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# Preface

It is now widely accepted that the extracellular matrix (ECM) is a key determinant of tissue-specific gene expression. Signals provided by ECM are transduced by integrins, a large and growing superfamily of transmembrane heterodimeric cell surface receptors that link the ECM to structural and functional elements within the cell. A wide range of cellular phenotypes have been shown to be regulated by integrins, including growth, differentiation, migration, invasion, angiogenesis, and apoptosis. Furthermore, abnormalities of integrin expression and function have been implicated in the etiology of various pathologic conditions, including cardiovascular disease, inflammatory disorders, and cancer. Thus integrins have emerged as an important class of molecules with wide ranging implications for understanding basic biological processes.

In *Integrin Protocols* we provide a wide-ranging collection of laboratory protocols intended to assist investigators interested in integrins in working productively with these molecules, in studying their expression, and in potentially manipulating that expression to define their role(s) in relevant biological models. Protocols are provided for the analysis of integrin expression both at the RNA and protein levels (Chaps. 2, 5, and 7). Delcommenne and Streuli describe procedures for making rat monoclonal antibodies specific for mouse integrins; Schneller et al. and Arap and Huang describe methods for western blotting of integrins and RT-PCR analysis. Protocols are included that cover the analysis of the functional properties of integrins (Chaps. 1, 3, 4, 8, and 9 through 11). Koivunen et al. discuss methods for isolating integrin binding peptides from phage display libraries; Oktay et al. and Wary et al. describe protocols for assaying integrin-mediated kinase activity and shc signaling; Li and Arnaout describe the functional analysis of the  $\beta_2$  integrins; Steger et al. discuss methods for analyzing the function of heterologous integrin genes; Edwards and Streuli provide methods for producing function blocking anti-integrin antibodies; and Talts et al. describe methods for knocking out integrin genes by homologous recombination.

The analysis of integrin function at the cellular level is described in Chapters 13 through 18. Wu et al. provide protocols for assessing and manipulating

integrin-mediated cellular adhesion; von der Mark and Goodman and Price and Thompson describe methods for studying cellular migration and invasion; Frisch discusses methods for the study of integrin-regulated epithelial cell apoptosis (anoikis); Brooks et al. address the role of integrins in angiogenesis and Somasiri and Roskelley describe protocols for assessing integrin signaling in the differentiation of mammary epithelial cells. Finally there is a chapter by Hirsch et al. on the analysis of the regulation of integrins themselves (Chap. 12).

Thus *Integrin Protocols* has been compiled from the viewpoint of understanding how integrins regulate normal and diseased cellular function and describes many of the currently available tools necessary to accomplish this task. The book should be useful to a broad range of investigators interested in this important class of molecules in both an academic and industrial setting.

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