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[54] COLLAGEN-POLYMER TUBES FOR USE IN VASCULAR SURGERY

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

[58] **Field of Search** 525/54.1; 523/113; 424/422, 423, 400

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[57] **ABSTRACT**

Medical articles in the form of tubes are formed by covalently binding collagen to pharmaceutically pure, synthetic, hydrophilic polymers via specific types of chemical bonds to provide collagen/polymer conjugate formulations which are used to make the tubes. The collagen may be recombinantly produced human collagen or collagen extracted from any source, such as a bovine or human placental source, and purified and 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 tube can be designed to incorporate other components such as liquid, pharmaceutically acceptable, carriers, and/or biologically active proteins such as growth factors or cytokines. The tubes contain large amounts of water when extruded and then may be dehydrated to form relatively solid but flexible tubes which can be easily stored. The tubes can be surgically implanted and attached to, or implanted within, a channel in a mammal for the purpose of repairing the channel. The tubes can be used to repair a wide range of different types of channels including but not limited to veins and arteries.

23 Claims, No Drawings