

Answering an Appeal by Mao Led Tu Youyou, a Chinese Scientist, to a Nobel Prize

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By JANE PERLEZ OCT. 6, 2015

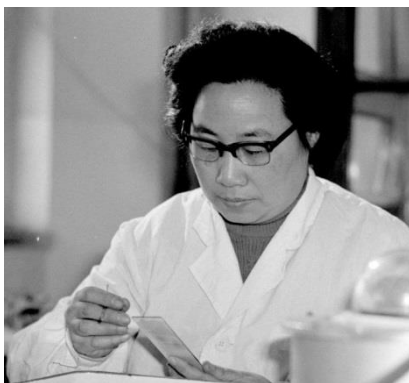
http://www.nytimes.com/2015/10/07/world/asia/tu-youyou-chinese-scientist-nobel-prize.html?_r=0

BEIJING — During the upheaval of [China](#)'s Cultural Revolution in the 1960s, when many of the country's Western-trained scientists were shunned and persecuted, the government had an urgent scientific problem that needed attention.

North Vietnam, an important ally that was in the middle of war with the United States, had asked for a way to reduce the deaths of its soldiers from [malaria](#), which had become resistant to the drug chloroquine. Malaria was also killing large numbers of people in southern China.

[Mao Zedong](#) set up a secret military project, Project 523 — named after its starting date, May 23, 1967 — to find a solution. But China's top expert in the field of malaria research, like legions of other Chinese in this time of high political turmoil, had been labeled a "rightist" and shunted aside.

After making little headway on the problem, the government turned to the Academy of Traditional Chinese Medicine in Beijing, and to a little-known scientist, Tu Youyou, who had studied both Western and Chinese medicine — and who found the solution in traditional Chinese healing.



Tu Youyou in the 1980s. Dr. Tu, 84, on Monday became the first citizen of the People's Republic of China to win a Nobel Prize in the sciences, for discovering artemisinin, a drug that is now part of standard antimalarial regimens. Credit Yang Wumin/Xinhua, via Associated Press

Dr. Tu, 84, on Monday became the first citizen of the People's Republic of China to win a [Nobel Prize](#) in the sciences, for discovering artemisinin, a drug that is now part of standard antimalarial regimens. She [shared the Nobel](#) for medicine or physiology with two scientists who also developed antiparasitic drugs.

Dr. Tu, through the Institute of Chinese Materia Medica at the Academy of Chinese Medical Sciences where she works, issued a statement about the value of artemisinin and traditional Chinese medicine.

“Artemisinin is a gift for the world’s people from traditional Chinese medicine,” the statement said.

Four Chinese scientists born in mainland China have been awarded the Nobel in physics, but only after making their careers in the West. The Chinese government has long wanted a Nobel in the sciences for the sake of prestige and as a confirmation of the quality of its education system.

The Chinese government and state-run news media celebrated Dr. Tu’s prize as an acknowledgment of the rising strength of Chinese science as well as a vindication of the value of traditional Chinese medicine. But some scientists and commentators also said that until now, China’s scientific establishment had treated Dr. Tu somewhat dismissively.

Prime Minister Li Keqiang said that Dr. Tu’s Nobel “was an expression of the prosperity and progress of Chinese science, and of the huge contribution that Chinese traditional medicine and pharmacy has made to the health of humankind.”

But Dr. Tu had been denied a place as an academican in China’s highest honorary body for scientists, apparently because of her lack of foreign training and a doctoral degree, other commentators noted.

“I think that Tu Youyou’s prize should lead to deeper reflection about China’s scientific efforts,” Wang Yuanfeng, a professor in Beijing said in an online commentary. “There are many problems in the institutions and mechanisms of scientific work in China.”

In an interview with China’s state news media, the Nobel laureate said the award was a recognition of her country and its traditional medicine.

At the start of her research for Project 523, Dr. Tu, then 39, was sent to Hainan Island, in the southernmost region of China, to see how the disease was affecting the population. Her husband had been purged during the Cultural Revolution, and she put her 4-year-old daughter into a nursery. Her visit to Hainan was the start of a decade of work, she told New Scientist [in an interview](#) in 2011.

