

## Book and Software Reviews

***Ageless Quest: One Scientist's Search for Genes That Prolong Youth.*** By Lenny Guarente. Cold Spring Harbor, New York: Cold Spring Harbor Laboratory Press. 2002. 154 pp. \$19.95

*Ageless Quest* is a personal account of how Lenny Guarente, a famed researcher from MIT, took a big risk and decided to study the process of aging by using the simple model organism, *Saccharomyces cerevisiae* (yeast). His gamble seems to have paid big dividends as he has been able to show that the aging process in yeast seems to be governed by a simple mechanism. Furthermore a single gene seems to be at the heart of this mechanism. Up until Lenny Guarente decided to tackle the process of aging, many researchers thought that aging was a complex process and that many pathways worked in concert to pace it. This book eloquently describes the efforts to show that at least in yeast, a single gene, the Sir2 gene, can govern the pace of aging. Throughout the book, Lenny Guarente describes how he went about tackling certain obstacles. In one instance, he realized that Sir2 was a deacetylase after viewing results from a mass spectrometer reading that seemed to be initially incorrect. The brilliance of Guarente is seen throughout this book, and his quest to understand the process of aging is inspirational.

The book also delves into aspects of his personal life such as his relationship with David Sinclair, a former postdoctoral fellow, from his lab, who has also continued this groundbreaking research on aging at Harvard. The book is overall an easy read but the subjects discussed in the book would most appeal to a biologist who has

a greater understanding about the details of research in biology.

By Han Lee  
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***Elastomeric Proteins: Structures, Biomechanical Properties, and Biological Roles.*** Edited by Peter R. Shewry, Arthur S. Tatham, and Allen J. Bailey. Cambridge, Massachusetts: Cambridge University Press. 2003. 408 pp. \$95.00.

Most people think about proteins as receptors binding ligands or enzymes binding substrates and converting them to products that feed into a myriad of reactions that propel life forward. However, very little is known about proteins that function as catapults or techno-fibers. Readers of *Elastomeric Proteins* need not understand all the nuances of the mathematics of mechanical engineering in order to become absolutely captivated by some of the most amazing things proteins can do. Among the proteins discussed are elastin, fibrillin, spider silk, collagen, titin, resilin, and gluten.

As implied by the title, the book is divided into sections that describe each of these proteins and explain how each is utilized mechanically in nature. This book describes various biophysical techniques that are used to analyze the proteins, as well as the general biology that allows the readers to understand how organisms have utilized these proteins. Therefore, this book can be appreciated by readers of all backgrounds with an interest in biology, although a detailed perusal would require

a graduate-level understanding of biophysics and protein biochemistry.

The authors elucidate the complex mechanics of these proteins by examining various aspects of proteins, including amino acid biochemistry, protein structure, and higher-order assembly. They also impart a sense of appreciation and understanding for the organisms that have evolved to utilize such proteins; that is, down to the level of amino acid sequence, organisms have evolved to design the best machines from proteins. The importance of the structure-function relationship was reiterated by the authors throughout the book. In the case of spider's silk, the spider (the architect), the architecture (web structure), and the building materials (silk) have all evolved to ensure the spider's survival. The silk exists in a liquid crystalline state inside the lumen of the glands. Amazingly, spiders can produce seven types of silk, with each designed for a specific function. As the fluid silk is pulled out and spun into webs, the silk crystallizes. Structural analyses from x-ray crystallography, NMR, and computer modeling have indicated that the presence of proline in the beta-turns of the spider silk contributes to its elasticity because proline has unique vibrational and rotational states that allow the beta-turns to function as spirals. Extensive hydrogen bonds within the beta-spirals help to slow the retraction of the silk, facilitating the capturing of intercepted prey.

Finally, the book ends by describing various applications of these elastomeric proteins in medicine. For example, recombinant forms of elastin can be utilized as a scaffold for tissue repair. By combining silk with synthetic fibers, stronger fabrics can be manufactured. Collagen has already been utilized in many sectors of medicine, including the synthesis of drug capsules, contact lens membranes, and skin ointments. Through the analyses of elastomeric proteins, this book reinforces the idea that nature is the greatest architect

of all and that many aspects of structure-function relationships of proteins are yet to be discovered.

By Fang Fang Yin  
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***Food Fight: The Inside Story of the Food Industry, America's Obesity Crisis, and What We Can Do About It.*** By Kelly D. Brownell and Katherine Battle Horgen. Chicago: Contemporary Books. 2004. 352 pp. \$24.95.

Portion sizes and Americans have both gotten bigger in the last thirty years. As people eat fewer meals at home, have more sedentary jobs and are encouraged to supersize their meals, the health problems and economic impact of an overweight and obese society are beginning to affect all Americans. In *Food Fight*, authors Kelly Brownell and Katherine Battle Horgen identify the causes of and potential solutions to America's rising obesity epidemic. Their main culprits are the unmitigated greed of the food industry, which formulates, sells and heavily advertises high-fat and high-sugar foods, and the failure of federal and state governments to level the playing field for healthier foods. *Food Fight*, however, does not merely point the blame at the corporations and the government; it is an in-depth evaluation of the many ways the packaged, fast food culture of America affects our waistline and our bottom line.

