

Aysha Divan & Janice A. Royds

# MOLECULAR BIOLOGY

A Very Short Introduction

OXFORD

## Molecular Biology: A Very Short Introduction

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     Graham Cowling  
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 THE EARTH Martin Redfern  
 EARTH SYSTEM SCIENCE Tim Lenton  
 ECONOMICS Partha Dasgupta  
 EDUCATION Gary Thomas  
 EGYPTIAN MYTH Geraldine Pinch  
 EIGHTEENTH-CENTURY BRITAIN  
     Paul Langford  
 THE ELEMENTS Philip Ball  
 EMOTION Dylan Evans  
 EMPIRE Stephen Howe  
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 THE ENLIGHTENMENT  
     John Robertson  
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     and Mike Wright  
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 ETHNOMUSICOLOGY Timothy Rice  
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     and Simon Usherwood  
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     Deborah Charlesworth  
 EXISTENTIALISM Thomas Flynn  
 EXPLORATION Stewart A. Weaver  
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 FILM MUSIC Kathryn Kalinak  
 THE FIRST WORLD WAR  
     Michael Howard  
 FOLK MUSIC Mark Slobin  
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     R. B. Bernstein  
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 GALILEO Stillman Drake  
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 GLOBAL ECONOMIC HISTORY  
     Robert C. Allen  
 GLOBALIZATION Manfred Steger  
 GOD John Bowker  
 GOETHE Ritchie Robertson  
 THE GOTHIC Nick Groom  
 GOVERNANCE Mark Bevir  
 THE GREAT DEPRESSION AND THE  
     NEW DEAL Eric Rauchway  
 HABERMAS James Gordon Finlayson  
 HAPPINESS Daniel M. Haybron  
 THE HARLEM RENAISSANCE  
     Cheryl A. Wall  
 THE HEBREW BIBLE AS LITERATURE  
     Tod Linafelt  
 HEGEL Peter Singer

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 HERMENEUTICS Jens Zimmermann  
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 THE HISTORY OF ASTRONOMY  
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 THE HISTORY OF CHEMISTRY  
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     Michael Benton  
 THE HISTORY OF MATHEMATICS  
     Jacqueline Stedall  
 THE HISTORY OF  
     MEDICINE William Bynum  
 THE HISTORY OF TIME  
     Leo Franc Holford-Strevens  
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Michele Catanzaro

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# Contents

Preface xiii

List of illustrations xv

Common abbreviations xvii

- 1 The early milestones 1
- 2 DNA 13
- 3 RNA 33
- 4 Proteins 45
- 5 Molecular interactions 63
- 6 Genetic engineering 78
- 7 Molecular biology in the clinic 93
- 8 Molecular forensics 109
- 9 Future challenges 124

References 137

Further reading 139

Index 141



# Preface

This brief account introduces biology at the molecular level. The aim is to provide information and understanding that will enable the reader to enjoy and evaluate the life-changing consequences that have come from the relatively new science of molecular biology.

We journey from the inspirational work of Charles Darwin that gave us the impetus to search for the heritable material to modern-day technology that has enabled us to identify a Plantagenet King in a car park, provide irrefutable forensic evidence, and develop therapeutic targets for new pharmaceuticals. We explore the work that led James Watson and Francis Crick to prove that DNA held the code of life. We look at the work of Alec Jeffreys, who provided forensic tools from 'junk DNA'; so-called because it initially appeared to have no function.

Molecular biology tools are being applied to address global challenges, including sustainable enhancement of food supplies and the improvement of health and well-being. You will learn about cutting-edge technologies that are transforming the life sciences, from high-throughput technologies that allow DNA or proteins to be analysed in a short space of time to synthetic biology and genome editing. These are ushering in an era of more precise medicine, enabling the redesign of existing natural

biological systems for medical, agricultural, and other useful purposes and accelerating research and discovery.

While these advancing technologies hold benefits for the public, they also raise concerns about the potential risks to human health, environmental contamination, and deliberate misuse. Dialogue between scientists and the public, legislation, and improved technology are all important in addressing these concerns.

