

## Professor K Barry SHARPLESS

Citation

Most people who are non-scientists think that the work of scientists has little to do with our lives. In the case of Professor K Barry Sharpless, they couldn't be more wrong. In a nutshell, if you care about the side-effects of drugs, you should care about the research results the good professor has achieved. His research on the mirror image of molecules, for which he was made a co-winner of the 2001 Nobel Prize for Chemistry, is vitally important for opening up new fields of research in the industrial synthesis of pharmaceutical products such as antibiotics, anti-inflammatory drugs and heart medicines. In the opinion of Prof Amos B Smith of the University of Pennsylvania, Prof Sharpless' research contributed "some of the most important reactions probably discovered in the last 50 years".

In layman's language, many molecules appear in two forms that mirror each other, just as our left hand mirrors the right hand. One form may be beneficial, while the other may be harmful. In the manufacture of pharmaceutical products, the difference between these two mirror forms is often a matter of health or debility, if not life and death. Tragically, in the 1960's, with the drug thalidomide, one form controls nausea in pregnant women, while the other causes limb deformities in fetuses. The scientists' job is to produce chemical reactions that yield the desired *outcome*.

Prof Sharpless has been exploring what he calls the "asymmetric nature of the chemical universe". He quite rightly declares that the scientific

method consists in asking the right questions. His co-recipient of the Nobel Prize, Prof William S Knowles, began asking the right questions and Prof Sharpless followed up with more of his own. In his life-long scientific pursuits, he has garnered awards, honors and memberships too numerous for exhaustive listing. Accolades have been showered on him from many international sources. These include the King Faisal Prize for Science, awards or memberships from the Italian Chemical Society, the Royal Society of Chemistry in Great Britain, the Israel Institute of Technology, Goethe University, the Swedish Academy of Pharmaceutical Science, and the American Chemical Society. He was elected to the National Academy of Sciences in 1984 and was named the "Top 75 contributors to the Chemical Enterprise" by the American Chemical Society. He was also honoured in several inaugural events, receiving the first Paul Janssen Prize for Creativity in Organic Synthesis presented by his Royal Highness Prince (now King) Albert of Belgium. He was Texas A & M University's first Barton Lecturer in 1997.

As an overachieving scientist, it is interesting to note that Prof Sharpless honestly considers himself an accidental scientist. He had never planned to be a scientist, just to follow in his father's footsteps as a medical doctor. He openly acknowledges the crucial role played by his mentors at the critical junctures in identifying his gift for science. Instead of going into medical school, his professor steered him into graduate school and even chose the school he attended. His ruling passion at that time was fishing. Perhaps

his encounter with his career-changing mentor might be considered an episode of serendipity. Since he threw himself into his passionate pursuit in chemical research, he has not gone fishing for more than thirty years. We are fortunate that the then budding scientist instead went into angling of the scientific kind and came up with such a bountiful catch.

Prof Sharpless, lauded and garlanded everywhere, remains a humble man who generously acknowledges his debts to his co-recipient Prof Knowles and the “75 or so former Sharpless Group members”, saying that if he had a crown, the jewels would be these fellow scientific travelers.

With his Nobel Prize, Prof Sharpless has reached the pinnacle of his scientific career. But he has other honors which are beyond the reach of even fellow Nobel laureates. He has scientific processes or discoveries named after him. While at Massachusetts Institute of Technology (MIT), where he was a chemistry professor for 17 years, he discovered the process known subsequently to the scientific world as the “Sharpless Asymmetric Epoxidation”. During the same tenure, he and his co-workers also discovered the “Sharpless Asymmetric Dihydroxylation”. At MIT, he was praised as a wonderful teacher and mentor for a great number of students over those long years. In 1990, he joined the Scripps Research Institute where he is the W M Keck Professor of Chemistry.

In the making of a great scientist, one is always curious about the schools he went to and the teachers that he had studied under. Prof Sharpless had gold-plated academic credentials. He received his PhD in chemistry at Stanford, and did post-doctoral work at MIT and Harvard. But we should

not overlook where his scientific dreams were hatched. His mentor and high school science teacher Clayton Farraday made the wise decision that he should attend a small college rather than a large university. He picked Dartmouth College where the teaching was excellent and opportunities for undergraduates to perform research in labs were abundant. This was how and where he got hooked. Undergraduate hands-on research is capable of igniting students’ scientific interest, as Dartmouth College consistently advocates.

When Prof Sharpless was awarded an honorary doctorate by Stockholm’s Royal Institute of Technology, he was also given a top hat, a ring with its insignia, plus a large brass cannon shell casing fired during the cannon salute as the degree was conferred. We, HKUST, are a young university, and have yet to develop our ceremonial traditions. Prof Sharpless will have to settle for just a simple verbal salute. But our simple tribute rings true, that scientists are toiling on our behalf for a better world and a better life. We don’t need a cannonball to carry this point across.

Mr Chancellor, on behalf of the Council of the Hong Kong University of Science and Technology, I have the honor to present Prof K Barry Sharpless, a Nobel Laureate in Chemistry, for the award of Doctor of Science *honoris causa*.