

## Editors' Introduction

This book «*Titanium in Medicine*» was planned to be a state-of-the-art textbook providing scientific and technical in-depth information in a form that was suitable for use in education as well as a reference book on titanium for biomedical applications. The need for a text like this arises from the rapid expansion of knowledge on titanium. This knowledge is widely scattered as articles featuring titanium appear in journals of numerous disciplines from cell biology through medicine to the physical sciences. The result is that both newcomers to the area of biomedical devices as well as those already active in the field can easily miss developments in topics not directly involved in their work. However the diversity of material relevant to titanium in medicine presents a challenge to the editors both in the selection of authors and in the adoption of a coherent organization.

As many excellent scientists investigate titanium and its applications in medicine, the choice of authors was difficult, but we tried to achieve a balance between those working in basic science departments at universities where basic knowledge is produced and those in industry or clinics where that knowledge is applied. Although most of the contributors have worked for many years in specific topics related to Titanium in Medicine, we also included a few younger investigators in order to present fresh perspectives and newly developed technologies. Finally we also solicited contributions from both European and North American investigators so that various research traditions would be represented.

The book is organized with an introductory section (*Part I*) in which senior biomaterials scientists give an overview and perspectives that come from long experience in the field. *Part II* contains 10 chapters that are largely based on physical material sciences and contain basic information on the materials properties as well as methods for the modification of titanium surfaces. The emphasis on surface properties arises from the importance of surface texture and chemistry for implant performance, but also from the likelihood that future improvements in titanium devices will be a result of interfacial modifications. *Part III* is devoted to cell and tissue responses to titanium and includes sections on various cell populations and tissue fluids that encounter titanium implants, including blood, soft tissues and bone as well as titania carriers for cell culture. *Part IV* concentrates on clinical applications, including contributions from authors involved in the design and production of titanium devices. Their perspective entails understanding the advantages and disadvantages of titanium relative to the more commonly-used material in orthopedics, stainless steel and cobalt–chromium alloys. Clinical applications are presented from the disciplines of orthopedics, dentistry, cardiology and cardiovascular surgery, and audiology. *Part IV* closes with a discussion on the processes involved in obtaining approval of implanted devices by governmental regulatory bodies. Emphasis has been given to cross referencing between the chapters, direct-

ing the interested reader to basic chapters where a particular aspect is treated in more detail or to more applied chapters where the information provided is relevant to the performance of titanium in a given medical situation. At the same time, the editors have deliberately accepted a certain amount of redundancy particularly when it helps the line of argument within a chapter to flow smoothly or where complementary views on a given topic are presented.

At a time when most working scientists routinely use the Internet for information services, we thought it was important that useful world wide web sites from academia and industry be listed in an *Appendix* and we also provide the email addresses and websites for the contributors. In this way we hope to make it convenient for readers to obtain updated information, such as the most recent publications. Since a compilation of web-site addresses is never complete and needs regular updates in order to remain useful, a *web-site*

**<http://www.titaniuminmedicine.com>**

has been created to allow the reader to provide further contact addresses as well as general feedback on the book. Finally as the range of disciplines is wide, the number of acronyms that may be unfamiliar to readers might be large and confusing, and we have included an appendix of *abbreviations* that are standard throughout the book.

Our aim has been to produce a book that can serve as a reference of value both to the newcomer to the field of titanium in medical applications as well as to those more familiar with the topics. Although all the editors have worked extensively in various aspects of titanium in medicine, one of the most frequent comments made as we discussed the chapters in the book was “I learnt a lot from that chapter”. We hope that the readers experience a similar satisfaction. Suggestions for additions or changes for possible future editions of the book will be most welcome.

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Titanium in Medicine

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