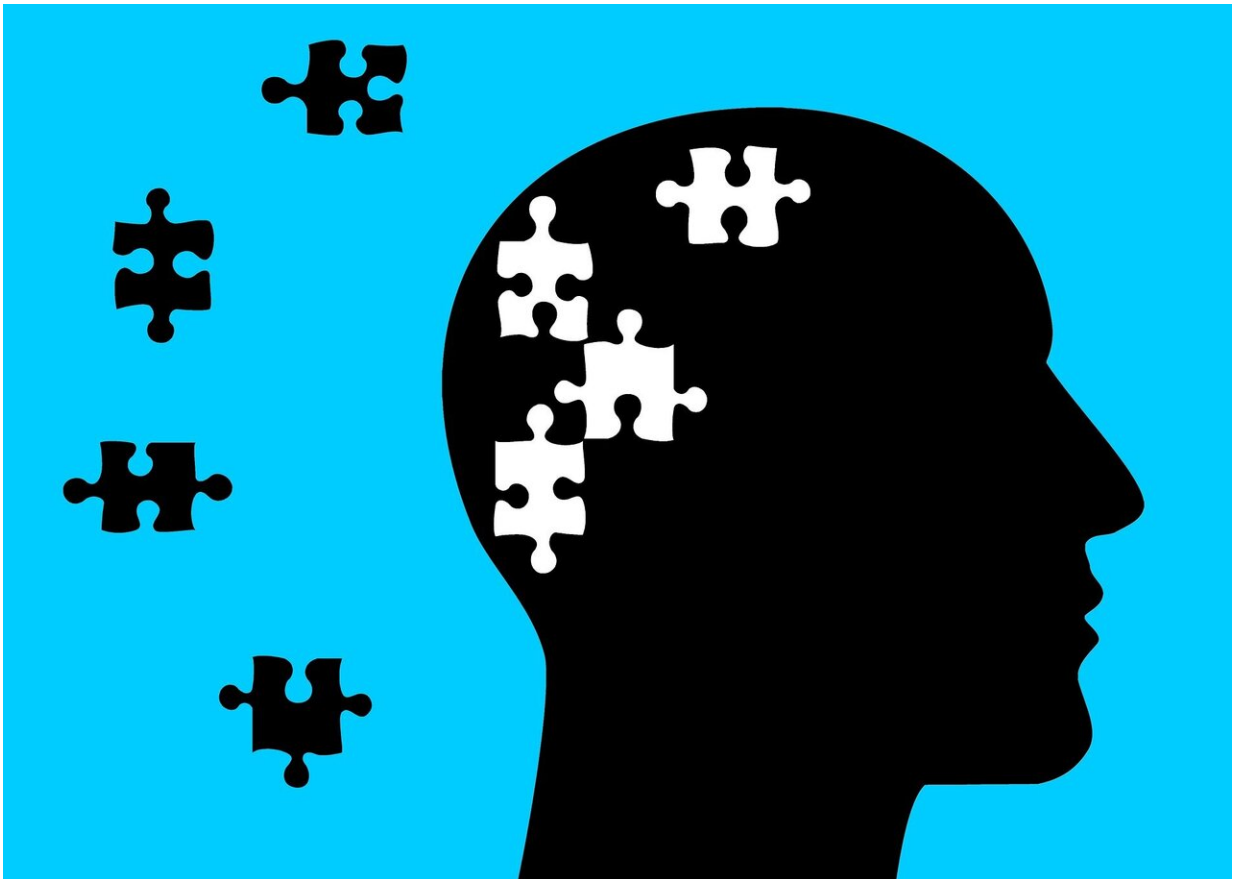


# Study in mice suggests post-surgical delirium caused by inflammation

April 15 2020, by Sarah Avery

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Alzheimer's disease patients who undergo orthopedic or other surgeries frequently develop post-surgical delirium, often leading to a poor

recovery and a higher risk of dying.

The cause of this acute disruption in the patient's mental status is largely unknown, but previous studies have suggested a link to some intrinsic response to surgical trauma itself, the multifaceted perioperative environment, and patient-specific factors that altogether contribute to post-surgical delirium.

In a study using mice led by Duke Health researchers, a new finding suggests that inflammation, especially as it impacts the blood-brain [barrier](#) in older and more frail subjects, amplifies neurodegenerative processes and drives the development of post-surgical delirium. The study is publishing online April 15 in *Alzheimer's & Dementia*.

"The blood-brain barrier has often been under-appreciated in the context of perioperative neurocognitive disorders, such as delirium," said senior author Niccolò Terrando, Ph.D., associate professor in the Department of Anesthesiology at Duke University School of Medicine. "This study provides evidence that a systemic response to surgery triggers a series of events that enables inflammation to breach the brain's gatekeeper."

Terrando and colleagues studied the effects of orthopedic surgeries in older mice with the pathological features of human Alzheimer's [disease](#). These animals underwent an orthopedic fracture model and the researchers traced how post-surgical delirium unfolds.

Notably, inflammation disrupted the blood-brain barrier, especially in older and more vulnerable animals, and caused rapid accumulation of amyloid beta (a key protein dysregulated in the Alzheimer's disease brain), which then altered the function of immune cells in the central nervous system, thus resulting in post-surgical delirium.

"We described a neurovascular pathology that drives the development of

postoperative delirium as a result of surgical trauma, which contributes to a rapid accumulation of amyloid beta in the brain," Terrando said. "This may represent a unique molecular signature of [delirium](#) superimposed on dementia and a potential target for interventions."

Terrando said future studies will focus on how [surgery](#) impacts the [blood-brain barrier](#) and potential ways to curtail this neuroinflammatory response in older surgical patients and, particularly, those with Alzheimer's disease.

Provided by Duke University

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