

# 2014 REPORT



## BREAKTHROUGH CANCER RESEARCH

# BREAKTHROUGH CANCER RESEARCH

**BREAKTHROUGH**  
**CANCER RESEARCH**

Dr. Robert (Bob) Korneluk is palpably excited as he sits down with his colleagues, Drs. Eric LaCasse and Shawn Boug, to talk about the team's recent major breakthrough. Despite being a senior scientist at the CHEO Research Institute, Korneluk is almost child-like in his delight as he explains the new cancer therapy they have developed in the lab.

Their discovery is technically specific, but at the same time simple. His lab combined two experimental cancer-fighting agents currently tested separately as part of clinical trials: one that employs a class of drugs called SMAC, another that induces death of cancerous cells; and the two in combination thus cause to kill cancer cells, known as oncotherapy.

The key component of this breakthrough is what really elevates this success story. Almost 20 years ago in 1995, Korneluk discovered a family of proteins that control cell death, known as IAPs (Inhibitors of Apoptosis). With upwards of 70 billion cells dying each day in healthy adult human beings, Korneluk had a hunch at the time that these were very important proteins. Today, with certainty, he knows why! The SMAC Mimetics, used in the combination immunotherapy, act by targeting or removing the IAPs; Korneluk believes his team's latest breakthrough has the potential to revolutionize the way cancer is treated. This CHEO research team is laser-focused on moving it into human clinical trials for cancer within the next three years.

The lab, at the CHEO Research Institute, Drs. Eric LaCasse and Shawn Beuken are major breakthroughs. Despite being a scientist at the lab, Korneluk is palpably excited about the new cancer therapy they have developed. Their discovery is technically specific, but at the same time, surprisingly simple. His lab combined two experimental cancer treatments (one currently tested separately as part of clinical trials worldwide); one employing a class of drugs called SMAC Mimetics, which accelerate the death of cancerous cells; and the other employing viruses that infect cancer cells, known as oncolytics, that trigger a natural immune system response to kill cancer cells. In 2014, Korneluk and his team found that in combination the two treatments are up to 10,000 times more effective together, than each therapy is on its own. There is no damage to any of the surrounding healthy cells when the cancer is destroyed either. The researchers are currently testing their new treatment on an iPad, which they hear on traditional and out-of-Animal Farm, and it can be repeated 3-103 and can be compared outside. Bromwich refers to this as "the right people

INNOVATION  
MOBILITY

**INNOVATION**  
**MOBILE HEALTH RESEARCH**  
Dr Matthew Bramwich sees many patients in Iqaluit. Only occasionally is there no northern territory, so the team travel to Ottawa. Often they use a mobile phone.

**INNOVATION**

## MOBILE HEALTH RESEARCH

Dr. Matthew Bromwich sees many children with hearing issues in Iqaluit. Only occasionally is there an audiologist that is accessible to Ottawa. Often though, Bromwich noticed, the children's hearing was normal so he started to question the costly process. A better method had to exist, and discovering it is what spurred his research portfolio.

Bromwich and his research team developed, tested and launched a ShoeBOX Audiometer, known simply as the ShoeBOX. "Cheaper, easier, faster, better," Bromwich says when he introduces the device. It employs existing capabilities found on an iPad, a special audiological headset, and proprietary software. Following validation, the device was validated and it is now available to researchers around the world.

Innovation of the ShoeBOX though, lies in its design. A visually appealing game interface which then requires them to move their head. While the technology tests hearing, it also tests balance.

The innovation of the ShoeBOX though, lies in the way it test works. A visually appealing game gets presented to a patient on an iPad, which then requires them to respond on the screen to what they hear on the headset. While the sounds are the beeps known to traditional audiology tests, the game itself looks like something taken out of Animal Farm, and the whole test takes no longer than 5 minutes and it can be repeated as often as needed. It is suitable for anyone from 3-103 and can be completed at home, in schools, in hospitals, or even outside. Bromwich refers to it as "Intelligent Triage" - medical testing that reaches the right people, in the right places.

The innovation of the ShoeBOX though, lies in the way the hearing test works. A visually appealing game gets presented to a patient on an iPad, which then requires them to respond on the screen to what they hear on the headset. While the game itself looks like something taken out of Animal Farm, and the whole test takes no longer than 5 minutes and it can be repeated as often as needed. It is suitable for anyone from 3-103 and can be completed at home, in schools, in hospitals, or even outside. Bromwich refers to it as "Intelligent Triage" - medical testing that reaches the right people, in the right places.