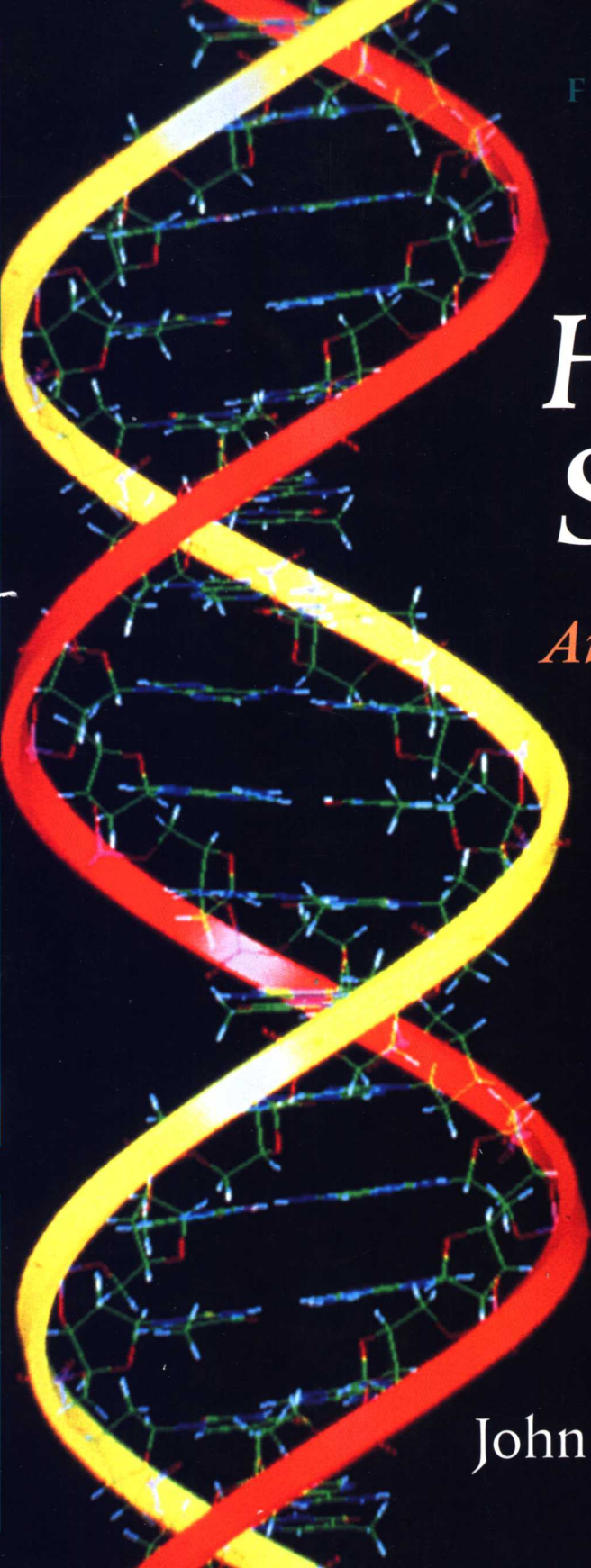


FOURTH EDITION

# The Human Species

*An Introduction  
to Biological  
Anthropology*

John H. Relethford



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EDITION

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# *The Human Species*

An Introduction to  
Biological Anthropology

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## P R E F A C E

This text introduces the field of biological anthropology (also known as physical anthropology), the science concerned with human biological origins, evolution, and variation. The text addresses the major questions that concern biological anthropologists: "What are humans?," "How are we similar to and different from other animals?," "Where are our origins?," "How did we evolve?," "Are we still evolving?," "How are we different from one another?," and "What does the future hold for the human species?"

