Canadian Cancer Society

# Atlantic Cancer Research Grants (ACR-21)

**Dr Jeanette Boudreau, Dalhousie University**

*Genetics, infiltration and immunity: Are natural killer cells the missing link in pancreatic cancer immunotherapy?*

Dr Jeanette Boudreau is seeking a new, more effective way to treat pancreatic cancer. Pancreatic cancer is difficult to treat with a 5-year survival rate of less than 10%. New approaches for precise, targeted therapy are urgently needed. With funding from an Atlantic Canada Research Grant, Dr Boudreau will test the effectiveness of a new immunotherapy treatment for pancreatic cancer based on natural killer (NK) cells. NK cells are a type of white blood cell that can survey the body's tissues for cancerous cells and help control of tumour regrowth. Dr Boudreau's team is characterizing the different genetic subtypes of pancreatic cancer, so they can predict which type will respond to NK-based immunotherapy. If successful, this work could lead to a new, more effective and affordable pancreatic cancer treatment that could improve outcomes for people with pancreatic cancer. NK-based immunotherapy could also benefit other tumour types.

**Dr Melanie Keats, Dalhousie University**

*Testing exercise to improve quality of life for people with glioblastoma*

Dr Melanie Keats is studying the effect of exercise on supporting function and improving quality of life in people with glioblastoma (GBM), an aggressive type of brain or spinal cord cancer. People with GBM can experience debilitating physical side effects as a result of their tumour and treatment, such as difficulty balancing, muscle weakness and loss of function. Exercise is known to help people with other types of cancer to manage similar side effects, but few studies have explored the benefit of exercise for people with GBM. With funding from an Atlantic Canada Research Grant, Dr Keats is comparing people with GBM performing regular resistance exercise with people with GBM receiving standard care. The study will reveal whether resistance training helps people retain their ability to perform daily tasks, improving quality of life and helping people with GBM live fuller lives.

**Dr Morgan Langille, Dalhousie University**

*Clarifying the links between cancer and the blood microbiome*

The human microbiome consists of microbes that live on and within the human body, and research shows that it could be associated with many types of cancer. The most well-studied human microbiome is in the gut, but microbes can also travel through the body via blood. How blood microbes change over time, across populations, or with cancer remains unknown. With funding from an Atlantic Canada Research Grant, Dr Morgan Langille and his team are aiming to close this gap in knowledge and learn what blood microbes can tell us about cancer. The researchers will examine microbes present in 3 environments: tumours and blood at the time of cancer diagnoses, the blood of people previously diagnosed with cancer, and the blood of people who go on to develop new cancer. Using software tools, mathematical models and statistics, they will scour this biological data for evidence of links between cancer and blood microbes. This project could help doctors identify new biomarkers in the blood that helps them diagnose cancer earlier and more accurately predict how it will progress and behave. By equipping oncology teams with this insight into their patient's specific cancer, this work could improve outcomes for people with cancer.

**Dr Andrew Makrigiannis**

*A breast cancer vaccine that can be modified to target other cancers*

Treatment-resistant and metastatic breast cancers that cannot be treated with surgery, radiation or chemotherapy require additional targeted therapies that improve the immune system's ability to kill

cancer cells. But due to safety, cost and effectiveness, these therapies currently have limited potential for use in other types of cancer. If a recently discovered immune cell could be trained or modified to recognize specific types of cancers, it would lead to new treatment options for various types and stages of breast cancer as well as other types of cancer.

Dr Andrew Makrigiannis and his team are studying recently discovered immune cells – the memory natural killer (NK) cell. The research team is working to understand the role that memory NK cells play in the detection and elimination of breast cancer cells. Next, the team will test whether NK cells can be targeted and modified to remember and recognize specific types of tumour cells. If successful, this work could lead to an immunotherapy that is effective against a broader range of breast tumours and could even be repurposed to target other types of cancers.

**Dr Paola Marignani, Dalhousie University**

*Identification of new breast cancer biomarkers in Black women*

Dr Paola Marignani is studying HER2-positive breast cancer in women of African ancestry to target care to this group, leading to earlier cancer diagnoses of and better, more personalized treatment. Black women have the highest mortality rates for breast cancer world-wide, and research has shown that they have a higher likelihood of HER2-positive breast cancer than any other type of breast cancer. Dr Paola Marignani and her team are tapping into advanced laboratory technologies and artificial intelligence to identify unique biomarkers for HER2-positive breast cancer in women of African ancestry. These biomarkers could enable earlier diagnosis of HER2-positive breast cancer in women of African ancestry, which would improve survival.