True to its name, *Food Fight* concentrates more on the problem of food availability than physical inactivity. It offers many top-down governmental initiatives and some bottom-up solutions to fight the fast food culture, ranging from restricting advertising aimed at children to snack food taxes to changing the way people talk about obesity. The authors advocate that obesity should no longer be considered a failure of will in the face of temptation but argue that the environment has become so

full of persuasion that the average American does not have the will, the skills, or the education to overcome temptation. Another suggestion is for Americans to simply call fatty, sugary, and non-nutritive foods unhealthy. The food industry vigorously resists the characterization of any food as unhealthy, and many examples are given in the book of the influence of the sugar, confectionary, and soft-drink lobbies on the wording and policies of the United States government.

Though many people might assume they already know the downside of our fast food culture, the depth of coverage in *Food Fight* will educate and shock even well-informed readers. For instance, most parents are aware that schools sign contracts with soda manufacturers in exchange for new sports uniforms or textbooks. However, it is less well known that these contracts can require monthly minimum sales, which induces or entraps teachers into encouraging their young students to buy and drink more sugary beverages. Another sinister side-effect of the reliance of school districts on funds from food companies is that teachers often become vocal opponents of removing soda machines or fast-food vendors from school grounds. The organizations that act *in loco parentis* are passively or actively encouraging children to eat and drink the unhealthy items parents often try to dole out in moderation.

For all of the insights and useful corrective actions suggested in the book, *Food Fight* is not an exhaustive treatment of how to solve the obesity epidemic in America. There are notable omissions throughout the book. For instance, diet soda is mentioned only once, when discussing the difficulty of creating a universal scale for measuring the healthiness of a food — diet soda, being nutrient-free and calorie-free, would be equivalent to water. Though the authors' main problem with sugared soda is the empty calories, they never discussed whether diet soda is a bet-

ter alternative to sugared soda or a different villain in its own right. A second neglected topic was community grocery cooperatives in poverty-stricken urban areas. Though the authors offer many high-level policy suggestions on how to get cheaper, healthier food into urban poor communities, they neglected to suggest community-based action like a non-profit co-op grocery. In general, *Food Fight* puts forth more plans for government action than personal action, though personal action (organizing, demonstrating, writing to your representatives) in support of government initiatives is frequently mentioned.

*Food Fight* is written for a general audience and can help inform all citizens of the dangers posed by the rampant unhealthy food culture of America. It requires no scientific knowledge beyond the nutrition lessons of high school home economics. Some of the anecdotes in *Food Fight* are truly memorable and readers will likely pass the stories, and even the book itself, on to interested friends and family.

By Siobain Duffy  
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***Biological Psychology: An Introduction to Behavioral and Cognitive Neuroscience, 4th Edition.*** By Mark R. Rosenzweig, S. Marc Breedlove, and Arnold L. Leiman. Sunderland, Massachusetts: Sinauer Associates, Inc. 2004. 622 pp. \$99.95.

This year, Sinauer Associates Inc. released the fourth edition of. The text is, as the title suggests, heavily oriented towards undergraduates. Its authors, Mark Rosenzweig, S. Marc Breedlove, and Neil V. Watson, published the first edition in 1996. Since then, it has gained popularity among educators for its colorful representations of ion channels, anatomy, and experimental methods. More importantly, educators report that, while it simplifies

complex foci of psychology like the principles of learning theory, the text does not compromise accuracy or integrity of information. Furthermore, “suggested readings” sections at the end of each chapter guide students to more in-depth textbooks like the excellent *The Biochemical Basis of Neuropharmacology* by Jack R. Cooper or Eric Kandel’s *Principles of Neural Science*.

The third edition of *Biological Psychology* is now only three years old. Unsurprisingly, this new edition contains much of the same information as the one before it. However, with the release of a new edition comes an obligation to educate students on the most recent findings in the field, while also providing them with an overview of basic principles and landmark discoveries. Rosenzweig and colleagues fulfill the obligation—a glance through the references section reveals well more than 100 citations from 2002 and 2003 alone. The CD-ROM that accompanies the book offers the latest in high-tech graphics and visual aids — for example, it offers video images of the now famous narcoleptic dog strains used to understand human narcolepsy.

The text is often clinically-oriented; MRI scans are scattered throughout the book, and case studies introduce each chapter’s central theme, much the same way medical students’ texts like Hal Blumenfeld’s *Neuroanatomy Through Clinical Cases* do. In fact, Rosenzweig’s and Blumenfeld’s texts often relate similar cases. In this way, Rosenzweig’s may appear to be intended for medical students, which may deter some educators from recommending it to their undergraduates. On the other hand, students new to the field often find clinical data more engaging until they are savvy enough to recognize the limitations of clinical research and appreciate the flexibility animal models offer. That said, the clinical vignettes

opening the chapters may serve to immediately interest students.

