Lack of 'editing' in brain molecules potential driver of cancer

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Scientists in the U.K. and India have observed a "significant" lack of 'editing' in microRNAs in brain tissue of brain cancer patients.

In a paper published in *Scientific Reports*, the researchers say the finding is a 'small but important' step in our understanding of brain cancer progression, and raises possibility of using genome engineering techniques to slow or reverse the march of the disease.

MicroRNAs are a special type of RNA molecules that do not code for proteins but participate in crucial regulatory functions. They can introduce targeted variations in organization of their building blocks (ribo-nucleotides) – a process known as 'editing'. In turn, editing can enable RNA molecules to expand their functional repertoire, a process which is vital to maintain cell diversity and help our body adapt and evolve dynamically.

Dr Arijit Mukhopadhyay, a researcher in human genetics and genomics in the School of Environment and Life Sciences, and colleagues in Dehli showed that a specific organisation of these building blocks favour such targeted variations to occur, and that certain variations are decreased in patients with brain cancer which can potentially drive the disease.

Dr Mukhopadhyay and the team also examined the normal microRNA editing spectrum in 13 human tissue types and found the healthy brain to have the highest amount of editing – implicating the importance of the observed drop in case of brain cancers.

"What precisely is happening, we can't say, but with altered levels and positions of these editing events, cellular output can be significantly altered which we see in case of cancers," he says.

And he says the findings pose the question of whether biochemically we can re-establish the 'editing' process using genome engineering techniques like CRISPR targeted to specific cells to revert the biological outcome.

More information: Deepanjan Paul et al. A-to-I editing in human miRNAs is enriched in seed sequence, influenced by sequence contexts and significantly hypoedited in glioblastoma multiforme, *Scientific Reports* (2017). DOI: 10.1038/s41598-017-02397-6