

1. Record Nr.	UNINA9910829917103321
Titolo	Centrosomes in development and disease [[electronic resource] /] / edited by Erich A. Nigg
Pubbl/distr/stampa	Weinheim ; ; [Great Britain], : Wiley-VCH, c2004
ISBN	1-280-51969-X 9786610519699 3-527-60380-8 3-527-60434-0
Descrizione fisica	1 online resource (475 p.)
Altri autori (Persone)	NiggErich A
Disciplina	571.65
Soggetti	Centrosomes Cytology
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Centrosomes in Development and Disease; Contents; Preface; List of Contributors; Color Plates; Part I Microtubule Organization and Dynamics; 1 Early Studies on Centrioles and Centrosomes; 1.1 Introduction; 1.2 Pioneering Studies; 1.3 Self-replication versus De Novo Formation; 1.4 Centrioles and Basal Bodies; 1.5 Blepharoplasts; 1.6 The Search for DNA; 1.7 On to Self-assembly; References; 2 The Tubulin Superfamily; 2.1 History; 2.2 Family Relations; 2.3 Localization and Function; 2.4 -Tubulin; 2.5 -Tubulin; 2.6 -Tubulin; 2.7 Other Members of the Fold; References; 3 Microtubule Nucleation 3.1 Introduction3.1.1 The Nucleation of Microtubules can occur Spontaneously In Vitro, but Requires -Tubulin In Vivo; 3.1.2 Models for the Mechanism of -TuRC/Tub4 Complex-mediated Microtubule Nucleation; 3.2 Kinetic Models of the Mechanism of Microtubule Nucleation; 3.3 The Involvement of Non--TuRC Proteins in Microtubule Nucleation; 3.4 Future Directions; Acknowledgments; References; 4 The Budding Yeast Spindle Pole Body: A Centrosome Analog; 4.1 Introduction; 4.2 Molecular Composition of the Spindle Pole Body; 4.2.1 The Central Plaque; 4.2.2 The Inner Plaque; 4.2.3 The Outer Plaque

4.2.4 Nuclear Membrane Factors; 4.2.5 The Halfbridge; 4.2.6 Structure Summary; 4.3 Microtubule Nucleation; 4.4 Assembly/Duplication of SPBs and Centrosomes; 4.4.1 Electron Microscopic Description of Duplication; 4.4.2 Cell Cycle Regulation of Duplication; 4.4.3 Genetic Analysis of Duplication; 4.5 Signaling Platform; 4.6 Developmental Alteration of SPB Function; 4.7 Parting Thoughts; Acknowledgments; References; 5 Dissection of Basal Body and Centriole Function in the Unicellular Green Alga *Chlamydomonas reinhardtii*; 5.1 Introduction; 5.2 Why Study a Green Alga to Learn about Centrioles and Basal Bodies? 5.3 Structure of the Basal Body and Centriole in *Chlamydomonas*; 5.4 Additional Fibers that Connect Basal Bodies and Centrioles; 5.4.1 Contractile Fibers; 5.4.2 Rootlet Microtubules; 5.4.3 Non-contractile Fibers; 5.5 Overview of the Cell Cycle of *Chlamydomonas*; 5.6 Duplication of Basal Bodies in *Chlamydomonas*; 5.7 Role of Tubulin Isoforms in Basal Body Duplication; 5.8 Timing of Basal Body/Centriole Duplication in *Chlamydomonas*; 5.9 Function of Basal Bodies and Centrioles in *Chlamydomonas*; 5.10 What Makes a Basal Body Different from a Centriole? 5.10.1 Transition Zone and Docking; 5.10.2 Transition Zone and Autonomy; 5.10.3 Maturation of Basal Bodies; 5.11 Conclusion; Acknowledgments; References; 6 The Centrosome in Evolution; 6.1 Introduction; 6.2 The Centriole/Basal Body Structure is a Derived Characteristic of Eukaryotes; 6.3 The Basal Body/Axoneme is the Ancestral Structure; 6.4 Functions Associated with the Flagellar Apparatus; 6.4.1 Cell Locomotion; 6.4.2 Sensory Reception; 6.4.3 Cell Division; 6.5 The Conservative Mode of Duplication of the Basal Body/Centriole/SPB: An Essential Clue for Cell Morphogenesis

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#### Sommario/riassunto

Discovered over a century ago, the centrosome is the major microtubule organizing center of the animal cell. It is a tiny organelle of surprising structural complexity. Over the last few years our understanding of the structure and composition of centrosomes has greatly advanced, and the demonstration of frequent centrosome anomalies in most common human tumors has sparked additional interest in the role of this organelle in a broader scientific community. The centrosome controls the number and distribution of microtubules - a major element of the cell cytoskeleton - and hence influence

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