

A muscle protein promotes nerve healing

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Injuries or diseases of nerves in the central nervous system result in lifelong disabilities, such as paraplegia caused by a damage to the spinal cord or blindness following the injury of the optic nerve. "Nerve regeneration therapies for clinical applications are not available yet," points out Dietmar Fischer. This is because nerve fibres – so-called axons – either don't produce any proteins that are essential for their regeneration at all, or they don't produce enough of them. "If we identified such proteins and triggered their production using gene therapy, we'd have novel, applicable methods for nerve regeneration at our disposal," says Fischer.

His team took a step towards this goal as they discovered that the muscle LIM protein (MLP), which plays a crucial role in, for example, the heart, is also produced in the [nerve](#) cells of the central nervous system under certain conditions.

MLP stabilises structures in growth cones

The scientists demonstrated that the production of MLP in neurons is induced if they had been artificially stimulated to grow [nerve fibres](#). In the process, the protein gathered in the tips of the regrowing fibres where it stabilised the structures in so-called growth cones that play an essential role in regeneration. This was the first evidence that MLP has a physiological role in other tissues than muscle.

If the researchers blocked the protein's function or suppressed its production, the nerve cells' ability to grow axons was significantly reduced. If, conversely, the researchers deployed [gene therapy](#) to cause damaged [nerve cells](#) to produce MLP, the respective axons showed a significant increase of their regenerative ability. In animals, axon growth in the injured optic nerve was thus considerably boosted when compared to animals that didn't undergo the therapy.

"At the Department for Cell Physiology, we will continue to study if similar methods may promote

the regeneration in other regions of an injured brain or [spinal cord](#) resp. after a stroke," concludes Fischer.

More information: Evgeny Levin, Marco Leibinger, Philipp Gobrecht, Alexander Hilla, Anastasia Andreadaki, Dietmar Fischer: Muscle LIM Protein is expressed in the injured adult CNS and promotes Axon Regeneration, in: *Cell Reports*, 2019, DOI: S2211-1247(18)31956-9 [www.cell.com/cell-reports/pdf/...-1247\(18\)31956-9.pdf](http://www.cell.com/cell-reports/pdf/S2211-1247(18)31956-9.pdf)

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