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Therapeutic potential of genetically modified stem cells: Role of arginine decarboxylase

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The use of stem cells in cell replacement therapy for neurodegenerative diseases has received a great deal of scientific and public interest in recent years. Oxidative stress, toxic byproducts, which prevails in the microenvironment during the diseased condition, may limit the survival of the transplanted stem cells affecting tissue regeneration and even longevity. Recently, functional neural stem cells with transgenes proved to be a promising therapeutic strategy for various stress models both *in vitro* and *in vivo*. Our investigations aimed to clarify whether constitutive retroviral expression of arginine decarboxylase (ADC) genes induces differentiation of NSCs *in vitro* and transplantation of these functional stem cells could enhance their survival and increase ROS scavenging capacity, thereby suppress the pathogenesis in different CNS injury models.

The spinal cord injured animals which received ADC-NSCs showed improvements in walking ability. Immunohistochemical staining results demonstrated that transplanted ADC-NSCs enhanced neurogenesis within the injury site, and these neurons extended their processes and formed synaptic structures. ADC-NSCs might attribute partly to a reduction in tissue loss from secondary injury processes as well as diminished glial scarring.

In experimental stroke, transplantation of ADC-NSCs contributed for the increased functional recovery and decreased gliar scar formation. The ADC-NSCs transplanted at the penumbra area regulated the proliferation and differentiation at the ischemic injury site. These effects were confirmed by Ki67, BrdU, Tuj1, DCX, GFAP and VEGF immunohistochemical staining.

Our study evaluated the ADC-NSCs are a potential source for transplantable material for therapy of spinal cord injury and experimental stroke models *in vivo*

Biography

Professor Jong Eun Lee, Department of anatomy, attained her Ph.D from Yonsei University Seoul, South Korea and perused her post doctoral research from Stanford University. She is an editorial board member for anatomy and cell biology and experimental neurobiology as well as reviewer for many international journals. She has delivered several invited talks at various National and International Conferences. Prof Lee has published about 90 research articles in various National and International peer reviewed journals. Her research was been supported by various funding agencies and some and research grant evaluator for some of the funding agencies

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