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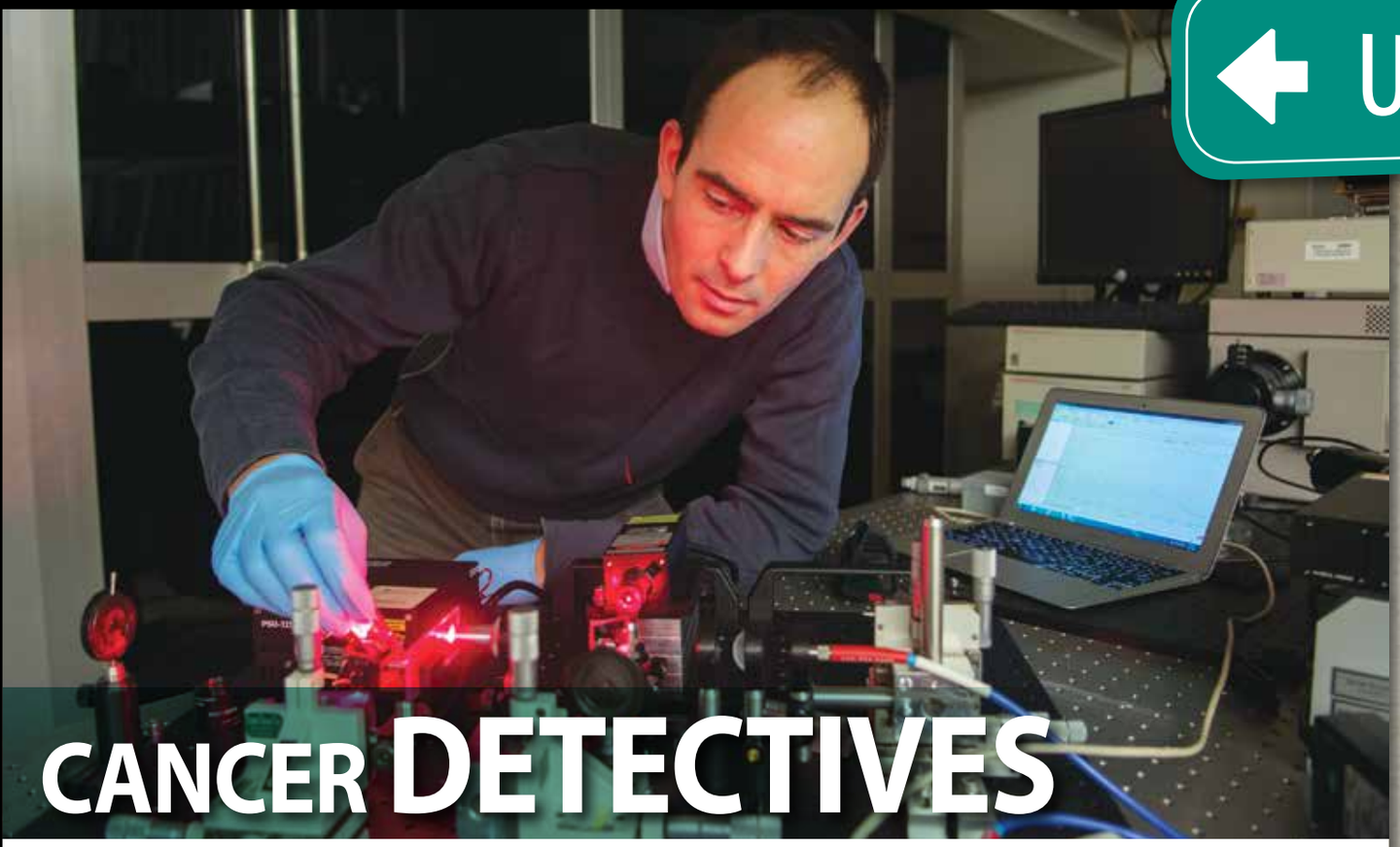

CANCER DETECTIVES

Gordon. UVIC PHOTO SERVICES

UVic research discovers a promising new way to detect lung cancer

by Suzanne Ahearne

It's good to have a fast metabolism if you're talking about maintaining a healthy body weight. But cancer cells are also fast metabolizers. It's what makes them more active and faster-growing than healthy cells. And it's what makes them so dangerous.

But their speed also makes them vulnerable. Long before cancer cells are detectible to most screening tests, their quick-metabolizing behaviours will still give them away—if you know where to look and what to look for.

A University of Victoria research team led by engineer Reuven Gordon and chemist Fraser Hof, in partnership with Vancouver-based Biomark Diagnostics, is developing an inexpensive, non-invasive way to detect cancer in urine.

In the trial now underway, a person swallows a dose of the prescription drug Amantadine, which is a common antiviral. When the drug metabolizes in the body, it creates a molecule (or biomarker), which is excreted in urine. Cancer cells metabolize the drug faster and in a characteristic way. If you have cancer, the levels of this metabolized marker in your urine will be higher.

It's what Gordon calls an "indirect measure" of having cancer—what it shows is how your body is processing this drug, and clinical trials are proving that it's a reliable way to tell if someone has an increased risk of having cancer. In addition to screening for family history, smoking and other lifestyle risk factors, this could save lives by diagnosing early-stage cancers before a person is symptomatic.

Lung cancer is Biomark's primary target for the discovery. Lung cancer represented 24 per cent of all new cancer cases in Canada in 2014 and is the leading cause of death from cancer for both men and women, representing 27 per cent of all cancer deaths.

Other types of hidden cancers like colorectal could also be targeted. A positive reading on a urine test would be followed up with other tests to determine the location of a tumour.

Gordon and his engineering team used Raman spectroscopy—a technology that employs a laser to identify individual molecules—to create a detection platform that would make the urinalysis cheaper and more easily available to labs. Hof and his group were responsible for the chemistry involved in biomarker capture.

"This approach is really unique," says Hof. "We aim to create a process that is fast, convenient, and cheap enough to enable trials with thousands of patients. We hope to improve decision-making prior to the elaborate scans and invasive biopsies that doctors currently use to diagnose lung cancer."

The researchers have shown that their technique works in the lab on mock urine samples and that it achieves the desired sensitivity. Now they're starting tests on clinical samples.

"As a scientist, the most significant thing for me is getting this type of research and analysis from the lab into the clinic," says Gordon. "I'm happy to be developing something that will make a difference in society."

As the Canada Research Chair in Nanoplasmonics, Gordon looks for innovative ways to "squeeze" light at the nanoscale (invisible molecular level). His research is applicable in a range of fields, from the development of sensors for the early detection of cancers, to the manipulation of viruses for study, to more efficient solar energy conversion.

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"The students in my group are fascinated with pushing the boundaries of nanotechnology," says Reuven Gordon. "Being able to hold on to single proteins, virus particles—that was impossible a few years ago. Listening to the unique acoustic vibration of the proteins as we're doing now, would have seemed even more unbelievable in the recent past."

The partnership with Biomark came together under a Natural Sciences and Engineering Research Council of Canada (NSERC) Engage Grant and is proceeding with funding from Genome BC.

Reuven Gordon is a featured speaker at IdeaFest, UVic's annual celebration of knowledge and creativity, which takes place March 2-7. He is one of four UVic Canada Research Chairs who will share their stories of innovation and impact in a series of fast-paced talks on March 2, 7-9 p.m. in the Hickman Building, room 105. The event is free and open to the public.

Meet Reuven Gordon at *http://bit.ly/uvic-gordon*