Characterisation and Engineering of Squid Sucker Ring Teeth Polymer Proteins

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Demand is huge for useful biomaterials that are biodegradable, biocompatible and environmentally-friendly yet possessing properties such as high tensile strength. Silk is an example of such materials found in nature and is currently used for a variety of applications. A recently discovered class of biomaterials, the squid Sucker Ring Teeth (SRT), possesses properties including high tensile strength similar to silk and rivals that of synthetic polymers. SRT's molecular motifs are not vastly different from that of silk. As such, SRT shows potential to be an alternative to silk as a biodegradable material. In my project, polymeric proteins of a gene coding for the Sepioteuthis lessoniana SRT (M.15073) were purified, cross-linked and used to form gels and films. Their structures were analysed through MALDI_TOF mass spectrometry and CD spectroscopy. In addition, human mensenchymal stem cells (hMSC) were cultured on the films and analysed for biocompatibility. Results showed that the polymeric constructs possess ß-sheets as well as disordered components and that the extent of photo-crosslinking could be manipulated. Furthermore, the resulting materials were also biocompatible and hence have potential uses in various biomedical applications.

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