

NUTRITION AND HEALTH

The modern science of nutrition is little more than a century old, and in that time researchers have studied interactions between nutrients and the human body ranging from the fulfillment of basic macronutrient needs to activities happening at the molecular level.

Researchers with the University of Florida Institute of Food and Agricultural Sciences have made notable discoveries in nutrition, including pioneering work on zinc and the B-vitamin folate. Today, the scope of UF/IFAS nutrition research is broader than ever, as our faculty members investigate ways to fight chronic disease, improve food safety, and encourage Floridians to lead more health-conscious lives.

These projects include development of an antimicrobial compound from shrimp shells, possible treatments for genetic conditions such as lupus, and efforts to help young people make healthy dining choices. These projects and many others are overseen by the Florida Agricultural Experiment Station as part of the UF/IFAS commitment to promote healthy communities throughout the state, the nation and the world.

NATURAL
RESOURCES



AGRICULTURE



HUMAN
SYSTEMS



Ongoing Research



NEW LUPUS TREATMENTS

The human immune system protects our bodies by finding and destroying pathogens; to function properly it must recognize foreign bodies and target them exclusively. In people suffering from certain autoimmune diseases, the system malfunctions and produces antibodies that attack healthy human tissue. These maladies often cause chronic inflammation and pain; some can even be fatal. Joseph Larkin, an associate professor with the UF/IFAS Department of Microbiology and Cell Science, leads a research team developing a treatment for lupus, one of the most well-known autoimmune diseases. Lupus causes overproduction of cytokines, compounds that signal cells to produce antibodies. The treatment Larkin envisions would involve giving patients a peptide known as Suppressor of Cytokine Signaling-1 that is believed to reduce cytokine production. Early findings are promising, though human trials are years away.



ANTI-OBESITY CAMPAIGN

Obesity rates among U.S. adolescents have more than quadrupled since 1976. Anne Mathews, an assistant professor with the UF/IFAS Department of Food Science and Human Nutrition, is addressing the problem through a USDA-funded project known as "Get Fruved," which encourages fruit and vegetable consumption and other health-protective habits. The five-year, \$4.9 million effort is enabling students at UF and seven other universities to develop and implement obesity-prevention programs for high-school and college students. The curriculum encourages participants to eat a balanced diet, exercise often and manage stress effectively. Components of the project include a website, social media outreach, live events and competitions. Researchers will evaluate the project's effectiveness and hope to apply their findings to develop a similar program for middle- and elementary-school students.



AGING EFFECTS ON MUSCLE

Scientists have established that many physical changes common in aging people and animals result from biochemical activity declines that can sometimes be slowed or even reversed. Muscle physiologist Stephanie Wohlgemuth, an assistant professor with the UF/IFAS Department of Animal Sciences, is investigating how dietary restrictions can stimulate autophagy, a cellular process that dismantles and replaces old, poorly functioning cell components. Her previous research with rats showed that diet-induced autophagy promotes efficient energy production and discourages premature cell death, benefits that could slow sarcopenia, the loss of muscle tissue associated with old age. Now, Wohlgemuth is researching possible methods for stimulating autophagy in older horses, with the goal of developing interventions for both animal and human populations that optimize this function without the need for dietary changes.

Research with Impact



CHITOSAN'S ANTIBACTERIAL EFFECTS

Shrimp may soon be the source of a low-cost, environmentally friendly antimicrobial compound that protects food animals from pathogens, according to Kwang Cheol Jeong, an assistant professor with the UF/IFAS Department of Animal Sciences. He leads a team studying chitosan, an edible compound derived from shrimp shells that kills bacteria and fungi. If approved by the FDA, chitosan could replace some traditional antibiotics used to prevent or treat disease outbreaks in animal production facilities. Jeong's team showed that chitosan microparticles quickly clear pathogenic *E. coli* O157:H7 bacteria from calves' digestive systems, a promising finding for ranchers. Researchers also believe the compound could protect cultured seafood species from waterborne pathogens, a finding that has also generated global interest in the commercial production of chitosan for sale to aquaculture producers.



IRON LOADING DISEASES

For years, scientists searched for the protein that facilitated iron uptake by the human liver, enabling it to clear excess iron from the bloodstream. In 2015, Mitchell Knutson, a professor with the UF/IFAS Department of Food Science and Human Nutrition, identified a protein called ZIP14 as a major iron transporter in the liver. This discovery opens the door to potential novel strategies for treating "iron overload" issues that arise from certain genetic disorders. Excessive iron concentrations in the liver can damage this organ and lead to other serious health problems. Knutson's findings will enable scientists to develop medications that block ZIP14's action and attenuate iron uptake by the liver, thus allowing for more efficient removal of excess iron from the circulation when using current therapies.



SCHOOL LUNCH PROGRAMS

Only about 1 percent of American adolescents consume enough fruits and vegetables, but UF/IFAS economist Jaclyn Kropp believes the National School Lunch Program could help rectify the situation. Kropp, an assistant professor with the Department of Food and Resource Economics, led an exploratory study where middle-school students pre-ordered their lunches; one pre-order group was encouraged to choose healthy foods. The results showed that, on average, students who pre-ordered made healthier choices than students in control groups who selected their food in the cafeteria. The pre-order group that was encouraged to eat healthy purchased 50 percent more fruit, 30 percent more vegetables and almost 40 percent more low-fat milk, compared with a control group. The USDA has interest in large-scale pre-ordering systems and in using Kropp's findings to help guide their development.

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