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Michael Kolios: Sounding Out Cancer: Using Ultrasound Research to Investigate Better Cancer Treatments

Some day, cancer patients may benefit from enhanced treatment, and transplant organ recipients may have a better chance at survival, thanks to research undertaken by Ryerson's Michael Kolios.

Although the areas of study may be slightly different – cancer and organ transplants – the common element is the use of ultrasound imaging.

"My research is the result of a discovery made by Gregory Czarnota (adjunct professor in the Dept. of Math, Physics and Computer Science) and myself in 1996 while we were still undergraduates at U of T," Dr. Kolios says. "We found that high frequency ultrasound could image the self-destruction of cells."

This self-destruction, known in scientific circles as apoptosis, is medically significant for a number of reasons, and the discovery that ultrasound could image it non-invasively is a potential breakthrough. Currently, the Math, Physics and Computer Science professor is working with researchers at Princess Margaret Hospital to develop a method for monitoring apoptosis in cancer patients. It would be the first non-invasive tool, and if developed successfully, could enable doctors to use ultrasound to check on the progress of cancer treatment without having to remove and analyze cells.

In addition to support from the Natural Sciences and Engineering Research Council, and funding from the Canadian Institutes of Health Research, Dr. Kolios and his colleagues won a Canada Foundation for Innovation and matching Ontario Innovation Trust grant to purchase an ultra high-frequency ultrasound machine, currently housed at Princess Margaret.

The research has progressed to the stage where clinical trials are imminent. Dr. Kolios' research has spun off into a slightly different direction, resulting in the recent announcement of a three-year, \$173,000 (US) grant from the Whitaker Foundation in the United States. The Whitaker Foundation is a private, nonprofit foundation dedicated to improving human health through the support of biomedical engineering. The grant will support research into the use of ultrasound imaging to study the quality of organs available for transplant. Ultrasound will be used to see how many cells die while the organs are in storage, typically from 12 to 24 hours.

"We are the pioneers in this research," Dr. Kolios says. "All of my research is applied and that fits well with Ryerson's focus," Dr. Kolios says. "I love research, but I also love teaching," he says. The Department of MPCS is currently developing a master's program proposal in medical physics.

In his four years at Ryerson, the Toronto-born Dr. Kolios has been

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