



Acknowledgments Preface

Microarrays are a tool for monitoring gene expression levels for thousands of genes in parallel. This technology has great utility, as patterns in the gene expression can be used for molecular characterisation of a wide range of diverse phenomena, from disease states and responses to stimuli, to the underlying differences between cells of different types, and for elucidating gene function. Microarray technology is increasingly finding its way into fields as diverse as clinical diagnosis, drug screening and environmental testing.

The amount of information obtained from each microarray experiment can be considerable. This presents new challenges for data storage, management and analysis by life scientists who have not traditionally had to deal with this type or quantity of data. An additional challenge is presented by software for data analysis that has largely been written by statisticians and mathematicians, employing terminology and concepts often unfamiliar to the life scientist.

This book addresses some of the issues faced by researchers in carrying out their first microarray experiments, and covers aspects of designing and analysing the results of microarray experiments. Although microarrays can be used to study phenomena other than gene expression, this remains the most common use of the technology and is the only use of arrays discussed here. The book is not intended to replace the bioinformatician, or statistician, but rather to explain the underlying concepts and principles routinely used in analysis of gene expression data, facilitating sound experimental design, use of the available software and communication with statisticians. The book is also intended for use by statisticians, computer scientists and students of bioinformatics who want a grounding in the types of analysis currently used to study microarray data.

Although all the authors contributed to all sections of the book, Chapter 2 was primarily written by Helen Causton, Chapter 3 by John Quackenbush and Chapter 4 by Alvis Brazma.