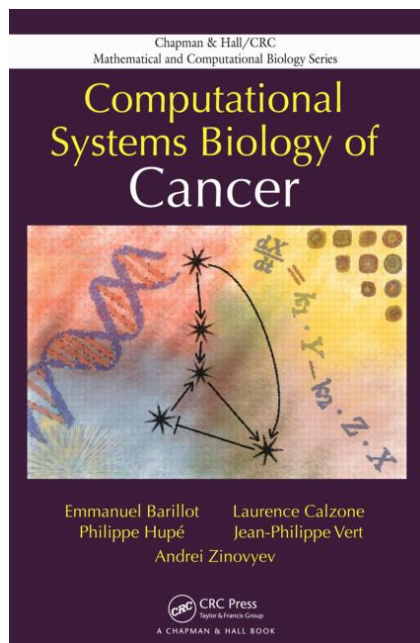


EMMANUEL BARILLOT, LAURENCE CALZONE, PHILIPPE HUPÉ, JEAN-PHILIPPE VERT, ANDREI ZINOVYEV COMPUTATIONAL SYSTEMS BIOLOGY OF CANCER



CRC Press
ISBN 978-1-4398-3144-1
Hard cover
460 pages
August 2012

This book presents a comprehensive review of systems biology applied to cancers. It is written in clear and accessible manner. Each chapter follows the scheme: presentation of the main problems and challenges and discussion of the existing state-of-the-art methods. Many of the largely used computational and design principle implemented in existing tools are analyzed in detail. The authors also provide extensive references to many additional resources that the interested reader can study in more detail. After introducing the reader to the concepts of cancer and systems biology, and why systems biology approaches are necessary for the treatment of cancer, the authors proceed with introducing the readers to molecular biology concepts and cellular regulation cycles. Presentation of experimental techniques for acquiring data and bioinformatical tools follow and finally the dynamical mathematical modelling approaches are described and analyzed in detail.

Table of Contents

| | |
|--|-------|
| Preface | xxvii |
| Acknowledgments | xxix |
| Chapter 1 Introduction: Why Systems Biology of Cancer? | 1 |
| Chapter 2 Basic Principles of the Molecular Biology of Cancer | 25 |
| Chapter 3 Experimental High-throughput Technologies for Cancer Research | 53 |
| Chapter 4 Bioinformatics Tools and Standards for Systems Biology | 105 |
| Chapter 5 Exploring the Diversity of Cancers | 127 |
| Chapter 6 Prognosis and Prediction: Towards Individualised Treatments | 165 |
| Chapter 7 Mathematical Modelling Applied to Cancer Cell Biology | 207 |



| | | |
|---------------------|--|-----|
| Chapter 8 | Mathematical Modelling of Cancer Hallmarks | 237 |
| Chapter 9 | Cancer Robustness: Facts and Hypotheses | 271 |
| Chapter 10 | Cancer Robustness: Mathematical Foundations | 305 |
| Chapter 11 | Finding New Cancer Targets | 347 |
| Apendices | | 357 |
| Glossary | | 373 |
| Bibliography | | 381 |
| Index | | 417 |