Their work reflects the institute's role in preparing the next generation of nutrition scientists through rigorous research, close mentorship, and hands-on experience in the laboratory.

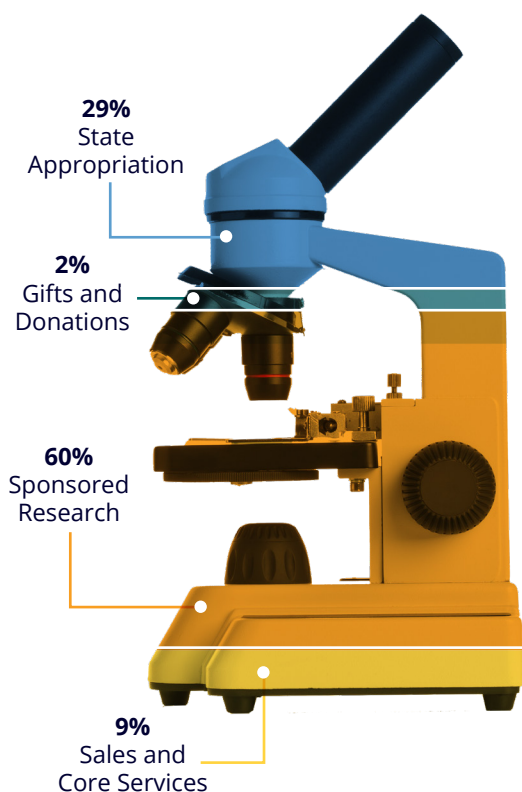
Madeline Childress, PhD | N. Krupenko Lab

Childress joined the NRI in 2019 and began her doctoral studies in 2020. Her research examined folate metabolism and its complex role in cancer, including how folate-related pathways could offer new approaches for targeting cancer cells while protecting healthy tissue.

Halle Meyers, PhD | S. Krupenko Lab

Meyers began at the NRI in 2020 as a research technician before pursuing her doctorate in Nutrition. Over nearly six years at the institute, she developed as a scientist through research, mentorship, collaboration, and participation in the NRI scientific community before successfully defending her dissertation.

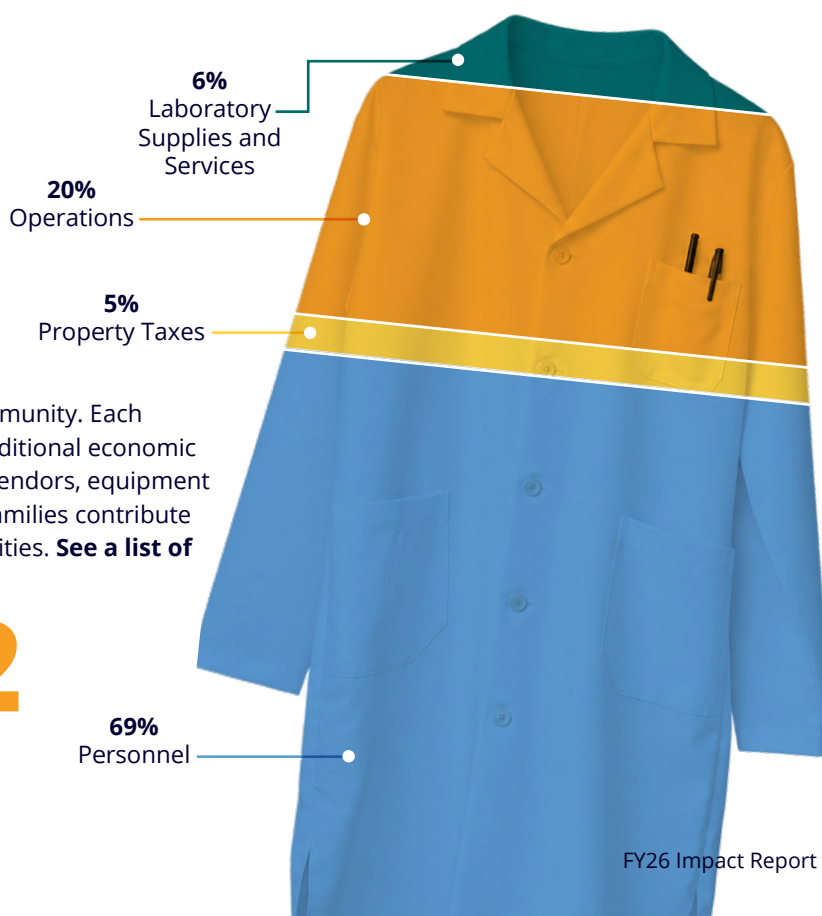
the power of your INVESTMENT



FY26 Funding

Funding from federal agencies, industry partners, foundations, and private donors gives NRI scientists the resources to pursue bold questions in precision nutrition. This year's support advanced research, strengthened critical infrastructure, fostered collaboration, and helped move discoveries closer to improving human health.

\$20,825,214



Local Expenditures

Research funding has a ripple effect throughout our community. Each dollar of NIH funding generates an estimated \$2.64 in additional economic activity. At the NRI, that investment supports jobs, local vendors, equipment purchases, and services while our employees and their families contribute to the economy of Kannapolis and surrounding communities. **See a list of our local partners on the back cover.**

\$7,111,152



**Nutrition Research
Institute**

Local Partners

Local partners are the vendors we purchase from and the organizations that collaborate with us in various ways. They play an important role in advancing our work and contributing to community growth.

Atrium Health
Albemarle Paper Company
Barefoot Oil Company
Best Impressions
Blendz Lab
Brothers Tire Sales
Cabarrus Health Alliance
Cabarrus Regional Chamber of Commerce
Cannon Ballers
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Catawba Valley Supply Company
Centerview Hardware
City Electric Supply
City of Kannapolis
Coddle Creek Capital
Corner Crust Pizza
Desco
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