

Maree Smith: Treating other's pain is crucial to me

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Eminent pain researcher Professor Maree Smith is a very good example of an academician, who turned towards the industry in order to bring her research to reality. Professor Smith, who is behind the formation of successful start-ups, QRxPharma and Spinifex Pharmaceutical in Australia, has been awarded the 2012 Life Sciences Queensland (LSQ) industry award for excellence.

This award is presented to individuals who have made significant contributions to the performance and success of the Queensland life sciences industry and demonstrated a breadth of impact across the sector in Queensland. Talking about the award, she said that, "I feel deeply honored to have received the LSQ Industry Award for Excellence in 2012 jointly with Dr Jim Alyward (Peplin), as voted by my peers in the industry. I sincerely thank all of the people who have helped me throughout my career."

Early life and education

Professor Smith grew up in Brisbane, the sub-tropical capital city of Queensland, the second largest state by land mass (nearly seven times the size of the UK). She feels fortunate to be the eldest of a family of nine children with loving parents, who encouraged their children to acquire good education. She recalls, "I enjoyed primary school and high school and was an enthusiastic netball player in inter-school competitions. I also enjoyed backyard games of cricket, rounders and red rover with my siblings and the children of neighborhood families on the south side of Brisbane."

She studied for a Bachelor of Pharmacy degree on the St Lucia campus of the the University of Queensland (UQ) and registered as a pharmacist in Queensland. During her undergraduate program in pharmacy at UQ, she was inspired by one of her lecturers, Mr Bill Harris, to do a postgraduate honors in the field of bioanalysis and clinical pharmacokinetics. Professor Smith remembers, "Mr Harris introduced me to my first mentor, Emeritus Professor Mervyn Eadie, from whom I learned a lot

about clinical studies, pharmacokinetics, academic writing and collaboration with industry."

Professor Eadie in turn introduced professor Smith to her second mentor, Emeritus Professor Tess Cramond, a pioneer and leader in the pain management field in Australia. "From Tess, I not only gained many pearls of wisdom and knowledge about clinical pain management but also about various aspects of professional life. These included the nature of setting and achieving stretch goals through a combination of 'out of the box' thinking, good planning, focus, hard work and collaboration with industry." Professor Eadie and Professor Cramond are two role models who stand out for the pain researcher of Australia. She mentions that both of them cared deeply about their patients and their students, and were visionary leaders.

From her time as a postgraduate research student and then as an early career postdoctoral biomedical researcher, Professor Smith was influenced 'at the subconscious level' by senior researchers and mentors in the Departments of Medicine and Anaesthesiology on the Herston campus of UQ. These researchers were distinguished in the way that they collaborated closely with the industry in an ethical manner on clinically relevant research projects that aimed at improving patient outcomes.

Shift from academia to industry

Talking about the importance of academia-industry collaboration, Professor Smith said, "From the onset of my career, I absorbed by osmosis, that clinical outcomes were paramount and that the best way to achieve such outcomes is by effective collaboration between academic life sciences researchers and industry. Hence, once I commenced my independent academic research career as a lecturer in the UQ School of Pharmacy in the early 1990's, I instinctively knew that for the discoveries to be successfully translated to the clinic, it would be important to collaborate with industry."

Since the latter half of the 1990's, she has collaborated with the industry, initially as a means of commercializing her own intellectual property (IP) and undertaking a few R&D contracts, and then in an accelerated and expanded manner over the last seven years as her role as executive director and co-founder of the Center for Integrated Preclinical Drug Development (CIPDD) at UQ. CIPDD was established as a university level center at UQ in May 2005 with \$8.1 million in investment funds from the Smart State Research Facilities Fund (SSRFF) to purchase leading edge infrastructure, as well as significant seed capital from UQ. CIPDD is a joint venture of the Faculties of Science and Health Sciences involving four schools (pharmacy, medicine, chemistry and molecular sciences, and biomedical sciences) and a collaboration between its four founders , including Professors Maree Smith, Ron Dickinson, Istvan Toth and Rod Minchin.

In the last seven years, the team at CIPDD has undertaken more than 500 contract R&D projects in collaboration with more than 200 industry and academic clients in the biopharmaceutical sector in Australia and abroad. All studies are conducted in a facility with internationally recognized quality credentials, viz GLP recognition and ISO17025 accreditation from the National Association of Testing Authorities (NATA). "The concept of my Centre and its evolution into the outstanding facility that it is, has been a logical progression," mentions Professor Smith.

