

Module 8 – Cell Replacement

Introduction to Cell Replacement

The goal of cell replacement is to treat injury or illness by replacing dead, damaged, or diseased cells with new, healthy ones.

Cell replacement strategies are already occurring for some health conditions. For example, bone marrow transplant, also called stem cell transplant, is a cell replacement therapy that is the standard of care to treat some cancers, blood disorders, and diseases of the immune system.

However, as of now, no cell replacement strategies are approved or acknowledged as the standard of care for SCI.

In SCI, cell transplantations can serve many purposes including

- Replace lost neurons and form a neural relay across the lesion
- Form a growth permissive matrix for axon regeneration to occur and fill the lesion cavity
- Produce growth factors and trophic factors to facilitate axon regeneration and plasticity
- Support surrounding tissue and protect against secondary injury cascades.

Researchers are studying several different cell types, including stem cells and glial cells, to see if they can restore function after an SCI. Cell replacement strategies that are currently being investigated include both cells that can or cannot form new neurons. Each cell being investigated has unique properties that may be beneficial to SCI.

For example, the objective of “neuroreplacement,” seeks to replace dead or damaged neurons, while non-neural cells can:

- Replace cells that myelinate neurons
- Replace cells that promote the growth of new axons
- Or protect neurons from secondary injury

In this module, you will learn:

- The basics of how cells are created and how they grow
- The main types of cells that are being studied for neuroreplacement
- How and why researchers think those cell types might work in SCI
- Challenges and unanswered questions