BOOK REVIEW

HANDBOOK OF PHYSICS IN MEDICINE AND BIOLOGY

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Edited by Robert Splinter, PhD
CRC Press, Taylor & Francis Group,
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Focus of this excellent handbook is the use of physics and its laws in biological organisms, as editor points that aspect excellently in his preface. Physics in this book is described in broad terms, as fluid dynamics, mechanics and electronics and intention was to describe and understand biological functions in general, from that particular point of view. Much of new discoveries and findings in biology are based on physics, whether it is electronics or mechanics, or it is development of instruments enabling modern research of biological systems. Particular value of this handbook is an attempt to explain some clinical conditions and diagnostic technologies using physics and engineering, and the book addresses the principles of physical descriptions and foundations of the biological processes.

This handbook is divided in 7 sections, consisting 44 chapters in total. Sections are Anatomical Physics, Physics of Perception, Biomechanics, Bioelectrical Physics, Diagnostic Physics, Physics of Accessory medicine and Physics of Bioengineering. As could be assumed by its titles, all chapters within mentioned sections are dealing with particular themes of physics in biology and medicine and describing particular medical phenomena from the physical point of view. Section I explains physics of cell membrane, cell proteins and action potential generation and conduction. Section II is dealing with perception, physics of senses, hearing and vision generation. Section III has focus on biomechanics of cardiovascular and respiration systems, dynamics of liquid and gas fluids. Section IV is giving descriptions of bioelectrical signals events during medical recordings. Section V explains physics and its laws behind CT, MRI or PET imaging techniques, different microscopy methods, as well as ECG and EEG. Section VI is an overview of nuclear and DNA biophysics, together with new technologies in medicine and biology, while section VII describes some aspects of biophysics in regenerative medicine. Lot of references illustrate depth of the topics described in each particular chapter, while extensive index at the end of the handbook helps reader to easily find terms of its interest.

Handbook is targeting professionals and students in the biomedical professions, with background in medical, technical or engineering fields, both in teaching or in research. Book offers opportunity to learn about new techniques and diagnostic methods as well as to understand underlying biological processes in the normal state or in disease from the different perspective. Physics in biological systems starts to interact on molecular and cell level expanding to function of organs and organism as a whole. Further, physics here was explained in some of modern diagnostic methods, biotechnology and biochemistry. All of that comprises interdisciplinary approach, from the understanding and insight into laws of physics within the cells and organs to implementation of phys-

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ics in diagnostics methods and medical treatment and its technology.

Editor of the handbook, Robert Splinter received his PhD from the University of Amsterdam. He has worked in biomedical engineering for over 20 years, and is affiliated with several physics departments in the Universities in the USA. His particular research interest is applied physics in the biomedical field, where he published more then 100 papers and several books.

More the 60 contributors all around the world participated in this handbook with their chapter contributions. It is nicely composed by the editor in one compact reading structure, even though participants are from different expertise areas. Excellent work of the editor composed and managed inputs and styles of all authors unified and explanations and descriptions given are more or less on equal level and depth concerning themes of chapters.

One of the chapters in this handbook (Chapter 8 - Somesthesis) is written together by the researcher from University of Belgrade, Serbia, Sasa Radovanovic, MD, PhD, from Laboratory for Neurophysiology, Institute for Medical Research, and his colleague from Universite Provence / CNRS, Marseille, France, Jean-Marc Aimonetti, PhD, from Integrative and Adaptative Neurobiological Department. That particular chapter overview some of the topics in the receptors physiology, and physical principles present in the fields of somatosensory perception, as touch, thermoception and pain. Common work of writing this chapter was also part of the bilateral scientific project between those two institutions, and supported by grant from Serbian Ministry of Science and French National Center for Scientific Research (CNRS). Within this joint project, scientists from both institutions met and performed collaborative research work in the field of human proprioception and pain.