### Organization

This book is divided into three parts. Part One, "Evolution and Diversity in Human Populations," provides basic background in human genetics and microevolution and applies them to an understanding of human biological variation. The first chapter of this book is a general introduction to the science of biological anthropology and its relationship to evolutionary science in general. Chapter 2 reviews molecular and Mendelian genetics as applied to humans in order to provide genetic background for later chapters. It includes a basic review of cell biology. Chapter 3 reviews basic microevolutionary theory. Chapter 4 examines different ways we measure human biological variation and contrasts racial and evolutionary approaches to variation. Chapter 5 presents case studies of human microevolution. Chapter 6 continues this theme within the broader perspective of human adaptation—biological and cultural.

Part Two addresses "Our Place in Nature," specifically the biology, behavior, and evolution of primates. A main focus of this section are the questions "What are humans?" and "How are we related to other living creatures?" Chapter 7 examines issues in classification and looks at the basic biology and behavior of mammals in general, and primates in particular. Chapter 8 looks at the different types of primates in terms of classification, biology, and behavior, with particular attention given to our closest relatives, the apes. Chapter 9 looks specifically at the human species and includes a comparison of human traits with those of apes. Chapter 10 begins looking at primates in a broader evolutionary perspective by discussing the models and methods of macroevolution. This chapter concludes

with a brief review of the evolution of life on earth prior to the emergence of the primates. Chapter 11 summarizes the major events of primate origins and evolution, from the time of the disappearance of the dinosaurs 65 million years ago to the split of ape and human lines 5–7 million years ago.

Part Three deals with “Human Evolution” in both a biological and cultural sense. Chapter 12 begins with a brief review of human evolutionary history and follows with a detailed summary of the first hominids, the australopithecines, and the origin of bipedalism. Chapter 13 examines the origin and biological and cultural evolution of the genus *Homo*. Chapter 14 looks at the fossil, archaeological, and genetic evidence for the origin of modern humans and includes a discussion of current controversies (Did modern humans evolve throughout the world, or are our recent ancestors exclusively from Africa?). The last two chapters continue the theme of human evolution, but focus on the biological impact of our rapid cultural evolution over the past 12,000 years. Chapter 15 explores the evolution of patterns of human health and disease in our evolutionary past and in today’s world. Chapter 16 looks at changes in the demographic structure of human populations.

Not all instructors will use the same sequence of chapters. Some may prefer a different arrangement of topics. I have attempted to write chapters in such a way as to accommodate such changes whenever possible. For example, some instructors may prefer to deal with certain aspects of human variation (Chapters 4–6, 15, 16) after the fossil record of human evolution.

## Features

Throughout the text, I have attempted to provide new material relevant to the field and fresh treatments of traditional material.

- ◆ All areas of contemporary biological anthropology are covered. In addition to traditional coverage of areas such as genetics, evolutionary theory, primate behavior, and the fossil record, the text includes material often neglected in introductory texts. There are separate chapters on adaptation, human health and disease, and demography, and the study of human growth is incorporated into several chapters.
- ◆ The relationship between biology and culture is a major focus. The biocultural framework is introduced in the first chapter and integrated throughout the text.
- ◆ Behavior is discussed in an evolutionary context. The evolutionary nature of primate and human behavior is emphasized in a number of chapters, including those on primate biology and behavior (7–9) and the fossil record of human evolution (12–14).
- ◆ The emphasis is on the human species in its context within the primate order. Discussions of mammals and nonhuman primates continually refer back to their potential relevance for understanding the human species. In fact, an

entire chapter (9) is devoted to treating our species written from a comparative perspective.

- ♦ Hypothesis testing is emphasized. From the first chapter, where students are introduced to the scientific method, I emphasize how various hypotheses are tested. Rather than provide a dogmatic approach with all the “right” answers, the text examines evidence in the context of hypothesis testing. With this emphasis, readers can see how new data can lead to changes in basic models and can better understand the “big picture” of biological anthropology.

