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Extracellular matrix cues for the differentiation of human embryonic stem cells into corneal and conjunctival epithelial-like lineage

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Introduction: The ocular surface is a vital part of the visual system comprised of the cornea and conjunctiva. It is often the first one to encounter many extrinsic and intrinsic threats such as ocular trauma, infection, autoimmune disorders etc. Many of these disorders are very debilitating leading to eventual blindness. Currently, patients with such problems would require extensive surgical procedures associated with a risk of infection, possible rejection along with limited supply of donor tissue. This has lead scientists in the search of a better therapeutic source such as the ability of human embryonic stem cells (hESCs) to differentiate into any cell type of the body.

Aim & Method: The aim of this study was to explore the potential of hESCs to differentiate into corneal/conjunctival like epithelial cell lineage by the use of corneal/conjunctival derived extracellular matrix (ECM) under controlled environment. hESCs were cultured on ECM and Matrigel in conjunctival/corneal medium. Quantitative real time polymerase chain reaction (qPCR) was used to measure the levels of expression of specific markers.

Results: Indeed, this study demonstrated that the applied model of culturing hESCs on corneal/conjunctival ECM in controlled environment leads to observed morphological changes, decreased pluripotency and increased expression of a specific epithelial marker.

Conclusion: The results of this study led us to the conclusion extracellular matrix plays a role in the differentiation of hESCs. Further future work would be beneficial in the confirmation of these results and the development of a timeline with the expression of specific markers. This study's outcomes expand the knowledge on the eventual potential application of epithelium differentiated from hESC for clinical conditions.

Biography

Petya Popova is currently a Medical student at University of Liverpool with an interest in academic ophthalmology research. /Her research was primarily focused on corneal and ocular surface diseases.

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