

Preface

A meteoric scientific and technological revolution in biomedicine is underway and is ruling by advanced biomaterials. A number of factors involved in biomaterials' advancement complement each other. Science of materials, synthesis procedures, and analytical contrivance are some of the major factors that have transformed over a period of time, thus popularizing the biomaterials for their advanced biomedical applications. Much of revolution in biomaterials is fundamental in nature; however, advances are often based on the new and extended understanding of basic principles of biomaterials along with its applications.

Biomaterials are a class of materials that are intended for applications in the biomedical field without being biologically vulnerable. Among many, metallic and polymeric biomaterials have most widely been studied due to several advantages. The growing number of publications and technology patents in this field has encouraged us to provide a comprehensive outcome with future scope. We have selectively chosen topics based on the latest and demanding areas of research in biomedicine. Each chapter of this book has discussed distinct biomaterial types. Many chapters begin with the basics followed by advancement and then application of biomaterial. Overall, this book elaborates on the preparation process and modification of polymers, blends, composites, nanoclusters, and nanohybrids, including advanced approaches such as bioprinting and plasma processing. These biomaterials have further been discussed in terms of their application as a carrier for drug and gene delivery, imaging and sensing, and also as an adjuvant, which are especially elaborated in the field of cartilage regeneration therapy, cancer management, and for the induction and treatment of autoimmunity, respectively. The use of polymeric scaffolds for engineering tumor microenvironment and decellularized extracellular matrix as the scaffolds for various tissue recreations has also individually been discussed in separate chapters. The various nanohybrid systems such as gold nanoclusters, graphene nanoclusters, and magnetic nanoparticles and various nanoantimicrobial biomaterials have also been elaborated as advanced therapeutics and developing antimicrobial biomaterials, respectively.

Arduous task of compiling recent 'Advances in Biomaterials for Biomedical Applications' and succinct pretension about their future requires greater leisure and

extensive reading. In this book, we have sought to bring together the expertise of scientists involved in the materials chemistry and theranostics, with the aim of providing overview on contemporary preparation and diversified applications of biomaterials. This book is appropriate to advanced graduate, introductory-level researchers, and also interdisciplinary and multidisciplinary scientists. It should also serve as a source book for statutory authorities and legislators charged with ethical monitoring and approving clinical applications.

We once again thank all the authors for the quality of their contributions that has enabled us to make possible this book beyond our own limited experience.

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