New study on cerebral astrocytes in depression and suicide

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A new study published by the team of Naguib Mechawar, Ph.D., a researcher with the McGill Group for Suicide Studies (MGSS) of the Douglas Institute (CIUSSS de l"Ouest-de-l"Ile de Montreal) and associate professor in the Department of Psychiatry at McGill University, sheds new light on the disruption of astrocytes in depression. Astrocytes, a class of non-neuronal cells, have previously been

implicated in depression and suicide.

However, it was not known whether these cells were affected throughout the brain or only in certain regions. This research provides evidence that networks of astrocytes are altered specifically in areas of the brain associated with mood regulation. In addition, in describing the existence of new subtypes of astrocyte, this study reveals features specific to the human brain.The diversity and functional and morphological complexity of cortical astrocytes in humans, as well as their involvement in normal and pathological brain function, have only recently begun to be recognized. In particular, accumulating data generated by the MGSS and other independent research groups have indicated an abnormal regulation of astrocytic genes in the prefrontal cortex of patients who died while suffering from depression.

Breaking new ground

This work, carried out by MGSS doctoral candidates Susana Gabriela Torres-Platas and Corina Nagy, breaks new ground. Based on the analysis of postmortem brain samples from the Douglas-Bell Canada Brain Bank, it demonstrates that the expression of the astrocyte-specific marker GFAP, which is significantly decreased in the prefrontal cortex of depressed suicides compared to that of healthy controls, is normal in other cortical areas that are not traditionally associated with depression, such as the visual cortex. However, GFAP expression was also found to be decreased in subcortical brain regions that are interconnected to the prefrontal cortex or that were previously implicated in mood disorders.

"Within these subcortical regions, in samples from both patients and healthy individuals, we also observed astrocytes that were larger and more complex than those seen in cortical areas. We are currently analyzing these cells to better understand their unique properties in the human brain. I am convinced that it is important to describe how the

human brain is organized at the microscopic level, and how this organization is altered in depression, in order to better understand the biological causes of this illness. This should help develop new therapeutical targets," explains Mechawar.

This study appears today in the journal *Molecular Psychiatry*.

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