Improving the Prediction and Prevention of Epileptic Seizures

Researchers at the University of Toronto and Toronto Western Hospital are bringing hope to those who suffer from epilepsy with the development of an implantable microsystem that senses signals in the brain and processes the acquired data, increasing opportunities to predict and prevent epileptic seizures.

"CMC's evolution into microsystems is helping Canadian researchers combine different technologies and develop novel systems for application in many sectors, including the life sciences. My research is dependent on access to the industry-grade tools and technologies provided by CMC."

Dr. Roman Genov / Leader of the Intelligent Sensory Microsystems Laboratory / University of Toronto

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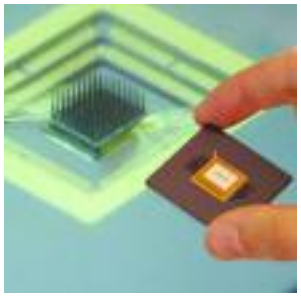

Epilepsy is a debilitating neurological disorder that affects over 40 million people worldwide, and there are only limited therapies to control the violent seizures associated with this disease.

Dr. Roman Genov, Leader of the Intelligent Sensory Microsystems Laboratory at the University of Toronto, is tackling this challenge head-on with the development of an implantable, low-power microsystem that could detect the onset of an epileptic seizure, and stimulate electrical signals in the brain to prevent the seizure from occurring.

With the support of CMC Microsystems, Dr. Genov is taking initial steps towards achieving this goal. He is among a growing number of engineers who are collaborating with biomedical scientists, neurologists and other medical experts to develop microsystems for life sciences applications–applications that promise to improve the health of Canadians.

Dr. Genov is working closely with Dr. Berj Bardakjian, a biomedical engineer at the University of Toronto and Dr. Peter Carlen, a neurologist at Toronto Western Hospital. The research team has discovered a way to significantly expand the functionality of a microchip with low power consumption, by attaching up to 256 tiny electrodes or needles onto its 3 x 4.5 mm surface. The integration of microelectronics and electrode technologies enables the device to record and process low-level electrical signals from different locations inside the brain.

"CMC has played a key role in this project, by providing access to computer-aided design tools, prototyping and custom packaging solutions," says Dr. Genov. "We have recently conducted early experiments on mice with promising results, and are now working with Toronto Western Hospital to assess the potential of this technology for those who suffer from epilepsy and other neurological disorders."