

HANDBOOK OF EPIGENETICS

The New Molecular and Medical Genetics

Third Edition

Edited by **Trygve O. Tollefsbol**

Handbook of Epigenetics: The New Molecular and Medical Genetics, Third Edition, provides a comprehensive analysis of epigenetics, from basic biology to clinical application. The biological processes impacted by epigenetics are vast and encompass effects in lower organisms and humans that include tissue and organ regeneration, X-chromosome inactivation, stem cell differentiation, genomic imprinting, and aging.

The new edition has been fully revised to cover the latest and evolving topics in epigenetics, with all chapters updated and new chapters added on DNA methylation clocks in age-related diseases, transposable elements and epigenetics, X chromosome inactivation, and the epigenetics of drug addiction, among other topics. Throughout this edition, greater emphasis falls on epigenomic analyses and incorporating multiomics approaches, rather than gene-specific analyses, consistent with the direction of this field.

This edition has also been enhanced with step-by-step instructions in research methods, as well as easy-to-digest disease case studies and clinical trials providing context and applied examples of recent advances in disease understanding and epigenetic therapeutics. These features empower researchers to reproduce the approaches and studies discussed and aid clinical translation. Live links across chapters tie in relevant external datasets and resources.

Key Features

- Timely and comprehensive collection of fully up-to-date coverage of epigenetics in one volume, written by leading figures in the field
- Covers basic epigenetic biology, research methods and technology, disease relationships, and clinical medicine
- Written at a verbal and technical level that can be understood by scientists and students alike, with chapter summaries and conclusions included throughout
- Discusses exciting new topics in epigenetics such as DNA methylation clocks in age-related diseases, transposable elements and epigenetics, X chromosome inactivation, and the epigenetics of drug addiction

Includes step-by-step instructions in research protocols to aid reproducibility, as well as easy-to-digest disease case studies and clinical trials providing context and applied examples of recent clinical translation

Trygve Tollefsbol is a distinguished Professor of biology and a Senior Scientist in the O'Neal Comprehensive Cancer Center, the Integrative Center for Aging Research, the Nutrition Obesity Research Center, the Comprehensive Diabetes Center, and the University Wide Microbiome Center at the University of Alabama at Birmingham (UAB). He is the director of the UAB Cell Senescence Culture Facility which he established in 1999. Dr. Tollefsbol has doctorate degrees in molecular biology and osteopathic medicine and has edited and coauthored numerous books on the topics of epigenetics, cancer, and aging and is the Series Editor of *Translational Epigenetics*.



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