## New to This Edition

Every chapter has been revised in light of new findings in the field and comments from users of the third edition. In addition, certain parts of the text’s structure have been changed based on the helpful feedback I received from colleagues. To make the text as clear, accessible, and up-to-date as possible, I’ve made the following specific changes:

- ♦ The chapters on human variation, microevolution, and adaptation have been moved to come immediately after the chapters on genetic and microevolutionary theory (2–3). This change allows a smoother flow from microevolutionary theory to case studies. This change was also made based on the suggestion of several colleagues that later chapters on human evolution are best understood with a prior understanding of human variation. In other words, the present is often the key to understanding the past.
- ♦ A section on human menopause (and its evolutionary significance) has been added to Chapter 9.
- ♦ The previously separate chapters on macroevolution and the fossil record have been merged and streamlined. This revised chapter (10) comes between the chapters on living primates (7–9) and the chapters on primate and human evolution (11–14) to provide a smooth transition from the study of variation to the study of paleontology.
- ♦ The chapter on primate evolution (11) has been further streamlined to emphasize the *major* evolutionary trends in primate evolution.
- ♦ The chapter on the first hominids (12) now focuses exclusively on the australopithecines and the origin of bipedalism. The section on *Homo habilis* has been moved to the next chapter.
- ♦ The chapter on the evolution of the genus *Homo* (13) has been completely rewritten, including treating *Homo habilis* and *Homo rudolfensis* as separate species, new thoughts on the relationship of *Homo erectus* to other species of early *Homo*, new discoveries about the culture of *Homo erectus* and archaic humans, and the analysis of Neandertal DNA, among other topics.
- ♦ The chapter on the origin of modern humans (14) has been extensively revised to accommodate new fossil and genetic analyses.

- ♦ The chapters on the evolution of health and disease (15) and the demographic evolution of human populations (16) have been kept in place, following the three chapters on the fossil and archaeological record of human evolution. The topics in Chapters 15 and 16 focus on our species' continued cultural evolution, and related biological impacts. Their placement in the text helps reinforce the fact that human evolution, in the broadest sense, did not end with the origin of agriculture.
- ♦ The chapters on health and disease and demography have also been revised to include recent data on disease and population trends.

## Study Aids

To make the text more accessible and interesting, I have included frequent examples and illustrations of basic ideas as well as abundant maps to help orient students. Although I have tried to keep the technical jargon to a minimum, every introductory text does contain a number of specialized terms that students must learn. The first mention of these terms in the text appears in boldface type and accompanying short definitions appear in the text margins. A glossary is provided at the end of the book, often with more detailed definitions.

Each chapter ends with a summary and a list of supplemental readings. A list of references appears at the end of the book, providing the complete reference for studies cited in the text.

## Ancillaries

The Instructor's Manual includes a test bank of more than 700 questions, as well as chapter overviews and outlines, topics for class discussion, and sources for laboratory equipment. A Computerized Test Bank is available free of charge to qualifying adopters. Also available to qualifying adopters is a package of 68 color and black-and-white transparency acetates.

## Acknowledgments

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Last, but not least, I dedicate this to my family. To my wonderful sons, David, Benjamin, and Zane—thanks for all the smiles and hugs, which made it all worthwhile. Thanks also for all those questions that really make me think (the ones that I couldn't answer as well as those I could). Finally, to my wife, Hollie, love of my life and best friend—thanks for love, friendship, and support. I couldn't have done this without you.



# CONTENTS

*Preface* v

## PART I

### *Evolution and Diversity in Human Populations* 1

#### 1 The Study of Biological Anthropology 3

What Is Anthropology? 4

*Biology and Culture* 4

*Variation* 6

*Evolution* 6

*Adaptation* 6

*The Subfields of Anthropology* 8

Special Topic: Biological Anthropologists at Work 10

Science and Evolution 12

*Characteristics of Science* 13

*The Development of Evolutionary Theory* 14

*Evidence for Evolution* 22

*Science and Religion* 24

Summary 27

Supplemental Readings 27

#### 2 Human Genetics 29

Molecular Genetics 30

*DNA: The Genetic Code* 30

*Chromosomes and Genes* 35

Mendelian Genetics 38

*Genotypes and Phenotypes* 40

*Predicting Offspring Distributions* 43

<i>Chromosomes and Inheritance</i>	45
<i>The Genetics of Complex Physical Traits</i>	47
Mutations	51
<i>Evolutionary Significance of Mutations</i>	51
<i>Types of Mutations</i>	52
<i>Rates of Mutations</i>	54
Special Topic: PCR and Ancient DNA	55
Genetics and Behavior	56
Summary	57
Supplemental Readings	58

