Oxygen-free energy designed to fuel brain development spurs on growth of cancer

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The metabolic process which fuels the growth of many cancers has its origins in normal brain growth finds a new study published in BioMed Central's open access journal *Cancer & Metabolism*. Using knock-out mice the study shows that interfering with Hexokinase-2 (Hk2), an enzyme integral to glucose metabolism, reduces the aggressiveness of medulloblastoma, the most common malignant brain tumor in children, and allows long term survival of mice.

Most cells only convert glucose to lactate in the absence of oxygen, for example, during a short burst of intensive exercise (anaerobic glycolysis). However rapidly dividing cells, including many cancer cells, convert glucose to lactate even in the presence of oxygen (aerobic glycolysis).

Researchers from the University of North Carolina have found that Hk2 switches on aerobic glycolysis in progenitor cells of the brain and in medulloblastoma. In the absence of Hk2, brain development was disordered. Additionally they found that deleting the Hk2 gene in mice genetically prone to develop medulloblastoma reduced the aggressiveness of the tumors, allowing long-term survival of the mice.

Dr. Timothy Gershon, who led this study, explained, "As long ago as 1924 Otto Warburg hypothesized that cancers use glycolysis to provide energy for growth even in the presence of oxygen. We found that glycolysis in the presence of oxygen is a developmental process that is co-opted in cancer to support malignant growth. We can now think about

targeting this process in patients".

Open access publisher BioMed Central is proud to announce the launch of the *Cancer & Metabolism* . Professor Chi van Dang, co-Editor-in-Chief, commented that "It has become self-evident that metabolism and bioenergetics are regulated by cancer genes. *Cancer & Metabolism* is launched uniquely to fulfil the needs of a burgeoning field." Professor Michael Pollak, co-Editor-in-Chief, added that "The scope of *Cancer & Metabolism* will allow for an interdisciplinary readership including cancer biologists, endocrinologists, oncologists, clinical trialists and population scientists."

More information: Hexokinase-2-mediated aerobic glycolysis is integral to cerebellar neurogenesis and pathogenesis of medulloblastoma Timothy R Gershon, Andrew Crowther, Andrey Tikunov, Idoia Garcia, Ryan Annis, Hong Yuan, C Ryan Miller, Jeffrey Macdonald, James M Olson and Mohanish Deshmukh, *Cancer & Metabolism*, 2013 1:1 doi:10.1186/2049-3002-1-2

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