# List of illustrations

- 1 Mendel's pattern of inheritance **3**
- 2 Photo 51 showing the X-ray diffraction pattern of double stranded DNA **8**  
King's College London Archives/  
Science Photo Library
- 3 The DNA double helix **9**
- 4 Gene expression: DNA to RNA to protein **11**
- 5 DNA is packaged along with histone proteins **17**
- 6 DNA is synthesized by the enzyme DNA polymerase **19**
- 7 Steps in a gene cloning experiment **23**
- 8 The polymerase chain reaction **27**
- 9 The Sanger sequencing method **30**
- 10 The two steps of protein synthesis **35**  
Based on and adapted from *Biology*, Tenth Edition, by Sylvia Mader. Copyright McGraw-Hill Education (2009). Reproduced by permission
- 11 The RNAi pathway **39**
- 12 A peptide bond is formed between two amino acids **47**
- 13 Two-dimensional gel electrophoresis **50**  
p. 321 Fig: 14.1 Two-dimensional electrophoresis from *Tools and Techniques in Biomolecular Science*, edited by Divan & Royds (2013). By permission of Oxford University Press
- 14 An immunoglobulin molecule comprising two heavy and two light polypeptide chains **55**



- 15 Western blot technique **56**  
p. 202 Fig: 9.2a 'Western blot' from  
*Tools and Techniques in Biomolecular  
Science*, edited by Divan & Royds  
(2013). By permission of Oxford  
University Press
- 16 Epigenetic variations consist  
of DNA methylation and  
histone modifications **67**
- 17 Cell cycle divided into  
phases **73**
- 18 Apoptosis **76**
- 19 Retroviral gene therapy **86**
- 20 p53 levels are controlled by the  
inhibitor protein, MDM2 **102**  
'Mdm2 in DNA damage activation of  
the p53 tumor suppressor', taken from  
<[http://www.umassmed.edu/cellbio/  
labs/jones/Research/regulation-p53/](http://www.umassmed.edu/cellbio/labs/jones/Research/regulation-p53/)>.  
By permission of Steve Jones
- 21 Geographical distribution of  
the *TP53* codon 72 variants or  
SNPs **104**  
Lara Sucheston, David B. Witonsky,  
Darcie Hastings, Ozlem Yildiz, Vanessa  
J. Clark, Anna Di Rienzo, Kenan Onel,  
'Natural selection and functional  
genetic variation in the p53 pathway',  
*Human Molecular Genetics* (OUP,  
2011), vol. 20. By permission of Oxford  
University Press
- 22 Gleevec<sup>TM</sup> **107**
- 23 DNA fingerprinting **111**  
Courtesy: National Human  
Genome Research Institute  
<<http://www.genome.gov/>>
- 24 Nuclear DNA from the  
mother's egg is transferred  
to a healthy donor egg  
cell that lacks its nucleus **129**  
'Step by Step: how PNT works',  
taken from New Techniques to  
prevent mitochondrial disease:  
Pro-nuclear transfer (PNT)  
<[http://mitochondria.hfea.gov.uk/  
mitochondria/what-is-mitochondrial-  
disease/new-techniques-to-prevent-  
mitochondrial-disease/  
pro-nuclear-transfer/](http://mitochondria.hfea.gov.uk/mitochondria/what-is-mitochondrial-disease/new-techniques-to-prevent-mitochondrial-disease/pro-nuclear-transfer/)>. Used  
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- 25 Synthetic biology uses a  
parts, devices, and systems  
approach, similar to  
engineering **131**  
kokandr/ Shutterstock
- 26 Double-stranded breaks and  
repair mechanisms **134**  
Figure 1 'Pathways for repair of DSBs  
induced by genome editing tools',  
from 'Genome Editing Technology  
from GeneCopeia, Inc.' <[http://  
www.genecopeia.com/resource/  
genome-editing-technology-from-  
genecopeia-inc/](http://www.genecopeia.com/resource/genome-editing-technology-from-genecopeia-inc/)>. Used with  
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