

## Introducing Epigenetics: a Graphic Guide

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As the book explains, while DNA is the code that defines an organism, epigenetics provides the notes on how to translate the code into a real live organism.

The book is formatted for modern readers. It is short as Kindle books go – only 1385 locations. It is divided into chapters about one page each in length. I include the chapter index at the end of the review. It is rich in diagrams.

In writing such a book, the author must strike a balance between readability and completeness. She has to make some assumptions about the reader. This book appears to assume that the reader will be college educated, not flummoxed by the introduction of new technical terms, and somewhat familiar with genetics. In other words, it is not for everybody.

I am 50 years out of college but have read much of the popular literature on genetics, starting with Dawkins' *Selfish Gene*. I found that the book demanded my attention, forcing me to reread a few chapters in order to fully grasp the concepts, but in the end quite satisfying.

DNA, the blueprint for our bodies, is invariant. Every cell of the body contains the same long, complex DNA molecules. However, DNA always exists among other, supporting molecules, which do differ from cell to cell. These epigenetic assistants control how the information from the DNA is translated into building proteins for the various types of cells within the body.

DNA stands for deoxyribonucleic acid – the double helix, half from the father, half from the mother. RNA stands for ribonucleic acid, the more general form. Proteins are formed by what is called messenger RNA. These molecules are copied from short subsets of the whole DNA molecule. Messenger RNA tells the cell how to build the proteins required to be, for instance, a brain cell or a liver cell.

The structures surrounding DNA in a given cell includes markers that control which part of the DNA will be used as templates for building amino acids within the cell and which will be ignored. There are different structures for different cells.

As the chapter titles below indicate, a lot of things affect the epigenetic material surrounding DNA. Among these are

aging and exposure to chemicals such as those in tobacco. While the DNA may not change within an individual, the body parts made according to that DNA model do change via epigenetics.

Epigenetic diagnoses for disease, and epigenetic-based cures for disease our already in place, and many more appear to be on the horizon. This book will be useful reading for investors interested in the next big things in biotechnology. It will help them read investment product prospectuses and annual reports from companies involved in esoteric new technologies.

The book is truly a five-star effort. The author deserves a great deal of credit for striking such a good balance among readability, completeness and bulk.

The chapter titles:

Genes, RNA and Proteins

Chromosomes, Nucleosomes and Chromatin

DNA Replication and Mitosis

Meiosis and Inheritance

Beyond the DNA Sequence: Gene Regulation

Nature and Nurture

Twin Studies

The History of Epigenetics

The Modern Understanding of Epigenetic Modifications

DNA Methylation

Histone Modifications

Chromatin Remodelling

Nuclear Location

RNA

Interactions Between Different Epigenetic Modifications

Epigenetics Explains What Genetics Alone Cannot

Epigenetic Changes During Embryonic Development

X Chromosome Inactivation

How Our Environment Affects Our Genes

Not So Identical Twins

Epigenetic Inheritance

Epigenetic Inheritance in Animal Models

Human Epigenetic Inheritance: The Dutch Hunger Winter

Human Epigenetic Inheritance: Överkalix

Mechanisms of Epigenetic Inheritance

Epigenetics in Evolution

Epigenetics in Disease: Ageing

Epigenetics in Disease: Inherited Mutations in Epigenetic

Regulators

Epigenetics in Disease: Imprinting Errors

The Epigenetics of Cancer

Epigenetics in Medicine

Stem Cell Therapies  
Epigenetics and Pseudoscience  
The Future of Epigenetics  
Epigenomics  
New Epigenetic Modifications  
The Epitranscriptome  
Epigenetic Editing  
Epigen-Ethics  
Looking Ahead  
Glossary  
Recommended Further Reading  
Author's Acknowledgements

Ennis, Cath. *Introducing Epigenetics: A Graphic Guide*  
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