

## 6th World Congress on Cell & Stem Cell Research February 29-March 02, 2016 Philadelphia, USA

## Electrical stimulation and umbilical cord stem cell transplantation in murine injured sciatic nerve

Amani Abdelfattah Mohamed Ali Elbaz<sup>1</sup>, Nagwan A Sabek<sup>1</sup>, Suzan M Hazzaa<sup>2</sup>, Ebtehal M Metwally<sup>2</sup>, Eman A Mohamed<sup>1</sup>, Sahar Mansour<sup>1</sup>, Angie Ameen<sup>1</sup>, Elham H Madny<sup>1</sup>, Mohamed K Hassan<sup>3</sup>, Fadia M Attia<sup>1</sup> and Fawzy A Ashour<sup>4</sup>

<sup>1</sup>Suez Canal University, Egypt
<sup>2</sup>Menoufia University, Egypt
<sup>3</sup>Port Said University, Egypt
<sup>4</sup>Al-Azhar University, Egypt

Several approaches have been proposed for peripheral nerve regeneration. We aimed to assess effect of electrical stimulation and Mesenchymal Stem Cells (MSCs) on recovery of rat sciatic nerve. Fifty adult male albino rats weighing 180-250 g were divided into 5 groups: Group-1; sham operated intact nerve. Group-2; crushed nerve control group. Group-3; crushed nerve followed by transplantation of MSCs (3×105 cells/rat) once intra-lesion immediately after injury. Group-4; crushed nerve followed by applying electrodes 5 mm proximal to the injured site using a biphasic current pulse (100 µs pulse width, 20 Hz pulse rate, 2 µA amplitude) for 30 minutes. Group-5; crushed nerve followed by combining procedures of previous two groups. Wound closure and post-surgical care followed. MSCs were isolated from human umbilical cord blood by Ficoll-Hypaque density gradient centrifugation, culture of mononuclear cells and selection by CD 105 positive CD34 negative CD45 negative magnetic separation method using MACs separator. Behavioral testing before injury and at fourth and eighth weeks, serum malondialdehyde and total antioxidant capacity at 48 hours then electrophysiological studies measured at 8 weeks. After 2 weeks, gene expression of brain derived neurotrophic factor (BDNF) mRNA in injured tissue was measured by real-time PCR. Treatment with either ES or MSCs transplantation accelerated regeneration in all parameters over 8 weeks of the study. Combined treatment group did not show superiority compared to the other two sole treated groups except in the BDNF expression value. Using MSCs and electrical stimulation give better outcome for peripheral nerve regeneration. Further investigation of combined electrical stimulation and stem cells is recommended.

amanielbaz@gmail.com

## Stem cells in orthodontics

Anirudh Agarwal Maharaj Vinayak Global University, India

T issue manipulation to achieve aesthetic, structural and functional harmony of dental, oral and craniofacial structures is the basis of all orthodontic and dentofacial orthopedic therapy. The diverse cell types of structure reshaping cells (cementoblasts, odontoblasts, osteoblasts, fibroblasts, chondrocytes and monocytes etc) are considered significantly crucial to achieving successful orthodontic treatment. Cell homing or cell recruitment of progenitor cells is the core concept of tissue regeneration using stem cell therapy. Allografts and other materials like beta-tricalcium-phosphate, hydroxyapetite etc., which have been used to augment bone formation in alveolar defects have demonstrated tooth movements into the areas being augmented. Though the restriction at the time which includes limited availability, translational barriers for cell delivery, high cost of commercialization and difficulties in regulatory approval have precluded to successful clinical translation to tooth regeneration and these technologies need time to mature. However, it is pertinent for the orthodontists to be prepared for paradigm shifts in craniofacial regeneration for optimal and efficient manipulation in conjunction with techniques of the future.

docanirudh@yahoo.com