

# Contents

## Part I Biological Tissues and Organs

<b>1 Bone Tissue and Biomaterial Design Based on the Anisotropic Microstructure .....</b>	<b>3</b>
Takayoshi Nakano	
<b>2 Joint: Normal Anatomy, Function, and Pathological Condition .....</b>	<b>31</b>
Takashi Sakai	
<b>3 Metallurgy of Spinal Instrumentation .....</b>	<b>53</b>
Reed A. Ayers, Evalina Levina Burger, Christopher J. Kleck, and Vikas Patel	
<b>4 Biomechanics of Blood Vessels: Structure, Mechanics, and Adaptation.....</b>	<b>71</b>
Takeo Matsumoto, Shukei Sugita, and Toshiyuki Yaguchi	
<b>5 Tooth and Tooth-Supporting Structures.....</b>	<b>99</b>
Shinji Kamakura	

## Part II Metallic Biomaterials

<b>6 Nickel-Free High-Nitrogen Stainless Steel.....</b>	<b>125</b>
Yasuyuki Katada and Tetsushi Taguchi	
<b>7 Co-Cr Alloys as Effective Metallic Biomaterials.....</b>	<b>157</b>
Takayuki Narushima, Kyosuke Ueda, and Alfirano	
<b>8 Titanium Alloys for Biomedical Applications .....</b>	<b>179</b>
Mitsuo Niinomi and Carl J. Boehlert	
<b>9 Zirconium Alloys for Orthopedic Applications.....</b>	<b>215</b>
Naoyuki Nomura	

**10 The Use of Porous Tantalum for Reconstructing Bone Loss in Orthopedic Surgery ..... 223**  
Nilesh Patil and Stuart B. Goodman

**11 Niobium Biomaterials ..... 245**  
Barry O'Brien

**Part III Reactions of Metals in Human Body**

**12 Corrosion of Metallic Biomaterials ..... 275**  
Burak Dikici, Ziya Esen, Ozgur Duygulu, and Serap Gungor

**13 Pathological Analysis of Metal Allergy to Metallic Materials ..... 305**  
Mitsuko Kawano, Yuri Takeda, and Kouetsu Ogasawara

**14 Cytotoxicity of Metallic Biomaterials..... 323**  
Akiko Obata and Toshihiro Kasuga