Virologist

BY LUBA VANGELOVA

Virologists study viruses (parasitic bits of genetic material encased in protein) and the diseases they cause to mitigate or eliminate their negative effects. Virology is a specialty within the field of microbiology, which is concerned with the study of microscopic organisms. Ewan Plant is a virologist at the Food and Drug Administration (FDA) in Silver Spring, Maryland. He focuses on trying to improve influenza vaccines.

Work overview

I spend a lot of time in a laboratory. Every year the circulating influenza viruses change, so the influenza vaccine also has to change. It contains an antigen that has to look like the virus and stimulate the body to make antibodies that will target the real virus. The antigen comes from a virus that must grow well and produce a lot of protein. I investigate what makes some viruses grow better in the media that manufacturers use, and what makes a virus produce more antigenic protein, so that these features will be included in the virus strains used in vaccines.

My work involves manipulating DNA, culturing viruses, and attending to cell cultures—replenishing their media, splitting them into new dishes, and checking for infection. I also keep up with the latest research publications, plan new experiments, write up my own results for publication, and review regulatory submissions from vaccine manufacturers.

During my career there have been considerable changes in what we use computers for, and keeping up with that is a constant challenge.

Career highlights

Having my work published in a scientific journal or being invited to speak at a conference is exciting. It makes me feel like the work I am doing is relevant and recognized by my peers. It is also always a thrill when an experiment first indicates that we have made a new discovery. One example was when we described how specific messenger RNA molecules could disrupt ribosome function using a method no one had thought of before.

Career path

I was always interested in nature, and I liked studying chemistry and biology in high school. I chose to major in biochemistry in college. A university genetics course, in which we introduced new DNA into plants and sequenced our own mitochondrial DNA, opened my eyes to the possibilities for discovery and learning using molecular techniques.

My career path has essentially involved doing things I was interested in and taking advantage of opportunities when they presented themselves. I didn’t have any job plans after college, and I really liked the laboratory work I had done during my undergraduate program, so I enrolled in a master’s program in the same laboratory. I then continued on to get a PhD. At that time, it was becoming easier to manipulate DNA using molecular biology techniques, so I started using those techniques to explore the biological pathways of yeast cells.
After that I did postdoctoral work in a lab that used yeast as a model organism to investigate viruses. We used yeast because it is an easy-to-manipulate single-cell organism; but because it has a membrane-bound nucleus, at the functional cellular level, it is similar to multicellular organisms such as humans. We collaborated with other research groups working with viruses, including one at the FDA. I learned new techniques through the collaborations and, as money ran out for one project, the new skills and connections enabled me to switch to jobs in new laboratories.

I spent a total of six years doing postdoctoral work, followed by three years in an FDA lab working on the SARS coronavirus. I have spent the last nine years at the FDA working on influenza viruses. In addition to working with DNA and yeast cells, I also learned how to work with RNA, ribosomes, and mammalian cells.

**Knowledge, skills, and training needed**
The ability to communicate clearly is very important. My regulatory memos and manuscripts have to be understandable. Science can get complicated quickly, and being able to convey a message without getting lost in the details is important. There is always some on-the-job learning—I had a lot of molecular biology under my belt when I got this job, but I didn’t have the influenza virology background. Expanding your knowledge base can make a job more interesting.

**Advice for students**
Work out your own best learning methods. In addition to knowing things, it is also important to recognize what you don’t know, and how you can fill those gaps. Being able to communicate effectively and work with a variety of people is also important. Internships or volunteer opportunities can be the best way to get a feel for what the work is really like.

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**BONUS POINTS**

**Plant’s education:** BS, MS, and PhD in biochemistry, University of Otago, New Zealand

**Website:** [www.cdc.gov/flu/index.htm](http://www.cdc.gov/flu/index.htm)

**Related careers:** parasitologist, mycologist, bacteriologist, epidemiologist

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