

Essential Concepts in Toxicogenomics

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Edited by

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Cover illustration: Chapter 2, Fig. 1.

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Preface

The field of toxicogenomics is moving rapidly, so it is impossible at the time of this writing to compile a classic methods textbook. Instead, we chose to identify experts in all aspects of this field and challenged them to write reviews, opinion pieces, and case studies. This book covers the main areas important to the study and use of toxicogenomics. Chapter 1 speaks to the convergence of classic approaches alongside toxicogenomics. Chapter 2 deals with the usefulness of toxicogenomics to identify the mechanism of toxicity. Chapter 3 calls attention to the issues that affect the quality of toxicogenomics experiments, as well as the implications of using microarrays as diagnostic devices. The need for appropriate statistical approaches to genomic data is discussed in Chapter 4, and Chapters 5 and 6 describe the use of genomic data to build toxicogenomic models and provide insights from the approaches of two companies. The important topic of storing the data generated in such experiments and the correct annotation that must accompany such data is considered in Chapter 7. The discussion in Chapter 8 speaks to the use of toxicogenomics to identify species similarities and differences. Chapters 9 and 10 deal with the use of genomics to identify biomarkers within the preclinical and clinical arenas. Biomarkers will only be useful if the community at large accepts them as meaningful. Consortia are important to drive this function, and Chapter 11 discusses current efforts in this area. Last but not least, Chapter 12 presents a perspective on the regulatory implications of toxicogenomic data and some of the hurdles that can be seen in its implication in GLP studies. Although this book tends to focus on pharmaceuticals, the issues facing toxicology are shared by the chemical manufacturers, the tobacco industry, and their regulators. We want to thank our contributors for their generous time and energy in providing their insights. Sadly, we must note the unexpected passing of one of our authors, Dr. Joseph Hackett of the FDA. Joe's contribution serves as a testimony to his accomplishments in this field, and his insight will be missed in the years to come.

Donna L. Mendrick

William B. Mattes

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Color Plates

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- Color Plate 1 Identification of genes regulated in the liver of rats after xenobiotic activation of the nuclear receptors PPAR- α , aromatic hydrocarbon receptor (AhR), or pregnane X receptor (PXR). (Chapter 2, Fig. 1; *see* legend and discussion on p. 26.)
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