

Book Reviews

Evolution and Medicine. By Robert L. Perlman. xi + 162 pp. Oxford: Oxford University Press. 2013. \$98.50 (hardcover), \$44.95 (paperback).

Since the publication of Randolph Nesse and George Williams' influential early writings more than 20 years ago, the field of evolutionary medicine is gaining steam, and is succeeding in establishing its identity within science and education. As evidence for this forward motion, recent years have witnessed the launching of two new peer-reviewed journals (*Evolution, Medicine and Public Health* and *Journal of Evolutionary Medicine*) devoted to the application of evolutionary theory to medicine and public health, and efforts are underway across the country to establish the teaching of evolutionary principles as core components of the pre-med and medical school curricula.

These developments have also been encouraged by the publication of several new volumes or textbooks devoted to evolutionary medicine. *Evolution and Medicine*, by Robert Perlman, is one recent addition to this field. In this compact volume, Perlman gives us a nicely written overview of some of the core principles of this emerging discipline. Chapter 1 provides a general introduction to evolutionary medicine. Chapter 2 reviews demographic principles that underlie evolutionary analyses, while Chapter 3 provides an overview of basic genetic principles. After coverage of these background topics, the book's topical chapters explore evolutionary approaches to a range of conditions. The chapter on cystic fibrosis (Chapter 4) discusses the condition's biological underpinnings and considers selection related to infectious disease mortality as an explanation for the emergence and maintenance of disease-conferring alleles. Chapter 5 covers life history theory and explores models for the evolution of aging, including mutation accumulation, antagonistic pleiotropy, and disposable soma. Chapter 6 discusses the biology of cancer, with a focus on the role of somatic mutations in cell cycle disruption, along with clonal selection operating on different cell lines within tumors. Chapter 7 reviews principles of host-pathogen coevolution, which provide background context for sexually transmitted diseases (STDs) like HIV and syphilis (Chapter 8), as well as malaria (Chapter 9). Classic work on the evolution of lactose persistence in dairying populations is discussed in the chapter devoted to gene-culture coevolution (Chapter 10).

As might be inferred from the topical focus of the chapters, *Evolution and Medicine* is most effective in communicating evolutionary principles that apply to Mendelian traits, infections and cancer – diseases that are dominated by the levels of phenotypic organization of individual genes or individual cells. Many of the examples foregrounded here, such as cystic fibrosis, malaria/sickle cell trait, and lactose tolerance, are evolutionary scenarios in which one's genotype largely determines disease outcomes because of a close correspondence between genotype and phenotype. Here, conventional models of selection that explain changing gene frequencies tell us much about the fate and spread of disease phenotypes within populations. The volume unfortunately has less to say about many of the complex diseases that increasingly dominate global

morbidity and mortality, such as obesity and cardiometabolic diseases. These are discussed in the final chapter on man-made diseases (Chapter 11), but here the focus is primarily on reviewing older, and at this point well-worn ideas: Neel's thrifty genotype, the Paleolithic Prescription, and related concepts of gene-environment mismatch. After reading this volume, one does not come away with a sense for current tensions within biology that evolutionary medicine must ultimately aspire to help resolve: the dizzying complexity of many common phenotypes and the many levels of regulation—developmental, epigenetic, transcriptional, and post-transcriptional—that lie between alleles and phenotypes, and that help explain why knowing an individual's genotype has proven to be a poor predictor of who ends up developing many of the most common and debilitating diseases.

Ignoring this gap in coverage, this book is a nicely written overview that illustrates how core evolutionary principles may help us understand the evolution of disease in human populations. I especially enjoyed the chapters on demography and genetics, which were fresh and engaging, and I found the background discussions in most chapters to effectively balance discussion of the details of biological mechanisms with clear communication of key concepts and evolutionary principles. Perlman's book is very effective in describing those areas of evolutionary medicine that it engages with fully. The absence of detailed coverage of the emerging complexities in phenotypic development may render some of the discussions of chronic disease outdated, but this also makes the book more easily digested and understood by non-specialist readers. Indeed, this book will work best in the classroom, which is presumably its intended target. It is good to see evolutionary medicine come into its own as a discipline, and I can recommend *Evolution and Medicine* to those looking for an overview of the foundations of this fascinating field.

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Dynamics of Human Biocultural Diversity: A Unified Approach. By Elisa J. Sobo. 356 pp. Walnut Creek, CA: Left Coast Press. 2012. \$39.95 (paper), \$39.95 (e-book).

Drawing on her years of experience crafting an integrative and original syllabus for an undergraduate course, Elisa Sobo offers an intriguing new textbook. The basic organizing principle behind this book is that "*our adaptive biocultural capacity has helped produce the rich range of human diversity seen today*" (p. 7). More than just a treatise on human diversity, this book captures the interesting intersections of evolution, culture, and biology.

As part of her effort to build a unified approach to biocultural interactions, Sobo takes the time to include epigenetics as a means to examine how biology and experience