

More than glue

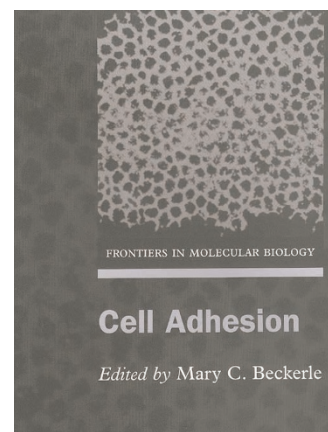
Cell adhesion

edited by Mary C. Beckerle

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Cell adhesion is the hallmark of multicellularity. The morphogenetic events that organize trillions of cells in our body into distinct organs and tissues are mediated by a large number of diverse adhesion receptors. In addition to their well-established functions in cell adhesion, these molecules are increasingly shown to be involved in signalling events that regulate apoptosis, proliferation, differentiation, migration and invasiveness. The recent explosion in the cell-adhesion field is fuelled by evidence that genetic or epigenetic changes in adhesion molecules are involved in several human disorders, or lead to tumour progression. A fascinating array of new technologies has allowed investigators increasingly to abandon traditional static approaches, in favour of studying adhesive events in living cells and in real time. Technological advances in microscope-based techniques, coupled with classic cell-biological and immunological procedures, complemented by recent progress in genomics and proteomics, have allowed an ever-deepening investigation of adhesion-receptor function. Our current understanding of cell adhesion is the focus of the book *Cell Adhesion* edited by Mary C. Beckerle.

In keeping with the style of previous books in the *Frontiers in Molecular Biology* series, this one provides an in-depth review of the cell-adhesion field. Eleven chapters, written by prominent investigators in the field, cover a wide array of adhesion-related topics. Forming the first thematic section, the initial seven chapters of the book deal with individual classes of eukaryotic cell-adhesion molecules. These include the immunoglobulin adhesion molecule family, selectins, cadherins, integrins, cell-surface heparan-sulfate proteoglycans, ADAMs (a disintegrin and a metalloprotease), and cell-surface protein-tyrosine phosphatases. Each chapter provides the most comprehensive review of these adhesion molecules that I have come across. The chapters are generally easy to read

and well organized, and the hand of the editor is clear throughout. Each chapter in this section discusses the molecular features of the relevant protein superfamily, provides an in-depth analysis of its functional properties and patterns of expression, and ends with a discussion of its involvement in development and disease. Reading this section, I realized that, although many fields are still uncovering potential second messenger pathways downstream of particular adhesion molecules, collectively all adhesion-molecule superfamilies are involved in signalling. In addition, although the variety of adhesive interactions in higher organisms is staggering, the repertoire of intracellular signalling events may be more limited and convergent, targeted primarily at modulating the cytoskeleton. To that extent, there may be significant crosstalk between members of different cell-adhesion superfamilies, an emerging concept in the field that is not covered in this book.

The second part of the book focuses on the structure and function of particular adhesive junctions. Junctional complexes cluster at specialized regions of the cell surface, to promote their adhesive function and transduce intracellular signalling. Four chapters in the book deal with the morphology, molecular composition and physiological significance of these junctions. Separate chapters are devoted to adherens junctions, focal adhesions and complexes, desmosomes and hemidesmosomes, and finally, tight junctions. Although this list is not all-inclusive (synapses, for example, have been left out), it represents the majority of junctions in cells of epithelial origin. I found this part of the book particularly appealing, perhaps because of my personal interest in signal transduction.

Looking back, I have very few complaints. At first glance, reading about cadherins or integrins in one part of the book, and about adherens junctions or focal contacts in another, seemed redundant.

After more detailed reading, however, it is apparent that the effort to separate the two sections thematically was fairly successful. My personal preference would have been to read about the types and functions of adhesive junctions first, before delving into the particulars of each major class of adhesion molecules. I also thought that the book would have benefited from a more extensive preface, perhaps an introductory chapter, that presented the main players and their relationship with each. A general introductory figure illustrating the major adhesive junctions in epithelial and mesenchymal cells should also have been included. Furthermore, I would have liked to have seen discussion about the crosstalk between particular adhesive interactions and complexes (e.g. cell-cell versus cell-extracellular matrix), perhaps in a summary chapter. This would also be a place to discuss similarities or differences in junction formation and function, from initial clustering events to downstream signalling, which are lost in the complexity of each chapter. A list of links to adhesion-related web sites would also have been a helpful addition, especially as they relate to adhesion-relevant protocols.

Still, with its comprehensive and authoritative nature, this book accomplishes its mission to provide a valuable resource for researchers and primarily for advanced students and their instructors. The text is well suited for a graduate-level course on cell adhesion, and is an ideal starting point for any researcher or post-doctoral fellow interested in cell adhesion. I believe this book would be a good addition to any scientific library. For new developments in each field, I suggest complementing it with recent cell-adhesion reviews, written within the last year.

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Corrigendum

In the book review piece by Anastasiadis (*Nature Cell Biol.* 4, E196 (2002)), the surname of the author was spelt incorrectly. The correct citation is P. Z. Anastasiadis.