GÉNOME QUÉBEC AND CYSTIC FIBROSIS CANADA INVEST $1.2 MILLION IN RESEARCH TACKLING RARE, ORPHAN CFTR MUTATIONS

Montréal, March 10, 2025 – Génome Québec and Cystic Fibrosis Canada today announced a $1.2 million investment in two new research projects focused on rare genetic mutations that are linked to cystic fibrosis and have no available treatment options. The projects are being funded through the two organizations' joint Tackle Rare, Orphan CFTR Mutations Competition and have the long-term goal of developing new therapies for cystic fibrosis.

With this research investment, Génome Québec and Cystic Fibrosis Canada are mobilizing the Quebec research community to find treatment solutions or new knowledge for those who have rare mutations and often poorer health outcomes.

While there are therapies that improve the function of the defective CFTR protein that causes cystic fibrosis, these therapies do not work in people who have rarer genetic mutations that fail to produce CFTR proteins, leaving them without the life-changing treatment options that others with more common mutations can access. Genetic profiling of cystic fibrosis patients reveals that several of these rare mutations are especially prevalent in Quebec. Given that cystic fibrosis is the most common, fatal genetic disease affecting children and young adults in Canada, Cystic Fibrosis Canada is working to ensure that people with rarer genetic mutations are not left behind – a goal this research funding is helping to support.

The two projects being funded are:

- **John Hanrahan, McGill University**
  Long term correction of 621+1G>T in CF airways
  Co-applicants: Jun Ding, The Research Institute of the McGill University Health Centre and Ashok Kakkar, McGill University

  Recent research into gene-based cystic fibrosis treatments has aimed to fix mutations or deliver a normal copy of the CFTR gene to cells that line the airways. However, the body replaces these cells every two months, making them an inefficient target for genetic therapies. This research aims to target self-renewing stem cells and develop methods to optimize delivery of gene-based therapies to them. The team will also develop base editing approaches for the long-term repair of the 621 mutation and test them in the laboratory on lung cells.

- **Larry Lands, The Research Institute of the McGill University Health Centre and Jacques-P. Tremblay, Laval University**
  Leave No One Behind: development of a genetic therapy for people living with cystic fibrosis who do not respond to available modulators

Co-applicants: Danuta Radzioch, McGill University, Alex Luedtke, McGill University and Christine DeWolfe, Concordia University

This project proposes using a gene modification technique called prime editing to permanently correct mutations in the CFTR protein. The research team will explore ways to deliver prime editing by injection or inhalation of lipid nanoparticles (LNP) to correct CFTR gene mutations in the airway cells of the lung. In the lab, a cell model will be created using a common Canadian CFTR gene mutation unresponsive to available modulators. This model will serve as the first step in testing the effectiveness of the prime editing therapy. The team will also assess the therapy using a variety of methods, including cells from people with cystic fibrosis, to identify optimal ways of delivering it. This work could pave the way for clinical trials, offering hope to those people with CF whose mutations currently lack effective treatments.

Each project will receive $600,000 in funding over three years. The investment follows a competition open to researchers affiliated with an eligible institution in the province of Quebec.

Quotes

“Thanks to genomics, we can now explore innovative approaches to treating people with cystic fibrosis whose rare mutations do not yet have a therapeutic option. By supporting cutting-edge projects such as those led by teams at the The Research Institute of the McGill University Health Centre, McGill University and Université Laval, this partnership with Cystic Fibrosis Canada is mobilising Quebec expertise to accelerate the development of targeted treatments and offer hope to the patients who need it most. In addition, the technological advances resulting from this research could pave the way for new approaches to other diseases requiring gene modification therapies.”

- *Stéphanie Lord-Fontaine, Vice President, Scientific Affairs at Génome Québec*

“There is a pressing need for treatment options that can have a life-changing impact on Canadians with cystic fibrosis who have rarer genetic mutations and can’t benefit from current therapies. We are prioritizing high-quality research that can be quickly validated and translated to the real world. The two initiatives we are funding with Génome Québec are exciting because they have the potential to speed up the development of new approaches for people who need them most—many of whom are in Quebec.”

- *Kelly Grover, CEO, Cystic Fibrosis Canada*

About Cystic Fibrosis

Cystic fibrosis is the most common fatal genetic disease affecting Canadian children and young adults. There is no cure. Of the Canadians with cystic fibrosis who died in the past five years, half were under the age of 38. Cystic fibrosis is a progressive, degenerative multi-system disease that affects mainly the lungs and digestive system. In the lungs, where the effects are most devastating, a build-up of thick mucus causes severe respiratory problems. Mucus and

protein also build up in the digestive tract, making it difficult to digest and absorb nutrients from food. In addition to the physical effects of the disease, mental health concerns are emerging; anxiety and depression are common among this population. Double lung transplants are the final option for patients with end-stage disease; most fatalities of people with cystic fibrosis are due to lung disease.

About Cystic Fibrosis Canada

Cystic Fibrosis Canada has dramatically changed the cystic fibrosis story, advancing research and care that has more than doubled life expectancy. Since being founded by parents in 1960, Cystic Fibrosis Canada has grown into a leading organization with a central role engaging people living with cystic fibrosis, parents and caregivers, volunteers, researchers and healthcare professionals, government and donors, all working together to change lives through treatments, research, information, support and connection. Cystic Fibrosis Canada has launched a clinical trials network and today 100 per cent of our population can be referred to a trial - bringing new and improved treatments to our community. Cystic Fibrosis Canada has also set the standard for advocacy work, driving changes to the healthcare system to enable approval and funding for the life-changing medicine, Trikafta, at record speed. Because of this work, children born with the disease today will have a much different, more positive path than even a decade ago. While we celebrate that progress and are proud of the treatment options Cystic Fibrosis Canada helped bring to this country, we still have much work to do. Trikafta is not a cure. People are still very sick from this disease and far too many are dying far too young. We applaud this life-changing treatment, yet it means very little if not everyone can benefit from it. And for those who may never benefit from it, we need new solutions. We still have much work to do to ensure healthy, full lives for everyone.

About Génome Québec

Génome Québec's mission is to catalyze the development and excellence of genomics research and promote its integration and democratization. It is a pillar of the Québec bioeconomy and contributes to Québec's influence and its social and sustainable development. The funds invested by Génome Québec are provided by the Ministère de l'Économie, de l'Innovation et de l'Énergie du Québec (MEIE), the Government of Canada, through Genome Canada, and private partners. To learn more, visit www.genomequebec.com.

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