The Realisation of Research

Novel UCL Nanocomposite Polymer and its Unique Role in the Field of Biomedical Devices

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Description:

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Available For: Exclusive and Non-Exclusive licensing

Summary

Our novel nanocomposite polymer (NC) can uniquely achieve complete tissue and blood compatibility, unlike conventional medical polymers such as PTFE and Dacron. This offers exciting possibilities for medical device manufacturers.

The Technology and its Advantages

The NC is based on silsesquioxane, and exhibits unique surface properties. It preferentially absorbs and deactivates fibrinogen, thus preventing activation of the coagulation cascade, inflammation and growth of tissue capsule.

A new synthesis route allows preparation of the NC so that it has controlled properties. This is achieved by introducing silsequioxanes as pendant groups into the backbone of the polymer. Uniquely there is no degradation by hydrolysis or oxidation. However, variants of the NC can also be produced so that the controlled degradation will occur, making these variants suitable candidates for tissue engineering scaffolds. In addition the NC can be manipulated, for example by attachment of drugs, gene vectors or other biomolecules relevant to applications.

The NC is not toxic to cells and supports the adhesion and growth of cells in vitro. Furthermore, the NC inhibits protein absorption by prolonging the coagulation time. This prevents thrombogenicity and non-compatibility with blood, which together are the second principle reason behind failure of material surfaces of medical devices.

A three-year in vitro implantation study in a large animal model has confirmed in vitro findings that the NC is biocompatible, non-toxic, and shows no evidence of degradation, inflammation or capsule formation. As the NC is not drug-based, CE anf FDA approval are more easily achievable and so offer the manufacturer unique opportunities.

Market Opportunity

The physical properties of the NC are such that it can be tailored to many specific medical device applications, for example:

- Coronary artery bypass grafts - the NC can be made more elastic to closely mimic the elasticity of arteries

-Coating of coronary stents - the NC supported adhesion and growth of cells, including endothelial cells.

-Tissue scaffolds - the NC can be tailor-made to be degradable under controlled conditions

-Breast implants, condoms and surgical gloves - the NC is thin and strong and retains its original shape

The NC will allow manufacturers to produce a broad spectrum of safer, more efficient medical devices and other products.

Intellectual Property Status

A PCT Application has been filed, priority date 20th January 2004. Application Number PCT/GB05/000189

Further Information

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