Brain cells help neighboring nerves regenerate

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Researchers have uncovered a completely unexpected way that the brain repairs nerve damage, wherein cells known as astrocytes deliver a protective protein to nearby neurons.

Astrocytes are a type of support cell in the brain that serve many functions; one of their roles is to chew up damaged nerves during brain injury and then form scar tissue in the damaged area.

Roger Chung and colleagues have now found that astrocytes have another trick up their sleeve. During injury, astrocytes overproduce a protein called metallothionein (MT) and secrete it to surrounding nerves; MT is a scavenging protein that grabs free radicals and metal ions and prevents them from damaging a cell, and thus is a potent protecting agent.

While the ability of astrocytes to produce MT has been known for decades, the general view was that the MT stayed within astrocytes to protect them while they help repair damaged areas. However, Chung and colleagues demonstrated that MT was present in the external fluid of damaged rat brain. Furthermore, with the aid of a fluorescent MT protein, they observed that MT made in astrocytes could be transported outside the cell and then subsequently taken up by nearby nerves, and that the level of MT uptake correlated with how well the nerves repaired damage.

While the exact physiological role that MT plays in promoting better

repair remains to be identified, this unexpected role for this protein should open up new avenues in treating brain injuries in the future.

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