New cancer 'tracer' promises to detect more tumors earlier

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For people waiting for imaging tests to diagnose neuroendocrine cancer, time is of the essence. Now, thanks to researchers at the University of Alberta, a new medical imaging agent for PET scans promises to reduce

wait times, while costing less to produce and possibly revealing more of some types of cancer tumors.

Ralf Schirrmacher, an oncology imaging professor and member of the Cancer Research Institute of Northern Alberta, and his team at the Medical Isotope and Cyclotron Facility on the U of A's South Campus have been using a state-of-the-art cyclotron—a machine that already supplies the province with medical isotopes used in diagnostic scans—to create a new imaging compound that will reveal cancer tumors when patients receive a PET or PET-MRI scan.

The use of extremely low amounts of radioactive material as diagnostic "tracers" in cancer imaging is not new, but researchers are continually working on new chemistries to make these radiotracers safer, more reliable and more effective.

The new radiotracer, labeled with fluorine-18, is good at locating neuroendocrine tumors—cancerous tumors that can appear anywhere in the body but are most often found in the intestines, lungs, pancreas and stomach.

Reducing wait times takes time

Schirrmacher says fluorine-18 is an improvement compared with other currently used radioisotopes such as gallium-68. Radioactive gallium requires a special generator. In addition, there are often supply shortages and use of the gallium generator is restricted to a limited amount, which means only two to three patients a day can receive a medical scan.

"We are lucky, we have access to two AHS cyclotrons—one here at the U of A and one at the Cross Cancer Institute as well," notes Schirrmacher, who is also a member of the Women and Children's Health Research Institute. "We could make a batch in the morning and

see 10 patients, so we could reduce the waiting time for patients substantially."

Schirrmacher, a radiochemist, has been working on the compound since 2005, when he had the breakthrough idea shortly thereafter to combine radioactive fluorine with silicon. It was previously only combined with carbon.

"The radioactive peptides are labeled capitalizing on the very strong bond between silicon and fluorine. The chemistry works at room temperature, and purification only requires one simple extraction and the imaging agent is ready for injection—this is why it is so stable and reliable," he explains.

Schirrmacher is now happy to see his team's work go from the chemistry lab bench to the bedside as clinical trials involving more than 2,000 people in Germany have been completed and are starting in the Netherlands and France, as well as India.

He says the clinical trials in Germany are showing that the new compound may actually catch more cancer metastasis than other gallium-labeled compounds, which is especially important in followup treatment and determining whether cancer is spreading to other parts of the body.

Next steps in Canada mean applying for clinical trials which will go through the newly formed Alberta Radiopharmaceutical Center, a collaboration between Alberta Health Services and the U of A.

Schirrmacher notes that he will not license the chemical process of creating the new imaging agent, because he thinks it's better that it is free for all to use so more people who may have cancer can get scanned sooner.

"I can't imagine how it feels having cancer or not knowing if you have cancer, and then having to wait to get diagnostic imaging," he says.

Provided by University of Alberta