

Preface

The discovery of centrosomes well over 100 years ago has been called as important as the discovery of the nucleus but it was only recently that research on centrosomes has moved this central organelle to the forefront of modern research and has exploded as a result of renewed appreciation, new enthusiasm, and new methods that are now available to study centrosomes on cellular, molecular, and genetic levels. Centrosome functions are critically important for cell cycle regulation while centrosome dysfunctions have been implicated in numerous diseases such as cancer and in disorders such as infertility and other reproductive disorders.

While most frequently described as microtubule organizing centers (MTOCs), the recent recognition that centrosomes are critical for cell signaling coordination and cellular protein degradation, and regulated proteolysis has revolutionized studies into disorders and in the pathogenesis and progression of diseases. To cover the wealth of new data on the significant role of centrosomes in cellular functions and implications in disease, a number of topic-focused review articles have been written and published in various specialized journals, as the demand for understanding the direct and indirect functions of this important organelle has increased in various areas of basic and biomedical research.

This book features a variety of different aspects on classic and modern centrosome research to cover topics of current interest. Each chapter is written by internationally recognized experts in their respective fields who have contributed their unique expertise in specific research areas and include comprehensive and concise reviews of key topics in the field as well as cell and molecular details that are important for the specific subtopics. Cutting edge new information is balanced with background information that is readily understandable for the newcomer and the experienced centrosome researcher alike. In addition, several articles will raise awareness of centrosomes in areas that have not yet considered centrosomes associated with disease including aspects of misguided signal transduction and several others that may find centrosomes as new targets for therapeutic intervention.

The book includes chapters on

- Centriole duplication and inheritance.
- Sperm centrioles and abnormalities underlying sperm pathology and infertility.
- Centrosomal functions and dysfunctions in cat spermatozoa.
- Nuclear-centrosome interactions during fertilization and cell division.
- Human centrosomal dynamics during gametogenesis, fertilization, and embryogenesis.
- Asymmetric centrosome behavior in stem cell divisions.
- Functional associations between the Golgi apparatus and the centrosome.
- The centrosome and its role in regulated proteolysis.
- Regulation of the centrosome cycle by protein degradation.
- Molecular links between centrosome duplication and other cell cycle associated events.
- Regulation of centrosomes by cyclin-dependent kinases.
- Disruption of centrosome duplication control and induction of mitotic instability by the high-risk human papillomavirus oncoproteins E6 and E7.
- Centrosomes, DNA damage, and aneuploidy.
- Centrosome regulation and breast cancer.
- The role of centrosomes in multiple myeloma.
- Centrosomal amplification and related abnormalities.
- Mechanisms and consequences of centrosome clustering in cancer cells.
- The neuronal centrosome as a generator of microtubules for axons and dendrites.
- Centrosomes and cell division in Apicomplexa.
- The centrosome life story in *Xenopus laevis*.
- The role of centrosomes in T cells, and concludes with.
- Thoughts on progress in the centrosome field.

The topics addressed are selected to be of interest to scientists, students, teachers, and to all who are interested in expanding their knowledge related to centrosomes. The volume is intended for a large audience as a reference book on the subject.

It has been a great pleasure and timely to edit this book on centrosomes and I would like to sincerely thank all contributors for their outstanding chapters and for sharing their unique expertise with the centrosome community. I hope that this book will stimulate further advances in centrosome research and contribute new insights and appreciation for the role of centrosomes in the basic and biomedical sciences.

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