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Proteomics and metabolomics of stomatal defense and glucosinolate metabolism

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Plant pathogens have caused serious crop losses and they gain entry into leaves through natural stomatal pores on leaf surface. Stomatal innate immunity responses are fast processes that take place within the first few minutes of pathogen exposure. One objective of my lab research is to identify molecular switches that regulate the fast processes of stomatal movement. A novel redox proteomics approach was developed to identify protein redox switches. The results have led to the discovery that glucosinolate metabolism may play an important role in regulating stomatal movement. Another objective of my lab research is to elucidate glucosinolate functions through systems analysis of plant molecular networks. We make use of glucosinolate metabolism as a model system. Over the past decades, glucosinolate biosynthesis, degradation and transport have been well-studied. However, pathways that interact and regulate glucosinolate metabolism need to be further explored. In this presentation, recent progress on utilizing reverse genetics, developing and implementing proteomics and metabolomics tools to discover novel nodes and edges will be reported. The large-scale discovery projects have led to many hypothesis testing experiments. Once the new components were characterized, we then used them as stepping stones for further understanding of the molecular networks. Future directions of integrating with stomatal signalling networks and rationale engineering of plant biochemical factory for crop defense, yield, bioenergy and human health will be discussed.

Biography

Sixue Chen has completed his PhD in 1996 from China and Postdoctoral studies in Germany, Denmark and University of Pennsylvania, USA. He is the Colonel Allen R & Margret G Crow Term Professor in Department of Biology and Director of Proteomics and Mass Spectrometry at Interdisciplinary Center for Biotechnology Research of University of Florida. He has published more than 150 papers in reputed journals and has been serving as an Editorial Board Member of *Journal of Proteomics*.

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