Serendipity, luck and hard work

Professor Kum Kum Khanna heads the Signal Transduction Laboratory at the QIMR Berghofer Medical Research Institute in Brisbane, Australia. She studies the role of the DNA damage response in tissue homeostasis and disease, including how to exploit its dysregulation in breast cancer to develop targeted therapeutic approaches.

Kum Kum Khanna

Hard work has been a huge part of my journey as a woman and a researcher, and was instilled in me from a very early age. I was the fifth of seven sisters and born in the beautiful French-architect-designed city of Chandigarh, India. A household of girls presented an unusual problem for my parents in what was still a conservative time in India: dowries had to be paid; marriages arranged. I spent my childhood watching my father work hard to support his family, taking on additional jobs that had him typing, reading and performing his duties long into the night. As a child, I used to wonder how I could ease his burden. Now, as a researcher and a group leader, I see myself channelling my father's passion and drive for his work in much the same way. Science is unforgiving in that it requires everything you have in order to solve problems, come up with solutions and innovate. But that is also what I love about it.

When I moved to South Australia from India as a young postdoctoral researcher in 1989, I was engrossed in the world of parasitology. I had visions of working overseas on the *Giardia* parasite and returning home after a few years to help solve issues that India was still grappling with. Just like my home city of Chandigarh, Adelaide was beautiful, but Australian culture was still a big transition for me. Luckily, my new supervisor, Peter Ey, was incredibly supportive — not only in the laboratory but also with simple tasks such as how to go about grocery shopping and finding my way around town. When my husband, professor and immunologist Rajiv Khanna, joined me in Adelaide three months later, Peter helped us to find a unit to rent. He went a step further, driving a van laden with appliances and furniture to our new home to kit us out. He made me feel so welcome and played a huge part in helping me to establish myself in a new country, so far from my strong family support network back in India. Although my husband became involved in the laboratory too, it was largely unpaid in the beginning. When a new job presented itself at the Queensland Institute of Medical Research (QIMR) Berghofer in Brisbane in 1990, he jumped at the chance. I remained in Adelaide to finish my project and we ended up living in different cities.

Around a year later, I followed him to Brisbane and took up a position in Martin Lavin's laboratory to understand cellular responses to DNA-damaging agents. This was a serendipitous move and a turning point. I changed my scientific focus and switched to studying a human genetic disorder designated as ataxia-telangiectasia (A-T), characterized by high cancer risk. The gene defect responsible for this disorder was unknown at that time. We postulated that the wild-type gene product normally prevents cancer by controlling activation of the p53 tumour suppressor pathway after ionizing radiation treatment but not after UV exposure, suggesting that it is involved in signalling responses to specific types of DNA damaging agents. Our findings were validated when *ATM*, the gene mutated in A-T, was cloned in 1995 by an international team led by Yossi Shiloh. Subsequent studies showed that it encodes a protein kinase activated after exposure to ionizing radiation and other radiomimetic agents, that signals to p53. I identified c-Abl kinase as the first partner protein for ATM and also a number of other interactors and substrates, including tumour suppressors such as p53, BRCA1, NBS1, CHK1 and CHK2. My second postdoc at QIMR Berghofer was a lot of hard work, but I had also read the writing on the wall. If I wanted to continue on this path, I needed to be adaptable. I worked day and night. Cancer research was new to me, so I did a lot of reading and a lot of retraining in basic skills. I remember being in the lab all day, arriving as the sun rose and working regularly into the early hours. The hard work paid off and many of these studies were published in highly respected journals, which helped me secure an independent fellowship and funding support to set up my own laboratory at QIMR Berghofer.

Tough decisions were also involved. I delayed starting a family while I worked to establish my scientific career. Although it was only by two years, in India our decision raised eyebrows. My daughter was born in 1991, and my son in 1995. He was born premature, weighing just 1.1 kg at barely seven months. I had been attending an American Association of Cancer Research conference in Toronto, Canada mere days before I suddenly went into labour on my return to Australia. I was going to be presented with a young scientist travel award and had been attending conference sessions from early morning until late at night. When doctors told me the labour was too far progressed to be stopped, I thought I had lost him. Incredibly, he survived and had no lasting ill effects, another amazing stroke of good fortune. Having children did not impede me attending conferences as I hired help to assist with childcare. Things are changing, with institutes like mine now providing financial support to help with childcare.

Even now, I think it is a challenge for women to have both a family and a scientific career, and I feel lucky to have a supportive and equal partner on the home front. I sometimes think that my husband contributes more to our home and family life than I do. My advice to any woman out there pursuing a career in science: do not give up and do not try to achieve everything on your own. If you need help, ask for it — it may be closer than you think. ❐

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Published online: 28 August 2018
https://doi.org/10.1038/s41556-018-0170-8

Competing interests
The author declares no competing interests.