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(54) Title: GROWTH FACTOR MODIFIED PROTEIN MATRICES FOR TISSUE ENGINEERING

(57) Abstract: Proteins are incorporated into protein or polysaccharide matrices for use in tissue repair, regeneration and/or remodeling and/or drug delivery. The proteins can be incorporated so that they are released by degradation of the matrix, by enzymatic action and/or diffusion. As demonstrated by the examples, one method is to bind heparin to the matrix by either covalent or non-covalent methods, to form a heparin-matrix. The heparin then non-covalently binds heparin-binding growth factors to the protein matrix. Alternatively, a fusion protein can be constructed which contains a crosslinking region such as a factor XIIIa substrate and the native protein sequence. Incorporation of degradable linkages between the matrix and the bioactive factors can be particularly useful when long-term drug delivery is desired, for example in the case of nerve regeneration, where it is desirable to vary the rate of drug release spatially as a function of regeneration, e.g. rapidly near the living tissue interface and more slowly farther into the injury zone. Additional benefits include the lower total drug dose within the delivery system, and spatial regulation of release which permits a greater percentage of the drug to be released at the time of greatest cellular activity.