# Preface

Chemical genomics is an exciting new field that aims to transform biological chemistry into a high-throughput industrialized process, much in the same way that molecular biology has been transformed by genomics. The interaction of small organic molecules with biological systems (mostly proteins) underpins drug discovery in the pharmaceutical and biotechnology industries, and therefore a volume of laboratory protocols that covers the key aspects of chemical genomics would be of use to biologists and chemists in these organizations. Academic scientists have been exploring the functions of proteins using small molecules as probes for many years and therefore would also benefit from sharing ideas and laboratory procedures. Whatever the organizational backgrounds of the scientists involved, the challenges of extracting the maximum human benefit from genome sequencing projects remains considerable, and one where it is increasingly recognized that chemical genomics will play an important part.

*Chemical Genomics: Reviews and Protocols* is divided into two sections, the first being a series of reviews to describe what chemical genomics is about and to set the scene for the protocol chapters. The subject is introduced by Paul Caron, who explains the various "flavors" of chemical genomics. This is followed by Lutz Weber and Philip Dean who cover the interaction between organic molecules and protein targets from the different perspectives of laboratory experimentation and *in silico* design. The protocols begin with the methods developed in Christopher Lowes' laboratory (Roque et al.) for what could be described as a classical example of chemical genomics, namely the design of small molecules as affinity ligands for specific protein families. The theme is continued with detailed protocols for *in silico* docking by Jongejan et al. that highlights the importance of computational approaches to protein–small molecule interactions. The remaining protocols are directed towards the aim of producing highly diverse collections of proteins, carbohydrates, and small molecules for use in arrays containing large numbers of molecules. This high-throughput approach to screening for interaction between small and large biological molecules is the essence of chemical genomics. The chapters by Ryu, Doyle, Murphy, Sawasaki, Endo, Kohno, and Hoyt cover methods for the production of proteins and carbohydrates using different expression systems. Webster and Oxley give a protocol for analyzing the proteins using mass spectrometry. The techniques for arraying these proteins and carbohydrates on solid supports are detailed in the chapters by Blackburn, Marik, and Wang. Finally

an in vivo method for identifying small molecule–protein interactions is described by Khazak et al. using the yeast two-hybrid system.

Although we recognize that no single book on chemical genomics can be totally comprehensive in its coverage, we hope that the protocols here, in covering the key elements of the subject, will be of genuine use to the wide variety of scientists in this rapidly expanding field.

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