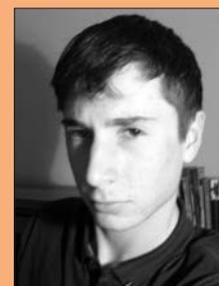


Interview with Professor Dr. Hamilton Othanel Smith



Louis Wilson

Simon Langton Grammar School for Boys, Kent, England, E-mail: louis-wilson@live.co.uk

ABSTRACT

Prof. Dr. Hamilton Smith was born in 1931 in New York. He studied at the University of Illinois, eventually transferring to the University of California, where he received a Bachelor of Arts in mathematics. Later, he studied at the Johns Hopkins University, receiving a medical degree in 1956. In 1967, Prof. Dr Smith returned to Johns Hopkins as an assistant professor of microbiology. It was there that in 1969, he made the discovery of Type II restriction enzymes – enzymes that cut DNA at specific points and are now a vital tool in modern genetics. He was subsequently awarded the Nobel Prize along with Prof. Werner Arber and Prof. Daniel Nathans in 1978.

Dr. Smith, thank you very much for joining us today. Can I ask you what your interests in science are and what you were awarded a Nobel Prize for?

Prof. Dr. Smith: I have had several interests over the years. I started out as a microbial geneticist studying the transformation of bacteria and that work is what led to the Nobel Prize. By chance, I discovered an activity in a bacterium called *Haemophilus influenzae* [Figure 1], where extracts of the bacteria could cleave foreign DNA without cleaving the cell's own DNA. In other words, here was an enzyme that could recognise DNA that was from another source – and that fitted the description of “restriction enzyme” that Werner Arber had postulated. So, I went ahead immediately to try to purify that enzyme, and in about 2 years, I had worked it out and published the data.

The interesting phrase you used there was ‘by chance’, which reflects Louis Pasteur’s idea that “chance favours the prepared mind”. Do you think that’s a correct statement?

Prof. Dr. Smith: It is a correct statement. In this case,

because I knew about the postulated existence of these enzymes, and we made the chance observation that extracts could cleave foreign DNA, [we] assumed immediately that it was a restriction enzyme.

How old were you when you considered that you had started your scientific career?

Prof. Dr. Smith: My father bought me a chemistry set when I was 5 years old, and I enjoyed mixing things, seeing different colours precipitated, burning sulphur etc. From my earliest memory, I think that my interest in both mathematics and science of any sort was almost genetic.

Did you still enjoy doing science as a teenager?

Prof. Dr. Smith: Yes, every evening, I worked with my brother – who was also in science – in a basement laboratory that we had. We worked on all sorts of things – electrical things, motors, Tesla coils, radios; we had a fairly sophisticated collection of chemicals, including concentrated acids and so on – we just experimented!

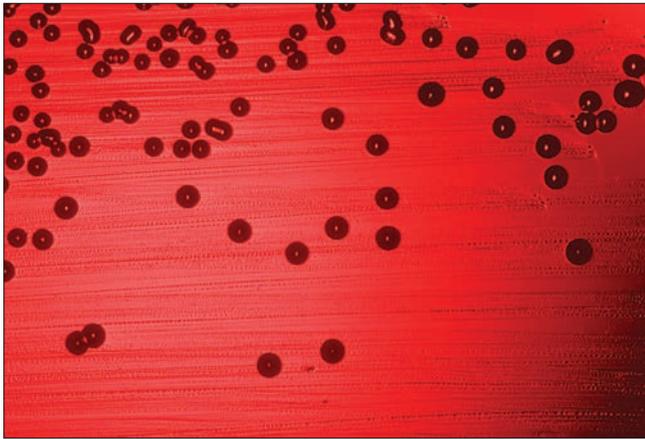


Figure 1: An Image of *Haemophilus influenzae* (available from http://upload.wikimedia.org/wikipedia/commons/d/dc/Haemophilus_influenzae_01.jpg)

Did this sort of experience of carrying out experiments without any sort of training affect your scientific career?

Prof. Dr. Smith: Yes, I've always thought that I was a natural in the laboratory, but it was because of that early experience that I knew about experimentation.

Did you have a role model in science?

Prof. Dr. Smith: Well, surprisingly, it was the physicists that were my role models – Einstein is a classic example. It was only later on that I became interested in biological research.

What did you particularly admire about Einstein?

Prof. Dr. Smith: The thing that impressed me was the fact that he didn't benefit much from teachers; he went his own way and didn't really do well in school. He developed all of his major theories just by thinking and doing thought experiments and using deductive power to build theories. I've always been in awe of the theoreticians, even though I'm an experimentalist.

So now you are at the top of your career, what is your advice to young people who are interested in science, especially those who haven't entered university yet?

Prof. Dr. Smith: The most important thing is to follow



Figure 2: A photograph of Hamilton Smith in 2011 (available from http://upload.wikimedia.org/wikipedia/commons/5/56/Hamilton_Othanel_Smith.png)

what you want to do yourself – don't let somebody direct you too much. If you enjoy working in a certain area, and maybe have some insights into it that other people don't have, then pursue that line [Figure 2].

How exactly did you discover the restriction enzyme?

Prof. Dr. Smith: The restriction enzyme discovery was a eureka moment – we'd made an observation in the lab that foreign DNA was being degraded by the *Haemophilus influenzae* organism and it occurred to us that it might possibly be one of the restriction enzymes of the sort postulated by Werner Arber but not yet isolated, so I went home that evening thinking it was probably not true. However, we had a way to assay¹ it, so the next morning we set up to assay, and within five minutes, the first point told us we had the thing. It was a fantastic experience to know that you had a new unusual activity, which, although I didn't know it, would be technologically valuable; it was something new that I could purify and isolate. It wasn't in my grant, but we just pursued it! I think that was the very pinnacle of my career.

Dr Smith, it's been a pleasure to talk with you, thank you very much for your time.

¹An assay is a procedure in molecular biology to evaluate the activity of biochemicals in an organism.

About the Author

Louis Wilson was born on 29th October 1994, and is currently studying Biology, Chemistry, Physics, 'Double' Mathematics and Russian. In addition to scientific pursuits, Louis enjoys classical music, and plays violin, piano and horn. He hopes to become a geneticist later in life.