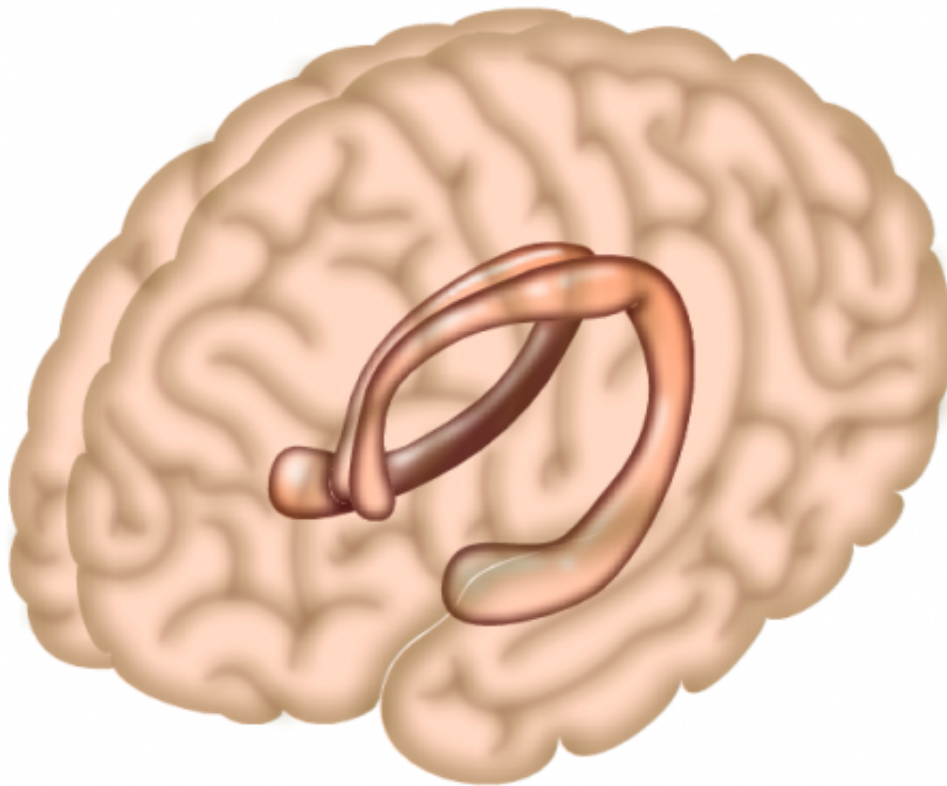


Memory and the hippocampus

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The hippocampus is a region of the brain largely responsible for memory formation. Credit: Salk Institute

New work by the Douglas Mental Health University Institute (CIUSSS de l'Ouest-de-l'île-de-Montréal) computational neuroscientist Mallar Chakravarty, PhD, and in collaboration with researchers at the Centre

for Addiction and Mental Health (CAMH) challenges in a thrilling way the long-held belief that a larger hippocampus is directly linked to improved memory function.

The size of the [hippocampus](#), an important structure in the brain's memory circuit, is typically measured as one method to determine the integrity of the memory circuit. However, the shape of this structure is often neglected. Using a novel algorithmic technique to map the hippocampus, Dr. Chakravarty, Assistant Professor, Department of Psychiatry at McGill University, is shedding new light on its shape. The algorithm developed by the team identifies individuals with differently shaped hippocampi. In fact, the study has found that while stereotypic shapes exist for this structure, individuals with a broader hippocampus tend to perform better on various tests that assess memory. In the study, these shape differences were better predictors of memory function than the bulk volume of the hippocampus.

"This exciting new finding may help us improve our understanding of how to preserve the [memory circuit](#) and its function. This work shows the value of multidisciplinary research, as it required the close collaboration of engineers, computer scientists and psychiatrists to complete this work," says Dr. Chakravarty, senior author on the study. Chakravarty's student Julie Winterburn notably worked on this project, and was co-first author with Dr. Aristotle Voineskos of CAMH's Campbell Family Mental Health Research Institute. in Toronto.

Why it matters

Improving our understanding of the geometry of different structures may have significant implications in understanding neuropsychiatric disorders, such as Alzheimer's disease, where memory function is significantly compromised. Given the aging demographics of Quebec and Canada, uncovering clues on how to improve [memory function](#), one

of the main impairments reported (even in healthy aging), will be critical to relieving the overwhelming burden our health care system currently faces. The results of this recent research are published in *Human Brain Mapping*, a peer-reviewed scientific journal.

Provided by Douglas Mental Health University Institute

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