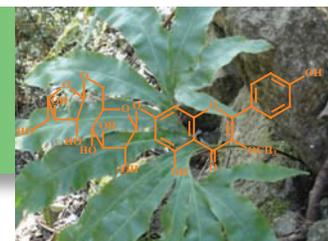


Behind The Scenes: Unfurling The Mystery of Ferns



by Dr. Amy Keller

Early this year, the *Journal of Natural Products* published an article from ASP member Dr. Hong-Jie Zhang and his colleagues entitled, "Bioactive Compounds from the Fern *Lepisorus contortus*." The Newsletter interviewed Dr. Zhang about this exciting research; he graciously gave us insight into the world of fern natural compounds. Please read the full article in the *Journal of Natural Products*, 2011, 74, 129-136.

How did you become interested in ferns and their phytochemicals?

Ferns are a group of plants without flowers and seeds. About 12,000 species of them have been identified in the world, and still many remain to be discovered. Ferns are most known as ornamental plants, but they have also been used as food, forage, fertilizer and medicine. Phytochemical study of ferns dates back to 19th century. Small molecule natural compounds such as terpenes, alkaloids, phenolic compounds, and amino acids have been reported from ferns. Huperzine A, a sesquiterpene alkaloid isolated from the fern *Huperzia serrata*, is currently sold as a dietary supplement as an acetylcholinesterase inhibitor to enhance memory. It is also in phase III clinical trials in China for the treatment of Alzheimer's disease. However, in comparison with seed plants, far fewer ferns have been chemically and biologically studied. Thus, considering the rich number of species, ferns may provide an additional arena for discovery of novel natural compounds.

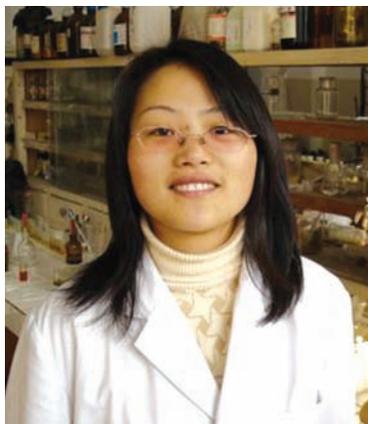
Who in your laboratory carried out the research?

We have developed an international collaboration among several United States and Chinese universities including University of Illinois at Chicago, Chicago, Illinois, University of Hawaii at Hilo, Hilo, Hawai'i, Purdue University, West Lafayette, Indiana, Yunnan Normal University, Kunming, China, Yunnan University, Kunming, China, and Guiyang College of Traditional Chinese Medicine, Guiyang, China.

Could you provide a brief explanation of the work and results in your own words?

In what way are the data in your paper new?

We have collected several hundreds of different species of fern plants, and have already evaluated more than 100 of the fern extracts for their anticancer, cancer chemopreventive, and anti-tuberculosis potentials through an



international collaboration. From one of the fern plant, *Lepisorus contortus*, we have identified 19 compounds including five new ones. Of particular interest, we discovered kaempferol/quercetin glycosides as potent quinone reductase 2 (QR-2) inhibitors.

What impact does this research have on natural product science?

Ferns are a group of diversified plants with more than 12,000 species currently identified. A majority of them have not yet been investigated for their chemical contents. Our study, a combination of chemistry and biology, has successfully identified the biologically active compounds, especially the QR-2 inhibitors from two ferns through an international collaboration. Further study is currently being carried out in Purdue University for determination of the binding site of the kaempferol/quercetin glycoside compounds with QR-2 enzyme through high-resolution X-ray structures.

What is a favorite nonscientific activity of your lab?

It is our great pleasure to have a tea break and chat with our Chinese visiting scholars, who always bring different types of high qualities of fresh Chinese tea.

What is your lab's motto?

Seek and you will find.

What is your greatest extravagance in the lab?

While collaborating with Chinese Universities, it is delightful to do field collection with our Chinese collaborators, and the local foods are great. ■

Banner: *Lepisorus contortus* (Polypodiaceae).
Top to bottom: Dr. Jianhong Yang, Dr. Yegao Chen, and Dr. Hongjie Zhang.