

THE POWER OF PROTEINS



Borchers. UVIC PHOTO SERVICES

Keeping you healthy is a top goal of world-leading protein research at UVic

By Kim Westad

A University of Victoria biochemist whose work could dramatically change Canadian health care tosses a football from hand to hand as he chats with students who have vied to work in the lab he leads.

While Christoph Borchers may present as low-key and casual, the research going on at the UVic Genome BC Proteomics Centre is anything but. As centre director, Borchers heads research that can be applied to everything from developing more insect-resistant forests to identifying environmental problems, such as oil leaks, before they cause massive damage.

But it's in health care that proteomics could have the most immediate and wide-ranging impact for the public. The research can help diagnose conditions such as cancer and heart disease earlier, enable individualized treatment, and provide deeper insight into the biological processes underlying cancer.

"This is the best equipped proteomics lab in the country and one of the best in the world," says Borchers, who is known worldwide as a proteomics pioneer.

Proteomics is the study of all the pro-

teins—antibodies, enzymes and structural molecules—that are directed by genes to keep cells functioning and healthy.

Genes are the "recipe" of a cell. The proteins encoded by the genes drive both normal and disease physiology. "Genes are the information, but proteins do the work," explains Borchers. "If you digest something, if you feel something, that's the protein. They are the molecules of function."

With just one pinprick of blood, scientists can quantify more than 300 proteins. These provide the protein fingerprint for a person's health at any given moment.

Proteins contain biomarkers. By looking at these, scientists—and ultimately doctors—can create a profile of the proteins and specifically target which treatment will best work for the ill person. Such individualized care is better for the patient and will save money in the long run, as the treatment is more efficient.

Our proteins are constantly changing, particularly if we're sick—even if we don't know we are. If protein testing were part of mainstream medicine, serious diseases could be detected via changes to the blood proteins before it advances, says Borchers.

"The earlier you detect a disease, the better

the chances to treat it. The holy grail is prevention," says Borchers.

The centre has partnered with McGill University's Jewish General Hospital to put the technology to work. There, Borchers and his team can access thousands of different samples to conduct clinical trials and studies and validate proteomics-based tests on patients.

Borchers foresees a time in the very near future where medicine is focused on preventative care, using proteomics.

Blood testing would go hand in hand with consultations with physicians, who would interpret the results and focus more on wellness than sickness.

Proteomics research is complex and expensive. The lab, housed at the Vancouver Island Technology Park in Saanich, has more than \$10 million-worth of specialized equipment, all of which Borchers encourages students to get their hands on.

These students are the future of modern health care, he says, and the best way to learn is through experience. "Here, they have the opportunity to work on cutting-edge technologies that will help people. What could be better than that?"

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KNOWLEDGE

Research and discovery
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EDGEWISE

Just as every living thing has a complete set of DNA known as its genome, we all carry a full complement of proteins known as the proteome. The total number of proteins in human cells is estimated to be between 250,000 to one million.

Proteins are of interest to researchers in just about every area of biochemical investigation, including medicine, pharmaceuticals, forestry, fisheries, agriculture, and environmental research.

UVic is a national and international leader in the development, use and application of proteomics technologies for improving human and environmental health.

The UVic-Genome BC Proteomics Centre has provided leading proteomics technologies to academic and industry clients since 2001, serving researchers in Canada and more than 25 countries around the world.

This spring, the UVic-Genome BC Proteomics Centre and the Proteomics Core Facility at UBC were unified into a single Proteomics Centre. This new arrangement provides clients with an expanded range of proteomics services in a "one-stop shop" and creates a central hub for proteomics research in Canada.

The unified Proteomics Centre is part of a new national Genomics Innovation Network and is funded by Genome Canada, Genome BC and other sources.

Meet Christoph Borchers at <http://bit.ly/uvic-borchers>