



An Introduction to Toxicogenomics

Edited by Michael E. Burczynski
 Boca Raton, FL: CRC Press, 2003. 332 pp.
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An Introduction to Toxicogenomics is one of the first books written to address the newly emerging field of applying gene expression microarrays to toxicology. Although the definition of toxicogenomics is broader than this, the focus of the first part of the book is to introduce the technology, explain the differences between the two conventional formats used most often (cDNA and oligonucleotide arrays), describe

various quality assurance parameters, and discuss current data analysis and mining methods. The second part emphasizes the application of microarrays in evaluating toxicity issues. Examples are given of gene profiling in both *in vivo* and *in vitro* systems and approaches determining mechanisms involved in toxicity and the predictive potential of the gene expression data. Overall, the book was meant to be an educational tool for toxicologists and nontoxicologists alike, but falls slightly short of this goal.

Although it is challenging to write a book on a timely subject, especially when the technology is changing rapidly, a portion of the information given is outdated. In the introductory chapters, a listing of microarray manufacturers include companies no longer in the array field and does not mention newer ones that have entered it. Alternative genomic technologies, such as differential display and serial analysis of gene expression (SAGE) are mentioned but not described. Other array formats (e.g., electronic, protein, and tissue arrays) are not noted. And some of the information is incorrect or lacks further explanation; one example is the inconsistency of the naming convention of “target” and “probe” between chapters and the historical reason behind this.

Many chapters relating the use of arrays to evaluate toxicity issues are well written. Most notable are the chapters illustrating the gene expression profiling in hepatocytes, by T.K. Baker et al. (Chapter 7), and the development of predictive databases for toxicity testing, by

Dunn and Kolaja (Chapter 11). The research in Chapter 7 describes gene expression changes in both *in vivo* and *in vitro* rat liver cells treated with nuclear hormone receptor ligands. In addition to citing which genes were found to be significantly up- or down-regulated, the authors detail the impact on the affected metabolic pathways. In Chapter 11, the authors describe the steps required to set up databases of gene expression data and discuss different structural formats depending on the information focus: compounds, pathological end points, or research interests. Novice and experienced readers alike will be able to appreciate the additional wealth of genetic and molecular information microarrays have brought to toxicology.

Two chapters (Chapter 3, by Hill and Whitley, and Chapter 4, by Immermann and Young) deserve special mention. These chapters deal with the most complex issues facing microarrays users: *a*) process control and quality assurance and *b*) data analysis and mining. In Chapter 3, the authors cover topics such as the quality and quantity of the labeled target, the use of housekeeping genes and other controls, imaging of the arrays, and initial statistical and data analysis steps. They emphasize in-process quality measurements, which are necessary to discern between biological and process variation in using microarrays. In Chapter 4, detailed step-by-step descriptions of methods used in the next steps of data analysis are given, including filtering, normalization, similarity measures, distance metrics, principal component analysis, and various clustering methods. The authors are experts in their fields, and they have furnished a well-balanced mix of mathematical explanations and clear and concise examples.

Overall, *An Introduction to Toxicogenomics* may be used as an education tool—but with caution. Some information is outdated and should be verified. Readers will realize the struggle of designing experiments early on with an emerging technology. Today, users have become more sophisticated in their approaches through their knowledge of past experiences. The chapters detailing process control and data analysis are especially informative and understandable and make use of this book as an educational tool worthwhile.

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Announcements New Books

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Richard J. Reece
 Hoboken, NJ: Wiley, 2004. 480 pp.
 ISBN: 0-470-84379-9, \$130 cloth;
 ISBN: 0-470-84380-2, \$55 paper

Analytical Biotechnology

Thomas G.M. Schalkhammer
 New York: Springer-Verlag, 2004. 200 pp.
 ISBN: 3-7643-6590-0, \$149 cloth;
 ISBN: 3-7643-6589-7, \$99 paper

Beyond the Genome: The Proteomics Revolution

Fred Md. Askari, Emilia Askari, Fred K. Askari
 Amherst, NY: Prometheus Books, 2004. 300 pp.
 ISBN: 1-591-02019-0, \$28

Data Analysis Tools for DNA Microarrays

Sorin Draghici
 London: Chapman & Hall, 2003. 512 pp.
 ISBN: 1-584-88315-4, \$79.95

Design and Analysis of DNA Microarray Investigations

Edward L. Korn, Richard M. Simon,
 Lisa M. McShane, Michael D. Radmacher,
 George W. Wright, Yingdong Zhao
 New York: Springer-Verlag, 2004. 199 pp.
 ISBN: 0-387-00135-2, \$59.95

Dictionary of Gene Technology: Genomics, Transcriptomics, Proteomics, 3rd Edition

Gunter Kahl
 Hoboken, NJ: Wiley, 2004. 1,300 pp.
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 ISBN: 0-12-437178-7, \$75

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Richard A. Shinkets
 Totowa, NJ: Humana Press, 2004. 184 pp.
 ISBN: 1-58829-220-7, \$79.50

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 New York: Springer-Verlag, 2003. 228 pp.
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Julia Richards, Scott Hawley
 New York: Academic Press, 2004. 460 pp.
 ISBN: 0-12-333462-4, \$49.95

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 Hoboken, NJ: Wiley-Liss, 2004. 352 pp.
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 New York: Springer, 2004. 670 pp.
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 Andrew Travers
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