

# Preface

The cytoskeleton is central to many critical cell processes including those that govern cell movement, migration, cell division, transport and cell signaling. It is well known that the cytoskeleton is often altered in disease and there is increasing interest in the role and mechanisms by which the cytoskeleton is involved in this process. Emerging evidence of the molecular and cellular events that drive cytoskeletal mediated disease including cancer, heart disease, myopathies and skin disorders, are also helping to shape targeted therapeutic approaches to treat these conditions. Diseases can also inform the normal function of genes and proteins and this has been the case for a number of cytoskeletal components. Advances in genetics, gene and protein identification, live cell and fixed imaging, and animal models of disease have accelerated knowledge in the cytoskeletal field. The *Cytoskeleton and Human Disease* book is intended to bring together key progress specifically related to the involvement of the cytoskeleton in different disease states from the basic science to clinical perspective.

The complexity of the cytoskeleton from a mechanistic and structural perspective is enormous. The three major filamentous components—microtubule, microfilaments and intermediate filaments—interacting with each other and hundreds of accessory proteins impart plasticity to the cytoskeleton for many cellular functions. Mutations, deletions, alterations in components of the cytoskeleton can lead to defects in normal function and illness. The book is divided into three broad themes covering the basics of the cytoskeleton to associated disease states. Part I discusses the normal structure and function of actin and microtubules and also includes detailed descriptions of kinesin and myosin structure and function. The second part focuses on actin and disease, including alterations in actin interacting, cross-linking and regulating proteins that perturb the function of the actin cytoskeleton. These include, membrane organization and actin in T-lymphocytes, causes of thin filament disease in muscle, spectrum of filamin diseases, the actin regulating protein LIM kinase in metastasis, mutations in actin associated with deafness, and the therapeutic targeting of actin. Part III covers microtubules as cancer therapeutic targets and their role in drug resistance, as well as the emerging field of posttranslational modifications of tubulin. This part of the book also covers the microtubule interacting protein stathmin and its role in cancer, the biology and pathobiology of Tau and tubulin-related malformations of cortical development. The final section, Part IV, centers on

intermediate filaments and diseases that includes spectrin disorders, laminopathies, desmin and heart disease and neurodegenerative diseases and intermediate filaments.

There have been great advances in our understanding of the cytoskeleton since the French scientist Paul Wintrebert first introduced the notion and coined the term cytoskeleton in 1931. This book links expert knowledge and brings to the fore unifying areas of overlapping interest that will stimulate further research and a better understanding of the cytoskeleton in health and disease.

Maria Kavallaris PhD

Editor, *The Cytoskeleton and Human Disease*



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