Past Research Findings Lead to New Discoveries in Pharmacological Research of Natural Products
About Professor Tsong-Long Hwang

Dr. Tsong-Long Hwang is currently the Professor of Graduate Institute of Natural Products, School of Traditional Chinese Medicine, Chang Gung University, and on secondment as the Dean of the College of Human Ecology, Chang Gung University of Science and Technology.

In collaboration with experts of drug research and development (R&D) from Taiwan and overseas, Professor Hwang has formed a research team for natural products, cultivating talents both in the theoretical and the practical drug R&D research fields. His areas of research expertise are neutrophilic inflammation, innate immunity, signal transduction, protein kinase, and drug research and development. He was the winner of the Ta-You Wu Memorial Award, National Science Council, Taiwan, 2006, and was granted the MOST Research Projects for Outstanding Young Scholar. Additionally, he has won the Best Research Paper Award, Shen Shui Te Foundation and the Teaching Excellence Award. He is also the applicant of many patents.

The main focus of the research team led by Professor Hwang is to understand the exact mechanisms of traditional medical herbs in treating or controlling chronic inflammatory diseases.

There are many publications on medical herbs concerning clinical practices or academic basics of Chinese medicine, which study the pharmacology and molecular mechanisms of traditional medical herbs. In addition to shedding new light on treatment, these publications also have potential in aiding drug R&D.

The findings and unverified results of earlier research now lead to new discoveries. They may help to bring discoveries of new chemical structures or pharmacological mechanisms, which may then suggest the feasibility of evidence-based medicine of Traditional medical herbs and future R&D targets.
Earlier Research Publications are Crucial to Pharmacology Research of Natural Products

Professor Hwang believes that, in terms of drug R&D and research of traditional medical herbs, whether or not the findings concerning the content and chemical structure of natural products were published in earlier journals is very important. That is to say, one has to scrupulously examine the past and current journals to see if there have been publications regarding traditional medical herbs or their chemical components or derivative components. And if indeed they exist, the issue will thus be how does one prove that the research done by one's team is innovative. While conducting systematic analyses on earlier science publications to examine their research strategies on chemical components, cell functions, animal models and the limitation of their research methods, apart from taking note of the positive effects, the negative data should also be part of the discussion. This is because a switch in the research strategy or direction may lead to new discoveries. Therefore, sometimes the negative information or data may, in helping to discover new chemical structures and pharmacological mechanisms, create possibilities of new strategies in the treatment of diseases and be the basis for future drug development.

For example, Osthol is a major component in the herbaceous plants Cnidium monnieri (L.) Cuss, and the research done on it dates back to 1960. Although Chinese medicine describes Cnidium monnieri (L.) Cuss as a component with several therapeutic effects, many aspects regarding its pharmacological activity still need to be clarified. This is very important to Professor Hwang because he needs to make sure that his findings are new. When it comes to achieving breakthrough from research done by past scientists, Professor Hwang turns to earlier journals in order to gain an understanding of relevant research in the past. Professor Hwang and his team found that Osthol is able to effectively inhibit the oxidative stress resulted from the human neutrophils, and that it possesses the potential of improving or treating pulmonary inflammatory diseases. The paper Osthol attenuates neutrophilic oxidative stress and hemorrhagic shock-induced lung injury via inhibition of phosphodiesterase was then published in Elsevier's journal Free Radical Biology and Medicine in 2015.

Professor Hwang says that the attempt in identifying pharmacological mechanisms is like searching for research clues, similar to solving riddles. Past research is like clues. “I synthesised my laboratory results to see if the active targets of pure compounds could be found, so as to explain why these pure compounds could create the therapeutic effects Chinese medicine has observed in clinical practices as well as to propose the research clues for innovative new drugs. I see all the past publications as clues. The more the clues are, the higher the chances of finding the answers,” Professor Hwang explained.

Nobel Prize in Medicine in 2015 – Youyou Tu found artemisinin and other antimalarial drugs, inspired by the ancient Chinese medicine books

Youyou Tu, who discovered that artemisinin has an effective curative effect on malaria, is the winner of the Nobel Prize in Medicine 2016. When Youyou Tu was assigned to research on the treatment of malaria in 1969, she was still a junior researcher at the China Academy of Chinese Medical Sciences. She said that “It was indeed very hard to conduct this research in the beginning. After we had systematically reviewed the ancient literature, we chose to put our research efforts in artemisinin, a drug with 2,000 years of history.” This goes to prove how important earlier literature is when it comes to conducting a research.

Professor Hwang thinks doing research is hard work, so to understand and verify the earlier scientific research in a comprehensive way is very important. He believes that it is particularly true with the pharmacological research of natural products. First, one has to understand the past pharmacological experiments and use the results in the current systems or mechanisms. By doing so, one can try to examine what the main target proteins or the target enzymes of these compounds are. Then, the next step is to gain clear insights into the mechanisms, and use them in animal studies, which allows interpretation as to whether traditional medicinal herbs have evidence grounds. Also, another objective is to gain the understanding of the potential of these new chemical structures and pharmacological targets in terms of the development of new drugs.

Of all Prof. Hwang’s papers, 43% of them were published in Elsevier's journals.

1Source: Storm Media http://www.storm.mg/article/75486
2Field Weighted Citation Index (FWCI) shows how well cited an article is compared to similar articles. It takes 3 factors into account: the year of publication, document type, and the disciplines associated with its source.
The world average FWCI is 1.
Professor Hwang praises the diversity of the content of Elsevier’s journals. Many of its journals related to his research have high academic reputation. As one of the most prolific authors of research papers at Chang Gung University, Professor Hwang is one of high productivity researchers and his papers are also of very high quality. The Field Weighted Citation Index of papers Professor Hwang published between 2011-2015 is 1.14; while 1 is the global average. Of all his papers, 115 (43%) of them were published in Elsevier’s journals. He also praises that our paper submission system is convenient and easy to navigate.