

New stem cell model to study how cancer arises

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Credit: Niek van Bree



In an interdisciplinary study combining stem cell biology and tumor biology, researchers from Karolinska Institutet (as well as Uppsala and Lund University, together with researchers in Canada, Germany and France), have succeeded in creating a new type of stem cell model for studies on cancer of the brain. The study was recently published in *PNAS*.

"We have created a new type of model for medullablastoma which is one of the most common forms of brain tumors that affect children. With current treatment, about 60% of the children affected survive," explains Margareta Wilhelm, researcher at the Department of Microbiology, Tumor and Cell Biology.

The treatment is often very tough and consists of surgery, radiation and chemotherapy, which can result in side effects in the form of cognitive problems, endocrine disorders, as well as increased incidence of secondary cancer later in life, which emphasizes the importance of developing effective treatments that do not harm the healthy part of the brain.

"In order to identify and test new treatments for this form of childhood cancer, we need to develop models that mimic the onset and growth of the disease," says Anna Falk, a researcher at the Department of Neuroscience.

"We have developed a model for medullablastoma by reprogramming skin cells from Gorlin's syndrome patients who carry a hereditary mutation in the PTCH1 gene—one of the most common mutated genes in medullablastoma—to become <u>pluripotent stem cells</u> and further to become <u>neural stem cells</u>, believed to be the cell of origin for medullablastoma," Anna Falk says.



"We show that transplanted patient neural stem cells form tumors in the cerebellum of mice, while cells from healthy individuals cannot," says Margareta Wilhelm.

The tumors that are formed are similar to those developed in medullablastoma patients and the researchers show that their model can be used to understand how the cancer starts and thereby find new therapy goals.

More information: Evelyn Susanto et al. Modeling SHH-driven medulloblastoma with patient iPS cell-derived neural stem cells, *Proceedings of the National Academy of Sciences* (2020). DOI: 10.1073/pnas.1920521117

Provided by Karolinska Institutet

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