

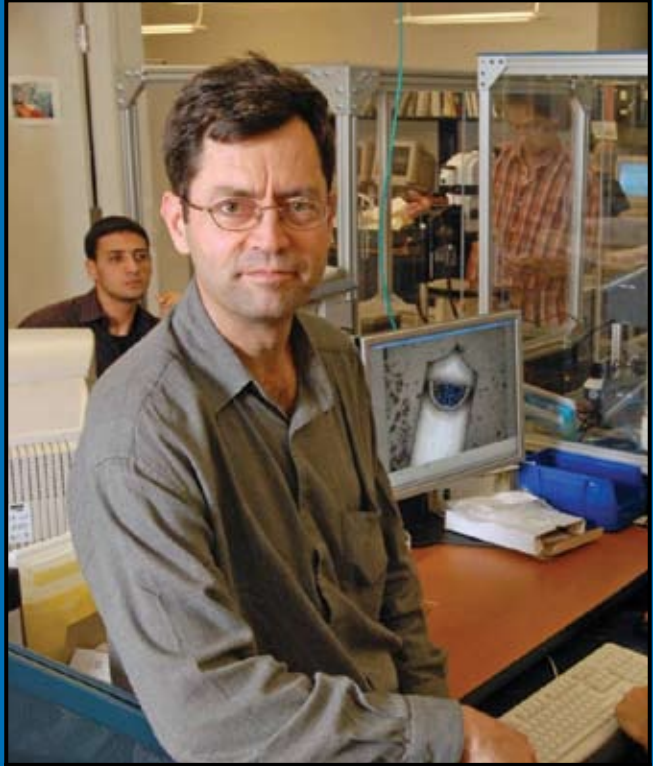


Harnessing the Power of MRI Systems to Transport Cancer-fighting Drugs Directly to Tumours

Dr. Sylvain Martel of École Polytechnique de Montréal is closing in on a holy grail of cancer treatment—a system that could transport chemotherapy drugs through the blood vessel directly to a cancerous tumour, without damaging the healthy cells around it.

“By using tools and technologies provided by CMC Microsystems, our team was able to develop integrated microsystem platforms required to validate our models in the lab. CMC will become even more important as we aim to develop more intelligent devices to transport life-saving drugs through even smaller blood vessels.”

Dr. Sylvain Martel
Canada Research Chair in Micro/Nanosystem Development, Fabrication and Validation;
Director, NanoRobotics Laboratory
École Polytechnique de Montréal



Dr. Sylvain Martel (left) of École Polytechnique de Montréal has developed a system that could transport chemotherapy drugs through a blood vessel directly to a cancerous tumour, without damaging the healthy cells around it.

Dr. Martel continues to be amazed at the international attention that his research is attracting. This Canada Research Chair in Micro/Nanosystem Development, Fabrication and Validation, made headlines around the globe in March 2007 with a world-first achievement in medical robotics. Using specialized software developed by his research team and experimental prototypes developed with the support of CMC Microsystems, he has transformed a conventional magnetic resonance imaging (MRI) machine into a potential transport system for cancer drugs. His innovation may enable the delivery of chemotherapy drugs directly to the cancerous cells of a patient.

Dr. Martel collaborated with a diverse team of researchers spanning physics, biology, oncology, materials science, electrical, computer and mechanical engineering from the NanoRobotics Laboratory at École Polytechnique de Montréal and a medical team at the Centre Hospitalier de l'Université de Montréal (CHUM). Together, they demonstrated how the magnetic field of an MRI can propel 1.5-millimetre-diameter beads through a 5-millimetre artery of a live pig. After applying for several patents, the team is now working with Gestion Univalor, a Québec-based technology transfer company, to commercialize this system.

“We want to provide doctors with new technologies to treat cancer,” he explains. “By using a nanorobotics approach, you can target the infected cells that require chemotherapy and other cancer-fighting drugs, while reducing the overall toxicity to the patient.”

It's a major technological breakthrough that Dr. Martel says he could not have achieved without CMC. “We relied on CMC to develop the microsystems prototype that allowed us to validate our concept in the lab, before conducting a test with an MRI system. This required access to sophisticated microelectronics tools and technologies, and integration capability. We also worked with CMC to develop some specialized platforms that allowed us to do characterization in-vitro. These were essential to understand what happens before we conduct the in vivo test. The capability provided by CMC will become even more important to our research in the future.” cmc