

Zhang Lizhu (1921-)

Zhang Lizhu is a Chinese gynecologist and researcher. For most of her career, she worked in the Peking Medical College Third Hospital, renamed in 2000, Peking University Third Hospital. There, she led a team of researchers and physicians in the study of human in vitro fertilization (IVF) and embryo transfer (ET) technology. Zhang and her colleagues contributed to the birth of the first test-tube baby in Mainland China in 1988.

Zhang Lizhu was born 15 January 1921 to Zhao Wen and Zhang Yaozeng in Shanghai, China. Her father, Zhang Yaozeng, was a prominent legal scholar who participated as a major drafter of the Provisional Constitution of the Republic of China, the first constitution of Nationalist China in 1912. With her father's vision that men and women should have equal opportunities, Lizhu enjoyed education to which most Chinese girls then rarely had access.

In 1937, Zhang finished high school and decided to study aeronautical engineering, hoping to meet the urgent national need for aircraft construction during the Sino-Japanese War. Zhang obtained admission to the nation's only department of aeronautical engineering at National Central University.

However, in September 1937, the university moved from Nanjing, the Capital of the Republic China, to the interior city of Wuchang. Concerned about the instability of inland cities during the war time, Zhang's family was reluctant to send her to Wuchang. Zhang thus remained in Shanghai and in the beginning of 1938 entered Pennsylvania Medical School , the Medical Department of Shanghai St. John's University.

Six years later, Zhang obtained her doctoral degree in medicine with The Best Graduate award of 1944. After two years of work in Shanghai West Hospital , Zhang went to the United States to pursue her postdoctoral studies. She first studied gynecological endocrinology and anatomy in New York at Columbia University and New York University. Afterwards, she went to the Johns Hopkins University Medical School , in Baltimore, Maryland, where she studied early diagnosis of gynecological cancers.

At Johns Hopkins, Zhang modified the Papanicolaou test, a cytological test used to help screen for malignant and premalignant cells in cervical fluids, making it useful in detecting uterine cancer. Due to her research, in 1949, Zhang became a resident gynecological physician at the London, UK Marie Curie Hospital, a small hospital specializing in gynecological cancers. In October 1950, Zhang passed the British national examination for gynecological physicians and obtained the Diploma of the Royal College of Obstetricians and Gynecologists.

In 1951, with the outbreak of the Korean War, Zhang perceived Londoners' increasing animosity towards the newly established communist China and Chinese individuals living in London. Having received sufficient training for independent medical research and practice, Zhang began looking for opportunities to go back to China.

Although the British government restricted the return of Chinese scholars to their own country, Zhang managed to obtain a departure permit and eventually boarded a ship to Shanghai. The Chinese domestic enthusiasm for building a new socialistic China during the 1950s attracted many scientists studying abroad to return to the motherland. On the deck of her ship The General, Zhang encountered several other returning Chinese scholars. Among them was Tang Youqi, who had recently received his PhD in chemistry from the California Institute of Technology. One year later, he became Zhang's husband and life-long companion.

Returning home in 1951, Zhang worked briefly in Shanghai. She soon moved to Beijing to join Tang and filled the post of assistant professor in gynecology and obstetrics in Peking Medical College First Hospital. Zhang's fluent English and western style of teaching impressed her early students. However, her intended research in cervical cancer was problematic. In a country where malnutrition and associated endocrinal problems preoccupied medical concerns, Zhang seldom encountered cancer patients. Her interest and expertise in gynecological cancer lacked sufficient research subjects to fulfill it.

Nonetheless, Zhang became the director of the Gynecology and Obstetrics Department of Peking Medical College Third Hospital in 1958. At this time, it was reported that many female students at the eight colleges in Beijing were menstruating abnormally. In 1960, the director of Beijing Health Bureau communicated his concerns with Zhang. Zhang tested the female students' hormonal level through measuring the effect of urine sample extracts on the uterine weight of sexually immature female mice, a method known as uterotrophic assay.

