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Nota di contenuto	1. The human genome and its variations -- 2. Gene expression and chromatin -- 3. The basal transcriptional machinery -- 4. Transcription factors and signal transduction -- 5. A key transcription factor family: nuclear receptors -- 6. Genome-wide principles of gene regulation -- 7. DNA methylation -- 8. Histone modifications -- 9. Chromatin remodeling and organization -- 9. Regulatory impact of ncRNA -- 11. Epigenetics in development -- 12. Epigenetics and aging -- 13. Epigenetics and immunity -- 14. Epigenetics and disease -- 15. Cancer epigenetics -- 16. Nutritional epigenetics.
Sommario/riassunto	This book delves into the fascinating realm of eukaryotic gene regulation. The specific expression of genes shapes the phenotype of cells and tissues. The regulation of gene expression, including up- and

downregulation, is a fundamental aspect of nearly all physiological processes, both in health and disease. These dynamic processes respond to various daily challenges, such as dietary changes and infections. Therefore, it is crucial for not only biologists and biochemists but also all students in biomedical disciplines to understand gene regulation concepts. This foundational knowledge will benefit them in their specialized fields. A comprehensive understanding of transcription factors and the mechanisms that alter their activity is a fundamental goal of modern life science research. Epigenetics refers to the packaging and accessibility of the genome in each of the trillions of cells in our bodies. The prefix “epi” (meaning “upon,” “above,” or “beyond”) indicates that epigenetic processes do not alter the DNA sequence of our genome, adding a layer of information beyond that encoded in our genome. Genomic DNA is wrapped around complexes of histone proteins, helping it fit into a cell nucleus with a diameter of less than 10 m. This protein-DNA complex is known as chromatin.
The content of this book is linked to the “Molecular Medicine and Genetics” course, which the author has lectured on in various forms since 2002 at the University of Eastern Finland in Kuopio. This book is an updated version of the textbooks “Mechanisms of Gene Regulation” and “Human Epigenomics.” It is divided into 16 chapters. Following two introductory chapters, four chapters explore gene regulation from the perspective of transcription factors, while another four chapters focus on chromatin and non-coding RNA. Three chapters then discuss the impact of epigenetics from a health perspective, and the final three chapters address epigenetics from the perspective of diseases. A glossary in the appendix explains the major specialist terms.