Characterization of collagen gel solutions and collagen matrices for cell culture.

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摘要

Abstract

The influence of glutaraldehyde as a crosslinking agent to increase the strength of collagen matrices for cell culture was examined in this study. Collagen solutions of 1% were treated with different concentrations (0-0.2%) of glutaraldehyde for 24 h. The viscoelasticity of the resulting collagen gel solution was measured using dynamic mechanical analysis (DMA), which demonstrated that all collagen gel solutions examined followed the same model pattern. The creep compliance model of Voigt-Kelvin satisfactorily described the change of viscoelasticity expressed by these collagen gel solutions. These crosslinked collagen gel solutions were freeze-dried to form a matrix with a thickness of about 0.2-0.3 mm. The break modulus of these collagen matrices measured by DMA revealed that the higher the degree of crosslinking. the higher the break modulus. The compatibility of fibroblasts isolated from nude mouse skin with these collagen matrices was found to be acceptable at a cell density of 3 x 10(5) cells/cm2 with no contraction, even when using a concentration of glutaraldehyde of up to 0.2%.