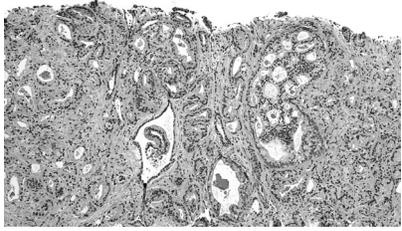


# RESEARCH HIGHLIGHTS AT MCMASTER

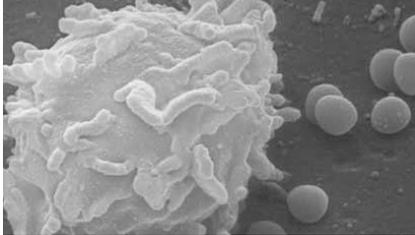
Compiled by Bhavik Mistry and Ilia Ostrovski



Prostate cancer is the most common type of cancer afflicting males in the United States. The question of what treatment regiment will optimally balance efficacy with minimal adverse effects is thus one that physicians are faced with particularly often. **Dr. Damu Tang**, Associate Professor of Medicine, concluded that elevated levels of the protein MAN2C1 predispose patients to more aggressive forms of the disease. In studying the mechanism of PTEN, a tumor suppressor protein, Tang discovered that its protective effects are impaired by MAN2C1. This finding provides physicians with a potential diagnostic marker for recognizing more severe cases for the purpose of determining when more aggressive therapy is warranted.

*He L, Fan C, Kapoor A, Ingram AJ, Rybak AP, Austin RA, et al. a-Mannosidase 2C1 attenuates PTEN function in prostate cancer cells. Nature Communications. 2011 May;2:307.*

*Image adapted from: <http://wikimedia.org>*



The advent of antibiotics has engaged researchers in a tireless race against what was believed to be the rapid microbial adaptation of drug-resistant properties. In a paper published in *Nature*, the research teams of **Dr. Gerry Wright** and **Dr. Henrik Poinar** subvert the idea that resistance arises spontaneously by demonstrating that the genes coding for these traits are ancient. Through studying bacterial DNA from soil frozen in 30000-year-old permafrost, the authors show that microbes have been adapting to obstacles in nature for millenia. As a result of this finding, the notion of creating a drug that is not susceptible to resistance may one day become obsolete in the scientific community.

*D'costa VM, King CE, Kalan L, Mariya Morar, Wilson W. L. Sung, Carsten Schwarz, et al. Resistance to antibiotics is ancient. Nature. 2011 August 31; 477(7365):457-461.*

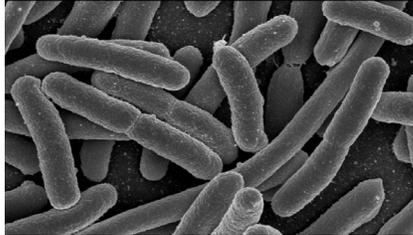
*Image adapted from: <http://www.immunitytherapy.com>*



**Dr. Daniel Goldreich**, Associate Professor of Psychology, Neuroscience and Behaviour, discovered that individuals with congenital blindness are able to detect tactile information much faster than sighted people. Goldreich's methodological approach involved analyzing the ability of participants to perceive the movement of a small probe at the tip of their index finger. From this promising study, Dr. Goldreich hopes to develop software that can track the perceptual ability of blind individuals as they learn Braille.

*Bhattacharjee A, Ye AJ, Lisak JA, Vargas MG, Goldreich D. Vibrotactile masking experiments reveal accelerated somatosensory processing in congenitally blind braille readers. J Neurosci. 2010 Oct;30(43):14288-14298.*

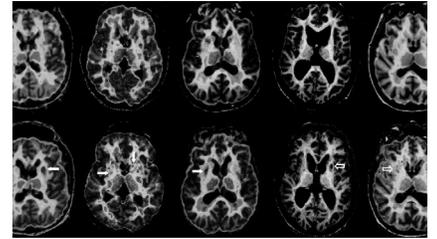
*Image adapted from: <http://www.ltsotland.org.uk>*



Infectious organisms have been known to develop resistance to antibiotic treatment. Recently, researchers **Dr. Gerry Wright**, **Dr. Eric Brown**, and **Dr. Brian Coombes** from the Department of Biochemistry and Biomedical Sciences discovered a new therapeutic approach for cystic fibrosis patients suffering from persistent bacterial infections. In particular, the joint initiative uncovered how a combination of an over-the-counter anti-diarrhea drug and the antibiotic, minocyclin, could be used to effectively inhibit bacterial growth. This novel discovery sheds light on a potential means to combat antibiotic-resistant bacteria and may lead to a safer method for treating lung infections in patients with cystic fibrosis.

*Ejim L, Farha MA, Falconer SB, Wildenhain J, Coombes BK, Tyers M, et al. Combinations of antibiotics and nonantibiotic drugs enhance antimicrobial efficacy. Nat Chem Biol. 2011 Jun;7(6):348-350.*

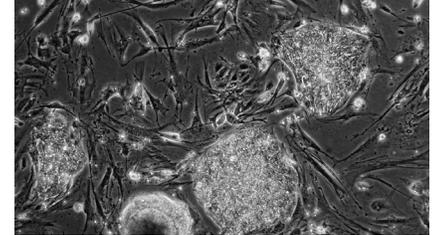
*Image adapted from: <http://www.labspaces.net>*



Recent research by **Dr. Ray Truant**, Professor in the Department of Biochemistry and Biomedical Sciences, has demonstrated an effective approach in delaying the onset of Huntington's Disease (HD). This condition is associated with aberrant modifications to the huntingtin protein, which Dr. Truant and his team were able to stop using drugs known as kinase inhibitors. Dr. Truant's team is now investigating the ability of these kinase inhibitors to cross the blood-brain barrier. If successful, stage 1 clinical trials could begin in five years.

*Atwal RS, Desmond CR, Caron N, Maiuri T, Xia J, Sipione S, et al. Kinase inhibitors modulate huntingtin cell localization and toxicity. Nat Chem Biol. 2011 May;7(7):453-46.*

*Image adapted from: <http://brain.oxfordjournals.org>*



**Dr. Mick Bhatia**, Director of McMaster Stem Cell and Cancer Research Institute, recently discovered new mechanisms behind the selective ability of human pluripotent stem cells to make important lineage decisions. A pluripotent stem cell can differentiate into 1 of 266 cell types in the human body. Previously, it was believed that all stem cells were alike and had an equal chance of differentiating into specialized cells. However, Dr. Bhatia suggests that this is not really the case. His study shows how a pluripotent stem cell can be 'forced' into a different cell type based on specific cell surface markers and histone modification marks on gene loci associated with pluripotent stem cells. Future investigations will involve understanding how these processes apply to induced pluripotent stem cells, which are stem cells generated from adult skin cells.

*Hong SH, Rampalli S, Lee JB, McNicol J, Collins T, Draper JS, et al. Cell fate potential of human pluripotent stem cells is encoded by histone modifications. Cell Stem Cell. 2011 Jul;9(1):24-36.*

*Image adapted from: <http://newsroom.stemcells.wisc.edu>*