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Nota di contenuto	Front matter -- Preface -- Contents -- List of authors -- Part I: Molecular level -- 1. Selected aspects of biological network analysis / Piwowar, Monika / Jurkowski, Wiktor -- Part II: Cellular level -- 2. Negative feedback inhibition - Fundamental biological regulation in cells and organisms / Wach, Jakub / Bubak, Marian / Nowakowski, Piotr / Roterman, Irena / Konieczny, Leszek / Chopa, Katarzyna -- 3. Information - A tool to interpret the biological phenomena / Roterman-Konieczna, Irena -- Part III: Organ level -- 4. The virtual heart / Sochocka, Anna / Kawa, Tomasz -- 5. Modeling figure/ground separation with spiking neurons / Ebner, Marc / Hameroff, Stuart -- Part IV: Whole body level -- 6. Simulation-based analysis of musculoskeletal system properties / Tadeusiewicz, Ryszard -- Part V: Diagnostics procedure -- 7. The world of virtual patients / Kononowicz, Andrzej A. / Hege, Inga -- 8. Interactive virtual patients in immersive clinical environments: The potential for learning / Davies, Dick / Arciaga, Peregrina / Dev, Parvati / Heinrichs, Wm LeRoy -- 9. Melanoma thickness prediction / Jaworek-Korjakowska, Joanna / Tadeusiewicz, Ryszard -- Part VI: Therapy -- 10. Simulating cancer chemotherapy / Tadeusiewicz, Ryszard -- 11. Introduction to Reverse Engineering and Rapid Prototyping in medical applications / Dudek, Piotr / Cielik, Jacek -- 12. Computer simulations in surgical education

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Sommario/riassunto

Simulations are an integral part of medical education today. Many universities have simulation centers, so-called skills labs, where students and medical personal can practice diagnostics and procedures on life-like mannequins. Others offer simulation courses in the different sub-disciplines. In the pre-clinical phase, simulations are used to illustrate basic principles in physiology, anatomy, genetics, and biochemistry. For example, simulations can show how the metabolism of enzymes changes in the presence of inhibitors, illustrating drug actions. This book covers all areas of simulations in medicine, starting from the molecular level via tissues and organs to the whole body. At the beginning of each chapter, a biological phenomenon is described, such as cell communication, gene translation, or the action of anti-carcinogenic drugs on tumors. In the following, simulations that illustrate these phenomena are discussed in detail, with the focus on how to use and interpret these simulations. The book is complemented by topics such as serious games and distance medicine. The book is based on a course for medical students organized in the editor's department. Every year, around 300 international undergraduate medical students take the course.
