



The Ottawa  
Hospital



## UPDATE 2018-2019

### Tomorrow's cancer care, today

The Ottawa Hospital (TOH) has earned an international reputation for leadership in cancer research. From unmatched expertise in oncolytic viruses to revolutionizing the clinical trials process, we are working hard to transform every aspect of cancer care.

Over the next 15 years, Canadians will see a 40 percent increase in cancer diagnoses with almost one in two developing cancer in their lifetime. Thanks to the incredible generosity of people like you, we are well-positioned to face this challenge head-on. You should be proud to know your contributions have helped us build one of the best-equipped cancer centres in the country and develop programs to translate our ground-breaking research into new and better therapies for our patients. Together we are providing tomorrow's care, today.



The Ottawa Hospital Cancer Centre

## Dr. Rebecca Auer: bringing a fresh perspective to translational cancer research



In April of 2018 The Ottawa Hospital appointed the highly-accomplished Dr. Rebecca Auer as our director of cancer research.

A native of Ottawa, Dr. Auer's early career trajectory includes accolades at Queen's University and the University of Ottawa before being recognized as the top resident researcher at Memorial Sloan Kettering Cancer Centre in 2007 and Distinguished Young Professor at the University of Ottawa in 2013.

Since starting her own research laboratory at The Ottawa Hospital in 2007, Dr. Auer has focused on the interplay of cancer, surgery and the immune system. She has made many important discoveries including how tumour removal surgery suppresses the immune system in a way that encourages remaining cancer cells to spread.

Now, in her new position, she will lead more than 300 cancer researchers as they too work to eradicate cancer.

"I'm really excited to take on this new role because I see an opportunity to bring people together, build bridges and accelerate the translation of our research into benefits for patients," said Dr. Auer. "The Ottawa Hospital is already leading the world in several areas of cancer research and there is great potential for further growth."

## A lifetime of leadership in lung cancer research

Dr. Glen Goss, recently received the Lifetime Achievement Award at the Canadian Lung Cancer Conference. This award recognizes his leadership in improving care for people with lung cancer, both as an oncologist and as a researcher. Dr. Goss has led many international clinical trials, with a focus on developing personalized, targeted therapies and his research has contributed to the approval of multiple new drugs for lung cancer.

"When a treatment doesn't work, we want to know why it doesn't work and we want to answer the question in order to bring better treatments to the patients," said Dr. Goss. "This is why we are passionate about personalized medicine - where the treatment is more precise, we know more about the patient, we know more about their tumours, and we can develop personalized care."



Dr. Glen Goss

## Clinical trial and research highlights

Today, cancer care is changing at an unprecedented pace, often with treatment becoming increasingly complex but also more targeted and personalized. We are seeing approvals for new cancer drugs grow at an almost exponential rate while translational research and clinical trials are now seamlessly integrated into cutting-edge cancer care. Your support has provided critical funding that has allowed us to lead this cancer care revolution and bring unparalleled expertise in biotherapy to our patients. None of these projects would have happened without your support.



Dr. Jean-Simon Diallo

## Starting the journey from bench to bedside

### "Bait and switch" approach stimulates immune attack on cancer

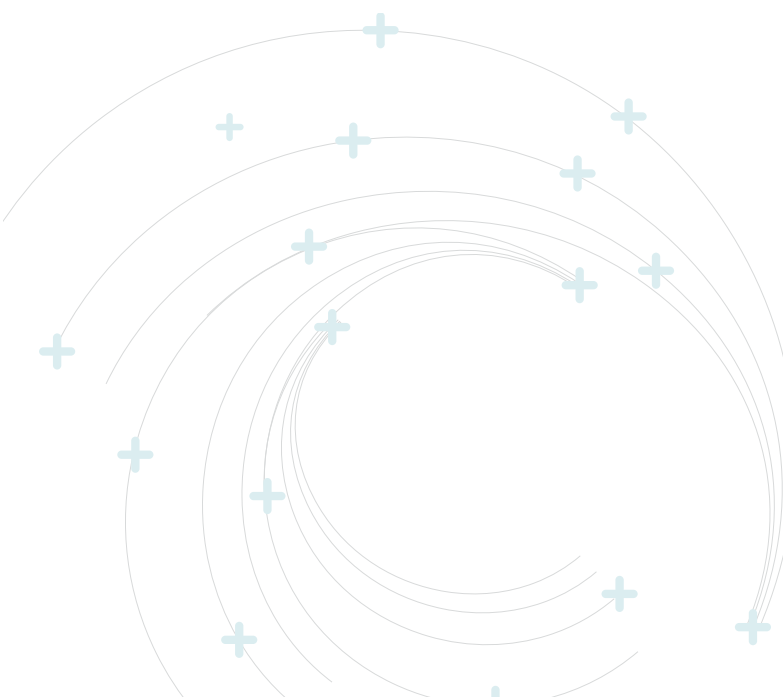
Oncolytic (cancer-fighting) viruses have shown promise because they can directly kill cancer cells while also stimulating the immune system to attack the cancer. Dr. Jean-Simon Diallo and his team recently discovered a novel approach to enhance this immune attack. In effect, the virus "baits" the immune system by triggering the tumour's interferon defense system, while vanadium "switches" this natural alarm signal into one that favours immune attack on the tumour as opposed to the virus. This approach cured 80 percent of some mouse cancer models.

