Janet Rowley

Chicago octogenarian Janet Rowley has always strived to balance a stellar research career with the needs of her family. Even working only part time for more than 20 years, she was the first to discover that chromosome translocations can trigger cancer.

At 80 years old, Janet Rowley is showing a few signs of her physical age. She no longer trains for Himalayan treks by tramping up hospital stairs with a heavy backpack. These days, she stays in shape by biking around Chicago and swimming in Lake Michigan.

Scientifically, however, Rowley gives no indication of slowing down. A distinguished professor at the University of Chicago, she has pioneered studies on the abnormal chromosomes in leukemia cells since the late 1960s. Her groundbreaking discovery of translocations—segments of chromosomes that are transferred from one to another—won her a share of the acclaimed Lasker Award in 1998. And as a member of the President's Council on Bioethics, she has won public attention for her outspoken criticism of its reports.

Rowley's academic talent shone through from an early age. She earned a scholarship that allowed her to begin University of Chicago courses when she was only 15. But when she applied for medical school at the same university, she was told to delay a year because the quota for women—3 in a class of 65—was already filled. "I was only 19 at the time, so I figured it was okay to wait," she says.

As a mother to four sons, Rowley has always made it a priority to spend time with her family while still pursuing her career. She married fellow medical student Donald Rowley the day after her 1948 graduation, and the two have shared a love of science ever since. While he progressed to become a professor of pathology, she worked two or three days a week for more than 20 years in order to look after their children. "She loves her family so much, but she also loves science so much," says Rowley's former postdoctoral fellow Jianjun Chen, now an assistant professor at the University of Chicago.

Rowley became interested in the relationship between chromosomes and disease in the late 1950s, while working at a clinic for children with developmental disabilities such as Down syndrome. She made her first real foray into research during a year at Oxford University, when she entered the burgeoning new field of chromosome study called cytogenetics. After less than two years in the lab, she published two *Nature* papers describing the application of radioactive labeling techniques to track DNA replication in cells with chromosome defects.

Despite her success, Rowley still considered science to be a hobby that she juggled with the care of her young children. "I thought that these were nice findings, but it was not clear this research was going to go anywhere," she says.

But when the family returned to the University of Chicago in 1962, Rowley's skills were in demand. To entice her into working for him, the university's hematology chair offered her a part-time position along with three feet of bench space, a microscope and $5,000 per year. "It was very unusual to have a position like this at the time," says Rowley, because women were generally expected to either stay at home or focus on their careers, but not both.

Over the next few years, Rowley made a string of exciting discoveries showing that different types of leukemia cells contain various chromosomal translocations. In one such finding, she showed that the 'Philadelphia chromosome'—a small chromosome found in cancer cells from individuals with chronic myelogenous leukemia—is the result of an exchange between chromosomes 9 and 22. She went on to discover more than a dozen other such translocations in other cancer cells.

At first, most hematologists dismissed the translocations as unimportant artifacts, and her findings were rejected for publication by the *New England Journal of Medicine*. But the defects occur so consistently in leukemia cells that Rowley was convinced they must be involved in triggering the cancer itself. "I went to hematology meetings as a missionary, to convince people that they were important," she says.

She was right. Later studies in her lab and others' revealed that translocations disrupt the activity of genes that control cell division, resulting in uncontrolled proliferation and cancer. Her discoveries paved the way for leukemia treatments such as Gleevec (imatinib), a drug that blocks the abnormal protein produced by the chromosome 9–22 translocation. Today, identifying the specific translocation in a patient's cancer cells is the most important method by which doctors diagnose leukemias and determine how the cancers will progress and how they should be treated.

Besides championing her own work, Rowley has never hesitated to speak her mind about issues that she sees as vital to research. "One thing about Janet is that she does not back down from a fight—ever," says lab chief technologist Mary Beth Neilly.

"I can be sharply critical of things, but never depart too far from being civil. I'm trying to remain as a voice of reason."

Rowley has been a particularly forthright member of the President's Council of Bioethics, a group created in 2001 by US President George W. Bush to advise him on ethical issues surrounding biomedical research. Rowley says that many of the council's reports, on controversial issues such as cloning and sex selection, contain scientific inaccuracies. In one instance, she criticized a 2004 report on stem cell research and opposed the council's recommendation to impose a moratorium on human embryonic stem cell research.

In February 2004, two council members who also supported such research were excluded from the group and replaced with members who oppose it. Rowley says that she has been kept on the council because she makes corrections to its reports but does not lose her temper. "I can be sharply critical of things, but never depart too far from being civil," she says. "I'm trying to remain as a voice of reason."

Now heading for her 81st birthday, Rowley is keen to continue all aspects of her work. "I realize that I will have to retire at some point, but not now," she says. Her lab has just won three years' funding to explore how chromosome translocations occur and trigger tumors. Outside the lab, she still finds time to travel, listen to opera and tend her garden. Her stately nineteenth-century home, only blocks from the medical center, includes a solarium that looks out on her flourishing flower and vegetable patch.

Indeed, Rowley attributes much of her success to the balance in her life between work and home. "I always felt I had the best of all worlds," she says. "I've had a very rich life outside of science."

Kris Novak, Chicago