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## The size of nanoparticles improves neurogenesis and inhibits astrogliosis

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Spinal cord injury (SCI) in humans stayed a ruining and healless disorder. At the first line of recovery, the most important factors in motor neuron recovery is decrease of inflammation and astrogliosis and then neurogenesis improvement. There are no reports to investigate the effect of particle size on neurogenesis so it was evaluated in the present investigation. Encapsulated drug nanocarriers at the same concentration of oil, surfactant and co-surfactant were synthesised by stirrer and sonication at the size of  $60\pm 1$  nm and  $190\pm 10$  nm. Then pH, cell viability, cell membrane damage, NO and ROS production was investigated by pH meter, MTT assay, PI flow-cytometry, LDH release, ELISA and flow-cytometry respectively. Then, its neurogenesis potential was investigated by real time PCR. To evaluate its efficacy in motor neuron recovery, FTY nano carriers injected in site in acute model of SCI in rats. MTT and PI results showed that smaller NPs at two concentrations of ethanol increased cell viability while increase of ethanol decreases NO production and relative fold change *nNOS* genes expression and the larger NPs increased the NO production and *nNOS* gene at low ethanol concentration. ROS kinetic measurements showed that increase of ethanol and decrease of particle size induced higher intracellular ROS production. Interestingly, the data related to *nNOS* gene expression was in good agreement with Tuj-1, NF and *MAP2* genes expression. GFAP as a marker of reactive astrocyte increased by the particles size while *MAP2* as a marker of mature neurons was over-expressed in small nanocarriers and interestingly ethanol got worsen both in favour of motor neuron recovery in *in vivo*. It means that the ethanol will increases astrogenesis and decreases neurogenesis.

### Biography

Shima Tavakol is Assistant Professor at Cellular and Molecular Research Center, Iran University of Medical Sciences and the first Post-Doc of Nanomedicine in Iran. She has the responsibility as a Secretary of Education and Research Committee at Iranian Society of Nanomedicine and is a Member of Nano-Tissue Engineering Committee, Presidency of the Islamic Republic of Iran, Vice Presidency for Science and Technology. She was awarded Young Faculty Award by Ministry of Health and Medical Education and the Young Faculty Investigator in Iran University of Medical Sciences by Iran University of Medical Sciences in 2016. At graduate level, she was awarded as the best PhD graduate of Nanotechnology in Iran by Iranian Nanotechnology Society and as the best PhD graduate of School of Advanced Technologies in Medicine by Tehran University of Medical Sciences in 2014 and ranked first, among PhD students in the board exam in 2012. Besides her awards, she has some publications, book compilations and patents in the field of Nanomedicine. She is especially interested in the field of nano-tissue engineering via self-assembling peptide nanofibers and drug nanocarriers.

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