**Dr Jean Marshall, Dalhousie University**

*Developing a new approach to ovarian cancer immunotherapy*

Dr Jean Marshall is developing a new form of immunotherapy that targets ovarian cancer. Often diagnosed after spreading, ovarian cancer is difficult to treat and has a 5-year survival rate of less than 50%. With funding from an Atlantic Canada Research Grant, Dr Marshall and her team are developing an immunotherapy treatment based on mast cells, a type of immune cell that populates the abdominal area where ovarian cancer often starts to spread. The researchers will genetically modify these cells to enhance their immune response to ovarian cancer. The modified mast cells will naturally cluster near ovarian cancer cells, creating a potentially effective therapy for ovarian cancer. Although still at an early stage, this treatment has already shown great promise to improve survival from ovarian cancer. Dr Marshall's work could also improve the effectiveness of immunotherapy for other cancers within the mast-cell rich abdomen.

**Dr Patrick Murphy, University of Prince Edward Island**

*Opening the door to a novel treatment for triple negative breast cancer*

Triple negative breast cancer (TNBC) is challenging to treat and has few treatment options but with the support of an Atlantic Canada Research Grant, Dr Patrick Murphy is working to improve the outlook for people facing this cancer. Some TNBCs grow by breaking down glucose into a molecule called serine. Serine-inhibiting drugs have been developed to stop TNBC's ability to grow and spread, but these drugs have not had significantly positive results in preclinical trials. To understand why these drugs fail, Dr Murphy and his team are using a tool called mass spectrometry to identify molecules that may be protecting TNBC from serine-inhibiting drug therapies. By targeting and disabling these molecules, the team may be able to revisit serine-targeting as a promising new therapy with potential to improve outcomes for people with TNBC.

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**Dr Rodney Ouellette, Université de Moncton**

*A liquid biopsy to predict how lung cancer will respond to immunotherapy*

Immunotherapy has shown remarkable promise in treating lung cancer, but not all patients respond to these therapies. With funding from an Atlantic Canada Research Grant, Dr Rodney Ouellette is working to understand the different ways lung cancer tumours evade immunotherapy drugs. Cancer cells and immune cells release small particles called extracellular vesicles (EVs) into our blood. EVs carry messages that can instruct the immune system to avoid attacking the cancer. Dr Ouellette will study the messages carried by EVs in the blood of lung cancer patients treated with immunotherapy to better understand what information is exchanged by EVs and how this may cause differences between the patients that respond to immunotherapy and those patients who do not. With a better understanding of why some patients do not respond to immunotherapy, the team can work to find new ways to make immunotherapy treatment more effective. If successful, this work could lead to a simple blood test, or "liquid biopsy" that helps more lung cancer patients to benefit from this treatment.

**Dr Nathalie Saint-Jacques, Dalhousie University**

*Identifying opportunities to prevent cancer in Atlantic Canada*

Dr Nathalie Saint-Jacques is looking for ways to reduce cancer risk in Atlantic Canada, where cancer incidence rates are among the highest in the country. Supported by an Atlantic Canada Research Grant, Dr Saint-Jacques and her team are mapping communities in all 4 Atlantic provinces with higher-than-average cancer rates. Through their work, the team will estimate the number and type of cancers that could be prevented in these communities through risk-reducing behaviours and identify community-level prevention and support efforts. The first study in Canada to assess community-specific cancer burden to identify and prioritize prevention strategies, this research has potential to reduce cancer rates and improve health for people in Atlantic Canada.

**Dr Robin Urquhart, Dalhousie University**

*Developing more personalized care after cancer treatment*

Dr Robin Urquhart is working to improve post-treatment care for people who have completed cancer treatment.

In Canada, follow-up cancer care is typically provided by oncologists. However, while oncologists are experts in screening for, diagnosing and treating cancer, patients who are finished treatment also need support to manage the late and ongoing side effects of cancer (and/or its treatment). For example, a person may need ongoing care for lymphedema after breast surgery, or for incontinence after treatment for colon cancer. The evidence shows that oncologist-led after-cancer care does not work well for patients, and is not efficient for our healthcare system. With input from breast, colorectal, and melanoma cancer survivors and their healthcare providers, Dr Urquhart will develop more personalized approaches to follow-up care that are better matched to address survivors' needs, and will test these approaches at 2 cancer centres in Atlantic Canada. If successful, this project could help to improve survivors' quality of life after cancer treatment.

**Dr David Waisman, Dalhousie University**

*Targeting a novel protein to stop the spread of cancer*

The spread of cancer, called metastasis, is responsible for 90% of cancer deaths. Dr David Waisman and his team have identified a protein found on the surface of connective tissue cells called calreticulin (CRT) that they believe is essential in the cellular processes that enables cancer cells to spread. With funding from an Atlantic Canada Research Grant, the Waisman lab is testing their hypothesis by comparing the

behaviour of actual cancer cells and non-cancerous connective tissue cells to special copies of these cells that have been engineered without CRT proteins. The researchers will expose these cells to a drug that stimulates the CRT protein and measure the rate of tumour growth and invasiveness. If CRT is found to be a key component of metastasis, it would open the door to new treatments to stop the spread of cancer. In the future, a new drug could be developed to delay or even halt the spread of cancer and could potentially improve outcomes and save.