New research unravels complex stroke mechanisms

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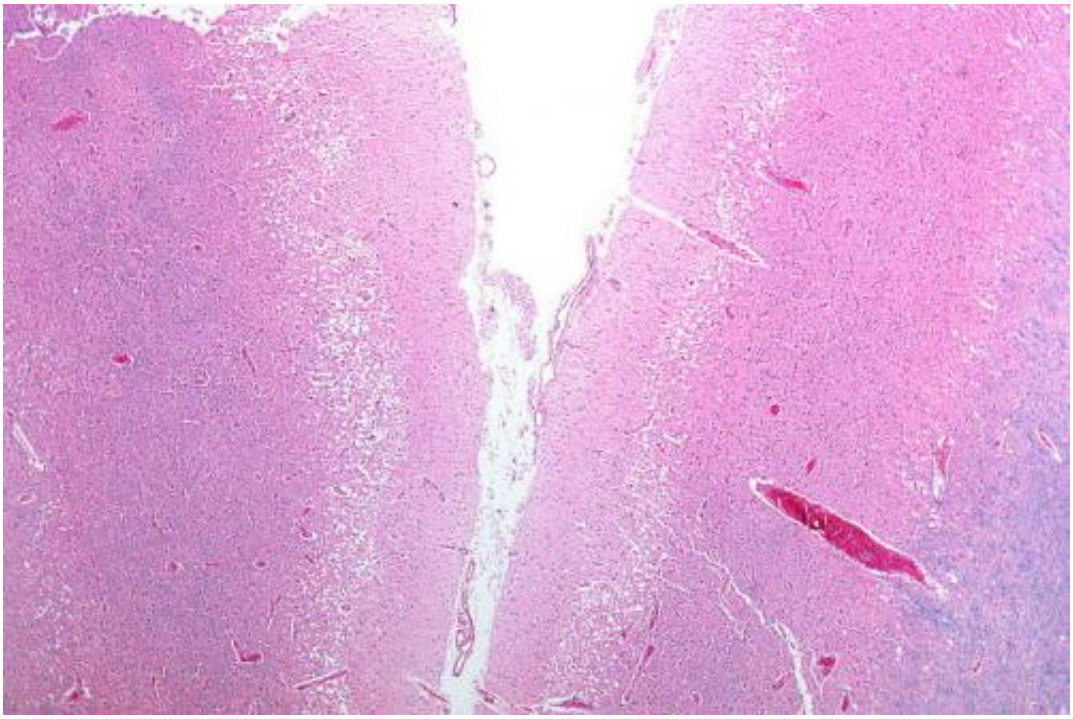

Micrograph showing cortical pseudolaminar necrosis, a finding seen in strokes on medical imaging and at autopsy. H&E-LFB stain. Credit: Nephron/Wikipedia

New research at the University of Adelaide has led to a deeper understanding of how the brain responds to stroke and which mechanisms may be harmful or beneficial following a stroke.

In laboratory studies in the University's School of Medical Sciences,

research leader Dr Renée Turner investigated the effect of blocking all neuropeptides (small protein-like molecules used by nerve cells to communicate with each other) in the brain after a stroke.

Speaking in the lead up to National Stroke Week (8-14 September), Dr Turner says the research builds on previous studies that show blocking the compound known as "substance P" not only reduces swelling in the brain caused by stroke but also improves survival and decreases disability.

"There are a range of benefits from blocking substance P, which has been a focus of research in our lab. But until now we haven't fully understood what would happen if we blocked all neuropeptides in the brain following acute ischemic stroke. The question was: would this be simpler and more effective than just targeting substance P alone?" Dr Turner says.

"What we found is that the brain's response to stroke is quite complex. Whilst blocking neuropeptides such as substance P was beneficial, due to its clear role in brain swelling and functional deficits, blocking all neuropeptides lead to a poorer response."

"We suspect this is because some of the neuropeptides are there to serve protective functions and promote brain repair and recovery. We can't just target them all because this may do more harm than good. We can only safely block those neuropeptides shown to have a harmful effect following stroke."

Dr Turner's research, now published in the journal Neuropeptides, also compared two treatments: capsaicin – an active component of chili peppers – and an NK1 tachykinin receptor antagonist (NAT), which is a drug that blocks the substance P receptor.

"Although in our laboratory studies blocking all neuropeptides with capsaicin treatment led to improved outcomes, blocking only substance P with NAT treatment was superior in improving post-stroke functional outcomes in every way," Dr Turner says.

"These results are important because they help us to better understand the range of mechanisms involved in the brain post-stroke, and they help to drive new directions for research. While much more work is needed, it gives us further hope that we can understand the mechanisms involved following stroke to develop improved treatments for stroke patients in the years to come."

Provided by University of Adelaide