

# An: In vitro evaluation of fibrinogen and gelatin containing cryogels as dermal regeneration scaffolds

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## Abstract

Macroporous cryogels containing mixtures of two key components of the dermal extracellular matrix, fibrinogen and collagen-derived gelatin, were evaluated for use as dermal tissue regeneration scaffolds. The infiltration of human dermal fibroblasts into these matrices was quantitatively assessed in vitro using a combination of cell culture and confocal laser scanning microscopy. The extent of cellular infiltration, as measured by the number of cells per distance travelled versus time, was found to be positively correlated with the fibrinogen concentration of the cryogel scaffolds; a known potentiator of cell migration and angiogenesis within regenerating tissue. An analysis of the proteins expressed by infiltrating fibroblasts revealed that the cells that had migrated into the interior portion of the scaffolds expressed predominantly F-actin along their cytoplasmic stress fibres, whereas those present on the periphery of the scaffolds expressed predominantly  $\alpha$ -smooth muscle actin, indicative of a nonmotile, myofibroblast phenotype associated with wound contraction. In conclusion, the cryogels produced in this study were found to be biocompatible and, by alteration of the fibrinogen content, could be rendered more amenable to cellular infiltration.

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