Preface

This book highlights contemporary and emerging aspects of improving medical treatment modalities employing biomaterials or transplantation. During such treatments, different biosurfaces (i.e., the surfaces of the medical devices or transplanted cells or organs) inevitably come in contact and interact with human blood and tissues. Such interactions frequently trigger activation of multiple defense systems such as the complement, contact, and coagulation cascades and contribute to anaphylactoid reactions, ischemia-reperfusion injury, thrombo-inflammation, and immune responses that negatively affect the clinical outcome. Classical examples of high clinical importance are biomaterial implants, extracorporeal circuits, bioengineered devices (e.g., drug delivery vehicles), soft and hard tissue implants, as well as transplantation of cells (e.g., mesenchymal stromal cells or hepatocytes), cell clusters (primarily islets of Langerhans), or whole vascularized organs. Optimal tissue integration and modulation of foreign body reactions are therefore essential for preserving anticipated functions and avoiding adverse effects. Modification of biosurfaces or pharmaceutical interventions are viable strategies that already produced successful results in some cases. However, biosurface-induced complications such as rejection, local and systemic inflammation, and thrombosis remain major problems in the clinic, thereby fueling a demand for novel surface-modification strategies and therapeutic modalities.

This volume compiles data on this rapidly growing field as presented by prominent scientists at the First International Conference on Immune Response to Biosurfaces (September 27–October 2, 2014) in Chania, Greece. Topics covered in this book include mechanistic and applied research within the fields of extracorporeal devices, soft and hard tissue implants, tissue and biomaterial targeting, therapeutic modulation of foreign body reactions, cell encapsulations, as well as cell and whole organ transplantation. We would like to express our sincerest thanks to all the authors for contributing timely and highly informative chapters on this fascinating and emerging topic of modern medicine. We also thank Dimitrios Lambris

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