### New mechanism to enhance cancer-killing viruses

Dr. Carolina Ilkow and her team are the first in the world to demonstrate that unlike normal cells that lose their first line of defence when they become cancerous, many cancer cells maintain an ancient antiviral defense mechanism called RNA interference. Her team created a virus that blocks this defense mechanism and found that it was much better at killing cancer cells, without harming normal cells. This research could lead to the development of better cancer-fighting viruses, as well as biomarkers to determine if an individual's cancer will be susceptible.

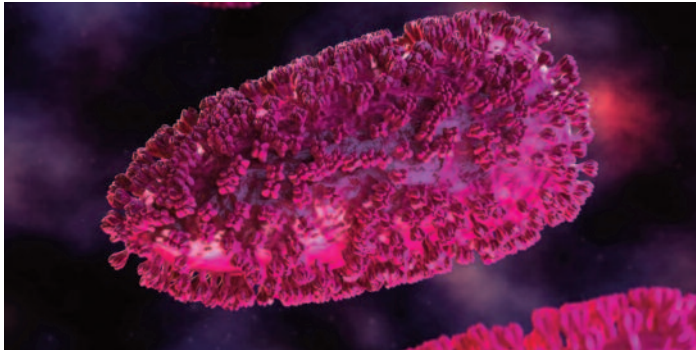


Dr. Carolina Ilkow



## Viruses and checkpoint inhibitors work together to cure resistant breast cancer in mice

A new study led by our researchers suggests that a combination of two immunotherapies (oncolytic viruses and checkpoint inhibitors) could be much more successful in treating breast cancer and possibly other cancers.



Maraba virus (credit: McMaster University)

Researchers studied three mouse models of triple negative breast cancer (the most aggressive and difficult to treat) and found all were resistant to a commonly-used checkpoint inhibitor. They also found an oncolytic virus called Maraba could help the mouse's immune system recognize and attack the cancer, but the virus alone had minimal impact on overall survival.

Researchers tested the virus and checkpoint inhibitor together and found it cured 60 to 90 percent of the mice. Further research will determine if the same mechanisms are at work in humans.

## Exosomes open up exciting new avenue of leukemia research

A new study led by Drs. David Allan and Yevgeniya Le shows the potential of exosome research for acute myeloid leukemia (AML), a kind of cancer that starts in the bone marrow.

They identified small RNA signals in exosomes released by certain "normal" supporting cells in the bone marrow that could help leukemia cells grow. Using samples from our patients as well as publicly available gene expression databases, they explored how five of these RNA factors could play a role in leukemia. If confirmed in other studies, these factors could be used as targets to develop new therapies.

## Advancing the science, clinical trials test groundbreaking treatments

### Erectile dysfunction drugs and flu vaccine may work together to help immune system fight cancer after surgery

Dr. Rebecca Auer and her team published a new study that suggests a common treatment for erectile dysfunction combined with the flu vaccine may be able to help the immune system mop up cancer cells left behind after surgery. The study shows that this unconventional strategy can reduce the spread of cancer by more than 90 percent in a mouse model. It is now being evaluated in a world-first clinical trial.

"We're really excited about this research because it suggests that two safe and relatively inexpensive therapies may be able to solve a big problem in cancer," said Dr. Auer. "If confirmed in clinical trials, this could become the first therapy to address the immune problems caused by cancer surgery."

### Targeting cancer stem cells improves survival with some colorectal cancers

An international clinical trial led by Dr. Derek Jonker found that a drug that targets cancer stem cells improved survival in patients with a specific form of colorectal cancer. Cancer stem cells make up a very small part of some tumours. However, they can repeatedly



