hOMCs for the treatment of neurological diseases (Ramot)

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Technology

A novel pluripotent stem cell population, termed hOMSCs, has been isolated from adult human oral mucosa. The hOMSC population expresses markers of pluripotent embryonic stem cells and of multipotent mesenchymal stem cell markers. hOMSCs form the majority of primary oral mucosa-derived populations grown in culture. Thus, their clinical use does not require cumbersome and expensive isolation/purification steps. A biopsy of a 4-5 mm2 from the oral mucosa is sufficient for generating 109 hOMSCs in a few weeks. Biopsy harvest is extremely simple, time-and cost-efficient, causes minimal morbidity to the patient and can be repeated unlimitedly. Furthermore, the frequency and "stemness" of hOMSCs is unaffected by the age of the patient.

Both in vitro and in vivo studies using these cells have demonstrated their efficacy and safety in different indications.

Mesodermal lineages (vascular tissue; bone; cartilage; muscle); Ectodermal lineages (Neurons; glia cells); Endoderm (Definitive endoderm – future development to pancreatic and hepatic lineages)

Data–to-date

- Differentiated hOMSC show astrocyte-like phenotype
- Differentiated hOMSC : a vehicle for NTF (or dopamine) delivery
- hOMSC differentiate into ligament fibroblasts capable of forming ligamentous structures that will strengthen the post-MI scared myocardium and thereby prevent the myocardial remodeling that leads to terminal ischemic heart failure

Potential Application

- Heart Diseases
- Cartilage and bone diseases or trauma
- Diabetes
- Neurodegenerative diseases
- Neural injuries
- Regenerative medicine
- Inflammatory diseases

Advantages

- Pluripotent autogenous adult stem cell source
- Stemness is not affected by the patient age
- Simple, cost-effective and unlimited source of adult pluripotent stem cells
- Stemness is not affected by cryopreservation and number of passages

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