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*8th
meeting on
medicinal
biotechnology*

BOOK OF
ABSTRACTS

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SCHOOL OF HEALTH
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BOOK OF ABSTRACTS OF THE 8TH MEETING ON MEDICINAL BIOTECHNOLOGY

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Bioactive Contact Lens Incorporating Umbilical Cord-Derived Mesenchymal Stem Cell Secretome for Corneal Regeneration

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Corneal injuries and degenerative corneal disorders remain a significant clinical challenge, as impaired tissue regeneration can lead to corneal opacity, neovascularization, and progressive vision loss [1,2]. Current therapeutic approaches, including topical eye drops and corneal transplantation, are limited by poor bio-availability, insufficient regenerative potential, and the risk of immune rejection [3]. Therefore, there is a pressing need for innovative, non-invasive strategies capable of restoring corneal function. In this context, conditioned medium derived from umbilical cord mesenchymal stem cells (UC-MSCs), rich in bioactive factors (secretome), has shown promising regenerative and immunomodulatory effects in corneal repair. This study aims to develop a bioactive contact lens as a non-invasive therapeutic platform for corneal regeneration. The system is based on a hydrogel composed of polyvinyl alcohol (PVA), hyaluronic acid (HA), and UC-MSC-derived conditioned medium. Prior to incorporation, the secretome will be characterized to identify key biomarkers associated with immunomodulation

and tissue regeneration and validated in vitro through cytocompatibility and cell migration (scratch) assays. The bioactive contact lenses will be fabricated using mold-based techniques to ensure reproducible geometry and structural consistency. Within the hydrogel matrix, PVA provides mechanical stability and flexibility, while HA enhances hydration, biocompatibility, and mimics native corneal properties, contributing to comfort and biological performance. This platform enables sustained and localized delivery of bioactive factors directly to the injured corneal surface. The resulting hydrogel will undergo physicochemical characterization using Fourier Transform Infrared Spectroscopy (FTIR) and Scanning Electron Microscopy (SEM). Biological performance will be evaluated in vitro using corneal epithelial cells under conditions that mimic the ocular environment. Overall, this work proposes a promising cell-free regenerative strategy for corneal wound healing, with the potential to enhance epithelial repair, reduce fibrosis, and improve visual outcomes.

KEYWORDS: *contact lens, corneal repair, secretome, umbilical cord mesenchymal stem/stromal cells*

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