

Youyou Tu: significance of winning the 2015 Nobel Prize in Physiology or Medicine

Wenxiu Liu, Yue Liu

Department of Cardiology, First Affiliated Hospital of Harbin Medical University, No. 23 Youzheng Street, Nangang District, Harbin 150001, China

Correspondence to: Yue Liu. Department of Cardiology, First Affiliated Hospital of Harbin Medical University, No.23 Youzheng Street, Nangang District, Harbin 150001, China. Email: liuyue198002@163.com.

Abstract: Youyou Tu, a female scientist at the China Academy of Traditional Chinese Medicine in Beijing, is the first Chinese winner of the Nobel Prize in Physiology or Medicine. Based on the study of recipes which had been used for thousands of years to treat fever, Tu's group discovered that the plant *artemisia annua*, sweet wormwood, showed substantial inhibition of rodent malaria parasites. Her achievement and experience have inspired other researchers and emphasized the development of traditional Chinese medicine. Her award has led to a heated discussion about scientific research investment, fair treatment of research staff, and intellectual property right (IPR) protection in China.

Keywords: Traditional Chinese medicine; Nobel Prize; scientific research investment; intellectual property right (IPR) protection

Submitted Dec 02, 2015. Accepted for publication Dec 15, 2015.

doi: 10.3978/j.issn.2223-3652.2015.12.11

View this article at: <http://dx.doi.org/10.3978/j.issn.2223-3652.2015.12.11>

The Chinese scientist Youyou Tu, together with William C. Campbell, and Satoshi Ōmura shared the 2015 Nobel Prize in Physiology or Medicine. William C. Campbell and Satoshi Ōmura received the prize for discovering avermectin which is used for the treatment of roundworm parasitic diseases. While Youyou Tu, a female scientist, was honored for discovering the anti-malaria drug artemisinin. She is the first mainland Chinese scientist winning the Nobel Prize in the history of science in China.

Interestingly, Tu's father named her "Youyou" based on a famous poem which means a deer is eating the artemisia in outside while calling its friends to come together. It is of course a coincidence that the plant *Artemisia*, which is mentioned in this poem, makes the indissoluble bond with Tu's professional career.

Tu graduated from the Beijing Medical College in 1955. Since then, she has been engaged in the research and development of anti-malaria therapy in Academy of Chinese Medical Sciences in Beijing. As a principal researcher, Tu initially identified anti-malarial effects of *Artemisia annua* extracts in 1971 and subsequently extracted artemisinin

from the *artemisia apiacea* in 1972. The drug is used for the treatment of malaria with the impact on morbidity and mortality of patients worldwide. Prior to the award of the Nobel price, Tu won the Lasker Award in 2011 for the discovery of artemisinin, a drug therapy for malaria that has saved millions of lives across the globe, especially in the developing world. Her success has inspired scientists and also emphasized the development of traditional Chinese medicine. Nationally, Chinese Premier Li Keqiang gave Tu high praise for her prize. He described that the prize signified China's impact in the science and technology area, and highlighted the contribution of traditional Chinese medicine to the human health and well-being.

Tu's career also reflects the development of science and research in China after the Second World War. The effects of the war and subsequent events in the "Cultural Revolution" led to inadequate scientific funding, unfair treatment and shortage of research oriented scientists. With the reforms and opening in the 1970's, funding of scientific research increased in parallel with the development of China's economy and society. For example, the total

investment in scientific research increased to 1.18466 trillion RMB in 2013, and increased by another 15% (154.82 billion RMB) in 2014. The increased funding in basic and clinical research, allows a reasonable re-compensation of scientists according to their contributions, and is also associated with recognition of a national and international level.

The Nobel Prize rewards individuals for their outstanding contributions in the respective field. In contrast, in the Chinese scientific community, the research team traditionally was emphasized over individual core scientists. Therefore, many Chinese scientists never obtain appropriate international recognition. Examples are Weihai Yu, “the father of Keshan Disease”, who dedicated his life to studying the pathogenesis, prevention and treatment of the Keshan Disease (a cardiomyopathy caused by combination of dietary deficiencies and presence of a virus), and Tingdong Zhang, who studies the role of arsenic in the treatment of M3 leukaemia. Today, along with reform of the scientific research system in China, more and more scientific achievements are credited to the principal investigator, allowing the international success of scientists, such as Youyou Tu, or Yigong Shi, who is a researcher in the field of protein X-ray crystallography and is also the dean of School of Life Sciences of Tsinghua University. In addition, as the

intellectual property right (IPR) protection is improving in China, new scientific research achievements are more likely to be approved, facilitating sharing and eventual application.

On the other hand, any scientific research achievements are inseparable from the efforts of the entire research team. Therefore, it is an important but difficult task to balance the recognition of the principal investigator and his/her research group. Anyway, it is further encouraging that scientific research training has significantly improved in China, and that many internationally renowned scientists have returned to lead research groups in their homeland.

In summary, Youyou Tu's winning of the 2015 Nobel Prize in Physiology or Medicine not only reflects her own career but also the development of scientific research in China.

Acknowledgements

None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Cite this article as: Liu W, Liu Y. Youyou Tu: significance of winning the 2015 Nobel Prize in Physiology or Medicine. *Cardiovasc Diagn Ther* 2016;6(1):1-2. doi: 10.3978/j.issn.2223-3652.2015.12.11