

OFFICE OF TECHNOLOGY TRANSFER

McGill

TECHNOLOGY OPPORTUNITY

# Novel Treatment of Viral Infections

McGill University is seeking a company interested in commercializing RNAi therapeutic compounds for the prevention and/or treatment of viral infections. Serious viral infections are responsible for high rates of mortality and morbidity as well as high costs to the healthcare system worldwide. There are no prophylactic vaccines or curative treatments for HIV and in the case of influenza new vaccines with limited efficacy have to be developed each year confirming unmet medical needs. It is estimated that AIDS has killed more than 25 million people since it was first recognized in 1981 whereas according to the WHO, influenza yearly affects 3 to 5 million people worldwide and results in 250-500,000 deaths. The current market for antiviral drugs is over $12 billion and is projected to reach in excess of $20 billion by 2012. Utilization of an effective antiviral therapy to treat serious viral infections such as HIV, HCV and influenza could be expanded to limited but deadly infections like Avian influenza and Ebola virus as well as to other diseases where a viral component is suspected, thereby further increasing the market potential.

## Applications

Prevention and treatment of viral infections.

## Advantages

• RNAi therapeutics can shorten significantly the time to clinical development thereby reducing development costs

•siRNA highly specific for 4E-BP1 and 4E-BP2 resulting in targeted induction of type-I IFN.

•Boosts innate defense mechanism providing efficacy against many viruses.

## Technology

We propose a novel approach to prevention and/or treatment of viral infections. New approaches targeting host mechanisms rather than the virus themselves are required to provide better prevention and treatment alternatives. Transcriptional control of IFN-gene expression plays a major role in the activation of the innate immune response whereas translational control is critical for induction of type-1 IFN production which is the first line of antiviral defense. Inhibition of the expression and/or activity of 4E-BPs leads to induction or enhancement of the immune response as determined by increased expression of type-1 IFN. This results in dramatically suppressed viral replication and resistance to viral infections, both in cultured cells lacking 4E-BP 1 and 2 and in 4E-BP 1/2 double knockout mice. Similar results were obtained in cultured cells with RNA interference (RNAi) technology proprietary to McGill. The wide application of this novel approach was validated using several different viruses: VSV, Sindbis, encephalomyocarditis, influenza, HIV-1, Herpes simplex 1 and myxoma.

## The Inventors

**Dr. Nahum Sonenberg** is James McGill Professor in the Department of Biochemistry and the McGill Cancer Centre of McGill University. He obtained his Ph.D. from the Weizmann Institute of Science. Dr. Sonenberg is a pioneer in research related to the control of protein synthesis. He identified the mRNA 5' cap-binding protein, eIF4E, in 1978. He later discovered the internal ribosome entry site mechanism of translation initiation and the regulation of cap-dependent translation by the eIF4E binding proteins (4E-BPs). While generating 4E-BP 'knock-out' mice, he and his colleagues found that this translation inhibitor plays critical roles in metabolism, cognition and viral infections.

**Dr. Masad J. Damha** is James McGill Professor in the Department of Chemistry of McGill University. He obtained his PhD in Chemistry from McGill University in 1988. Dr. Damha's research is focused on nucleic acid chemistry. He has been studying DNA mimics as model systems for down-regulating gene expression. The arabinose-based compounds his research group has developed entered human clinical trials in 2007 for the management of chronic obstructive pulmonary disease.

## CONTACT:

Michèle Beaulieu, Ph.D. MBA
Office of Technology Transfer
McGill University
Tel: 514-398-6874
Email: michele.beaulieu@mcgill.ca
Reference code: ROI 08047/09065
Opportunity: Exclusive license or research collaboration

McGill

OFFICE OF TECHNOLOGY TRANSFER