## CELL BIOLOGY: A Review 59

### 3 Principles of Microevolution 64

Population Genetics	64
<i>Definitions of Population</i>	64
<i>Genotype and Allele Frequencies</i>	65
<i>Hardy-Weinberg Equilibrium</i>	67
Evolutionary Forces	69
<i>Mutation</i>	69
<i>Natural Selection</i>	70
<i>Genetic Drift</i>	78
<i>Gene Flow</i>	83
<i>Interaction of the Evolutionary Forces</i>	86
Special Topic: Tay-Sachs Disease: Genetic Drift or Natural Selection?	90
<i>Nonrandom Mating</i>	90
Summary	91
Supplemental Readings	92

### 4 The Study of Human Variation 93

Measuring Human Variation	93
<i>Biochemical Variation</i>	94
<i>Complex Trait Variation</i>	98
The Racial Approach to Variation	99
<i>The Biological Concept of Race</i>	100
<i>Problems with the Concept of Race</i>	100
The Evolutionary Approach to Variation	107
<i>The Analysis of Gene Flow and Genetic Drift</i>	108
<i>The Analysis of Natural Selection</i>	110
Special Topic: Genetics, Race, and IQ	113
Summary	115
Supplemental Readings	115

5	Human Microevolution	116
	Case Studies of Gene Flow and Genetic Drift	116
	<i>Social Organization and Genetics of South American</i>	
	<i>Indians of the Rain Forest</i>	117
	<i>The Vikings and Irish Population History</i>	118
	Special Topic: The Biological History of the Ancient Egyptians	120
	Case Studies of Natural Selection	120
	<i>Hemoglobin, Sickle Cell, and Malaria</i>	120
	<i>Blood Groups and Natural Selection</i>	129
	<i>Lactase Deficiency</i>	134
	<i>Skin Color</i>	136
	Summary	140
	Supplemental Readings	141
6	Human Adaptation	142
	Types of Adaptation	143
	<i>Physiologic, Genetic, and Cultural Adaptation</i>	143
	<i>Adaptation to Ultraviolet Radiation: An Example</i>	143
	Special Topic: Cold Nights in Tierra Del Fuego	144
	Climate and Human Adaptation	144
	<i>Physiologic Responses to Temperature Stress</i>	145
	<i>Climate and Morphological Variation</i>	146
	<i>Cultural Adaptations</i>	152
	High-Altitude Adaptation	154
	<i>High-Altitude Stresses</i>	154
	<i>Physiologic Responses to Hypoxia</i>	155
	<i>Physical Growth in High-Altitude Populations</i>	156
	Summary	158
	Supplemental Readings	159

## PART II

### *Our Place in Nature* 161

7	Primates in Nature	163
	Taxonomy	163
	<i>Taxonomic Categories</i>	164
	<i>Definition of Species</i>	165
	<i>Methods of Classification</i>	166
	<i>Approaches to Classification</i>	168
	<i>The Vertebrates</i>	169

Characteristics of Mammals	171
<i>Reproduction</i>	171
<i>Temperature Regulation</i>	174
<i>Teeth</i>	174
<i>Skeletal Structure</i>	176
<i>Behavior</i>	177
Primate Characteristics	178
<i>The Skeleton</i>	180
<i>Vision</i>	181
<i>The Brain and Behavior</i>	182
<i>Reproduction and Care of Offspring</i>	184
Special Topic: What Will Happen to the Primates?	186
<i>Social Structure</i>	188
Models of Primate Behavior	190
<i>Socioecology</i>	191
<i>Sociobiology</i>	192
Summary	196
Supplemental Readings	197

