

New study finds external stimulation impacts white matter development in the postnatal brain

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A team at Children's National Medical Center has found that external stimulation has an impact on the postnatal development of a specific region of the brain. Published in *Nature Neuroscience*, the study used sensory deprivation to look at the growth and collection of NG2-expressing oligodendrocyte progenitor cells (NG2 cells) in the sensory cortex of the brain. This type of research is part of the Center for Neuroscience Research focus on understanding the development and treatment of white matter diseases.

NG2 cells can develop into oligodendrocytes progenitor cells that generate myelin, the protective material around the axons of neurons, but this is based on functional and developmental interactions with outside stimuli. With this kind of plasticity, or ability to change and mold a cell in different ways, the researchers were able to determine that [sensory stimuli](#) can control the number and positioning of developing NG2 cells.

"Understanding how external stimulation and experience impact the development of NG2 cells means that we can try to modulate these factors to help regulate and promote the expansion of these cells. This could ultimately have an impact on white matter diseases," stated Vittorio Gallo, PhD, study coordinator and Director of the Center for Neuroscience Research at the Children's Research Institute. "We will now investigate in more detail how sensory experience can regulate NG2 cell development, particularly how experience activates specific genes

and [molecular pathways](#) in these cells."

Collectively called NG2 progenitors, these cells also serve as the primary source of cells to regenerate oligodendrocytes and myelin in the postnatal brain. Without myelin, the brain does not function properly. Myelination can be impaired for a number of reasons, resulting in mental retardation and developmental disabilities. Myelination, white matter growth and repair, and the study of complex mechanisms of pre- and postnatal [brain development](#) are a key focus of the Center for Neuroscience Research at Children's National, which also houses the White Matter Diseases Program, one of the largest clinical programs in the country for treating children with disorders that cause the brain's [white matter](#) to degenerate.

Provided by Children's National Medical Center

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