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Nota di contenuto	Part I. Genome Architecture, Evolution, and Cell Fate -- Chapter 1. Networks and Islands of Genome Nano-Architecture and their Potential Relevance for Radiation Biology (A Hypothesis and Experimental Verification Hints) -- Chapter 2. A Unified Genomic Mechanism of Cell-Fate Change -- Chapter 3. Alterations to Genome Organisation in Stem Cells, Their Differentiation and Associated Diseases -- Chapter 4. How Genomes Emerge, Function, and Evolve: Living Systems Emergence - Genotype-Phenotype-Multilism - Genome/Systems Ecology -- Chapter 5. Integrating Multimorbidity into a Whole-Body Understanding of Disease Using Spatial Genomics -- Part II. Chromosomes and

Chromatin Architecture and Dynamics -- Chapter 6. Mitotic Antipairing of Homologous Chromosomes -- Chapter 7. CENP-A, a Histone H3 Variant with Key Roles in Centromere Architecture in Healthy and Diseased States -- Chapter 8. Scaling Relationship in Chromatin as a Polymer -- Chapter 9. Chromatin Dynamics during Entry toQuiescence and Compromised Functionality in Cancer Cells -- Chapter 10. Functional Aspects of Sperm Chromatin Organization -- Part III. Mechanosensitive and Epigenetic Regulators of Gene Expression and Chromatin Organization -- Chapter 11. The LINC Complex Assists the Nuclear Import of Mechanosensitive Transcriptional Regulators -- Chapter 12. Epigenetic-Mediated Regulation of Gene Expression for Biological Control and Cancer: Cell and Tissue Structure, Function, and Phenotype -- Chapter 13. Epigenetic-Mediated Regulation of Gene Expression for Biological Control and Cancer: Fidelity of Mechanisms Governing the Cell Cycle -- Chapter 14. Histone Modifications in Mouse Pronuclei and Consequences for Embryo Development -- Part IV. Nucleus, Nucleolus, and Nucleolar Organizer Architecture -- Chapter 15. Nuclear Architecture in the Nervous System -- Chapter 16. Nuclear Morphological Abnormalities in Cancer: A Search for Unifying Mechanisms -- Chapter 17. Nuclear Organization in Response to Stress: A Special Focus on Nucleoli -- Chapter 18. Simulation of Different Three-Dimensional Models of Whole Interphase Nuclei Compared to Experiment – A Consistent Scale-Bridging Simulation Framework for Genome Organization -- Chapter 19. Nucleolar Organizer Regions as Transcription-Based Scaffolds of Nucleolar Structure and Function -- Chapter 20. A Transient Mystery: Nucleolar Channel Systems -- Part V. Nuclear Actin Role in Polarization, Genome Organization, and Gene Expression -- Chapter 21. Cellular Polarity Transmission to the Nucleus -- Chapter 22. The Role of Nuclear Actin in Genome Organization and Gene Expression Regulation During Differentiation -- Chapter 23. Nuclear Actin Dynamics in Gene Expression, DNA Repair, and Cancer.

Sommario/riassunto

This volume reviews the latest research on the functional implications of nuclear, chromosomal and genomic organization and architecture on cell and organismal biology, and development and progression of diseases. The architecture of the cell nucleus and non-random arrangement of chromosomes, genes, and the non-membranous nuclear bodies in the three-dimensional (3D) space alters in response to the environmental, mechanical, chemical, and temporal cues. The changes in the nuclear, chromosomal, or genomic compaction and configuration modify the gene expression program and induce or inhibit epigenetic modifications. The intrinsically programmed rearrangements of the nuclear architecture are necessary for cell differentiation, the establishment of cell fate during development and maturation of tissues and organs including the immune, muscle, and nervous systems. The non-programmed changes in the nuclear architecture can lead to fragmentation of the nucleus and instability ofthe genome and thus cause cancer. Microbial and viral infections can lead to a clustering of centromeres, telomeres and ribosomal DNA and alter the properties of the nuclear membrane, allowing large immobile macromolecules to enter the nucleus. Recent advances in next-generation sequencing technologies combined with nucleus/chromosome conformation capture, super-resolution imaging, chromosomal contact maps methods, integrative modeling, and genetic approaches, are uncovering novel features and importance of nuclear, chromosomal and genomic architecture. This book is an interesting read for cell biologists, researchers studying the structure and function of chromosomes, and anyone else who wants to get an overview of the

field of nuclear, chromosomal and genomic architecture.