## 8 The Biology and Behavior of the Living Primates 198

Primate Suborders	198
<i>Prosimians</i>	198
<i>Anthropoids</i>	202
<i>Alternative Classifications</i>	202
The Monkeys	203
<i>New World Monkeys</i>	203
<i>Old World Monkeys</i>	207
The Hominoids	210
<i>Hominoid Characteristics</i>	211
<i>Classification of the Hominoids</i>	213
The Living Apes	217
<i>Gibbons</i>	218
<i>Orangutans</i>	220
<i>Gorillas</i>	222
<i>Chimpanzees</i>	225
Special Topic: Social Structure and Testes Size in Primates	226
<i>Bonobos</i>	229
Summary	232
Supplemental Readings	232

## 9 The Human Species 233

Characteristics of Living Humans	234
<i>Distribution and Environment</i>	234

	<i>Brain Size and Structure</i>	234
	<i>Bipedalism</i>	237
	<i>Canine Teeth</i>	240
	<i>Sex and Reproduction</i>	241
	<i>Human Growth</i>	242
	<i>Social Structure</i>	247
	How Are Humans Unique?	248
	<i>Tool Use and Manufacture</i>	248
	Special Topic: Can Apes Make Stone Tools?	249
	<i>Language Capabilities</i>	253
	<i>What Is Language?</i>	254
	Summary	258
	Supplemental Readings	258
10	Macroevolution and the Fossil Record	259
	Patterns of Macroevolution	260
	<i>Speciation</i>	262
	<i>Adaptive Radiation</i>	264
	<i>The Tempo and Mode of Macroevolution</i>	264
	<i>Extinctions and Mass Extinctions</i>	266
	<i>Species Selection</i>	267
	Misconceptions About Evolution	267
	<i>The Nature of Selection</i>	267
	Special Topic: Science Fiction and Orthogenesis	268
	<i>Structure, Function, and Evolution</i>	270
	The Study of the Fossil Record	271
	<i>Relative Dating Methods</i>	272
	<i>Chronometric Dating Methods</i>	273
	<i>Reconstructing the Past</i>	277
	Evolution Before the Primates	279
	<i>Perspectives on Geologic Time</i>	279
	<i>The Origin of Life</i>	282
	<i>The Paleozoic Era</i>	282
	<i>The Mesozoic Era</i>	284
	Summary	285
	Supplemental Readings	286
11	Primate Origins and Evolution	287
	Early Primate Evolution	287
	<i>Overview of Early Primate Evolution</i>	288
	<i>Primate Origins</i>	288
	<i>Anthropoid Origins</i>	293

<b>Evolution of the Miocene Apes</b>	<b>295</b>
Special Topic: The Giant Ape	296
<i>The Diversity of Miocene Apes</i>	297
<i>The Fossil Evidence</i>	297
<i>Genetic Evidence</i>	302
<i>Conclusions</i>	305
Summary	307
Supplemental Readings	308

### PART III

## **Human Evolution 309**

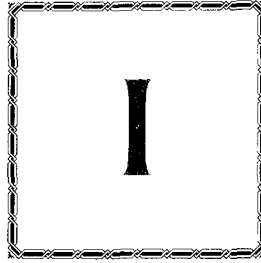
<b>12 Human Origins</b>	<b>311</b>
Overview of Human Evolution	311
The First Hominids	314
<i>Primitive Hominids</i>	316
<i>Later Australopithecines</i>	323
Evolutionary Trends	328
Special Topic: The Piltdown Hoax	329
<i>Evolutionary Relationships</i>	330
<i>The Origin of Bipedalism</i>	334
Summary	338
Supplemental Readings	338
<b>13 The Evolution of the Genus <i>Homo</i></b>	<b>339</b>
The Origins of the Genus <i>Homo</i>	339
<i>Early Homo</i>	340
<i>Evolutionary Relationships</i>	344
<i>Homo erectus</i>	344
<i>Distribution in Time and Space</i>	344
<i>General Physical Characteristics</i>	347
<i>Cultural Behavior</i>	351
Archaic Humans	356
<i>Anagenesis or Cladogenesis?</i>	357
Special Topic: Neandertals: Names and Images	359
<i>Distribution in Time and Space</i>	359
<i>Early Archaics</i>	361
<i>The Neandertals</i>	364
Summary	369
Supplemental Readings	369

