

Nasal Chondrocytes in Tissue Engineering

Tissue-engineered cartilage fabricated from nasal chondrocytes (NCs) has been successfully used in the surgical reconstruction of the nasal lobule after two-layer carcinoma removal, as well as in the repair of traumatic articular cartilage defects in human. Built on the positive outcome of these trials the utilization of NCs has become of interest for the treatment of further orthopedic indications such as osteoarthritis and degenerated disc disease. NCs are an autologous cell source isolated from the hyaline cartilage of the nasal septum, which can be easily obtained under minimally invasive conditions. Not only do NCs display an increased rate of proliferation and synthesis of extracellular matrix *in vitro* in contrast to chondrocytes isolated from articular cartilage, but they are also more resistant to harsh environments such as hypoxia, low glucose, and inflammation, as well as down-regulate a subset of inflammation factors. Interestingly, NCs also display features of environmental plasticity as they partially adopt the *HOX*-expression profile of cells at a recipient implantation site *in vivo*. This particular trait is likely attributed to the fact that NCs are derivatives of cranial neural crest stem cells, which display similar characteristics in development. Comprehension of this NC plasticity and its possible influence in regenerative aspects of tissue engineering are the focus of an offset European funded synergy project.