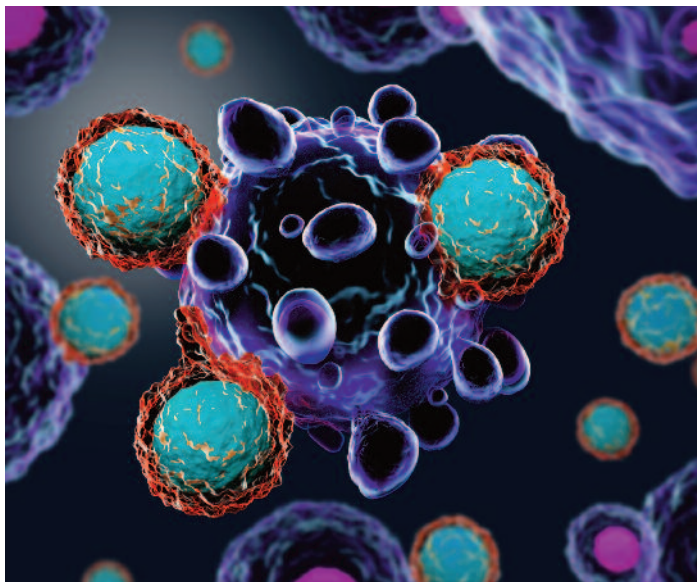
Dr. Derek Jonker

duplicate and give rise to all the cell types in a tumour and may help cancer spread to other parts of the body or resist treatment. The study showed that while the drug did not improve survival among the general population of patients, it did improve survival in people with a molecular marker called pSTAT3 in their cancer. Further studies will now examine STAT3 as a target for treating this kind of colorectal cancer.

### **Made-in-Canada CAR-T therapy to wipe out blood cancers**

The Ottawa Hospital is leading a national initiative to bring made-in-Canada CAR-T cell therapy to patients. Shown to eliminate some advanced blood cancers, this revolutionary treatment removes a patient's T-cells and modifies them in the lab to attack cancer cells.

The Biotherapeutics Manufacturing Centre at The Ottawa Hospital houses one of the most advanced systems in Canada for manufacturing virus-based products like CAR-T cells. This facility will be one of only two sites in Canada manufacturing the cells for this trial. The design of this national trial is being led by our very own Drs. Natasha Kekre, Dean Fergusson and Manoj Lalu, which means our patients will be among the first to participate in clinical trials of this revolutionary therapy.



3D representation of T cells attacking cancer cells



The Rose Ages Breast Health Centre

## **Unveiling a new era in breast health at The Ottawa Hospital**

The new Rose Ages Breast Health Centre officially opened its doors on September 20, 2018. The event marked a thrilling close to an ambitious \$14 million fundraising campaign.

Built and equipped through the unfailing generosity of our community, the Centre now houses an impressive suite of technologies that is among the latest and most comprehensive in Canada – many of which enable more accurate and much less invasive diagnoses and treatments.

But more than just technology, the new centre was designed as an inviting space to enhance wellness and connection to family and friends. It also allows closer proximity to all the specialists involved in a patient's care, from before diagnosis to after treatment and beyond. This means, thanks to your donations, we can see more patients, more quickly by employing an efficient and effective team approach, all while providing more precisely tailored therapies to enhance survival.

## Radiation oncology on the cutting edge

The Ottawa Hospital is home to one of the best equipped radiation programs anywhere in the world. With this distinction comes the responsibility of ensuring our patients continue to have access to the best care possible and that often means we strive to employ the latest, proven technologies that will make a significant difference in the patient experience.



A CT simulator assists with treatment planning

### Better by the dozen - renewing radiation treatment machines

Earlier this year our radiation oncology department began the first of 12 separate renovations to accommodate the phased, planned replacement of our radiation treatment machines. Each machine is coming to the end of its life cycle and, once replaced, our patients will benefit from newer technology that will have a greater capacity to deliver very complex and precise treatments to a larger number of people.

"In the past patients with certain cancers would come for 15, 20 even 25 or more treatments broken down into many daily doses," said Dr. Miller MacPherson, Head of medical physics at The Ottawa Hospital. "This was to allow the healthy tissue time to repair. Now that we are able to deliver more precise and image-guided radiation we are able to target the tumour and give very high doses over a very small number of visits. This means rather than coming for 25 visits, some patients might now come for just five and get as good a treatment."

### New state-of-the-art simulators for radiation therapy planning

In a similar vein, we recently built a new facility to house three brand new simulators to assist with radiation planning. Included in these are two CT (computerized tomography) machines and an MR (magnetic resonance) machine that is one of only four dedicated to radiation planning in Ontario.

"This could be a game-changer," said Dr. MacPherson. "Before we only had CT images which are great for showing us where things are, but not very good at telling one kind of soft tissue from another."

All three of the new machines will help the physician determine where to direct the radiation but the MR machine provides enhanced imaging contrast to help visualize the tumour better and increase precision. For the patients who need it, the doctor will be better able to tell where the tumour is in relation to healthy tissue and design more precise, personalized radiation treatments.

The team expects to image their first patient in January 2019.

## Thank you!

It is thanks to the commitment and generosity of our community that we have been able to excel in the field of cancer care and research at The Ottawa Hospital. On behalf of the thousands of people every day and from every corner of our region who depend on The Ottawa Hospital, we thank you for your support!

For more information, please contact:  
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