

PATHOBIOLOGY RESEARCH PROJECTS IN
MOLECULAR VIROLOGY

**Molecular Virologists
engineer viruses to prevent,
treat and cure diseases.**

**Nuclease-based gene therapy
for permanent correction of
Cystic fibrosis**

By engineering baculovirus to deliver all the “tools” required to insert a functional copy of the CFTR gene into the genome of lung cells, we hope to be able to provide a safe and effective treatment for CF patients irrespective of their CFTR mutation status, gender or genetic background.

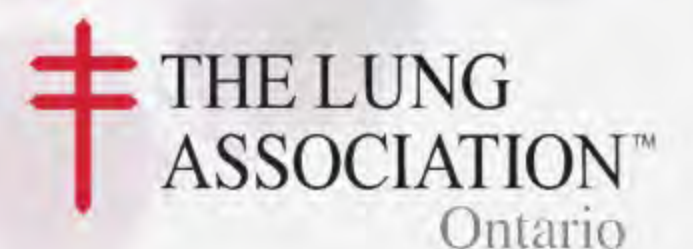
Collaborator
Dr. Theo Moraes, Sick Kids



**Nuclease-based gene therapy
for permanent correction of
alpha-1 antitrypsin deficiency**

We are currently employing the use of AAV and baculovirus gene therapy vectors and two different cutting-edge genome editing technologies (TALENs and CRISPR) to insert a functional copy of the AAT gene, permanently, into a “safe harbour” within the human genome.

Collaborator
Dr. Theo Moraes, Sick Kids



**Antibody-based protection
against Ebola virus infection
by vectored immunoprophylaxis.**

We are developing a VIP approach to protect against Ebola virus disease in humans.

Collaborators:
Dr. Gary Kobinger, Laval University
Dr. Xiangguo Qiu, Public Health Agency of Canada



**Oncolytic virotherapy using
Newcastle Disease Virus
and parapox ORF virus.**

Our goal is to develop “armed” oncolytic ORFV and NDV viruses with improved immunomodulatory functions for the treatment of solid tumors in humans and companion animals.

Collaborators:
Dr. Jim Petrik, University of Guelph
Dr. Byram Bridle, University of Guelph

**Development of a vaccine
to protect against
Toxoplasma gondii
infection in sheep**

We aim to develop recombinant ORFV and adenovirus vectors expressing protective antigens from *T. gondii* and to evaluate immunogenicity and protective efficacy of a prime-boost vaccination strategy in sheep. We anticipate that immunized sheep will develop a robust immune response against *T. gondii* leading to a reduction in tissue cysts and protection against congenital infection.

Collaborators:
Dr. Karen Shapiro, University of California Davis,
University of Guelph
Dr. Paula Menzies, Ontario Veterinary College
Dr. Byram Bridle, University of Guelph



**Pathogenesis of
ovine betaretroviruses**

This research will contribute to our understanding of virally-induced cancers and uncover novel mechanisms governing neoplastic transformation of epithelial cells, which may be exploited for therapeutic purposes.

