

especially with reference to the etiology and development of neoplasia. But one can supplement this introduction with additional information from recent literature. The book is clearly quite expensive for the individual buyers but perhaps not too high when compared to other volumes of its genre in the biomedical field.

KRISHNA DRONAMRAJU, *Foundation for Genetic Research, Houston, Texas*

#### MOBILE DNA III.

*Editor-in-Chief: Nancy L. Craig; Editors: Michael Chandler, Martin Gellert, Alan M. Lambowitz, Phoebe A. Rice, and Suzanne B. Sandmeyer. Washington (DC): ASM Press. \$160.00. xxiv + 1321 p.; ill.; index. ISBN: 978-1-55581-920-0. 2015.*



#### MICROBIOLOGY

THE HUMAN SUPERORGANISM: HOW THE MICROBIOME IS REVOLUTIONIZING THE PURSUIT OF A HEALTHY LIFE.

*By Rodney Dietert. Dutton. New York: Penguin Random House. \$28.00. ix + 341 p.; index. ISBN: 978-1-101-98390-4 (hc); 978-1-101-98391-1 (eb). 2016.*

A superorganism is made up of many organisms. The centuries-old concept has been used to explain emergent properties in complex biological systems, including the evolution of coral reefs, termite colonies, and even the behavior of human populations. In his new book, Rodney Dietert argues that the superorganism concept has been overlooked with respect to the human microbiome even though we share our bodies with trillions of bacteria that have tremendous metabolic potential. The author's central theme is that through the neglect of our microbiomes, we are becoming incomplete superorganisms. Microbiome depletion may explain the dramatic rise in noncommunicable diseases (NCDs), including cancer, autism, diabetes, asthma, allergies, and obesity. We may be able to reverse this trend by treating the human body as the rich ecosystem it is.

The volume begins by describing "Old Biology" in which microbes are primarily viewed as pathogens, or at best commensal organisms with minimal benefit. Meanwhile, we have seen a rise in prophylactic use of antibiotics, an increase in cesarean-section births, a revolution in our diets, and major shifts in how we interact with the natural world. Together, these changes have disrupted our "second genome," i.e., the collection of microbial genes on and within us, which is one-hundredfold larger than

the human genome. The author contends there is a growing disabled population with microbiome-based birth defects that is leading to social fracturing of our daily lives.

*The Human Superorganism* succeeds in describing how alterations to our microbiome could be etiological in the rise of NCDs. An immunologist by training, Dietert talks about the potential of microorganisms to control on-off gene switches of the human genome. Specifically, he outlines the importance of our microbiome in the development of our immune system. There are critical windows of immune vulnerability and compromised microbiomes can lead to later-life dysfunction and disease. Over the past decade, researchers have used highly controlled germ-free model systems in attempts to link microbiome diversity to host health. Certainly, mice without microbes have compromised nutrition, physiology, and immune function, but it is less clear-cut how subtler changes in microbiome composition influence the emergence of NCDs in humans, especially when microbes have high rates of dispersal, a high degree of functional redundancy, and the capacity to swap genes among distantly related taxa.

Ultimately, Dietert synthesizes microbiology, ecology, and medicine to cogently argue for a "New Biology" in which mammalian organisms are considered ecosystems. His book highlights human traits that are influenced by our microbiomes while offering advice for using one's status as a superorganism to live a healthier life. A near-future is described in which powerful sequencing technologies enable treatments to be tailored to patients based on their specific genomic and metagenomic identities. Given that microbes are the most abundant, diverse, and successful organisms on Earth, incorporating them into a new model for human health is clearly justified. *The Human Superorganism* is a useful addition to the recent collection of volumes highlighting the importance of microbiomes for human health and well-being.

ROY Z. MOGER-REISCHER and JAY T. LENNON,  
*Biology, Indiana University, Bloomington, Indiana*

MICROBIOLOGY: A CLINICAL APPROACH. *Second Edition.*

*By Anthony Strelkauskas, Angela Edwards, Beatrix Fahnert, Gregory Pryor, and Jennifer Strelkauskas. New York: Garland Science (Taylor & Francis Group). \$155.00 (paper). xix + 722 p. + L1-L17; ill.; index. ISBN: 978-0-8153-4513-8 (pb); 978-0-8153-4544-2 (loose leaf). 2016.*