

**GENOMICS AND PHARMACOGENOMICS  
IN ANTICANCER DRUG DEVELOPMENT  
AND CLINICAL RESPONSE**

# CANCER DRUG DISCOVERY AND DEVELOPMENT™

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RESPONSE**

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# PREFACE

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*Genomics and Pharmacogenomics in Anticancer Drug Development and Clinical Response* provides the most comprehensive body of knowledge available on the role of genetic and genomic variation in the individualization of drug therapies in cancer patients. As a consequence of the intrinsic chromosomal and genetic instability of the tumor genome, it is generally believed that tailoring of chemotherapy in cancer patients might be achieved by molecular analysis of patient tumor DNA. In addition, to reduce the toxicity risk of patients, the tumor DNA information should be integrated with the available data on polymorphic drug-metabolizing enzyme and transporter genes mediating the exposure of patients to active drugs and/or their active metabolites. The chapters of this book clearly show how DNA information from both the host (germline) and the tumor should be taken into account for rational selection of drug therapies in cancer patients, an aspect that received little attention, despite its importance.

The availability of new molecular approaches to the selection of drug therapy is an emerging need, because the traditional approach based on the evaluation of patient and tumor characteristics is clearly far from optimal. Many treated patients do not experience significant benefits from the treatment, while they often experience moderate to severe toxicities. In addition, the development and clinical use of novel molecularly targeted agents (alone or in combination with classical cytotoxic therapy) requires the understanding of the molecular features of the tumors and the identification of tumor markers of response.

In this book, the readers will find a series of chapters addressing the role of genomic information in cancer therapy and in drug development. Several books on pharmacogenomics are currently available, but this book represents a unique source, as it describes experimental approaches, statistical strategies, and clinical examples of the application of genomic medicine in oncology. Many outstanding scientists in the field of cancer pharmacogenomics have been invited to contribute, and I am grateful to have had the opportunity to work with them, learning a great deal from reading their chapters.

I have approached this book from both a basic and an applied perspective. Among three different sections, six chapters in the first section are focused on up-to-date genomic experimental approaches in oncology, including genome-wide phenotyping (microarray and proteomics) and genotyping methods, as well as novel cell-based models used for the identification of genetic markers of drug response.

The second section shows how genetic and genomic information is currently applied to treatment individualization and optimization: Eleven chapters describe some of the most elegant examples of genetic and genomic markers that are predictive of the survival and toxicity risk of cancer patients.

Finally, in the third section, readers will find four chapters that address the role of pharmacogenomics in drug development in oncology, including an industry perspective on this subject, as well as statistical aspects related to the discovery of pharmacogenomic biomarkers during drug development.

Because the discovery of genetic markers of response is of high relevance in oncology, we perceived the need that a collection of multidisciplinary topics be gathered together to discuss this important aspect of pharmacogenomics applied to cancer patients.

I believe that this book represents the first reference for researchers in the field of cancer pharmacogenomics and clinicians, from both the academia and industry.

Federico Innocenti

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