Thromboresistant Biomaterials

Background

Thrombosis is a medical complication frequently associated with medical devices whereby a thrombus or blood clot forms when devices implanted within the body come in contact with body fluids. It is widely believed that the composition of the biomaterial surface of the medical device plays a critical role in the initiation of thrombosis. For example, Dacron, a biomaterial used in certain medical devices, is more effective in platelet activation than polytetrafluorethylene. Surface morphology and properties such as smoothness and hydrophilicity of the biomaterial surface have also been shown to have an effect on thrombosis. A variety of approaches such as coating of heparin, albumin or polyurethanes to the surface have been attempted to increase the thromboresistance of the surface. These approaches, however, have several limitations. Thus, there is a great unmet medical need for biomaterials with non-thrombogenic properties that can be used in medical devices that come in contact with body fluids.

The present invention describes a coated biomaterial having thromboresistant properties.

Description of the Technology

UMDNJ scientists have developed a coated biomaterial that is stable, strong and thromboresistant. This biomaterial contains a surface coated with a chitosan-based membrane and certain biologically active materials such as antibiotics, antibodies or antithrombotic agents. The invention also provides a method to prepare the thromboresistant biomaterial. Briefly, the procedure involves coating biomaterial surfaces such as polyamides, polyesters, or polyurethanes with mixtures of acidic chitosan solutions, polymer solutions and non-ionic detergents followed by air drying or cross-linking to stabilize the membrane. The biomaterials prepared in this fashion contain a smooth surface and all the desirable properties that prevent the adherence of platelets to the membrane. These coated biomaterials may be used for the production of prosthesis having an interior diameter as small as 6 millimeters.

Advantages

. • The procedure described in the invention can be used to coat a wide range of biomaterials such as polytetrafluorethylenes, polyamides, polyesters, polyurethanes, Dacron polyvinylchlorides, polysioxanes, polyolifins, copolymers, and metals.
. • Chitosan is a natural polysaccharide
. • The procedure is inexpensive and efficient

Applications

- To produce medical devices and prosthesis such as vascular grafts, catheters, cardiac pacemakers, heart diaphragms, heart valves, sutures, needles, tubing and other artificial implants

Patent Status

. • United States Patent granted on November 26, 1996
. • Patent Number: 5,578,073

Licensing Opportunity

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This technology is available for licensing exclusively.

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