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ADULT NEUROREPAIR OF THE ADULT CNS WITH ADULT HUMAN OLFACTORY NEURAL PROGENITORS AS A THERAPEUTIC STRATEGY TO CNS INJURY

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BACKGROUND/AIMS Recent work in neuroscience has shown that the adult central nervous system (CNS) contains neural progenitors. While challenging previous dogma that no new neurons are born in the adult mammalian CNS, these findings bring with them future possibilities for the development of novel neural repair strategies. The purpose of this study is to present our laboratory findings about adult mammalian neurogensis and neurorepair with adult human olfactory neural progenitors and to describe the cardinal features of a novel therapeutic strategy for CNS injury.

METHODS/RESULTS The human olfactory stem cells (OSC) were cultured from the nasal polyps tissue. After in vitro certification of the characteristic marker proteins the human OSC were transplanted into the spinal cord of adult rats with complete spinal cord transection. Human OSC survival and new myelin formation were examined. The locomotor's function of animals was assessed and axonal regeneration was evaluated at the morphological level. To our knowledge, we report that in this frontier field there was improvement of hindlimb function after OSC transplantation in adult rats with T8 transection injury. This study has been performed with three goals: (1) functional recovery of transplantation human OSC in transection rat model, (2) characterization of human OSC in vitro and its differentiation in vivo, (3) neuroanatomical mechanism of functional recovery. Our laboratory was able to successfully recruit the human neural progenitors from the human olfactory tissue culture; the results of the study also suggest that the human olfactory neural progenitor cells have the potential to repair spinal cord injury by promoting regeneration in the lesion site.

CONCLUSION This study aims to forward the possibility of repairing neural circuitry by manipulation of neurorepair and cellular manipulation of endogenous neural progenitors in situ, without transplantation.

Keywords: Stem Cell. Neurorepair. Neuron.