

11<sup>th</sup> World Congress and Expo on  
**Cell & Stem Cell Research**  
 March 25-26, 2019 | Orlando, USA

E-POSTER PRESENTATIONS

JOURNAL OF CELL SCIENCE & THERAPY, VOLUME: 10 | DOI: 10.4172/2157-7013-C1-050

**Intrathecal cell free  
 exosome administration  
 induces clinical  
 and histological  
 neuroregeneration  
 comparable to cellular  
 administration in canine  
 model of spinal cord  
 injury**

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**Introduction:** Spinal cord injuries (SCIs) can cause severe disability or death. The principal treatments for traumatic SCI include surgical stabilization and decompression. However, this rarely causes recovery of neural damage. Stem cell therapy is gaining solid grounds in the induction of neural regeneration. The proposed mechanisms of regeneration include transdifferentiation, stimulation of endogenous stem cells, angiogenesis and paracrine action. Cytokine-Induced regeneration is probably the most important arm of this process. The aim of the present experiment is to compare the regeneration following mesenchymal stem cell injection

with that following cell-free exosome injection.

**Experimental Design:** This study included 12 adult male dogs, subjected to surgical laminectomy, the dura opened and the spinal cord subjected to a guided fixed length clipping contusion. The study group was divided into the following subgroups: Group I: Left untreated, Group II: Received GFP-labelled MSCs in a dose of 2x10<sup>6</sup> by lumbar puncture, Group III: Received neural differentiated MSCs in a dose of 2x10<sup>6</sup> by lumbar puncture, Group IV: Received cell-free exosome in a dose of 100ug/kg body weight by lumbar puncture. In addition to normal control.

**Follow-up:** Clinical evaluation: For 8 weeks after the operation, weekly evaluation of all groups was done using Olby and modified Tarlov scores. Laboratory evaluation: After 8 weeks, dogs were sacrificed and histological image analysis and immunohistochemical evaluation of neural regeneration were done.

**Results and Conclusions:** Clinical Evaluation: All studied groups showed improved Olby and modified Tarlov scores, with

significantly higher scores in treated than control groups. No significant difference between treated groups was seen in weeks 1 to 6. MSC group showed higher scores in weeks 7 and 8. Histological Evaluation: Significant histological improvement was seen in all three treated groups as compared to the untreated control group. Image analysis semi-quantitative count of exons per high power field showed a mean of 18.4±3.0 in MSC group, 17.0±2.7 in the neural differentiated group, 17.5±3.3 in exosome group; as compared to 8.0±1.5 in the untreated group and 35.0±4.0 in the normal group. This shows a statistically significant difference between treated groups and the untreated group with no statistically significant difference between the three treated groups. Count of oligodendrocytes per high power field showed a mean of 6.2±1.5 in the normal group, 5.5±2.0 in the untreated group, 17.3±2.0 in MSC group, 15.8±2.4 in the neural differentiated group and 16.0±1.7 in exosome group. No statistically significant differences were found between the three treated groups. In conclusion, exosome-mediated neural regeneration maybe comparable

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to MSC-mediated regeneration. Dose escalation experiments are needed for further evaluation.

### Biography

Mostafa Abdallah, last year medical student, faculty of medicine Cairo University. He joined medical school in 2011 after 98.4 % success rate at secondary school. He started my research way after my fourth year of medicine.

He got many workshops for stem cells separation and culture. He have been working with my professor, the Egyptian scientist (Hala Gabr) at her lab. I'm Head of a Research Group Egyptian society for progenitor cell research (ESPCR) Non-Governmental Organization From August 2016 – Present. He has given 1 international publication about using muscle graft in treatment of spinal cord injury he was speaker at the annual conference of ESPCR ( introduction of regenerative medicine and stem cells) held at faculty of medicine

cairo university 15th of January 2017. He was speaker at the 41st international conference of medical histology and cell biology (regenerative medicine and cell transplantation). Held at faculty of medicine cairo university 28th of December, 2017 he was speaker at the international meeting of the Egyptian society for progenitor cell research at Grand Nile Hotel in EGYPT 8th of july, 2018.

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