Can Nerves Grow and Regenerate?

By Rafael_B

Can nerves grow and regenerate? The answer may be yes, according to a new research published in the journal *Advanced Materials*. This research shows that nerves from the central system, known as neurons, can grow and regenerate with the appropriate technique.

The technique uses a polymer that contains a chemical substance that mimics the acetylcholine (AC) neurotransmitter. The AC induces nerves to grow by inducing the development of what is known as neuritis, the projections that neurons have to connect one to another. So, this polymer may induce the growth of the nerves. It works like a seed for the nerve to grow.

Until now, nerves can not be repaired since they are known not to grow. Human nerve function can not be regenerated until now with this treatment that seems to be working out, according to this research. So, self-repair of nerves may be true in the near future.

Yadong Wang, assistant professor in the Coulter Department of Biomedical Engineering at Georgia Tech and Emory University, led this study that shows that nerves can grow and regenerate. He is a very outspoken person about this technique of nerve growth and regeneration.

Wang and colleagues designed this study to develop these new biodegradable polymers. This new polymer has a backbone that permits the attachment of different chemical compounds. One of these compounds is AC which seems to be working out very well at seeding the neuritis growth and development. The polymer with AC would have to be inserted surgically on the damaged central nerves.

The goal with this type of study is to create a channel where nerve can grow guiding neurons to regenerate. As neurons grow the polymer would degrade so as to avoid that nerves will be compressed.

This new technique would be helpful for victims of central nervous system injury, stroke or certain diseases. Patients with this treatment could recover sensory, motor, cognitive or autonomic functions.

Researchers tested different polymers and different chemical compounds attached to the backbone. They also tried polymers with different amounts of the acetylcholine-like substances. Nervous tissue samples were taken from humans and placed them to see if they grew.

More specifically, they tested if the neuritis grew (at least 20 of them) and also how long they grew. They used a potent inverted phase contrast microscope to do these tests.

Seventy percent of acetylcholine concentration on the polymer was needed to effectively induce neurites growth at a rate averaging 0.7 millimeters per day.

Currently, the researchers will explore the mechanisms by which these neurons interact with these types of polymers.