



Dental stem cells to treat spinal cord injury

A method of treating nervous tissue damage using dental pulp stem cells that leads to neuro-regeneration with a high safety profile and low probability of patient rejection.

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Unrealized treatments for spinal cord injuries

Spinal cord injuries can result in serious, debilitating outcomes including quadriplegia or paraplegia. There is a dire need to identify treatment strategies for this type of nervous tissue damage. Regenerative therapy has focused on the use of stem cells to treat spinal cord injuries and all related clinical trials have reported favorable safety profiles. Unfortunately, these same trials have failed to show improvement in patient nerve function. Drs. Leslie Morse and Ricardo Battaglino identified dental pulp stem cells as a promising therapeutic and have developed a method to prepare these cells and subsequently used them in rat models of spinal cord injury. These dental stem cells could be developed into treatments for patients with nervous tissue injuries.

A therapeutic option with some real “teeth”

The researchers found in a rodent model of spinal cord injury, transplantation of dental pulp stem cells into the damaged tissue enhanced recovery through inhibiting apoptosis, preserving neural fibers and differentiating into mature oligodendrocytes. Dental pulp stem cells can be derived from permanent teeth and offer a variety of advantages over current stem cell sources:

- Heightened capacity to become neural cells
- Low possibility of patient rejection
- Avoid ethical issues associated with embryonic stem cells
- Readily available (as compared to cord-derived cells)
- Obtained using a minimally invasive procedure (as compared to bone marrow harvest)

These neuro-regenerative properties have not been observed with embryonic stem cells, adult bone marrow stromal cells, or other stem cell populations. Dental pulp stem cells show incredible promise in the treatment of neural damage from stroke, traumatic brain injury, or spinal cord injury.

Phase of Development

In vitro and animal studies completed. Dental pulp stem cells have been harvested, expanded, characterized and shown to be effective in a rat model of spinal cord injury.

Key Benefits & Differentiators

- **Unique neuro-regeneration in spinal cord injuries:** Dental pulp stem cells inhibit apoptosis, preserve neural fibers and differentiate into oligodendrocytes. Properties not exhibited by other tested stem cells.
- **High safety profile:** Cells can be harvested from a patient's own teeth, minimizing the risk of rejection. Furthermore, all stem cells to date have exhibited favorable safety profiles in clinical trials.
- **Ethical, readily available source of stem cells:** Dental pulp stem cells are harvested from teeth, avoiding the ethical and availability limitations of other stem cell sources.

Applications

- Spinal cord injury treatment
- Traumatic brain injury and stroke treatment
- Basic stem cell research
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Researchers

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