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[54] **GELS FOR ENCAPSULATION OF BIOLOGICAL MATERIALS**

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[63] Continuation-in-part of Ser. No. 870,540, Apr. 20, 1992, Ser. No. 598,880, Oct. 15, 1990, abandoned, and Ser. No. 740, 703, Aug. 5, 1991, Pat. No. 5,380,536, which is a division of Ser. No. 740,632, Aug. 5, 1991, Pat. No. 5,232,984, said Ser. No. 870,540, is a continuation-in-part of Ser. No. 843,485, Feb. 28, 1992, abandoned.

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[58] **Field of Search** 427/213.35, 213.3, 427/213.32, 23.33; 264/43, 4.1, 4; 435/177, 178, 182; 424/93, 493, 499, 489, 487; 514/2; 522/87, 88, 89, 149, 151, 152, 154, 181

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[57] **ABSTRACT**

This invention provides novel methods for the formation of biocompatible membranes around biological materials using photopolymerization of water soluble molecules. The membranes can be used as a covering to encapsulate biological materials or biomedical devices, as a "glue" to cause more than one biological substance to adhere together, or as carriers for biologically active species. Several methods for forming these membranes are provided. Each of these methods utilizes a polymerization system containing water-soluble macromers, species which are at once polymers and macromolecules capable of further polymerization. The macromers are polymerized using a photoinitiator (such as a dye), optionally a cocatalyst, optionally an accelerator, and radiation in the form of visible or long wavelength UV light. The reaction occurs either by suspension polymerization or by interfacial polymerization. The polymer membrane can be formed directly on the surface of the biological material, or it can be formed on material which is already encapsulated.

69 Claims, 12 Drawing Sheets