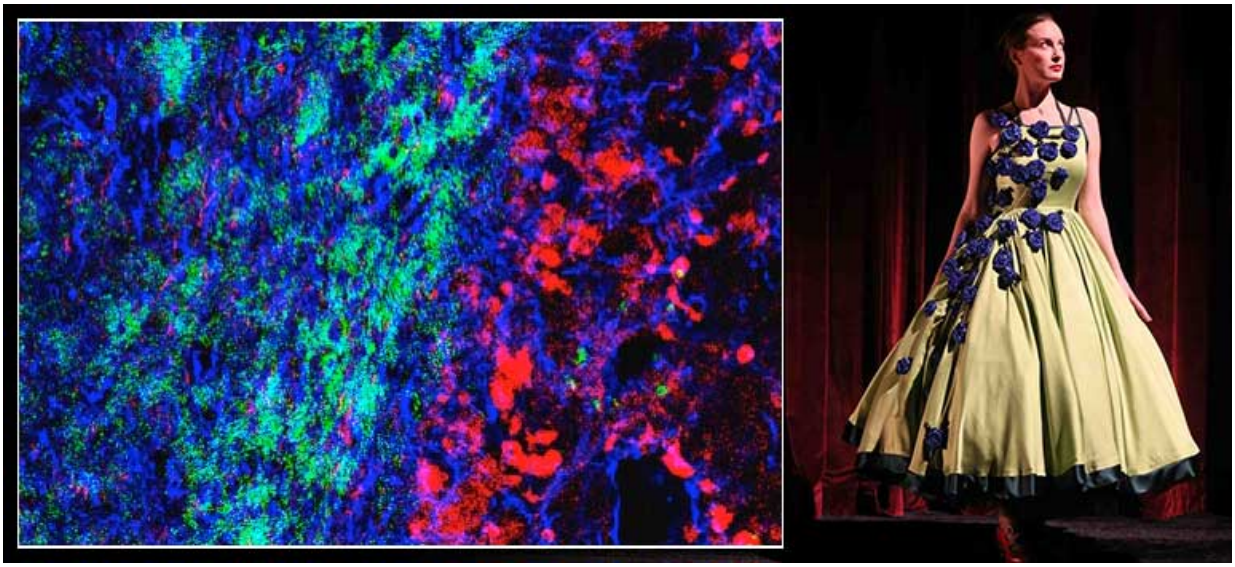
Target healthy cells to stop brain cancer 'hijack'

August 12 2015



Normal brain area on the left (blue and green) is encountering invading cancer cells (glioma; red). Credit: Wun Chey Sin/Christian Naus. Cells in Community dress: Bronwyn Malloy, UBC Alumna & now McGill MA English student, in a green silk charmeuse with blue rosettes & dark green hem and edging. Credit: Tim Matheson

New UBC research into brain cancer suggests treatments should target the cells around a tumor to stop it from spreading.

UBC research team Christian Naus, Wun Chey Sin and John Bechberger study glioma, the most aggressive form of adult brain cancer. Glioma has

a low five-year survival rate of 30 per cent because it is difficult to completely remove cancer cells without compromising brain functions and chemotherapy and radiotherapy do not prevent the regrowth of remaining cancer cells.

With this new research, the team reveals an alternative route to rein in the glioma cancer cells. The cancerous cells mingle with astrocytes, a type of cell that regulates the environment in the brain to create favourable conditions for brain functions. The research team found that glioma cells can reprogram the astrocytes with little pieces of genetic code (microRNAs). Those codes act as master switches, turning specific sets of genes on and off.

"This is the first evidence that microRNA can go from glioma cells into astrocytes and reprogram them to provide an altered environment that stimulates tumor growth and invasion," said Naus, a professor in the Department of Cellular & Physiological Sciences in the Life Sciences Institute and an investigator with the Djavad Mowafaghian Centre for Brain Health.

"We should consider the possibility of creating a treatment that would temporarily modify the healthy astrocytes around the tumor so the cancer cells can't hijack them," said Sin, a research associate leading the glioma investigation in the Naus laboratory.

The findings were recently published in three related papers in the journals *Oncogene* and *Oncotarget*.

The research was also highlighted in a recent interdisciplinary project, "Fashioning Cancer: A Correlation Between Destruction and Beauty", where images of brain cancer were used to highlight public awareness, as well as raise funds for cancer research.

More information: Publications

Astrocytes promote glioma invasion via the gap junction protein connexin43. Sin WC, Aftab Q, Bechberger JF, Leung JH, Chen H, Naus CC. *Oncogene*. 2015 Jul 13. DOI: 10.1038/onc.2015.210. [Epub ahead of print] PMID: 26165844

Gap junctions modulate glioma invasion by direct transfer of microRNA. Hong X, Sin WC, Harris AL, Naus CC. *Oncotarget*. 2015 May 4. [Epub ahead of print] PMID: 25978028

Reduction in gap junction intercellular communication promotes glioma migration. Aftab Q, Sin WC, Naus CC. *Oncotarget*. 2015 May 10;6(13):11447-64. PMID: 25926558

Provided by University of British Columbia