



US005324775A

# United States Patent [19]

Rhee et al.

[11] Patent Number: 5,324,775

[45] Date of Patent: Jun. 28, 1994

[54] **BIOLOGICALLY INERT,  
BIOCOMPATIBLE-POLYMER  
CONJUGATES**

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[21] Appl. No.: 907,518

[22] Filed: Jul. 2, 1992

### Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 433,441, Nov. 14, 1989, Pat. No. 5,162,430, which is a continuation-in-part of Ser. No. 274,071, Nov. 21, 1988, abandoned.

[51] Int. Cl.<sup>5</sup> ..... C08G 63/48; C08G 63/91; C08G 63/40

[52] U.S. Cl. .... 525/54.2; 525/54.21; 525/54.22; 525/54.23; 525/54.24

[58] Field of Search ..... 525/54.2, 54.21, 54.22, 525/54.23, 54.24

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### [57] ABSTRACT

Pharmaceutically acceptable, non-immunogenic compositions are formed by covalently binding biologically inactive, natural, biocompatible polymer to pharmaceutically pure, synthetic, hydrophilic polymers via specific types of chemical bonds to provide biocompatible conjugates. 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 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 (preferably human) being for the purpose of providing soft tissue augmentation. Once in place, the particles rehydrate and expand in size five fold or more.

14 Claims, No Drawings