

CONSTRUCTING TISSUE REGENERATION SCAFFOLDS USING MARINE BIOMOLECULES

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Introduction:

Severe burn injuries pose an immediate threat to life. The wound must be covered to prevent dehydration and infection of the affected area. Following these critical measures, implantation of dermal regeneration scaffolds following debridement of the wound site has become an accepted means of regenerating the lost dermal tissue at the site of insult. Current dermal tissue regeneration matrices are expensive and are generally derived from mammalian tissue.

Method:

We have been examining the use of fish gelatin and agarose as naturally gelling materials of marine origin as alternative ingredients in dermal tissue regeneration scaffolds. By formulating these materials into cryogels we have produced highly macroporous, morphologically uniform and elastic materials.

Results:

A range of gel formulations with varying degrees of cross-linking were examined for their rheological properties. The most favoured formulation was assessed for its ability to accommodate the attachment and proliferation of human dermal fibroblasts in cell culture over a defined time interval. Confocal laser scanning microscopy revealed that the cells readily infiltrated and proliferated within the scaffolds.

Discussion:

Cryogel formulations containing cross-linked fish gelatin and agarose show promise as dermal tissue replacement materials.