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## Restoration of the corneal epithelium using a novel Bioink™

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The cornea is the transparent outermost layer of the eye and plays both a tectonic and refractive role. Corneal trauma represents the most common ophthalmic emergency presentation with approximately ¾ of all cases due to corneal foreign bodies or abrasions. These injuries are estimated to cost the Australian population more than \$155 million per year and if not treated effectively, can lead to infection and scarring resulting in permanent, impaired vision. We have developed a novel, xenogeneic-free corneal Bioink™ using a human platelet lysate (hPL) base that promotes the proliferation and migration of corneal epithelial cells. hPL has previously been shown to promote mesenchymal stromal cell growth. Our Bioink™ sets in a matter of minutes as a transparent, gel-like substance. We performed cell proliferation and scratch wound-healing assays using human corneal epithelial cell lines (HCE-T), and rheology tests to examine its mechanical properties. Our preliminary results have shown the Bioink™ supports multidirectional growth and stratification of HCE-T and the cells completely biodegrade the Bioink™ once forming a complete monolayer. Performing flow cytometry using Ki67, we found that Bioink™ promotes proliferation in HCE-T at a rate comparable to foetal bovine serum (FBS), which is the current standard serum used to culture HCE-T. Scratch wound assays showed that the cells in the Bioink™ and FBS both promoted full-wound closure at a comparable rate. Rheology testing demonstrated the high gel-forming potential and shear-thinning property of our Bioink™, which demonstrates its capability for extrusion bioprinting. Our Bioink™ represents a potential alternative to existing treatments.

### Biography

Hannah Frazer is currently completing her MPhil at Sydney Medical School, University of Sydney.

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