Accelerated coronary stent endothelization using targeted microbubbles

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Technology description

The inventors have developed a method for manipulating the physical location of cells in suspension using ultrasonic microbbuble technology. The novel principle of this method consists of tagging gas-filled, acoustically active microspheres (microbubbles) to cell-specific markers which enable attachment of the microbubbles to the cells, and then imparting kinetic energy to these microbubble-cell complexes using radiation force generated with ultrasound. The general concept is that by attaching acoustically active microbubbles to a cell, the cell can be made to move to a specific area by directing ultrasound, which creates acoustic radiation force, to push the cell to the desired site. We are describing a specific application for this concept, namely accelerated stent or vascular graft endothelization using intravascular ultrasound. The general concept, however, can be extended to other therapeutic applications, such as local drug delivery to specific sites using microbubbles as drug vehicles directed to target sites using ultrasound-mediated acoustic radiation force.

Application area

* Coating of vascular stents or grafts with endothelium * Targeting of cellular therapies * Cell separation Advantages * Currently there is no available method to deliver cells targeted to a vascular segment.

Advantages

* Proposed method allows for complete coverage of the stent struts and the injured artery wall itself (the stent is a scaffold, when deployed the metal coverage represents only 10-20% of the stented segment). * Less antiplatelet therapy is required leading to decreased thrombosis rates, and possibly decreased restenosis, by promoting rapid healing of the coronary segment injured by the stenting procedure.

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