

Plant Genomics

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Understanding redox sensing and signaling through the identification and functional characterization of redox-sensitive proteins

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A common physiological response to various environmental stresses in plants is accumulation of reactive oxygen species (ROS). ROS can cause oxidative damage to macro biomolecules. On the other hand, ROS have increasingly been recognized as important regulators in physiological and developmental pathways. ROS signaling is mediated largely through actions on redox-sensitive proteins that undergo oxidative modifications in response to perturbation of cellular redox states. We have developed gel-based and gel-free (OxiTRAQ) quantitative redox proteomics methods to identify Arabidopsis proteins whose thiols underwent oxidative modifications in response to treatments of ROS and the defense elicitors (salicylate and flagellin). The redox-sensitive proteins are involved in a variety of biological processes including chromatin remodeling and transcription, mRNA processing, post-translational modifications and primary and secondary metabolism. A redox-sensitive bZIP transcription factor in Arabidopsis has been found to act as a redox sensor and mediate expression of oxidative stress responsive genes through its oxidation/reduction. Our progresses in developing redox proteomics methods and in characterizing the role of the transcription factor in redox sensing and stress responses will be presented.

Biography

Yiji Xia is currently a Professor and Head of Department of Biology at Hong Kong Baptist University. He has received his PhD in Genetics from Iowa State University in 1997 and was a Joint Postdoctoral Associate at Salk Institute/Noble Foundation from 1997 to 1999. After working at Akkadix Corporation (San Diego, USA) as a Senior Scientist from 2000 to 2001, he has joined Danforth Plant Science Center (St. Louis, USA) as Principal Investigator. Since 2009, he has been working at HKBU. He has published over 40 research articles in Nature, EMBO Journal, EMBO Reports, Plant Cell, PNAS and other journals with a total citation count of over 4,900. His main research focus is on plant stress responses, particularly on redox sensing and epigenetic and transcriptional regulation in response to biotic and abiotic stress.

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