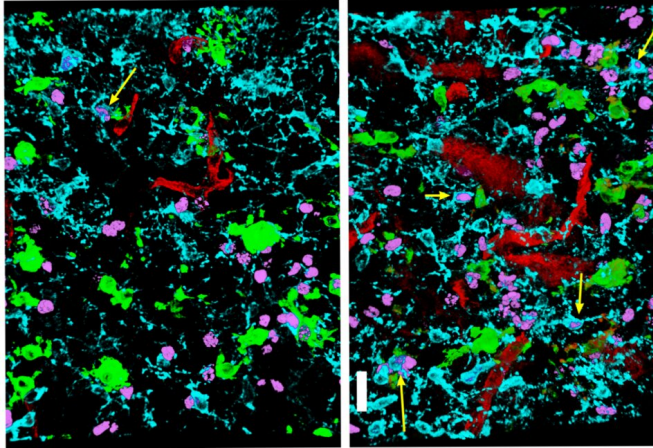


Repairing nerves requires prods of protein

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The arrows show where oligodendrocyte precursor cells (blue – all OPCs, pink- dividing OPCs) and their growth factor receptors are in contact with microglia (green) and their signaling proteins (red). Credit: Akiko Nishiyama

When there's damage in the body, our cells call for help. UConn brain researchers just found a new way cells do this—like in the old AT&T ad campaign, they reach out and touch someone.

Or some cell, rather.

UConn neuroscientist Akiko Nishiyama and graduate student Amin Sherafat report in the April 15 issue of *Nature Communications* that when the [insulation](#) around our nerves gets damaged, [cells](#) called microglia make a special protein they use to prod oligodendrocyte precursor cells (OPCs). The OPCs respond by making more insulation.

Wires need to be insulated or they short out; our nerves need to be insulated for the same reason. If the insulation deteriorates and is not repaired, it can lead to diseases like multiple sclerosis. Scientists used to think the insulation around nerves was static, and if it deteriorated there was nothing to be done. But now they know about OPCs. OPCs live in our brains and are continually

ready to produce more insulation for our nerves as necessary. But it wasn't clear how they were activated.

Microglia are another kind of brain cell. They have long been considered the bad guys of brains, because they always show up near injuries and inflammation. However, Nishiyama and Sherafat found that microglia located next to OPCs in the [brain regions](#) that are rich in nerve bundles will stick a particular protein on their cell membrane when the nerves are developing or damaged. The protein sticks out and actually touches nearby OPCs. When the protein touches a growth factor receptor on an OPC, the OPC starts to multiply and produce more mature versions of itself that make or repair the insulation. That seems to be one way, at least, that OPCs are activated.

Using a [protein](#) stuck in the [cell membrane](#) to actually touch and activate a growth factor receptor on an adjacent cell is an unusual way for cells to communicate. Sometimes cells that line organs such as the lungs or intestine stick together with proteins, but those cells are stationary. Microglia can move around, and they have a completely different origin than OPCs, making their communication more surprising.

The findings also explain why microglia are so often found near inflammation and damage: that's where they do their job. Nishiyama and Sherafat suggest that instead of causing [tissue damage](#), [microglia](#) in axon-rich regions might be sentinels, tasked with sensing changes in the insulation. And reaching out and touching OPCs with proteins might just be their way of getting their message across.

More information: Amin Sherafat et al. Microglial neuropilin-1 promotes oligodendrocyte expansion during development and remyelination by trans-activating platelet-derived growth factor receptor, *Nature Communications* (2021). [DOI: 10.1038/s41467-021-22532-2](#)

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