

Scientists find three subgroups in a children's brain cancer, identify druggable targets

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Multi-institutional researchers investigating an incurable brain cancer in children have discovered three distinct subgroups of disease and identified promising drugs to target each type.

The research findings are published online today and depicted on the cover of *Cancer Cell*. Co-principal investigator Dr. Daniel De Carvalho, Scientist at Princess Margaret Cancer Centre, says being able to segregate and classify specific subgroups opens the door to providing precision medicine for children who have a highly malignant, non-inherited type of brain cancer called atypical teratoid rhabdoid tumours (ATRTs).

"Now we have the ability to match the patient to new drugs using this subgroup classification," he says. The next step will be moving into [clinical trials](#) to determine if the tumour targets will respond to the drugs, which are already either approved for use or being tested in clinical trials to treat other types of cancer.

Dr. De Carvalho holds the Canada Research Chair in Cancer Epigenetics and Epigenetic Therapy and is an Assistant Professor in Cancer Epigenetics, Department of Medical Biophysics, University of Toronto. In Toronto, the team was co-led by Drs. De Carvalho, James Rutka and Annie Huang, Hospital for Sick Children; and in Montreal, by Nada Jabado, McGill University.

The researchers integrated the analysis of 191 tumour samples provided by international collaborators and 10 cell lines to define the genomic and epigenomic landscape of ATRTs.

The team also discovered that one of the subgroups exhibits distinct sensitivity to two particular drugs that inhibit cell signalling.

Dr. De Carvalho, an epigeneticist whose research focuses on variants in acquired mutations outside the genes, says the analysis showed the subgroups are defined by epigenetic changes and that the [cancer](#) is driven by a mutation in epigenetic enzymes.

"The mutation is random, but once it occurs we now know what caused it and, depending on where it occurs, the targets downstream are different."

He says the next research focus will be to learn more about the mechanism of how these subgroups are sensitive to the drugs. "By understanding the mechanism, we can develop [new drugs](#), new targets and new approaches to treatment."

Provided by University Health Network

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