Interview with Nobel Laureate

Professor Peter Agre

Professor Peter Agre is a Professor of Biological Chemistry at the Johns Hopkins University School of Medicine, USA. He was awarded the 2003 Nobel Prize in Chemistry. He was recognized for his laboratory’s discovery of the long-sought “channels” that regulate and facilitate water molecule transport through cell membranes, a process essential to all living organisms. The discovery of the water channel, dubbed “water pore” or aquaporin, has helped scientists to discover drugs that can specifically target water channel defects.

Q: In what areas has the knowledge of your discovery in water-ion channels been applied?
The understanding of water-ion channels led to the treatment of some medical conditions such as brain oedema, premature infancy, and asthma. Corticosteroid is already being used to treat various illnesses related to water retention such as kidney diseases. The knowledge of how water-ion channels work can also be applied in agriculture.

Q: What are some technological trends and developments you have observed in the biomedical arena?
We are witnessing a revolution in the understanding of gene transcription right now. I think that computational biology, in terms of protein structures, is going to be very important. Individualized medicine is also another important trend.

Q: What do you regard as the most important biomedical breakthrough of the 20th century?
There is a number of important breakthroughs in the 20th century. I think the discovery of the restriction enzymes is one of the most important. Hamilton Smith and Daniel Nathans won the Nobel Prize in Physiology or Medicine in 1978 for that. Restriction enzymes are tools to dissect DNA into smaller defined fragments to determine the order of genes on chromosomes, to analyze the chemical structure of genes, and to recombine genes by chemical means. There are plenty of other breakthroughs. Science moves along somewhat incrementally; one big event often leads to another.

Q: What do you think of nanotechnology?
Nanotechnology is a kind of miniassay. Nanotechnology increases the acceleration to do screening procedures but it does not give us new ideas—it is simply a method. We still need to have clever ideas and smart students who are curious to do many experiments very carefully.
Q: Which area in science do you see Asia as having an edge?
I think Asia has a tremendous wealth of intelligent, highly motivated young people who like science. The university students in East Asia and South Asia study science much more than they do in the US. These are very good students. There is a huge population of Asians whose priority is education. This is a century of East Asian domination of science. In the US, we are not enthusing our young people enough. Less than half of our graduate students come from the US; the others come from abroad. The government is making visas more difficult so these young people are not coming to the US. US will decline unless things change. So what does it take to get a Nobel Prize? I am very lucky as I come from a huge system in the US. Singapore is a much smaller country but I think Singapore has more high quality substrates in terms of young people. That is your advantage and it is the most precious one of all. You can buy machines, but you cannot buy the talent.

Q: Do you see Singapore as having any niche in terms of scientific work?
I think Singapore is concentrating on the right priority and that is medically relevant basic science. I think we should not try to become developmental biologists studying yeast or worms. That will be basically looking at the interface between clinical medicine and basic science. Your unique niche is your young people—they are smart, creative, highly motivated. Keep them encouraged and focused.

Q: What got you interested in research?
My dad was a chemist who taught at a small college. I had great interest in education. My brothers and sisters and I were encouraged to apply ourselves in studies and pursue science or medicine as careers. I am very curious about things. I do not see myself spending as much time in the laboratory side of science but more in efforts to excite people about science. Science is a difficult career. It is easier to sell something, say to be a lawyer; but science is where all the big advances come from.

Q: What attitude should a young person or researcher have?
They have to be curious and to question how things are done. They have to be careful in their technical study and they cannot be assuming. It is more like exploration than engineering. When you are exploring, you have to be able to go out into the unknown and still come back. Science is like that; you do not know what you are going to find.
Q: How has being a Nobel laureate changed your life?
My dog does not love me any more than before. My wife does not love me any less! It has brought a lot of attention and I try to use it responsibly. Many people think that a Noble Prize winner will know everything. It is not true, trust me! It has been good. It has gotten me places that I could not go otherwise. I hope I can use it for the public good. It has not made life easier. In some way, it has brought a loss of privacy. There is a point you just like to have quiet to be able to think, and that is getting to be increasingly rare.

Q: Who has inspired you most in your career path?
My dad was a wonderful inspiration. If I have to pick a hero of all the people, it would be Linus Pauling. He was a friend of my dad and I met him when I was a child. He was a brilliant scientist who made many important discoveries in chemistry, medicine, and peace. He was a scientist who got involved and initiated test-ban treaty. Here is a scientist who used his “bully pulpit” to change how society viewed nuclear weapons, and they restricted it.

Q: What is your greatest achievement?
My greatest achievement is to have four wonderful children who are very interested in the world and want to make it a better place. They are 27, 25, 20, and 16 years old. None of them are scientists.

Q: What would you like to be on your epitaph?
Thomas Jefferson, the third president of the US, asked to have three things mentioned on his gravestone. He was the author of the statute of religious freedom for Virginia, he was the author for the Declaration of Independence; and he was the founder of the University of Virginia. Being a president was not important to him. If my ashes could be strewn in the forest somewhere, that would be fine. But to have some monument saying “He won the Nobel Prize” would definitely not be my choice. Maybe I will say something like “he had a sense of humor, and he tried to make the world a better place; and he had a wonderful family.” That is not so special in terms of unique individuals, but that is something we all would like to have.