## Neural crest stem cell

Neural crest cells (NCCs) are born during vertebrate embryogenesis within the dorsal margins of the closing neural folds. Initially, they are integrated within the neuroepithelium where they are morphologically indistinguishable from the other neural epithelial cells. Upon induction by signals that come from contact-mediated tissue interactions between the neural plate and the surface ectoderm, NCCs delaminate through an epithelial-to-mesenchymal transition and start migrating extensively to several different locations in the embryo where they contribute to a remarkably diverse array of different tissue types ranging from the peripheral nervous system (PNS) to the craniofacial skeleton <sup>1)</sup>.

Multipotent neural crest stem cells (NCSCs) were differentiated from induced pluripotent stem cells, embedded in the hydrogel on the outer surface of nanofibrous graft polymers, and implanted into rat carotid arteries by anastomosis. After 3 months, NCSCs differentiated into smooth muscle cells (SMCs) near the outer surface of the polymer grafts; in contrast, NCSCs differentiated into glial cells in the most part of the hydrogel. Atomic force microscopy demonstrated a stiffer matrix near the polymer surface but much lower stiffness away from the polymer graft. Consistently, in vitro studies confirmed that stiff surface induced SMC genes whereas soft surface induced glial genes. These results suggest that the scaffold's mechanical properties play an important role in directing stem cell differentiation in vivo, which has important implications in biomaterials design for stem cell delivery and tissue engineering <sup>2</sup>.

1)

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