

Interview: Chemistry, life and longevity

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Jyoti Chattopadhyaya talks to Marie Cote about chemistry's fundamental role in our lives, the secrets of a successful business and delivering his message to younger scientists



Jyoti Chattopadhyaya is professor of bioorganic chemistry at the University of Uppsala, Sweden. His research focuses on a biophysical/bioorganic approach towards understanding the structure-function of nucleic acids, encompassing the design of biological mimics with synthetic chemistry and their structural studies *via* NMR and computation, and kinetics, for a better understanding of the chemistry-biology interface.

What inspired you to be a scientist?

Curiosity inspired me. I am driven by curiosity and the unknown. I also wanted to pass on my knowledge, to let people know what I know. Science is for society, and we, as scientists, have a duty to keep the public informed.

What motivated you to study chemistry?

Once I realised the bountiful gifts of nature as an undergraduate, I understood how chemistry has made our lives so successful. From drugs to clothes to hygiene, chemistry plays a fundamental role. Look at the longevity of the human race today: in Sweden, where I live, you can hope to reach 85-86 years old. Can such longevity be possible without chemistry?

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With this in mind, we need to work towards a cleaner environment so that toxicity levels are lowered and controlled. In this way, the positive effects of chemistry will come into focus. If chemistry can find its way into the containment of carbon monoxide and carbon dioxide emissions, then let's hope it won't be unusual to live to 150! We want to live long and productive years, and not perish like the dinosaurs. To reduce carbon dioxide pollution, we need help from all corners of research, for example, to develop hybrid cars for the next generation. Politicians also need to take responsibility. More money should be invested in these research fields and chemistry and politics must work together.

What led you to specialise in the biophysical aspects of nucleic acids?

If you wish to carry out synthetic organic chemistry, you need to understand the physical chemistry behind it. In order to understand biological functions, there must be interplay between physical and synthetic chemistry. Chemistry cannot be distinguished into separate branches as it used to be 30-40 years ago.

How do you see nucleic acid chemistry progressing over the next 10 years?

There is a metamorphosis going on in this field, but nucleic acids do not stand alone - they have a role to play with other biopolymers and ligands. Nucleic acids alone cannot achieve the whole process from

transcription and translation to glycosylation of proteins. This can only take place through the interaction of different ligands and biopolymers.

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You have initiated many start-up companies. What is the secret to setting up a successful business?

The secret is to understand that we cannot have companies without patents, we cannot have patents without fundamental discoveries, and we cannot have fundamental discoveries without solid support behind us - it's a continuum. The dynamic of the process is very important and the market force alone cannot dictate what will actually make it to the market. I would like to see more commitment from the representatives of our democratic society; I would be happy to see some of the profits from the start-up companies go back to the tax payers.

You have received many awards. Which are you most proud of?

This is not so much about the award itself. The real reward is to go to a conference and have the opportunity to communicate with my colleagues. The award is for the gallery.

What would your message for younger scientists be?

Have trust in yourself, and be ready to put your heart and soul into the game. We as teachers have a responsibility to communicate to the younger generation about the science of today and how it has developed. However, I can only paint my own picture: the students have to decide for themselves. Science pays off, but it demands a full commitment. The younger generation takes it for granted, because they have not seen days without antibiotics or a flushing toilet. We would not be what we are today without science and many people tend to forget this. That is the message I want to give to them.

What would you be if you were not a scientist?

I wasn't very good at sports. I played some chess, but I was not alpha plus in that either. But I am good at what I do, and that is what I want to be. I want to keep sharpening my mind and look forward: there is still much to learn.

Can you tell us something about yourself that people don't know?

This is a difficult question, because I don't know what people know... but I can tell you that I demand from my students as much as I demand from myself, no more, no less. If you are going to be in this business, you want to be the very best.