14	The Origin of Modern Humans	370
	Anatomically Modern <i>Homo sapiens</i>	370
	<i>Distribution in Time and Space</i>	371
	<i>Physical Characteristics</i>	371
	<i>Cultural Behavior</i>	372
	The Origin of Anatomically Modern Humans	380
	<i>Early Models</i>	381
	<i>Current Models and Debates</i>	382
	<i>The Fossil Evidence</i>	384
	Special Topic: The Iceman	387
	<i>The Genetic Evidence</i>	387
	<i>Consensus?</i>	391
	<i>Why Did Modern Humans Evolve?</i>	391
	Recent Biological and Cultural Evolution in <i>Homo sapiens</i>	394
	Summary	396
	Supplemental Readings	397
15	The Evolution of Human Health and Disease	398
	The Study of Epidemiology	399
	<i>Types of Diseases</i>	399
	<i>Rates of Diseases</i>	400
	<i>Causes of Diseases</i>	401
	<i>Studying the Evolution of Human Disease</i>	403
	The Evolution of Human Disease	406
	<i>Disease in Hunting-Gathering Societies</i>	406
	<i>Agriculture and Disease</i>	409
	<i>Urbanization and Disease</i>	410
	<i>Culture Contact</i>	412
	<i>The Epidemiologic Transition</i>	413
	<i>Secular Changes in Human Growth</i>	416
	<i>Some Contemporary Issues</i>	418
	Special Topic: The Coming Plague?	420
	Summary	425
	Supplemental Readings	426
16	The Demographic Evolution of Human	
	Populations	427
	The Study of Demography	427
	<i>Demographic Measures</i>	427
	<i>Population Growth</i>	431
	<i>The Age-Sex Structure of Populations</i>	433
	Demography and the Modern World	435

<i>The Demographic Transition</i>	435
Special Topic: The Baby Boom	436
<i>World Population Growth</i>	438
<i>Implications of Changing Age Structure</i>	439
Summary	441
Supplemental Readings	441
Epilogue: The Future of Our Species	442
Appendix 1 Mathematical Population Genetics	444
Appendix 2 Classification of Living Primates	453
Appendix 3 Conversion Factors	457
Appendix 4 Comparative Primate Skeletal Anatomy	458
 <i>Glossary</i>	 461
<i>References</i>	471
<i>Index</i>	483



## PART



# *Evolution and Diversity in Human Populations*

“Why are human beings different from one another?” We all encounter biological diversity every day of our lives. Some people are taller than others or have rounder heads or lighter skin color. Analyses of DNA show even greater variation. Biological anthropologists are interested in describing and explaining such variation. After you have read the first chapter, it should come as no surprise that this book explains variation in terms of evolution. The first section of the book looks more closely at the evolutionary process and how it relates to human biological diversity. Chapter 1 introduces you to the nature of anthropology, specifically biological anthropology, the subject of this text. This chapter focuses on the nature of science and biological anthropology as an evolutionary science. Chapter 2 provides a review of some basic concepts of human genetics that are necessary for understanding variation and evolution. Chapter 3 builds on this background to focus on the details of the evolutionary process. In Chapter 4 different materials and methods used to study human variation are described. Chapter 5 presents several case studies showing evolution in living and recent human populations. Finally, Chapter 6 looks at evidence that shows the biocultural nature of human adaptation.