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## Preface

Interleukins are a family of proteins that regulate the maturation, differentiation, or activation of cells involved in immunity and inflammation, and belong to a broader family termed cytokines. Collectively these proteins are the key orchestrators of host defense and the response to tissue injury. There are currently 23 different interleukins (numbered from IL-1 to IL-23), although the full extent of the interleukin family will only become clear upon analysis of the human genome sequence. Most important, interleukins are central to the pathogenesis of a wide range of diseases that involve an immune component, including such conditions as rheumatoid arthritis, multiple sclerosis, ulcerative colitis, psoriasis, and asthma. Interleukins have also been implicated in other conditions, including cancer, migraine, myocardial infarction, and depression.

In essence, when cells are activated by interleukins, a program of gene expression is initiated in the target cell that alters the cell's phenotype, leading to enhanced immune reactivity, inflammation, and/or proliferation. Interleukins are therefore at the core of the cellular basis for many diseases. They are the subject of intense investigation by biomedical researchers and the targeting or use of interleukins in the clinic is proceeding apace. Approaches such as targeting IL-4 in asthma or IL-1 in joint disease are being pursued, and it is likely that in the next 5–10 years a number of new therapies based on either inhibiting or administering interleukins will be available. In addition, the assaying of interleukins has a role in the diagnosis and prognosis of disease, and polymorphisms in interleukin genes may well be found to predispose individuals to disease.

The basis for these many advances in interleukin research lies in the use of a range of methodologies for their study. In *Interleukin Protocols* we have brought together a critical mass of chapters covering the major techniques currently available to researchers in this area. The book is divided into five sections. Parts I and II concern a range of methods for assaying interleukin protein and mRNA. The ELISA is the mainstay of assaying interleukin protein production and the chapters here cover the basic methodologies, where to purchase reagents and also recent developments in the use of ELISA. The use

of FACS as a method of assaying interleukins intracellularly has been an important advance and is also covered. The ability to measure interleukin mRNA is another important technique in interleukin research and several chapters describe quantitative methods that mainly rely on RT-PCR and RNase protection. Part II gives examples of how to measure specific interleukins in order to illustrate the approaches that can be used for investigators interested in a particular interleukin.

Part III covers the assays of interleukins in specific pathologies, including breast cancer, depression, psoriasis, Grave's disease, migraine, and myocardial infarction. Part IV is related to Part III in that it also concerns pathologies, but has as its focus the assaying of interleukins in different biological fluids relevant to disease. These include peritoneal fluids, sputum from asthma patients, synovial fluid from arthritic joints, and cerebrospinal fluid from patients with meningitis. More important, this section covers the difficulties associated with the measuring of interleukins in such fluids. Finally, Part V concerns newer methods in the study of interleukin signal transduction, analysis of polymorphisms in interleukin genes, and the use of cDNA arrays, areas that will surely expand greatly in the next years as the feasibility of assaying the consequences of interleukin action in disease becomes more apparent.

*Interleukin Protocols* will therefore be of interest to a wide range of investigators, from molecular and cell biologists to immunologists to clinical investigators. The discovery of interleukins and the analysis of their role in disease represent major advances in molecular medicine. The methods described will help researchers continue to advance, ultimately leading to better diagnosis, prognosis, and treatment of many diseases where there remains an unmet medical need.

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