

Module 8 – Cell Replacement

Summary of Key Points

This concludes Module 8: Neuroreplacement. Before you take the quiz, let's review the key points:

- 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 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.
- Embryonic Stem Cells have the ability to make all other types of cells in the body, termed “pluripotent”
- Adult stem cells are found in a tissue or organ and can differentiate to yield the specialized cell types of that tissue or organ
- Skin cells can be reprogrammed back into a pluripotent state and have similar properties to an embryonic stem cell – thus forming induced pluripotent stem cells (iPSCs)
- There are severable variables that can affect how well cell replacement works to treat SCI. These include:
 - The level, severity, and mechanism of the injury
 - The timing of the therapy (acute, subacute, chronic)
 - The number of cells used
 - The types of cells used
- The ability for cell transplants to produce and secrete proteins that encourage regeneration has been attributed to much of the therapeutic properties of stem cells
- Cell transplantation, although very popular in clinical trials, still have a long way to go to ensure appropriate therapeutic effects can occur