KISR

Innovation Brief

September 2022

Discovery of Unique Protein Brings Us a Step Closer Insect-Resistant Crops

A recent breakthrough was made in a collaboration led by Nagoya University. Associate Professor Mika Nomoto and Professor Yasuomi Tada at the Graduate School of Science identified a protein called NPR1, that helps plants decide which of the pathways to use. It simultaneously activates the salicylic acid pathway and suppresses the jasmonic acid pathway. The researchers published their findings in the online edition of Cell Reports.

Researchers Find New Sugar Substitutes in Citrus That Could Change Food Industry

Researchers at the University of Florida Institute of Food and Agricultural Sciences have made a breakthrough -- discovering new, natural sweeteners in citrus for the first time. This finding opens opportunities for the food industry to produce food and beverages with lower sugar content and lower calories while maintaining sweetness and taste using natural products. Yu Wang, associate professor of food science at UF/IFAS, managed the multi-year project that found eight new sweetener or sweetness-enhancing compounds in 11 citrus cultivars.

Researchers Engineer Novel Material Capable of 'Thinking'

Penn State and U.S. Air Force researchers have harnessed this processing of mechanical information and integrated it into engineered materials that "think. "The work, published today (Aug. 24) in Nature, hinges on a novel, reconfigurable alternative to integrated circuits. Team's discovery revealed the opportunity for nearly any material around us to act like its own integrated circuit: being able to "think" about what's happening around it.

A Novel COVID-19 Vaccine Using Modified Bacterial DNA

Researchers at University of California San Diego School of Medicine, with colleagues elsewhere, describe a different way to build a COVID-19 vaccine, one that would, in theory, remain effective against new and emerging variants and could be taken as a pill, by inhalation or other delivery methods. Their findings publish in the July 21, 2022 online issue of PLOS Pathogens. They can be used by scientists to transfer genetic material from one cell to another, after which the introduced genetic material can replicate in the receiving cell.

New Evidence That Water Separates into Two Different Liquids at Low Temperatures

A new kind of "phase transition" in water was first proposed 30 years ago in a study by researchers from Boston University. This new evidence, published in Nature Physics, represents a significant step forward in confirming the idea of a liquid-liquid phase transition first proposed in 1992. Francesco Sciortino, now a professor at Sapienza Università di Roma, was a member of the original research team at Boston University and is also a co-author of this paper.

Researchers Develop Novel 3D Atomic Force Microscopy Probes

A team of researchers has developed new kind of Atomic Force Microscopy (AFM) probes in true three-dimensional shapes they call 3DTIPs. AFM technology allows scientists to observe, measure, and manipulate samples and micro and nanoscale entities with unprecedented precision. The new 3DTIPs, which are manufactured using a single-step 3D printing process, can be utilized for a wider variety of applications -and potential observations and discoveries.

Solar Energy Breakthrough: Perovskite Cell With Greater Stability, Efficiency

Researchers at the U.S. Department of Energy's (DOE's) National Renewable Energy Laboratory (NREL) made a technological breakthrough and constructed a perovskite solar cell with the dual benefits of being both highly efficient and highly stable. The work was done in collaboration with scientists from the University of Toledo, the University of Colorado-Boulder, and the University of California-San Diego.