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Book Review: The Paradox of the Immune System: Protection, Chronic Inflammation, Autoimmune Disease, Cancer, and Pandemics

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Abstract

Book Review:

Pandemics, Artificial Intelligence, Optometrists, COVID-19, Immune System Diseases, inflammation

Keywords

Chronic inflammation, Immunogenomics, pandemics

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Catania LJ. *The Paradox of the Immune System: Protection, Chronic Inflammation, Autoimmune Disease, Cancer, and Pandemics*. First Edition. Elsevier Inc.; 2022. \$131.49, 257 pages, Paperback ISBN: 978-1975170172, e-book ISBN: 978-0323951876

The Paradox of the Immune System: Protection, Chronic Inflammation, Autoimmune Disease, Cancer, and Pandemics is an authoritative scientific text, written by an optometrist with patients in mind. His expertise in Health Care, Immunology and Artificial Intelligence (AI) resonates in every chapter. Beyond the enigmatic title, the book contains a thorough immunology description from the ancillary basics to our most current Covid19 pandemic. The author makes a provocative statement that immunology is the basis of all human diseases. The study of immunology incorporates the role of AI in the advances of the field as well as provides a genomic approach to immunology while still identifying the multiple paradoxes of the immune system. I can certainly see this book as a useful complement to teachers and clinicians as it contains an extensive review of all the aspects of the immune system and an up-to-date bibliography that incorporates the basic science of immunology and current trends in diagnosis and therapeutics.

The figures provided are necessary to identify immunological processes, disorders and key players of the immune system. Except for an error on page 8 where the terms granulocytes and agranulocytes are swapped in Figure 1.2 and its description, the book content is not only accurate but current, with last minute additions until the day it was published. The complex processes detailed, from the original cells involved in the immunological reactions to every possible outcome, helps to put into perspective the different immunological processes. However, some of the figures that describe these processes could benefit from a bigger font as they become a challenge to the reader.

The author dissects the immune system and its inherent paradoxes in an educational manner through every chapter, identifying the immune system as our “best friend and worst enemy.” The book is divided in two sections with a total of seven chapters. The first section unravels the beneficial goals of an immune response by introducing the key players of the immune response as well as the different processes involved, innate processes that we have since birth, and those that develop later. The first chapter focuses on the development of the innate immune system and the “foreign” paradox, “self” versus “non-self,” debating on the phenomenon of tolerance and adaptation to self, which will lead to a mature and functional immune system, and which dysregulation will be part of immune disorders. From the friendly innate immune system in chapter 1, it transitions to the “enemy” in the acquired immune system in chapter 2. At this moment it

becomes obvious the collateral damage associated with inflammation. The devastation caused by the inflammatory response destined to protect us from the viral infection during Covid 19 that became uncontrollable and led to the high mortality rate during the pandemic makes sense now after reading this chapter. As the last chapter of the first section, the role of immunogenomics and the microbiome in self recognition and immune disorders is addressed, including the pivotal role of AI that has largely contributed to a more timely diagnosis of those disorders. The second section of the book contains chapters involved in the “enemy” aspect of the immune system, from the chronic inflammation to the autoimmune disorders, cancer and the infections and pandemics, with specific emphasis in Covid 19.

As part of the educational approach, I found a highlights section at the end of each chapter. I found these highlights very useful as they contain an accurate summary of the topics described in the chapter, which can easily help the reader navigate the scientific content in a very efficient manner. Another unique aspect of this book is the constant references to previous or later chapters (with the inclusion of page numbers) that facilitate the search of those terms or topics. The connections made between the chapters help the reader truly grasp the interaction between the different parts of the immune system. The book feels like a conversation, engaging and funny at times, as the author continually makes anecdotal remarks, includes his opinions, and proposes new terminology to be used in immunology and health care in general. Despite the attempt to attract the non-medical community, the scientific terminology included is overwhelmingly complex for those not familiar with the immunology field.

In contrast with current Immunology publications, one of the notable aspects is the inclusion of the very well-known sexual dimorphism in autoimmune disorders. This is thoroughly addressed, including speculative theories as well as evidence-based findings, in chapter 5. A comprehensive and very useful list of medications used in autoimmune disorders can also be found. Or should we say diseases? There is a very noticeable, repetitive, and clear distinction made between disorders and diseases in every chapter of this book, where disease is defined as an abnormal process with a cause and certain characteristics, while disorder is just a deviation of the normal structure and function.

This is definitely a book that could potentially be used by teachers as a resource in medical libraries to supplement curriculum, but the large inclusion of anecdotal quotes and personal opinions might result in a better fit for practicing optometrists. There is no doubt that with the growing incidence of immune related ocular disorders, this would be of great value in the daily optometric practice.