

## Jacqueline Whang-Peng-Cancer Research Pioneer

### Taiwan's first female surgeon

On Wednesday morning, quick-paced, crisp footsteps echo through the central hall of the old National Taiwan University Hospital building. The slightly wiry yet spry Whang-Peng has just arrived from a meeting at Veterans General Hospital to do clinic duty at NTUH. Her face shows no trace of fatigue from the all-nighter she pulled last night.

"Seeing patients improve is uplifting to me," says 75-year-old Whang-Peng, adhering to her long-time custom of visiting with patients twice a week, serving clinic duty in the cancer centers at NTUH and Wanfang Hospital. Direct contact with patients in the clinic, besides giving her a sense of joy and accomplishment, is also helpful in her research. "By actually seeing patients, you learn where the problems are and can better find ways to solve them," she says. Clinic duty and research complement each other.

Whang-Peng is a member of the first class to complete the NTU Department of Medicine's seven-year medical training program, and she is also the first female doctor in Taiwan to choose the surgical field. Surgery is work that takes time, physical effort and mental capacity; it also involves seeing blood. The majority of women keep their distance from such work, but Whang-Peng, with her orderly, forthright personality, has a special fondness for it. "I like the straightforwardness of surgical work: the success of an operation is clear right away. In contrast, medical work is long and drawn out. You see the patient today, then tomorrow, and the progress is slow and seemingly endless. It's quite a bother," she laughs.

Her graduating class includes such figures as former Cathay General Hospital director Chen Kai-mo, Shin Kong Wu Ho-Su Memorial Hospital director Hung Chi-jen, former Taipei Medical College president Chen An-chun and former Mackay Memorial Hospital director Lan Chung-chi. Though the majority of these venerable personages in Taiwan's medical community have stepped down from their posts, the sole woman from that era, Whang-Peng, remains ever busy, shunning retirement.

At the end of December 2007, she left her position as director of the Institute of Cancer Research, a branch of the National Health Research Institutes (NHRI), but remains an honorary researcher. In January 2008 she became vice-superintendent of Taipei Municipal Wanfang Hospital and director of its Cancer Center. Despite changing locations and methods, Whang-Peng still continues her fight against cancer. "I should be able to do this for a few more years," says Whang-Peng, steadfast in her noble sentiments.

"I've been given some special privileges," says Whang-Peng. In most public institutions, those over 65 can't serve as administrators, and those over 70 have to retire. How can she still be working beyond age 75? Despite officially leaving her public position and serving in honorary consultant positions, her workload hasn't decreased: she leaves home around seven in the morning and works until night. There's never enough time, not even to become old.



With the major discovery that chromosomal aberrations occurred in cancer patients, Whang-Peng won the Arthur S. Flemming Award in 1972, becoming the first female scientist born outside of the US to receive this honor.

## Pioneering chromosomal research

Whang-Peng served a year-long internship in Taiwan after graduating from NTU. Then, in 1957, she went to New England Hospital in Boston to serve as an intern. But due to her twin obstacles of being a woman and a foreigner, compounded by her imminent wedding, Whang-Peng's applications for full posts at hospitals were rejected, and her dreams of going into surgery were dashed, leading to a period of dejection. Instead she took on a position as a research assistant to Dr. Joe Hin Tjio, entering the field of oncological medical research. Little did she know that this convergence of events would propel her toward her greatest achievement in cancer research: proving that cancer was caused by mutations within chromosomes.

In 1958, after chromosome assay methods became available, people were well aware that congenital diseases such as Down's syndrome were linked to chromosomal aberrations, but at the time nobody made the connection that cancer, with its numerous forms and symptoms, also involved chromosomes.

In 1960, Whang-Peng and Dr. Tjio (who with Dr. Albert Levan discovered in 1958 that people normally have 46 chromosomes) were conducting research into cell inheritance at the National Cancer Institute, part of the US National Institutes of Health (NIH). She discovered chromosomal aberrations in the bone marrow and peripheral blood of leukemia patients: some chromosomes were broken, some had shifted position or proliferated, and some had even disappeared.

This major discovery in the cancer field opened up the way for future gene therapy research around the world to treat major illnesses, and won Whang-Peng the 1972 Arthur S. Flemming Award (whose purpose is to honor outstanding public employees). She was one of the first two women, and the first person not born in the US, to win the award in the 24 years since its founding.

Whang-Peng lived in the US for 33 years, advancing from resident physician to medical director of the Public Health Section and chief of the Cytogenetic Oncology Section at the National Cancer Institute. But with her four children grown, she turned her attention to her homeland of Taiwan where cancer was becoming a top killer but which lacked drugs, information and even qualified specialists.

She saw a new opportunity. For years, her compatriots from Taiwan had to come to the US to seek cancer treatment, a situation that saddened Whang-Peng. First of all, they incurred a considerable financial, mental and physical expense by crossing the ocean for medical treatment. Secondly, there was inadequate research in the US into the forms of cancer most common in Taiwan-nasopharyngeal, liver and stomach cancer-so the outcomes of treatment were poor. This gave Whang-Peng the idea of bringing her expertise back with her to Taiwan. Thus, she stepped down from her position and devoted two years to obtaining her oncologist's license.

On New Year's Day, 1994, Whang-Peng left her family and her comfortable life in the US, and, at the invitation of former Academia Sinica president Wu Ta-you and Institute of Biomedical Sciences director Wu Cheng-wen, became director of the institute's Cancer Clinical Research Center, with the mission to revitalize the field of cancer treatment in Taiwan.



Whang-Peng so often burned the midnight oil working on her experiments that her occasional days off prompted her children to ask, "Ma, are you feeling OK?" Pictured here is Whang-Peng in a genetics lab at the US National Institutes of Health.