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Method for the production of a cell composition containing epithelial cells

Key words: epithelial cells, autologous graft, tissue engineering

Epithelial cells are of great relevance to biotechnologists and physicians. Especially in transplantation medicine, epithelial cells are commonly utilized to encase individual cells or cell groups, line tissue or fill tissue gaps that arise in consequence of an injury or an operation. Further, in the field of tissue engineering there is an increasing demand for epithelial cells to envelop artificially produced tissues made out of cells.

Within the body, the formation of epithelial tissue does solely occur at the basal layer, which is missing in engineered tissue cultures. Although epithelial cells can be differentiated from embryonic stem cells (ESC) in vitro, ethical concerns demonstrate the need for an adult stem cell source and an appropriate differentiation technique to obtain epithelial cells. The usage of autologous adult stem cells would also help to overcome harmful host-versus-graft reactions in a clinical setting.

The Invention

The invention relates to a method for generating epithelial cells from adult stem cells originated from glandular tissue such as salivary glands, sweat glands and pancreas. Aggregation of gland-derived stem cells into organoid or tissue bodies and subsequent cultivation thereof results in a targeted epithelial differentiation of the outer cellular layers. Organoid or tissue bodies can either be cultured on a substrate or at an air-liquid interface.

Encompassing both the isolation, as well as the specific propagation procedure of gland-derived stem cells, this invention describes an easy and cost-effective method to obtain large numbers of epithelial cells. In the field of tissue engineering, scientists and physicians are often in demand for tissues of a certain shape. To meet this need, the transfer and cultivation of organoid or tissue bodies onto a substrate of predetermined shape could result in a tissue fragment surrounded by epithelial cells, forming the desired shape.

Market potential

- Autologous graft for epithelial regeneration
- Tissue engineering for therapeutic applications
- Synthetic preparation of biological tissue

State of Development

Stem cells from murine and human pancreas have been shown to assemble into organoid and tissue bodies when cultivated in hanging drops and subsequent suspension culture. Plating of organoid or tissue bodies on a suitable substrate leads to the outgrowth of activated cells, which preferentially differentiate into cells of the ectodermal lineage. The cultivation of organoid or tissue bodies at an air-liquid interface also results in an epithelial differentiation of the outer cell layers.

Branch

Pharma, Cosmetics, Medical technology

Patent situation

Patent granted (D, EP, GB, US, IL)

Offer

Co-operation, Contract research, License, Sale

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