

Roleplay

Systems Biological Approaches in Infectious Diseases

Edited by Helen I. Boshoff and Clifton E. Barry, III.

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As witnessed in pharmaceutical industries, the problem of complexity in living systems is challenging the reductionism-based drug discovery techniques, and presently limiting the development of effective and safe drugs. Systems biology is expected to provide promising solutions to this challenge and to improve drug discovery and development in the post-genomic era. This book brings together various approaches in systems biology and demonstrates their applications to drug discovery in infectious diseases. All of the 12 chapters in this book showcase an emerging field using either practical examples from the various "omic" sciences or conceptual examples of how theories or models of living systems could contribute to drug discovery.

First, the current state of systems biology approaches in infectious disease is reviewed in Chapter 1. Then several popular "omics" platforms including transcriptome, proteome and metabolome are introduced in more detail in Chapters 2, 4 and 5, respectively. The data generated from these platforms have shown promise in revealing the mechanisms of pathogen–host interactions and anti-infectious drug actions, thus providing an opportunity to identify potential drug targets. A very interesting part of this book comes from the chapters that discuss the different approaches to identifying drug targets.

Chapter 3 introduces chemical genetic approaches to experimentally identify proteins responsible for a particular phenotype induced by drug perturbations. In contrast, Chapters 6–8 discuss ways to find novel targets computationally; for

instance, a subsystem-based approach identified targets based on the essentiality and predicted vulnerability of the enzymes in the pathogens (Chapter 6), metabolic control analysis compared the flux through a single metabolic pathway in pathogen versus in host to identify vulnerable pathways (Chapter 7), and a protein-network-based method identified new drug targets by finding the proteins that linked directly or indirectly to current drug targets in the network (Chapter 8).

With increasing availability of data from various techniques, it has become possible to understand design principles of host–pathogen systems more accurately. In Chapter 10, a conceptual framework is proposed to understand and characterize the complex behaviors of host–pathogen systems in term of biological robustness. Chapter 11 discusses a constraints-based approach integrating available "omics" data and prior knowledge to model and simulate cell behaviors, thus allowing one to explore the dynamics of host–pathogen interactions. The last chapter describes functional genomics of host–pathogen interactions, which lends insight into the importance of gene acquisition and decay for pathogen evolution. These studies enable a better understanding of the principles of host–pathogen systems; therefore, they could provide valuable insights to guide the design of more effective therapeutics.

Overall, this book contains a mixture of reviews and specific methodological articles making for a somewhat uneven, but nonetheless very useful, compendium. The book is easily accessible and provides entry to newcomers into this field. The issues tackled by the book range from data generation to quantitative modeling of the various steps in the drug discovery process, including target identification and efficacy assessment, etc. Almost all of the approaches intro-

duced in this book could be applied to other diseases, and are not limited to infectious diseases. Therefore many scientists in academia as well as pharmaceutical industries should find useful information in this book. However, it should be noted that this is a fast moving field, newly developed techniques and methodologies (i.e., next generation sequencing) relevant to this field are not covered in this book, thus interested readers should be encouraged to go to the literature for the latest progress in this field after reading this book.

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Concerning Cytochromes P450: Role in the Metabolism and Toxicity of Drugs and other Xenobiotics

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RSC, Cambridge 2008. xviii + 522 pp., hardcover £ 110.00.—ISBN 978-085-404-2746

This book is one in a series entitled *Issues in Toxicology*, which is devoted to the coverage of modern toxicology and assessment of the risk. The book is a reference and guide to investigations in the biomedical, biochemical and pharmaceutical sciences at the graduate and post graduate level. The initiative for the book comes from the need to update the area of cytochrome P450, since it was some time

