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# United States Patent [19]

**Hubbell et al.**

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[54] **MULTIFUNCTIONAL ORGANIC POLYMERS**

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**Related U.S. Application Data**

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[52] **U.S. Cl.** ..... **525/54.1**; 525/54.2; 525/54.3; 528/354

[58] **Field of Search** ..... 525/54.1, 54.2, 525/54.3; 528/354

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[57] **ABSTRACT**

Described herein is a multi-functional polymeric material for use in inhibiting adhesion and immune recognition between cells and cells, cells and tissues, and tissues and tissues. One component of the polymeric material adsorbs well to cells or tissue, and the other component of the polymeric material does not adsorb well to tissues. A water-soluble polymer that does not bear charge (polynonion) is used as the non-binding component, and a water soluble polymer that is positively charged at physiological pH (polycation) is used as the tissue binding component. When the bi-functional polymeric material contacts a tissue, the tissue-binding component binds and thus immobilizes the attached non-binding component, which will then extend generally away from the tissue surface and sterically block the attachment of other tissues. The method and compositions are useful in inhibiting formation of post-surgical adhesions, protecting damaged blood vessels from thrombosis and restenosis, and decreasing the extent of metastasis of attachment-dependent tumor cells.

**18 Claims, 2 Drawing Sheets**