1871 N GAFFEY STREET
SUITE A & B
SAN PEDRO CA 90731
www.celprogen.com

Phone: 310 547 3975
Fax: 310 547 2975
Email: info@celprogen.com
stemcells@celprogen.com

Transplants of Human Embryonic Stem Cells (HESC) Improved Motor Function recovery in Spinal Cord Injured rats.

Cristian V. R. Sharma, Michael V. R. Sharma, Rafael Perez, Chrystal Johnson, Henry Eran, Jay Sharma.
Request for off-prints should be addressed for Jay P. Sharma. Email: stemcells@celprogen.com
Celprogen Inc, 1871 N. Gaffey Street. Suite A & B San Pedro, CA 90731 www.celprogen.com

Human Embryonic Stem Cells (HESC) derived from Amniotic membrane / fluid represent a potentially useful source of stem cells for cell replacement therapy after nervous tissue damage. The HESC's can be maintained and expanded in Celprogen's HESC matrix and serum free media tissue culture system without losing their stem cell characteristics (stemness). These HESC's once expanded in culture can be re-introduced into patients as auto-grafts or allo-grafts. In preclinical transplant studies with embryonic stem cells, various investigators have demonstrated both safety as a source for neurons for transplantation and efficacy in treating stroke-related behavioral deficits.

The objective of this study was to examine whether HESC's transplanted in an area of complete spinal cord contusion would improve locomotor function. Methods: Complete spinal cord contusion injury, defined as the complete loss of motor evoked potential (MEP's), was produced in 15 rats at T8. Five rats with contused spinal cords underwent transplantation with HESC within the site of contusion immediately after injury (Group A). Group B consisted of five rats that underwent HESC transplantation following 2 weeks evaluation for loss of locomotor (MEP's). The control group C, received the T8 contusion without transplantation treatment.

All rats survived 10 weeks after transplantation. Our results indicated gradual improvement of locomotor function in rats that received the transplanted HESC's as demonstrated by return of MEP's. Immunocytochemical analysis utilizing BrdU antibodies confirmed survival of HESCs in the injured site.

The transplanted HESC's were found to infiltrate mainly into ventrolateral white matter tracts, spreading to adjacent segments of the injury site. Furthermore, immunohistochemical analysis indicated survival, integration, long fiber outgrowth of engrafted HESC, Oligodendrocyte positive cells, and neuronal positive cells. Conclusions: Our results indicate that HESC's may facilitate recovery from spinal cord injury by re-myelinating motor / sensory spinal tracts and may be an effective means of re-establishing electrical connectivity of the injured spinal cord. Further studies need to be performed in evaluating the molecular mechanisms of how the stem cells are capable of restoring motor function in spinal cord injury.