The results showed that the students maintained relatively low levels of luteinizing hormone secreted by anterior pituitary gland. Therefore, Zhang concluded that these young women's menstrual cessations were unrelated to problems in the ovary but did relate to the abnormal signaling of the hypothalamus, which regulates the anterior pituitary gland. She inferred that intense labor and malnutrition during the famines of the late 1950s caused menstrual cessations, or as pathologists call it, secondary amenorrhea. Zhang confirmed that normal cycles would return once the women's nutritional situation improved. Zhang's prediction was correct. The female students' normal menstrual cycles resumed as soon as the famines passed in 1962.

The 1960 study on the mechanism of menstrual cessation became the start of Zhang's series of endocrinology studies. Zhang continued to study related topics during the 1960s and 1970s, such as changes in ovary functions after tubal ligations, how different hormones orchestrate for maintaining early pregnancy, and the measurement of changes of hormones and their receptors in normal and aberrant menstrual cycles.

Years of clinical and surgical practice made Zhang a well-known and trusted doctor and director. She presided over the most challenging gynecological operations in the hospital and saved the lives of many patients. Zhang also stressed attentiveness towards patients in training her students. For example, she required that her students recite the cases of patients without referring to records. Her educational philosophy was so uncompromising that some students felt they could not meet such stringency.

China's 1960s political turmoil interrupted Zhang's research and practice several times. In 1965, Zhang moved to Tong County to serve the peasants for one year. There, she taught barefoot doctors, performed caesarean sections on women and pigs, and treated long neglected gynecological complications among peasants.

During the Cultural Revolution, Zhang was attacked in both verbal and physical manners because both her work and her lifestyle were considered as bourgeois and reactionary. From 1966 to 1970, Zhang was demoted and assigned daily custodian work at the Third Hospital. She was frequently summoned to the dining hall of the Third Hospital to confess her alleged crimes in bringing medical devices from the imperial England and establishing the bourgeois cervical outpatient clinic in the Third Hospital.

Zhang was attacked with insults and physical punishments such as being forced to keep in a kneeling position throughout the night. During this time, nurses were in charge of the surgical work. Sometimes when Zhang was on dust cleaning duty and passed the operation room, some of the nurses would secretly consult her for ideas about difficult medical conditions.

However, in the 1980s, with new economic and social reform policies, Zhang reconnected to her colleagues abroad. In 1980, she represented Chinese women and gave presentations at the Second World Woman Conference in Copenhagen and other international forums to disseminate knowledge about China's public health measures and its One Child Policy.

Informed about new developments in reproductive medicine, and encountering patients who asked for infertility treatment, Zhang became interested in using in vitro fertilization and embryo transfer

technology to treat infertilities. Her proposal of IVF research eventually became a major project listed in the Seventh Five-Year plan and was funded by China's National Natural Science Foundation.

Designing a surgical method of egg retrieval that differed from the techniques derived from laparoscopy in the West, Zhang eventually led a team of developmental biologists and gynecologists to success. One important step for successful IVF was ovum retrieval.

About one third of Chinese women with blocked fallopian tubes attributed the blockage to complications from a past tuberculosis (TB) infection. Adhesions resulting from TB often wrap around the ovary and make it invisible from the laparoscope. Zhang solved this problem by designing an open-pelvic surgery in which she could retrieve eggs directly from the ovary.

On 10 March 1988, Zheng Mengzhu, the first test-tube baby in Mainland China was delivered at the Peking Medical College Third Hospital. The media soon celebrated this achievement as a major progress in China's medical modernization, and dubbed Zhang as a contemporary Children-Granting Guanyin, a Buddhist goddess of mercy.

After the success in 1988, Zhang concentrated on modifying her IVF methods. She succeeded in developing a protocol that used ultrasound guidance to retrieve eggs through the vagina without incisions. In 1988 she also successfully used gamete intrafallopian transfer technology, injecting eggs and sperm into the fallopian tubes. The first test-tube babies generated from eggs from donors or fetuses carried by surrogate mothers in China were also born under her care in the early 1990s. As the IVF project in the Third Hospital expanded into a Center for Reproductive Medicine, Zhang retired in 1998.

For her work with IVF, Zhang was awarded the Beijing Science and Technology Progress First Prize and the National Science and Technology Progress Second Prize in 1989. In 2006, Zhang received the Award for Technological Contribution for China's Population and Family Planning. As of 2010, Zhang lives with her family, continues to write, and gives occasional lectures in Beijing.

Sources

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