New avenue for study of diseases like multiple sclerosis

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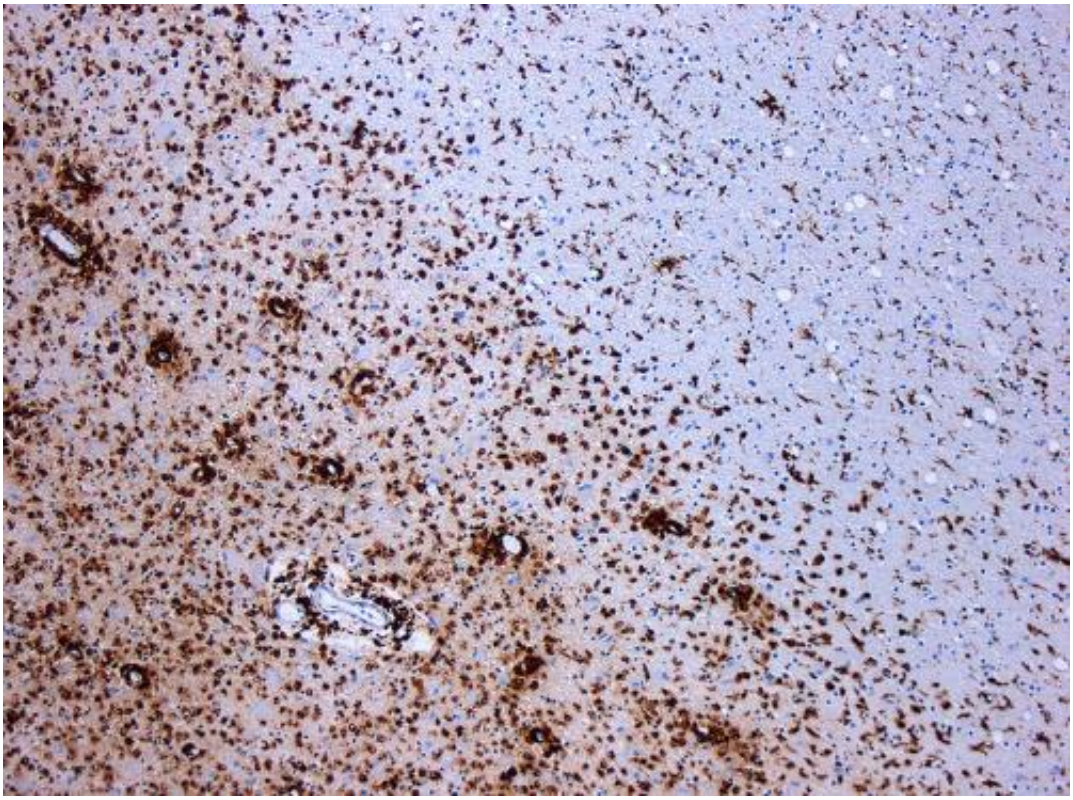

Demyelination by MS. The CD68 colored tissue shows several macrophages in the area of the lesion. Original scale 1:100. Credit: CC BY-SA 3.0 Marvin 101/Wikipedia

A surprising discovery may offer a promising new direction in the study of multiple sclerosis and other diseases of hypomyelination—when axons of neurons are not covered sufficiently in fatty sheaths (myelin),

which disrupts communication between nerve cells.

While investigating potential mechanisms of brain tumor formation, Oren Becher, MD, from Ann & Robert H. Lurie Children's Hospital of Chicago, and colleagues, found that overexpression of a growth factor receptor (called PDGFRA) in a mouse model did not cause tumors, as anticipated. Instead, they observed severe hypomyelination, which manifested as impaired balance, and hindlimb and tail tremors. Their findings were published in the journal *Brain and Behavior*.

"Our study provides a new model for studying hypomyelination," said Dr. Becher, senior author on the study, Rory David Deutsch Malignant Brain Tumor Research Scholar at Lurie Children's and Associate Professor of Pediatrics, Biochemistry and Molecular Genetics at Northwestern University Feinberg School of Medicine. "Blocking this receptor might prove to be a novel strategy to treat myelination disorders like multiple sclerosis. Of course, more research is needed to confirm our results and explore further."

Dr. Becher pointed out that the current study focused on prenatal events, which might explain why no tumors were formed, since timing is very important in cancer development.

"We saw that too much PDGFRA interfered with differentiation of progenitor cells that give rise to cells that make myelin," said Dr. Becher. "These progenitor cells, which continue to be generated throughout the human lifespan, are known to be the cell of origin for brain tumors like diffuse midline glioma. Our findings suggest that the mechanisms we observed might spur brain tumor development at a postnatal stage."

"I would like to express my profound gratitude to the Rory David Deutsch Foundation and Lurie Children's for their vision, confidence and support of this research," said Dr. Becher.

Medical Xpress

More information: Herminio Joey Cardona et al, Prenatal overexpression of platelet-derived growth factor receptor A results in central nervous system hypomyelination, *Brain and Behavior* (2021). DOI: 10.1002/brb3.2332

Provided by Ann & Robert H. Lurie Children's Hospital of Chicago

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