

In A Nutshell  
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## Re-myelination

Remyelination is the process of propagating oligodendrocyte precursor cells to form oligodendrocytes to create new myelin sheaths on demyelinated axons in the CNS. This is a process naturally regulated in the body and tends to be very efficient in a healthy CNS. The process creates a thinner myelin sheath than normal, but it helps to protect the axon from further damage, from overall degeneration, and proves to increase conductance once again. Demyelinating diseases, such as Multiple Sclerosis, have been of utmost interest within the last couple of decades. Recent research is uncovering some of the many unknown pathways involved with remyelination in hopes of battling demyelinating diseases like MS which can ultimately cripple a person. While no treatment exists yet in preventing remyelination failure in the chronic stages of these diseases, future research may yet prove to unlock key pathways that can be targeted.

A new report in JCI Insight from Arjun Saha and colleagues at Duke University demonstrates that a cell therapy product called DUOC-01 can accelerate remyelination of axons in mice treated with a demyelinating chemical agent. DUOC-01 cells, which are derived from banked umbilical cord blood, were transplanted into mice following toxic demyelination. DUOC-01 treatment resulted in faster remyelination and promoted the differentiation of oligodendrocyte progenitor cells. These results suggest that a cord blood-derived cell product can promote neuronal repair and remyelination. Future clinical studies will be needed to determine if DUOC-01 cell therapy benefits patients with demyelinating diseases.

So why does this myelin regeneration process eventually fail in MS? According to researchers at Weill Cornell Medical College, the body relies on a balance of on and off signals in biological processes like remyelination. In MS, researchers believe off signals inhibit the repair of myelin. Off signals warn your body that the environment is too hostile for growth. Inflammatory processes at work in MS cause these warning signals.

The goal of much of MS research is to figure out how to repair myelin and restore function. Remyelination could effectively reverse disability once thought to be permanent. Scientists all over the world are working toward this goal. Researchers at Case Western Reserve School of Medicine have recently discovered how to turn ordinary skin cells into oligodendrocytes. These are cells that can regrow myelin and reverse damage that occurs due to diseases such as MS. In a process known as "cellular reprogramming," researchers retrained the proteins in skin cells to become precursors to oligodendrocyte cells. The research team was able to quickly grow billions of these cells. This discovery will help scientists turn a readily abundant cell into a building block for myelin regrowth.

Gilenya has been approved for people with RRMS. It works by preventing neuro-inflammation, but it also appears to be able to help people by directly enhancing nerve regeneration and remyelination. It works by inhibiting the action of a certain enzyme that creates a fatty acid that damages myelin. One study showed that Gilenya could promote nerve regeneration, reduce nerve inflammation, and improve myelin thickness. Other efforts to regrow myelin are also underway. Researchers in Germany are in the early stages of experimenting with human growth hormone to encourage production of myelin. Their initial results are promising, but more studies are necessary.

Reversing disability

## Just for Fun

Just for fun let's all be hopeful because:

Research in MS remyelination is on the brink of exciting breakthroughs. Scientists from around the globe are focusing their efforts on new ways to solve this problem. Some are trying to control the inflammatory processes and turn off switches back on. Others are reprogramming cells to become oligodendrocytes. These efforts bring scientists one step closer to helping people with MS. For example, regenerating the nerve's myelin covering may allow people with MS who can't walk to walk again.

<https://en.wikipedia.org/wiki/Remyelination>

<http://www.news-medical.net/news/20160818/Cell-therapy-product-can-accelerate-brain-remyelination-in-mice.aspx>

<http://www.healthline.com/health/multiple-sclerosis/remyelination-possibilities#reversing-disability6>