When cells (including Schwann cells, SCs) of the PNS could be purified and expanded in number in tissue culture, Richard Bunge in 1975 envisioned that the SCs could be introduced to repair the CNS as SCs enable axons to regenerate after PNS injury. This vision influenced our work thereafter, in part due to the possibility of autologous human SC implantation. Availability of the new culture systems to study interactions between sensory neurons, SCs and fibroblasts led to increased knowledge of SC biology in the 70s and 80s. Joining the Miami Project to Cure Paralysis in 1989 brought the opportunity to use this knowledge to initiate spinal cord repair studies. Development of a rat complete transection model allowed the demonstration that axons regenerate into the SC bridge. Together with study of contused rat cord, the conclusions were that implanted SCs reduce cavitation, protect the tissue from injury, support axon regeneration, and form myelin. The outcome of SC transplantation was improved when combination studies were undertaken, such as the addition of neurotrophins, elevation of cyclic AMP levels, olfactory ensheathing cells, a steroid or chondroitinase. Increased efficacy meant higher numbers of axons, particularly from the brainstem, and more myelinated axons in the implants and improvement in hindlimb movements. Astrocytes at the SC/host spinal cord junctions play a key role in determining whether axons cross the interfaces. The SC work in part led to approval from the FDA for an autologous human SC clinical trial now underway at the Miami Project.