BIOMATERIALS

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BIOMATERIALS
From Molecules to Engineered Tissues

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Preface

The interdisciplinary fields of Biomaterials and Biomedicine are founded on basic sciences, engineering, medicine, pharmacy, dentistry, and other health-related fields. The aim of these areas is to solve health related problems using the scientific and technological tools available. Although wooden legs or metallic hands were known since the ancient times, the field started to take shape in the last quarter of the 20th Century. A special branch of biomaterials, Tissue Engineering, started in the late 1980's and then stem cell research became the hottest topic of the first decade of the 21st Century. Today with these developments, we are almost ready for generic implants that could be converted into the implants needed when the appropriate biological, chemical and physical signals are provided. Responsive materials used in drug delivery systems, sensors, and other biomedical devices constitute the intelligent biomaterials. Biodegradable materials that are gradually replaced by the natural tissue during the healing process, on the other hand, are the third generation biomaterials. Miniaturization of electronic systems and developments in the field of computers helped to create hybrid biomedical systems employing high-tech biomaterials.

This book is based on papers presented in Biomed-2003, the 10th International Symposium on Biomedical Science and Technology, held in Northern Cyprus from October 10-12, 2003, and covers a broad spectrum of biomedical research, from molecules to engineered artificial organs. In the initial chapters basic and intelligent biomaterials are discussed, followed by specific applications in analysis, separation and tissue design. The development of drug delivery systems is the next topic covered. Tissue repair and engineering using differentiated cells and stem cells are studied in several exciting chapters. The subjects of medical informatics and ethics
constitute the two final topics that complement and guide the scientific research making the results of the research worthwhile.

As the editors we believe that the chapters presented here give a condensed knowledge about a wide spectrum of biomedical applications and will be very beneficial for the researchers and graduate students involved in research in the fields of biomaterials and biomedicine.

We wish to express our gratitude to the authors for their cooperation and very valuable contributions to the book. It would not be possible to complete this book without them. We also would like to thank the President of the Middle East Technical University and the Scientific and Technical Research Council of Turkey for their support during the organization of 10th International Symposium on Biomedical Science and Technology.

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