



## The Deeper Genome: Why there is more to the human genome than meets the eye

By John Parrington

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Over a decade ago, as the Human Genome Project completed its mapping of the entire human genome, hopes ran high that we would rapidly be able to use our knowledge of human genes to tackle many inherited diseases, and understand what makes us unique among animals. But things didn't turn out that way. For a start, we turned out to have far fewer genes than originally thought - just over 20,000, the same sort of number as a fruit fly or worm. What's more, the proportion of DNA consisting of genes coding for proteins was a mere 2%. So, was the rest of the genome accumulated 'junk'?

Things have changed since those early heady days of the Human Genome Project. But the emerging picture is if anything far more exciting. In this book, John Parrington explains the key features that are coming to light - some, such as the results of the international ENCODE programme, still much debated and controversial in their scope. He gives an outline of the deeper genome, involving layers of regulatory elements controlling and coordinating the switching on and off of genes; the impact of its 3D geometry; the discovery of a variety of new RNAs playing critical roles; the epigenetic changes influenced by the environment and life experiences that can make identical twins different and be passed on to the next generation; and the clues coming out of comparisons with the genomes of Neanderthals as well as that of chimps about the development of our species. We are learning more about ourselves, and about the genetic aspects of many diseases. But in its complexity, flexibility, and ability to respond to environmental cues, the human genome is proving to be far more subtle than we ever imagined.

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### **Bibliography**

- Sales Rank: #834799 in Books
- Published on: 2015-07-28
- Original language: English
- Number of items: 1
- Dimensions: 6.20" h x 1.00" w x 9.30" l, .0 pounds
- Binding: Hardcover
- 288 pages



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## Editorial Review

### Review

"*The Deeper Genome* is unique in that it provides an entertaining tale of personalities with lots of useful technical knowledge. We highly recommend the book as a supplement for classroom teaching as it covers fundamental concepts in an easily readable format. Students will likely find it even more interesting than many of the more standard textbooks. ... *The Deeper Genome* is a great read that definitely imparts knowledge in an entertaining fashion and connects the almost 99 percent of the genome that is not protein coding to all sorts of interesting questions. We highly recommend it." --Dov Greenbaum and Mark Gerstein, *Cell*

"This informative, highly readable book addresses scientists' current understanding of noncoding DNA. ... All in all, this is a valuable book for anyone wishing to explore the newest discoveries, and the implications of these discoveries, in a rapidly expanding field. Highly recommended." --CHOICE

### About the Author

John Parrington, *Associate Professor and University Lecturer in Cellular & Molecular Pharmacology, University of Oxford*

John Parrington is an Associate Professor in Molecular and Cellular Pharmacology at the University of Oxford, and a Tutorial Fellow in Medicine at Worcester College, Oxford. He has published over 80 peer-reviewed articles in science journals including *Nature*, *Current Biology*, *Journal of Cell Biology*, *Journal of Clinical Investigation*, *The EMBO Journal*, *Development*, *Developmental Biology*, and *Human Reproduction*. He has extensive experience writing popular science, having published articles in *The Guardian*, *New Scientist*, *Chemistry World*, and *The Biologist*. As a British Science Association Media Fellow he has worked as a science journalist at *The Times* for 7 weeks where he published 22 articles. He has also written science reports for the Wellcome Trust, British Council, and Royal Society.

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