The Molly Appeal for Medical Research

MOLLY DONOR RUTH PEPPARD
See her story on page 23 >

THE DMRF MOLLY APPEAL

Nearly 40 years ago, a humble Maritime housekeeper named Molly Moore donated a $5 bill to DMRF in support of medical research. She explained that she didn't have much, but believed that if everyone could donate even a small sum, together, a large difference could be made. This marked the beginning of DMRF's annual Molly Appeal campaign in 1980, which raises critical funds for medical research throughout the Maritimes every year.

MOLLY'S FALL CAMPAIGN 2019

Dalhousie Medical Research Foundation's fall 2019 Molly Appeal is set to equip Dalhousie's Faculty of Medicine's leading research teams with a sophisticated device, named *The Orbitrap Fusion Mass Spectrometer*, that will open up a whole new scientific frontier in eastern Canada.

This equipment will replace 20-year-old technology to provide researchers with the most-powerful tool available for analyzing proteins and the by-products of metabolism in cells, rapidly and precisely.

This will shed light on the mechanisms of a vast range of diseases, including **cancer, Alzheimer's disease, ALS, autoimmune diseases, heart disease, infectious diseases, bipolar disorder, and schizophrenia.**

The Orbitrap Fusion Mass Spectrometer is up to 100 times more sensitive than the technology it will replace, giving scientists dramatically more detailed information about the workings of proteins and metabolites in the body, and paving the way to new strategies for diagnosing and treating disease.

The new equipment will position Dalhousie medical researchers to be international leaders in the emerging and influential field of proteometabolomics, which studies the impact of both proteins and metabolites on cell function in health and disease.

That's why we are appealing to Maritimers to help researchers at Dalhousie's Faculty of Medicine secure *The Orbitrap Fusion Mass Spectrometer* – the most advanced equipment available for analyzing proteins and the by-products of metabolism inside cells.

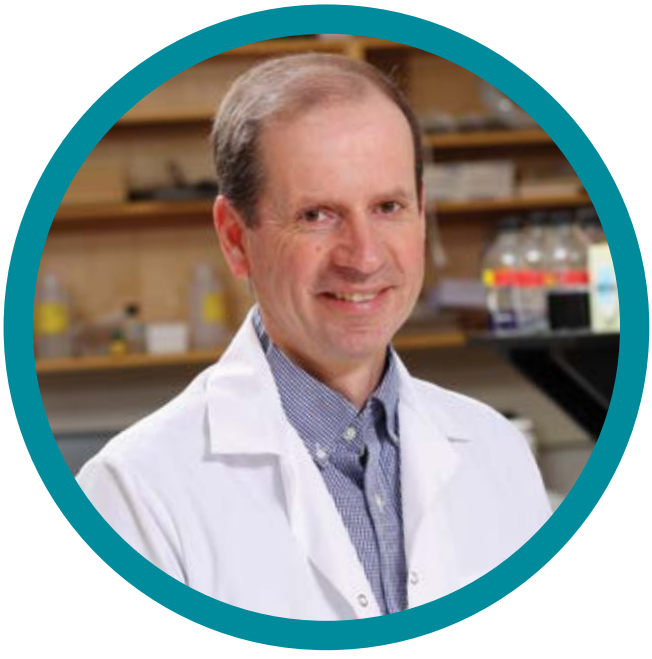
We need to raise **$251,082** to help purchase this equipment. With support from donors like you, we will have the mass spectrometer working in our labs within the year.

Your gift today will help bring hope and better outcomes to the many families living with cancer and other challenging diseases and conditions. Your donation towards this equipment will accelerate the pace of our researchers, leading us to breakthroughs sooner.

Our sincere thanks to all DMRF donors who continue to support our Molly Appeal!

A SNAPSHOT OF

DMRF MOLLY APPEAL FALL 2019 RESEARCHERS



DR. JAMES FAWCETT

EXPLORING HOW BRAIN PROTEINS CAN EFFECT NEUROLOGICAL DISORDERS

Dr. James Fawcett's lab studies how proteins in the brain talk to one another to enable proper functioning of the brain. Understanding the function of the synapse – the region of one brain cell that talks to another – is crucial. In nervous system disorders, one nerve cell cannot communicate with another effectively. Learning how protein-protein interactions are affected in various neurological disorders is critical in knowing how drugs work in the brain.

"New mass spectrometry equipment will allow us to identify all the partner proteins talking to a specific protein and to develop ways to quantify how protein levels and their locations within the brain are affected. Increased sensitivity and accuracy to detecting subtle changes in response to drug treatments will allow us to develop new and better treatments with fewer side effects. The equipment will accelerate our research, enhance training for our team, and allow us to integrate into more regional, national and international research programs."

DR. CARMAN GIACOMANTONIO

STIMULATING THE IMMUNE SYSTEM TO FIGHT CANCER

Dalhousie cancer surgeon, Dr. Carman Giacomantonio is putting old-school immune therapies to work with startling new results in skin cancers that would have been deadly just a few years ago. By directly injecting patients' skin tumours with off-the-shelf immune-stimulating agents, he is sending their cancers into remission and granting them years of good-quality life. Immune therapy has taken off in the past few years, thanks in large part to research and successful clinical trials with melanoma.