She visited traditional medical practitioners across China, and from those conversations, compiled a notebook, “A Collection of Single Practical Prescriptions for Anti-Malaria.” Among 2,000 traditional Chinese recipes, she said, one compound was found to be effective: sweet wormwood, or *Artemisia annua*, which was used for “intermittent fevers,” a hallmark of malaria.

In the interview, Dr. Tu told New Scientist that she reread a particular recipe, written more than 1,600 years ago in a text titled “Emergency Prescriptions Kept Up One’s Sleeve.” The directions were to soak one bunch of wormwood in water and then [drink the juice](#).

But Dr. Tu said she realized that her method of preparation — boiling the wormwood — probably damaged the active ingredient. So she made another preparation using an ether-based solvent, which boils at 35 degrees Celsius, or 95 degrees Fahrenheit. When tested on mice and monkeys, she said, it proved 100 percent effective.

After the successful animal tests, Dr. Tu volunteered to be the first human subject, along with two colleagues. Satisfied that she had suffered no ill effects, she conducted clinical trials with patients.

“We had just cured drug-resistant malaria,” Dr. Tu told New Scientist. “We were very excited.”

Ten years after Mao founded Project 523, her work was published, though anonymously.

Western aid agencies did not take advantage of artemisinin for decades, even after its effectiveness was established. Older drugs were cheaper, but resistance to them was growing and some experts said the delay endangered lives.



The Nobel is not the first recognition for Dr. Tu’s work. In 2011, when she won the Lasker Award for clinical medical research, which named her the discoverer of artemisinin, some Chinese and Western malaria experts protested. Credit China Network/Reuters

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Dr. Nicholas J. White, a prominent malaria researcher at Oxford, said that others involved in the research equally deserved the honor. He suggested that the clinical trial leader, Dr. Li Guoqiao, and a chemist, Li Ying, had contributed just as much. A malaria researcher from Hong Kong, Dr. Keith Arnold, agreed.

But Dr. Tu said [in an interview](#) that she had done the decisive work. As the leader of a small team within the large Project 523, she was the first to isolate the active ingredient, and the one who had thought of using ether to extract it rather than the boiling method, she said.

The Lasker citation had noted that the research under Project 523 was collaborative. In 1978, she was singled out to accept an award from the Chinese government to Project 523.

By all accounts, Dr. Tu, who was born in Ningbo, a port city in the province of Zhejiang, is modest and shuns the limelight. She was born in 1930, the only daughter among five children, and was admitted to the Beijing Academy of Medical Sciences. She said she was “very lucky” to go to university as a woman, according to a blog post by Songshuhui, a nongovernmental organization focused on writing about science.

New Scientist described Dr. Tu as diminutive, with wisps of black curls, and passionate about her work. In 2008, a Phoenix television reporter described meeting her in her office in central Beijing, where there was an old couch and barely any heating. A phone and a refrigerator for storing medicines were the only modern touches, the reporter said.

Some analysts have said that Chinese scientists have not had the stability and long-term funding needed to establish a tradition of excellence in research. The [lack of a Nobel Prize for science](#) has been particularly galling in recent years, as the government has tried to emphasize that China can be as innovative as the West in the technology and medical sectors.

Liu Xiaobo, the Chinese writer, dissident and literary critic, was awarded the [Nobel Peace Prize in 2010](#), the first Nobel of any kind to be given to a citizen of China. Mr. Liu was serving an 11-year prison sentence for “subversion of state power” at the time of the designation, and he remains in prison. The Chinese novelist Mo Yan won the Nobel for literature in 2012.

Despite her age, and some health problems associated with [osteoporosis](#), Dr. Tu has continued to work, said her son-in-law, Lei Mao, who works at a pharmaceutical company in North Carolina. He said Dr. Tu lives quietly in Beijing with her husband, an engineer, and works on scientific projects on a part-time basis.

Chris Buckley contributed reporting. Mia Li contributed research.

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