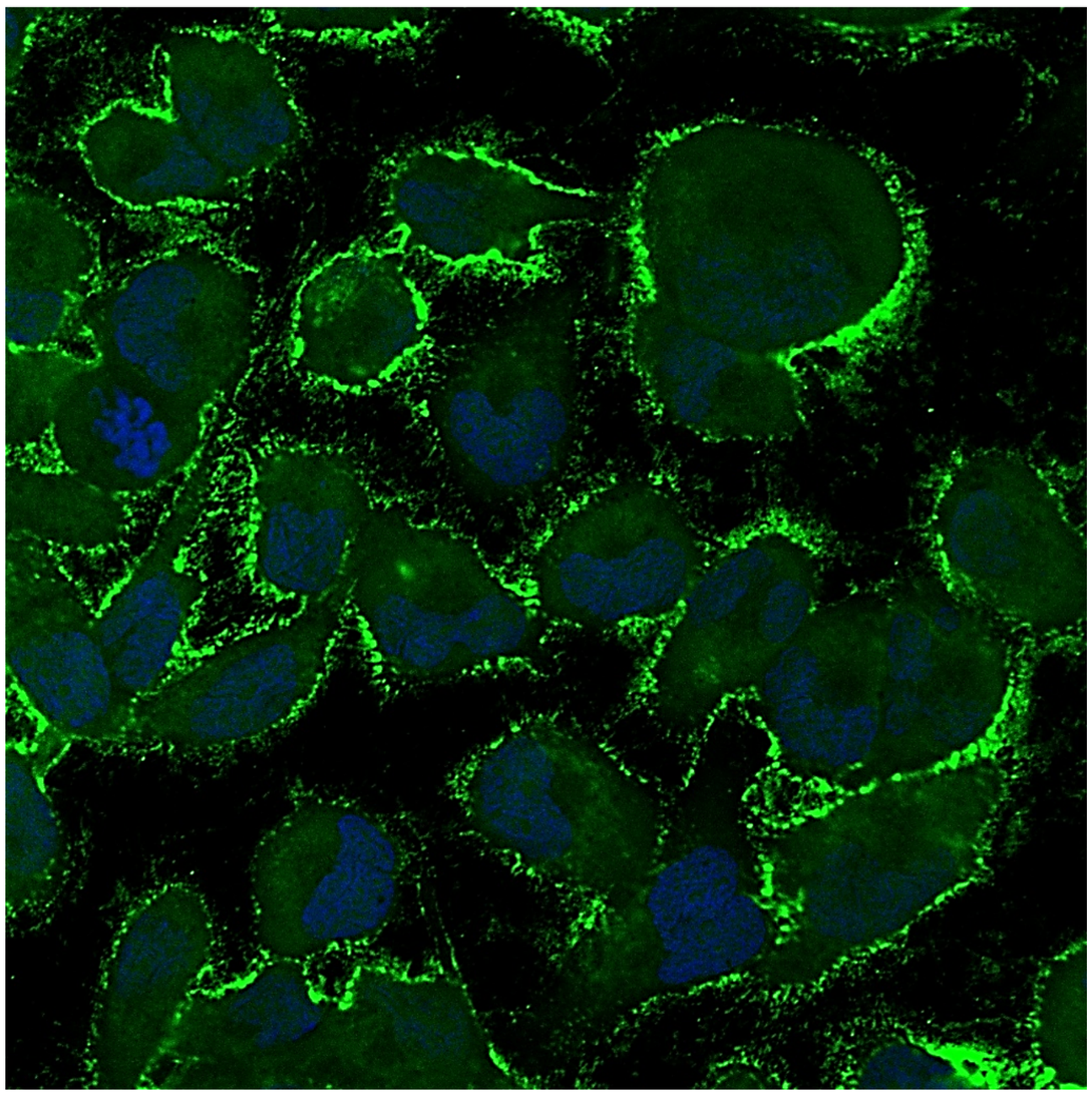
Chemical & Physical Sciences
UNIVERSITY OF TORONTO
MISSISSAUGA

Colloquium Seminar Series
Wednesday, Nov. 28, 2018
3:10pm in CC2150

Dr. Kathy Borden

Structure and Function of the Cell Nucleus Research Unit
Institute for Research in Immunology and Cancer (IRIC)

The forces of genetic dark matter and their role in cancer



The central dogma of molecular biology is that the information from DNA is transmitted via RNA messengers, to deliver the code to make protein. Proteins are generally considered the cellular actors which carrying out the activities required for cell life and death. Cancer cells are often considered to arise because mutations to the genome lead to aberrant or absent protein effectors and subsequently, dysregulated cell growth. However, things appear more complicated than first thought. For instance, the RNA intermediary was initially considered a simple message, passed from the home of the DNA, the cell nucleus, to the cytoplasm, where this message was translated into protein. However, measures of the genome (DNA content of the cell), the transcriptome (RNA content) and the proteome (protein content) indicate large disconnects between transcriptome and proteome. This leads to the essential questions: why don't they agree and how does this discordance arise? It seems that there must be forces in place, a sort of genetic dark matter, to explain these observations. My laboratory has been studying this genetic dark matter. In essence, these mechanisms distort the message originally sent by the DNA. This can be for the good, to respond to environmental stresses but many of these mechanisms are also co-opted by cancer cells for their own nefarious purposes.