

How Plants Sense Environmental Stress



Ruth Welti

University Distinguished Professor, Division of Biology

CURRENT RESEARCH

Understanding the functions of lipid dynamics during plant stress

A field of lush, green plants only thrives if the plants are able to respond to their environment. Drought, disease, and lack of critical plant nutrients are only examples of the types of stress that affect plants on both a visible level and, as Dr. Ruth Welti, of Kansas State University, is discovering, inside their cells' cores. Lipids, the overarching focus of Dr. Welti's research, are compounds that form the structure of plant cell membranes. Some lipids play a crucial role in photosynthesis. Lipids can also go from being part of a plant's structure to being signals. It's as if little hunks of the plant itself are transformed into messages that tell the plant how to survive tough times. Dr. Welti and her colleagues are working to read the messages. She aims to characterize the lipids and their changes upon stress and the genes underlying the changes. By establishing a profile of these key factors, agriculture would gain a direction for selective breeding of plants that are more resilient to environmental stresses. Knowing which genes metabolize lipids also may lend insight into some of the thousands of genes in humans whose functions are not currently understood by scientists.

Dr. Welti is one of the few scientists involved in using mass spectrometry -- a method for analyzing chemical makeup -- to study plant lipids. This method lets scientists learn about lipids and their composition much more rapidly than other approaches. She is the director of the Kansas Lipidomics Research Center, a unique facility for mass spectrometry research, while leading a diverse team of investigators within her own research group. Each of her team members have years of lipid research experience and together they have a...

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AFFILIATION



Kansas State University

EDUCATION

- Ph.D. in Biological Chemistry 1982, Washington University in Saint Louis
- B.S. with honors in Chemistry 1976, University of Connecticut

AWARDS

- Pearl Award (an award for excellence in science, technology, engineering, or math), Girl Scouts of NE Kansas and NW Missouri, 2013
- AAAS (American Association for Advancement of Science) Fellow, Section on Biological Sciences, 2012
- University Distinguished Professor, Kansas State University, 2012
- Sigma Xi, Kansas State University Chapter, Outstanding Senior Scientist Award, 2008
- Kansas Technology Enterprise Corporation Scholar, 2006

RESEARCH AREAS

Environment, Chemical, Natural Disasters / Emergency

FUNDING REQUEST

Your contributions will support the \$480K/year necessary to meet supplies and personnel costs. An additional \$500K would mean provide for a new mass spectrometer for Dr. Welti to make even further advances in lipid research. By choosing to donate, you will aid in the discovery of the function of genes and lipids and in relating the functions to agriculture and humans.