She believes that she has made the transition from academic researcher to her present role where she is working in close collaboration with industry, with relative ease. "This is because I really enjoy working at the interface of science and business." Professor Smith finds it very satisfying in the professional sense to be able to assist researchers from industry and academia to progress their life sciences inventions from the discovery laboratory through the various nonclinical translational research steps towards commercialization, as well as to undertake research aimed at bringing innovation into the methods used for R&D studies.

Treating others pain

When asked why pain interests her so much, she says "For my second postdoc, I changed from the clinical pharmacokinetics, bioanalysis and drug metabolism field to the field of pain management. This field is of high importance to me because population surveys in many countries show that approximately 20 percent of people suffer from chronic pain. Additionally, on average only 30 percent of patients achieve at least 30 percent pain relief from currently available medications with tolerable side-effects. Hence, there is a very large unmet medical need that is driving research directed at producing a new generation of highly effective and well-tolerated analgesic agents to improve patient quality of life."

Despite a large collective global research effort over the past two decades on the pathobiology of chronic pain and on drug discovery programs in the pain therapeutics field, very few new analgesic drugs have reached the market. As many compounds have failed phase II clinical trials on efficacy grounds, this highlights the need for research to improve the ability of 'preclinical pain models' to identify molecules that will be analgesic when progressed to clinical trials in patients with chronic pain. Addressing this hurdle is a major area of research focus in Professor Smith's Center at UQ.

QRxPharma and Spinifex are commercializing pain medicine based on Professor Smith's work. QRx Pharma has completed phase III clinical trials of MoxDuo for improved treatment of moderate to severe acute pain such as that which occurs post-operatively, and filed a New Drug Application with the United States FDA. The company hopes to receive notification of approval in mid-2013.

In August 2012, Spinifex Pharmaceuticals announced successful results of a phase IIa clinical trial of EMA401, a first-in-class, orally active, new pain therapeutic for the treatment of neuropathic pain. This clinical trial was a multi-center, randomized double-blind, placebo-controlled design undertaken in 180 patients with post-herpetic neuralgia, a type of neuropathic pain that is notoriously difficult to treat. Patients were randomly assigned to either EMA401 (100 mg twice daily) or placebo treatment for four weeks. Patients on active treatment achieved clinically significant pain relief above placebo and EMA401 was well-tolerated.

Challenges she faces

Professor Smith feels that there are two major challenges that stand out. One is the on-going challenge of being a member of the small minority group of female professors in universities, a situation that has not improved in two decades. To address this challenge, Professor Smith believes that it will require affirmative action to be implemented for at least a decade. Another challenge for her is to secure investment for undertaking "killer experiments". "I addressed this in the late 1990's by securing angel investment for my IP that is currently being commercialized by QRxPharma. In the case of my IP being commercialized by Spinifex Pharmaceuticals, funding for the early "killer experiments" was secured by UniQuest from Australian venture capital firms in 2005."

However, since the 2008 global financial crisis, there has been an on-going dearth of venture capital in Australia for these experiments. To address this issue, the Australian Government has recently invested \$35 million in infrastructure in the Translating Health Discovery into Clinical Applications initiative. Specifically, four investments were made that are being managed by the not-for-profit company, Therapeutic Innovation Australia (TIA).

One of these investments, the TIA-Queensland Node comprises the CIPDD and four collaborating translational research Centers located in South-East Queensland that have complementary nonclinical and clinical research capabilities, viz the UQ Diamantina Institute, Griffith health Institute (GHI) at Griffith University, UQ Center for Clinical Research and Queensland Center for Clinical Trials & Biostatistics at UQ. The mission of the TIA-Queensland Node is to provide a facilitated pathway to assist Australian life sciences discovery researchers to progress their inventions across the so-called 'valley of death' towards commercialization. Co-investment funding of \$2 million was provided by the Queensland government in 2012 for operational funds and to undertake four 'exemplar' translational research projects that will begin to deliver commercial returns within five years.

However, things are not that dim either. Strategic investment by various governments has attracted a critical mass of talented and committed individuals across many disciplines to the sector. An advice which Professor Smith gives to the young researchers of this generation is that "Find your passion, become an expert in one or more sub-disciplines in the field and collaborate with experts in complementary areas as progress is often made at the interfaces between established sub-disciplines. Also, think 'outside the box', set stretch goals and make a plan. It will be a bumpy ride with many 'ups and downs' but if you maintain focus and stay the course, you will be well-placed to fulfill your dreams."

Professor Smith hopes to continue her role as executive director of her center and work in collaboration with the TIA-Queensland Node colleagues to provide a facilitated pathway to assist Australian life sciences discovery researchers to move their inventions through various nonclinical and clinical development steps to the point where they will attract investment for commercialization into products for improving human health.