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[54] VISCOELASTIC COLLAGEN SOLUTION FOR OPTHALMIC USE AND METHOD OF PREPARATION

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[*] Notice: The portion of the term of this patent subsequent to Dec. 15, 2004 has been disclaimed.

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 890,847, Aug. 6, 1986, Pat. No. 4,713,446, which is a continuation-in-part of Ser. No. 773,310, Sep. 6, 1985, abandoned.

[51] **Int. Cl.**[4] **A61K 31/78**; A61B 17/00

[52] **U.S. Cl.** **530/356**; 128/DIG. 8; 514/2; 514/801; 514/912; 523/113; 604/51

[58] **Field of Search** 530/356, 353, 402; 128/DIG. 8; 604/51; 514/21, 801, 912; 523/113; 3/1

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[57] **ABSTRACT**

Chemically-modified collagen is prepared by reacting native collagen with a di or tri-carboxylic acid halide, di or tri-sulfonyl halide, di or tri-anhydride, or di or tri-reative active ester coupling agent. The reaction is done in a controlled manner so that the degree of cross-linking is limited. Any remaining lysine epsilon amino groups present in the coupled collagen product may be converted to carboxyamido or sulfonamido groups by acid halide, anhydride, sulfonyl halide or active ester amine-modifying agents. The resultant product when dissolved in a physiological buffer provides a viscoelastic solution having therapeutic application in a variety of surgical procedures, particularly in ophthalmic surgery. This viscoelastic solution "melts," i.e., exhibits a dramatic loss of viscosity, when subjected to temperatures of between 32° and 48° C.

12 Claims, No Drawings