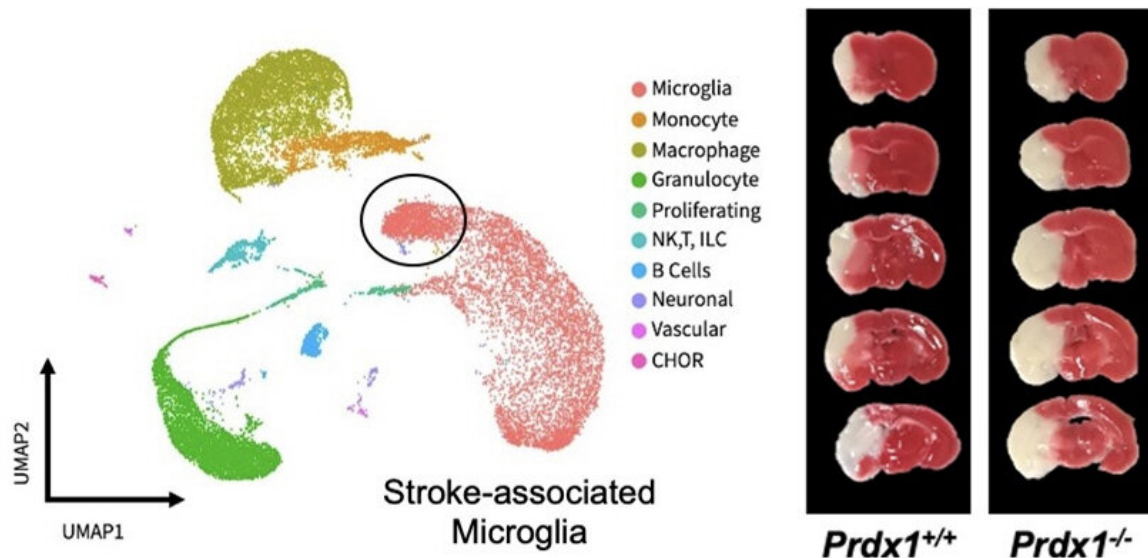


New study identifies unique type of microglia associated with stroke in the I/R injured brain

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Peroxiredoxin1 (Prdx1) is essential for SAM activation after stroke damage. (Left) UMAP plots showing clusters and annotations of cells identified in Prdx1^{+/+} and Prdx1^{-/-} IL hemispheres after tMCAO. (Right) Representative images of TTC stained brain slices of Prdx1^{+/+} (n = 18) and Prdx1^{-/-} (n = 22) mice. Credit: UNIST

A research team, affiliated with UNIST has identified a new type of microglia associated with stroke in the ischemia/reperfusion (I/R)

injured brain. This breakthrough has been led by Professor Sung Ho Park and his research team in the Department of Biological Sciences at UNIST, in collaboration with a research team, led by Professor Goo Taeg Oh from Ewha Womans University.

Microglia, the primary immune cells in the central nervous system (CNS), are known to eliminate unwanted germs and debris and remove dying neurons. In this study, the research team classified a new type of microglia with enhanced antioxidant function and markers similar to those of disease-associated microglia (DAM), designated them as [stroke-associated microglia \(SAM\)](#).

Through [animal experiments](#), the research team demonstrated that the presence of the typical antioxidant gene, Peroxiredoxin-1 (Prdx1), protects against acute I/R injury and is required for SAM activation and the consequent reduction of microglial cell death and inflammatory responses.

In addition, after performing transient middle cerebral artery occlusion (tMCAO) surgery to induce [ischemic stroke](#) in mice, the research team found that Prdx1^{-/-} mice were more severely injured by acute I/R injury, as confirmed by TTC staining, neurological deficit scores, motor tests, and the survival rate, indicating that Prdx1 has a protective function.

"In this study, we have, for the first time, identified a specialized and distinctive type of microglia with enhanced antioxidant function in stroke mice," says Professor Park. "Prdx1-dependent SAM may be a potential biomarker and therapeutic target for protecting microglial function and treating brain I/R injury," He adds, "Although this [new cluster](#) will require further study, our findings provide a new perspective that Prdx1-mediated microglial heterogeneity is important in ischemic stroke."

This study has been jointly participated by Wonhyo Lee, a doctoral researcher within the Department of Biological Sciences at UNIST and Sinai Kim, a doctoral researcher within the Department of Life Sciences at Ewha Womans University, as first authors. Their findings have been published in *Redox Biology*.

More information: Sinai Kim et al, The antioxidant enzyme Peroxiredoxin-1 controls stroke-associated microglia against acute ischemic stroke, *Redox Biology* (2022). [DOI: 10.1016/j.redox.2022.102347](https://doi.org/10.1016/j.redox.2022.102347)

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