"Before the introduction of immune therapy in melanoma, surgery was the only option for cure in the patient population, with little or no additional benefit from systemic chemotherapy. In those days, for the majority of patients a diagnosis of metastatic melanoma would be a death sentence. Today, more than 60 percent of advanced-stage melanoma patients treated with immunotherapy respond to immune therapy and over half of those patients are cured."

DR. PAOLA MARCATO

STUDYING BREAST CANCER PROGRESSION TO CREATE IMPROVED THERAPEUTIC OPTIONS

A molecular biologist, Dr. Paola Marcato focuses on understanding breast cancer progression and the factors that determine response to therapy. Dr. Marcato's lab studies breast cancer stem cells using genome-wide assays, cell lines, patient samples and tumour models to identify biomarkers of drug response, in order to better understand factors important in breast cancer progression. The long-term goal is to develop improved therapeutic strategies for breast cancer based on a personalized precision medicine approach.

"Acquiring this new mass spectrometry equipment at Dalhousie University will have a major impact on the progress of my cancer research program. It will allow the students in my lab to do new state-of-the-art analyses on our cancer samples that will lead to new discoveries about how to treat breast cancer better. Thank you so much to all the donors who will make this new research possible."

DR. CRAIG MCCORMICK

TACKLING VIRUSES LIKE INFLUENZA AND HERPES WITH A VIEW TO CREATING EFFECTIVE ANTIVIRAL DRUGS AND VACCINES

Dr. Craig McCormick's lab studies how viruses take command of the human cells, to "hide out" and evade detection by our immune systems, and to "replicate" using parts of the cell to make more viruses. Studies focus on two types of viruses; (1) influenza viruses causing acute infections leading to seasonal epidemics and periodic worldwide pandemics, and (2) herpes viruses causing chronic life-long infections with a variety of impacts on human health, including cancers.

"Enhanced mass spectrometry will allow us to study the intimate interactions between viruses and the human cells that they commandeer and help us learn how these viruses alter the metabolism of infected cells. It will help us to identify how these viruses alter the cell to hide out from the immune system and to fully catalogue how the virus re-shapes the "proteome" (all the proteins made by the cell), enforcing the production of viral proteins at the expense of cellular proteins. Our team will be able to use new high-resolution information to develop new vaccines to prevent infection and new antiviral drugs to treat infection."

DR. ADRIENNE WEEKS

TARGETING GENETIC MUTATIONS TO STOP BRAIN TUMOUR GROWTH

As a neurosurgeon, Dr. Adrienne Weeks treats patients afflicted with both benign and malignant brain tumours. She also spends as much time as possible in her lab, searching for ways to eradicate deadly and dangerous brain tumours with more targeted treatments.
Dr. Weeks also studies genetic mutations in meningioma, a common non-cancerous brain tumour that grows in the covering of the brain and damages critical functions, like vision and speech. Her goal is to find a mutation that can be targeted to arrest the tumours' growth.

"Glioblastoma is the most invasive and deadly form of brain cancer. You can't cure it surgically, because it sends tendrils to all parts of the brain. Even with surgery, chemotherapy and radiation, glioblastoma remains universally fatal. With new and improved mass spectrometry capacities, we can study how brain cells form molecules called stress granules – a way in which brain tumour cells protect themselves and survive conditions that will kill normal human cells. With information gained using this new equipment, we can test drugs to learn how to strip brain tumour cells of this protective defence mechanism."

DR. DENYS KHAPERSKYY

FINDING TARGETS FOR A NEW GENERATION OF ANTI-FLU TREATMENTS

The flu vaccine has to be updated every year and is only partially effective, particularly for immunocompromised individuals. Currently, we have only one antiviral in Canada, Tamiflu, which is rarely able to be administered at early-enough stages of the illness to be very effective. If a new pandemic strain of influenza develops resistance to Tamiflu, we are defenseless. Dr. Denys Khaperskyy, an influenza researcher and assistant professor in the Department of Microbiology and Immunology at Dalhousie Medical School, wants to change that.

Dr. Khaperskyy is seeking to find targets for a new generation of much more effective anti-influenza treatments. He and his colleagues, including Dr. Craig McCormick, are studying how the flu virus exploits human cells to thrive. They want to identify which proteins encoded by human genes complement influenza virus genes and support the virus's ability to survive and replicate inside cells, and go on to infect even more cells.

"The new equipment will allow us to compare the protein interactions in infected cells with those in uninfected cells. From there, we can pinpoint which cellular proteins the virus absolutely relies on to survive, and which of these we can target with new therapies without disrupting healthy cells."

DR. SHASHI GUJAR

EDUCATING OUR IMMUNE SYSTEM TO RECOGNIZE AND DESTROY CANCER

Dr. Shashi Gujar, an assistant professor in the departments of Pathology, Microbiology & Immunology, and Biology, and his team will make extensive use of updated mass spectrometry equipment to be purchased with funds from DMRF's Fall 2019 Molly Appeal. His team's work to develop cancer immune therapies will be accelerated by an improved ability to analyze massive amounts of data quickly.

"Our goal is to develop personalized therapies that educate patients' immune systems to recognize and destroy cancer. We are exploring how to use cancer-killing viruses – which target and kill cancer cells without harming healthy cells -- to flag cancer cells to the immune system. When we infect cancer cells with the virus, it's like putting a transponder in the cancer cell. Now the immune system recognizes the signature of that cancer and will target and kill not just that cell but all other cancer cells like it."