On the pre-clinical side, the text offers a boxed two-page section on current techniques in nearly every chapter, most of which describe animal model approaches to biological psychology. The behavioral endocrinology chapter, for example, describes autoradiography from start to finish. A brief discussion of knockout mice in the same section leaves much to be desired, but the topic is addressed again in an excellent appendix, “Molecular Biology: Basic Concepts and Important Techniques.” This seven-page section is one of the text’s greatest strengths. Although many undergraduate texts describe the methods used by the forefathers of biopsychology (such as Freud’s bell-and-meat approach to conditioning), too few texts discuss methods psychologists actually use today.

The appendix emphasizes the breadth of biochemical knowledge and experience today’s biological psychologist must have by addressing protein synthesis, cloning, polymerase chain reactions, blotting techniques, and *in situ* hybridization. The appendix is not a user’s guide to immunocytochemistry however. It does not offer enough detail to guide the reader at the bench. Rather, it might serve as an excellent guide for beginner students, particularly students just starting to read primary research articles and who may have trouble understanding the methods authors report, or why those methods were chosen. Further, this appendix could be tremendously valuable to a student joining a biopsychology or neuroscience laboratory as an undergraduate assistant, in that it familiarizes the reader with basic information about techniques most commonly used today, allowing the student to understand and adeptly discuss when, why, and roughly how she or her labmates might test a hypothesis.

As an aside, black and white photos of past and present prominent researchers fill the margins, from father of neuroanatomy Santiago Ramon y Cajal to contemporary maternal behavior expert Michael Meaney. The photographs might seem like a trite gimmick to seasoned researchers, but as the young users of this text advance in their careers and begin to attend meetings, being able to identify the field's heavy hitters by sight may give students an added edge.

In short, this text comes recommended for an introductory biological psychology class in which the instructors will teach both clinical and pre-clinical information to students at a research university. It could also be used in upper-level, advanced placement high school courses. The writing is clear; the information is accurate, accessible, and skillfully represented graphically. This text's breadth, however, is both its greatest strength and its greatest weakness — instructors interested in emphasizing animal model approaches to biological psychology, for example, should look elsewhere.

By Shannon Gourley  
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***Histology: An Interactive Virtual Microscope.*** By Ruth Wood and Joel Schechter. Sunderland, Massachusetts: Sinauer Associates, Inc. CD-ROM. \$39.95

For the first-year medical student, the study of histology falls somewhere on the list of things to do, if not near the top. There are a number of ways one can pursue the study and understanding of human histology. There are also a number of tools available to the brave medical students who set out to accomplish said feat. The time-tested classical approach of sitting at a microscope and examining histological sections, believe it or not, still works! Despite its proven merit, this approach

has fallen out of favor with an increasing number of medical students due to its apparent time-consuming nature and the need to acquire the skills to properly use a light microscope. Many students now turn to textbooks, prepared slide shows, or other didactic tools to help them understand the structural and functional aspects of the wide variety of human tissues for which they are held responsible.

*Histology: An Interactive Virtual Microscope* is a two-CD set created from the collection of histologic specimens at the Keck School of Medicine of the University of Southern California. In the study of histology, students have traditionally used microscopes to study specimens on glass slides. This is an attempt to recreate the look and feel of a microscope in a digital format. The images were collected on an Olympus BH-1 microscope equipped with 1x, 4x, 10x, 20x, 40x, and 100x objective lenses. The images are organized by system: cells and tissues, immune, skeletal, respiratory, endocrine, renal, cardiovascular, gastrointestinal/liver, reproductive, and skin. The CDs can be navigated on both PC and Mac platforms using internet browsers such as Internet Explorer, Netscape, and Safari (Mac OS X). Once you click on a particular system, you will see images of glass slides with mounted tissue representing different tissues/organs within that particular system. For example, under the heading of Respiratory System, slides for the trachea, bronchi, and lung tissue can be found.

The first click on the glass slide will bring you to a 1x view of the slide. On the image, several red boxes will appear with a small red square in the bottom left-hand corner. Clicking on the little red square within the boxes will magnify these images. Before the images magnify, a brief explanation is provided in a text field to the left of the image. Unfortunately, the information provided here is nothing close

to sufficient for a good functional understanding of histology. For more detailed information, another text or tutor should be consulted. These blurbs serve to conceptually orient you to what you are looking at. There is a list of items above this description, one of which is labeled "Hide Boxes" and the other is "Show Labels." The authors have done a fairly good job at pointing out the major landmarks and important cell types in each of the slides. There are also "Back" and "Return to Start" options.

Will this tool replace the use of the light microscope by medical students around the world in the study of histology? No. Will it make you smart? No. Is it the

best thing since sliced bread? No. The point is that this is simply a great review tool. Its hierarchical organization allows you to quickly visualize any histological section of interest and to easily test yourself by hiding and showing labeled structures at will. A survey of every tissue, organ, and cell type can be done as quickly as you can click through it. So, don't put away that microscope or those textbooks, but when you need to scan the human body at 40x, pop in this CD and click-away.

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