



Stem Cells and PPS

A Bruno Byte

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Stem cells are remarkable, embryonic “baby cells” that will grow up to be any kind of cell that the body makes. With all the excitement about stem cells curing spinal cord injury, many polio survivors are asking if stem cells could “cure” PPS, or even reverse the damage caused by polio itself.

The hope with SCI (spinal cord injury) is that stem cells, injected into the spinal cord, would “bridge the gap” in cut spinal cord axons, which are like long telephone wires that connect brain motor neurons to spinal cord motor neurons and allow the brain to “tell” muscles to move again. This notion requires working motor neurons below the cut in the cord. And herein lies the problem with stem cells “curing” polio or PPS. Even in “mild” cases, the poliovirus killed off least 50% of neurons throughout the spinal cord. Stem cells injected into a polio survivor’s spinal cord would not have to just bridge a gap, but have to become new, functioning motor neurons.

What’s more, those new neurons would have to send out their own axons to find and activate the specific muscles that were paralyzed when the original axons disappeared 50+ years ago after poliovirus-infected neurons died, by burrowing inches, or in the case of the leg three feet, through the tissues inside the arms and legs.

Finally, the brain's motor neurons would have to send out new axons as well, since the brain’s neurons and axons also died as a result of the poliovirus infection. These axons would have to burrow through the entire brain, the brain stem and down through the spinal cord to get to the newly implanted motor neurons, indeed a tremendous tunneling task!

So, the idea of rebuilding a polio-damaged spinal cord would require a “hat trick” of creating new brain and spinal motor neurons, new axons tunneling from the brain to the spinal cord and from the spinal cord to the muscles. Reconnecting a lesioned spinal cord would “only” require the bridging the gap between cut axons.

Yes, a possible use for stem cells would be to inject them into the brain, as is being tried in Parkinson’s disease (PD) patients, where they could produce the main brain activating neurochemical, dopamine, which is decreased in polio survivors and causes post-polio fatigue. But, such injections are not widely accepted even in PD patients yet.

So, if stem cells aren't the answer, is there anything polio survivors can do to help their remaining poliovirus-damaged neurons? Recently, there has been research on “[neuroprotective](#)” drugs, medications that protect neurons’ innards from overuse-abuse that causes post-polio symptoms. Several studies have focused on degenerative diseases, such as Parkinson’s and Huntington's disease, which involve damaged dopamine neurons. Minocycline, a common antibiotic used to kill a variety of bacteria, and creatine, which helps to provide energy to muscle cells, have been given to PD patients, who showed a less rapid a decline in function compared to those taking a placebo.

However, a study comparing creatine and placebo in 60 PD patients found that, while their mood improved and their need for medication decreased, their symptoms did not lessen.

In eight studies, Vitamin E has been found to have some neuroprotective effect in PD, while vitamin C and beta-carotene were not helpful. Some research even links coffee's ability to limit blood vessels from opening to protecting neurons against PD, with one cup a day cutting the risk of developing PD by as much as fifty percent. Another dietary supplement, coenzyme Q-10, is being testing to see if it protects PD patients' neurons.

Huntington's Disease patients have also benefited from potential neuroprotectives. Huntington's patients given minocycline had slower progression or no decrease in physical ability, thinking and memory. Creatine had similar beneficial results in Huntington's.

Should polio survivors take minocycline, creatine and Vitamin E, or order a Starbucks' grande, three-shot cappuccino to prevent post-polio brain fatigue? Not yet. There aren't enough studies to prove that any of these is truly neuroprotective in Parkinson's or Huntington's disease, let alone helpful for polio survivors, in which these substances haven't been studied at all.

Double-blind, placebo-controlled studies of potential neuroprotectives are warranted in polio survivors. For now, the only neuroprotective that we know works in polio survivors is "The Golden Rule:" If anything causes fatigue, weakness or pain, DON'T DO IT! (Or do less of it.)

The Encyclopedia of Polio and Post-Polio Sequelae

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