

## Research of Cell-Biomaterial Interactions and Development of Cardiovascular Medical Devices

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#### Abstract

Cell-material interactions play a vital role in advanced biomaterials, and microenvironment of cells is the key to tissue engineering and regenerative medicine. The microenvironment of a cell consists of not only its surrounding cells and soluble factors, but also its extracellular matrix or nearby external biomaterials. This lecture will review the main factors to influence biomaterial-related cell microenvironment. Some complicated material cues to regulate cell adhesion, migration and differentiation have been decoupled using a unique surface patterning technique developed in this research group; and thus the material technique and some corresponding science stories about argues of cell-material interactions in the world will be further told. The last part will introduce a case about a nanocoated cardiovascular medical device from bench to bedside in cooperation among university, hospital and company for more than 10 years, guided by the fundamental research of cell-material interactions in this group and translated in China, Europe and other regions recently.

#### Biography

Dr. Ding is a Distinguished Professor of Biomaterials and Polymer Sciences of Fudan University and Director of State Key Laboratory of Molecular Engineering of Polymers. He obtained his bachelor degree in School of Life Sciences in 1988, master degree in Department of Material Science in 1991, and Ph.D in Department of Macromolecular Science in 1995, all at Fudan University. Dr. Ding pursued his postdoctoral research at University of Cambridge from 1998 to 1999.

His research group focuses on biomedical materials concerning cell-material interactions, tissue regeneration, and drug delivery carriers. His publications have been highly cited and selected as Core Papers in Research Fronts by ESI. One of advanced cardiovascular medical devices guided by his fundamental research has recently been clinically used in about 23 thousands patients in more than 40 countries including China, Germany, and USA etc. The R & D in his group about injectable medical hydrogels won "First-Rate Prize of Natural Science Research" awarded by State Ministry of Education of China and Gold Medal in Inventions Geneva.

He is the Executive Associate Editor-in-Chief of Regenerative Biomaterials, an international journal organized by Chinese Biomaterials Society and published by Oxford University Press. Professor Ding is a fellow of International Union of Societies of Biomaterials Science and Engineering for "the development of cell responsive biomaterials for tissue engineering, regenerative medicine and drug delivery".

