
Preface

Much has been written on the perspectives opened up by the completion of the human genome to the biomedical sciences. The knowledge of the complete repertoire of genes contained in human genetic material allows for a conceptual scale-up in areas such as biochemistry, molecular and cell biology.

These disciplines are progressively moving from a traditional single-gene/protein focus to a more complex, integrated, and dynamic view of the molecular events taking place in the cell. As a result, the attention to individual entities such as genes, proteins, and gene mutations is progressively shifting toward the analysis of functional gene networks, biochemical pathways, and complex genetic features such as haplotypes.

DNA microarrays is the technology that probably has contributed most to the consolidation of the "global" approach to biological experimentation that started with the human genome era. Given its potential in areas such as pharmacogenomics, diagnostics, and drug target identification, this technology has polarized the enthusiasm and the expectations of the scientific community and has been the hub of important investments by industrial and academic institutions. Furthermore, the advent of microarrays has given a strong impetus to computational biology through the need for new tools and algorithms for data analysis and has shortened the distance between areas such as molecular biology, clinical diagnostics, statistics, information technology, and epidemiology.

At present, it seems clear that large-scale microarray studies are not a passing fashion, but are instead becoming a crucial aspect of a new way to conceive experimental biology, one involving large-scale, high-throughput assays.

With this book, we aim to outline the major results achieved since the first appearance of DNA microarrays in the scientific scene. Our intention is not only to illustrate a number of successful applications but also to provide the reader with useful guidance of the main concepts and the philosophy driving these types of study. By integrating the description of the methodologies with the scientific achievements obtained in various research areas, we hope to highlight the

potential and the challenges offered by high-throughput approaches to modern biology.

Finally, and maybe more importantly, we hope that readers will find this field as interesting as we do.

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