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Human epigenomics explained in new textbook

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Researchers from the University of Eastern Finland have published a textbook on human epigenomics, the study of epigenetic modifications across the entire genome. The book is the first of its kind to focus on epigenomics in humans and its role in health and disease.

Epigenetics is the study of gene regulation and information storing mechanisms not involving any changes in DNA sequence. Epigenetics is closely related to the extensively folded state in which the genome is packaged, known as chromatin. New genomic tools allow the genome-wide assessment of chromatin states and DNA modifications, among other things. This has led to the emergence of epigenomics and unexpected new epigenetic principles, such as epigenomic memory.

Authored by Professor Carsten Carlberg and Dr Ferdinand Molnár, the Springer textbook *Human Epigenomics* summarizes the role of epigenomics in defining chromatin states, euchromatin and heterochromatin, respectively representative of active and repressed genes. Moreover, the book discusses the principles of gene regulation, chromatin stability, genomic imprinting and the reversibility of DNA methylation and histone modifications. Different sections of the book focus on the molecular basis of epigenomics and provide examples for the impact of epigenomics in human health and disease.

"This information should enable a better understanding of cell type identities and will provide new directions for studies of cellular reprogramming, the response of chromatin to environmental signals and

epigenetic therapies that can improve or restore human health. In order to facilitate the latter, we favored a high figure-to-text ratio following the rule 'a picture tells more than thousand words,'" the authors say.

Besides its value as a textbook, *Human Epigenomics* is a useful reference for individuals working in biomedicine. The contents are based on the second half of Professor Carlberg's lecture course "Molecular Medicine and Genetics," primarily designed for MSc and Ph.D. students in biomedicine. The first half of the course was covered by the textbook *Mechanisms of Gene Regulation* from the same authors. They have also co-authored a third Springer textbook called *Nutrigenomics*. Carsten Carlberg is Professor of biochemistry at the School of Medicine, Institute of Biomedicine at the University of Eastern Finland. His main research interest is the (epi)genomics of nuclear receptors and their ligands, with special focus on vitamin D. He has given yearly courses on epigenetics and gene regulation since 2001.

Dr. Ferdinand Molnár is Project researcher at the School of Medicine, Institute of Biomedicine at the University of Eastern Finland. His main research interest is the molecular structure of nuclear receptor proteins and their natural and synthetic ligands.

More information: Carlberg, Carsten, Molnar, Ferdinand. Human Epigenomics. Springer 2018.
www.springer.com/gp/book/9789811076138

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