

# Three studies find IDH enzyme mutations may alter activity leading to growth of cancer tumors

February 16 2012, by Bob Yirka

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(Medical Xpress) -- Three research teams have published papers in *Nature*, that together offer evidence suggesting that isocitrate dehydrogenase (IDH) enzyme mutations may play a role in altering activity that could have an impact on whether or not cancerous tumors begin to grow.

IDHs are enzymes that are part of the chemical reactions that lead to energy production in cells. Mutations that occur within such enzymes have been linked to many kinds of cancers, including gliomas, which is cancer that starts in [glial cells](#) in the brain. One of the mysterious of how [cancer tumors](#) get their start though is the process by which such mutations actually contribute to tumor growth. In the three new studies, researchers find that mutations in IDH enzymes can interfere with the switching on and off processes that can lead to a problem with [cell differentiation](#).

In one of the studies, a group led by Timothy Chan demonstrated that mutations of IDH1 led to alterations of DNA in glial cells, which were the same changes as were seen in some types of glioma, which seem to indicate that there is a likely link. As part of that research the team showed that mutations in the enzyme that regulate how much [methyl groups](#) are deposited on DNA can create changes in the process that is involved in the switching on and off of gene expressions across an entire genome.

In another of the papers, Craig Thompson and fellow researchers found that the expression of mutant DNA produced the metabolite 2-hydroxyglutarate (2HG) which is known to interfere with [demethylation](#) of histones leading to cell differentiation, which could lead to tumors.

And finally, in the third study, William Kaelin and colleagues examined different possibilities in exploring how 2HG accumulating in cells helps induce cell growth by interrupting the actions of proteins that are known to suppress tumors.

In cancer research, both lack of cell differentiation and [cell proliferation](#) are clear early indicators of tumor growth. Studies such as these make it clear that mutations in IDH enzymes are almost certainly involved in preventing them from functioning properly leading to the growth of [cancerous tumors](#), thus the development of pharmaceutical therapies that could prevent such mutations may lead to ways to prevent tumors from starting.

**More information:** The three *Nature* papers are:

[dx.doi.org/10.1038/nature10898](https://doi.org/10.1038/nature10898)

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