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[54] COLLAGEN-POLYMER CONJUGATES

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Related U.S. Application Data

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[52] U.S. Cl. **525/54.1; 523/113; 523/115; 424/422; 424/423; 424/426**

[58] Field of Search **525/54.1, 937; 523/113, 523/115; 530/356, 840; 424/422, 423, 426**

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[57] ABSTRACT

Pharmaceutically acceptable, non-immunogenic compositions are formed by covalently binding atelopeptide collagen to pharmaceutically pure, synthetic, hydrophilic polymers via specific types of chemical bonds to provide collagen/polymer conjugates. The atelopeptide collagen can be type I, type II or type III and may be fibrillar or non-fibrillar. The synthetic hydrophilic polymer may be polyethylene glycol and derivatives thereof having a weight average molecular weight over a range of from about 100 to about 20,000. The compositions may include other components such as liquid, pharmaceutically acceptable, carriers to form injectable formulations, and/or biologically active proteins such as growth factors. The collagen-polymer conjugates of the invention generally contain large amounts of water when formed. The conjugates can be dehydrated to form a relatively solid object. The dehydrated, solid object can be ground into particles which can be suspended in a non-aqueous fluid such as an oil and injected into a living being for the purpose of providing soft tissue augmentation. Once in place, the particles rehydrate and expand in size five fold or more.

25 Claims, 2 Drawing Sheets