

## AB084. intracavernous administration of embryonic stem cell-derived exosome restores erectile function through penile neurovascular regeneration in the streptozotocin-induced diabetic mouse

Mi-Hye Kwon, Kang-Moon Song, Kalyan Ghatak, Nguyen Nhat Minh, Min-Ji Choi, Guo Nan Yin, Ji-Kan Ryu, Jun-Kyu Suh

National Research Center for Sexual Medicine, Department of Urology, Inha University School of Medicine, Incheon, Korea

**Background:** Exosome contains a variety of protein, mRNA, and miRNA and is known to play an important role in intercellular communication as a bio-nanoparticle with a diameter of 40 to 100 nm. Recent studies have demonstrated the therapeutic potential of exosome in a variety of animal models for cardiovascular diseases and neuropathies. The aim of this study was to investigate effectiveness of embryonic stem cell (ESC)-derived exosome in restoring erectile function in diabetic mice.

**Methods:** Diabetes was induced by intraperitoneal injection of streptozotocin into 8-week-old C57BL/6 male mice. At 8 weeks after the induction of diabetes, the animals were distributed into 3 groups: control nondiabetic mice and diabetic mice receiving two successive intracavernous injections of phosphate buffered saline (PBS) (days -3 and

0; 20  $\mu$ L) or ESC-derived exosome (days -3 and 0; 1  $\mu$ g in 20  $\mu$ L of PBS). Two weeks after treatment, we measured erectile function by electrical stimulation of the cavernous nerve. The penis was harvested and stained with antibodies to PECAM-1, smooth muscle  $\alpha$ -actin, NG2, and  $\beta$ III tubulin. We also determined angiogenic potential of ESC-derived exosome in an *ex vivo* aortic ring assay and in primary cultured mouse cavernous endothelial cell (MCEC) and pericyte (MCP) mono-culture or co-culture system *in vitro*.

**Results:** Intracavernous injections of ESC-derived exosome significantly improved erectile function in diabetic mice, which reached up to 90% of control values. ESC-derived exosome induced significant restoration of cavernous contents of endothelial cells, smooth muscle cells, pericytes, and neuronal cells in diabetic condition. Moreover, ESC-derived exosome promoted microvascular sprouting from aortic ring and accelerated tube formation in primary cultured MCEC and MCP mono-culture or co-culture system *in vitro*.

**Conclusions:** ESC-derived exosome successfully restored erectile function through enhanced cavernous angiogenesis and neural regeneration in diabetic mice. Further studies are needed to clarify mechanism by which ESC-derived exosome induces neurovascular repair.

**Keywords:** Erectile dysfunction; diabetes; exosome

doi: 10.21037/tau.2018.AB084

**Cite this abstract as:** Kwon MH, Song KM, Ghatak K, Minh NN, Choi MJ, Yin GN, Ryu JK, Suh JK. Intracavernous administration of embryonic stem cell-derived exosome restores erectile function through penile neurovascular regeneration in the streptozotocin-induced diabetic mouse. *Transl Androl Urol* 2018;7(Suppl 5):AB084. doi: 10.21037/tau.2018.AB084