Spinal neural elements. moreover, transplantation of human

Spinalcord injury (SCI) is a devastating neurological problem which posesserious clinical and socioeconomic burden, coupled with a range ofcomplex and long-term sequelae leading to drastic decrease in quality oflife for affected individuals. In this context dental derived stem cellbased transplantation strategies hold great potential. Recent evidence suggestthat dental stem cells promote spinal cord repair by inducing reduction ofcystic cavity and glial scar, and by enhancing neurofilamentdensity near the site of lesion (Nicola et al.

, 2016). Remarkably, the transplantation of SHED following SCI resulted in marked improvement, which was attributed to the anti-inflammatory property of SHED (Nicola et al., 2016). In a similar finding, dental pulp cells grafted in rat hemisected spinalcord were able to promote the survival of motor neurons (Nosrat et al., 2001). DPSC transplantation in a completely transected spinal cord showeda marked improvement of hindlimb locomotor functions, accompanied bybetter preservation of neural elements.

Moreover, transplantation of humanDPSCs together with chitosan scaffolds into an SCI rat model showed noticeable spontaneousfunctional recovery of hind limb (Zhang et al., 2016). Thus, it isreasonable to say that with the above remarkable abilities DSCs hold immensepotential to overcome the outcome of the SCI. Strokeresults in the loss of a large variety of neural cells, with the limitedcapacity of the central nervous system for regeneration, leading to functionaldisability (Leong et al., 2012). Thus, the main challenge for restorativetherapeutics is how to enhance functional recovery following stroke. Stemcell based therapies for stroke utilizes different cell sources

includingembryonic stem cells, neural stem cells mesenchymal stem cells (MSCs) and DSCs.

Transplanting differentiated neural stem cells isolated from dental pulpimproved motor disability and reduced infarct volume (Nakashima et al., 2009). The occlusion of a cerebral artery leads to ischemia in a restricted region ofthe CNS leading to stroke. Therapeutic translation studies of DPSCs to stroketreatment in a cerebral ischemic rodent model have shown promising observations(Nesti et al., 2011 and Sugiyama et al., 2011). Transplantation of porcineCD31~/CD146~ side population (SP) cells accelerated neovascularization of theischemic zone and enhanced neuronal regeneration (Sugiyama et al.

, 2011). Theintracerebral transplantation of human DPSC after focal cerebral ischemia in arodent model resulted in significant improvement in forelimb sensorimotorfunction (Yamagata et al., 2013). Intranasal administrated of conditioned mediaderived from SHED in a middle cerebral artery occlusion (MCAO) model promotedmigration and differentiation of endogenous neural progenitor cells, vasculogenesis, and ameliorated ischemic brain injury (Inoue et al.

, 2013). Identical outcomeswere observed as shown after DPSC delivery which reduced the peri-infarctlesion and enhanced recovery after MCAO (Leong et al., 2012 and Sugiyama etal., 2011). Thus, these cells may serve as valuable therapeutic for strokerepair.