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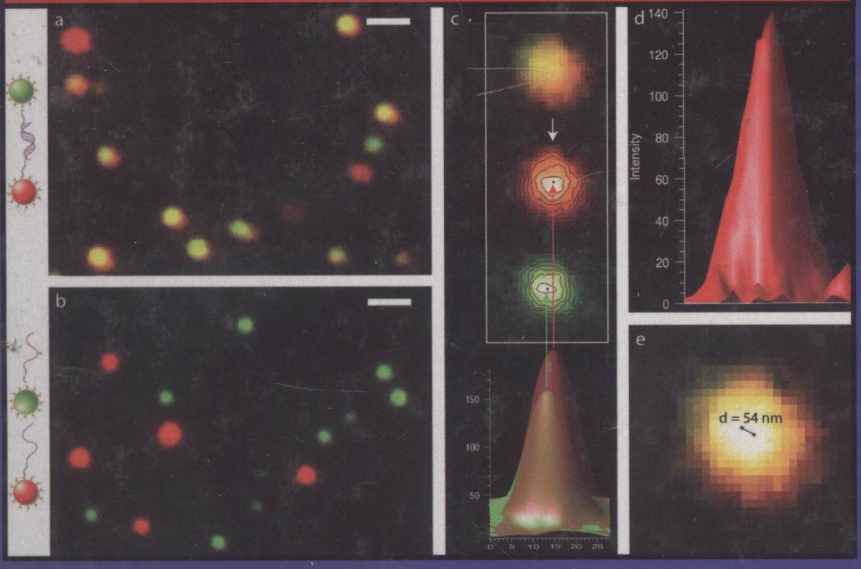
Biomedical Nanostructures



EDITED BY

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Learn to Use Nanoscale Materials to Design Novel Biomedical Devices and Applications

Discover how to take full advantage of nanoscale materials in the design and fabrication of leading-edge biomedical devices. The authors introduce you to a variety of possible clinical applications such as drug delivery, diagnostics, and cancer therapy. In addition, the authors explore the interface between micron and nanoscale materials for the development of applications such as tissue engineering. Finally, they examine the mechanisms of cell interactions with material surfaces through the use of nanotechnology-based material processing and characterization methods.

The text's three sections highlight its interdisciplinary approach:

* Part One: Nanostructure Fabrication
* Part Two: Bio-Nano Interfaces
* Part Three: Clinical Applications of Nanostructures

Among the key topics covered are nanotechnology in tissue regeneration; biomolecular engineering; receptor-ligand interactions; cell-biomaterial interactions; nanomaterials in diagnostics, drug delivery, and cancer therapy; and nano- and micron-level engineering and fabrication.

Throughout the text, clear examples guide you through the chemistry and the processing involved in designing and developing nanoscale materials for biomedical devices. Each chapter begins with an introduction and ends with a conclusion highlighting the key points. In addition, references at the end of the chapter help you expand your research on any individual topic. In summary, this book helps biomedical researchers and engineers understand the physical phenomena that occur at the nanoscale in order to design novel cell-based constructs for a wide range of applications.

KENNETH E. GONSALVES, PhD, is Distinguished Professor in the Department of Chemistry at the University of North Carolina at Charlotte. Dr. Gonsalves has more than fifteen years of experience in using photolithography and chemistry to develop materials that have features at both the micron and nanoscale. Working with Dr. Craig Halberstadt, he has successfully demonstrated the ability to create a new material that can be controlled at both these size scales to influence cell behavior. He has also developed active polymeric nanoparticles for delivery of antibiotics and genes. **CRAIG R. HALBERSTADT, PhD,** is Director of Tissue Engineering and Senior Research Scientist at the Cannon Research Center of Carolinas Medical Center. Dr. Halberstadt is a pioneer in the development of a scalable commercial process for the growth of a human skin product. He has also published extensively on cell/biomaterial interactions for cellular transplantation. **CATO T. LAURENCIN, MD, PhD,** is Lillian T. Pratt Distinguished Professor and Chair of the Department of Orthopaedic Surgery and Professor of Biomedical Engineering and Chemical Engineering at the University of Virginia. He has also been designated one of fifteen University Professors at the School. He has authored more than 250 peer-reviewed articles and has edited books in the areas of biomaterials, orthopaedic tissue engineering, and nanotechnology. He is the recipient of several national and international awards and was elected to the National Academy of Sciences, Institutes of Medicine. His current research interests include biomaterial synthesis, orthopaedic tissue engineering, gene therapy, drug delivery, and nanotechnology. **LAKSHMI S. NAIR, MPhil, PhD,** is Assistant Professor in the Department of Orthopaedic Surgery at the University of Virginia. She has authored more than fifty peer-reviewed articles in the areas of biomaterials, tissue engineering, drug delivery, and nanotechnology. Her research interests include hydrogels for tissue engineering and drug delivery, stimuli sensitive materials, and biomedical nanotechnology.

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