
Systems biology is presently a field of interest for computational biologists to collect comprehensive biological datasets to gain information about the constituent molecules. With the help of this subject, one can solve problems of compound biological regulatory systems as this field can offer knowledge and new opportunities for practical application in natural science.

This book provides valuable information on ageing and health-related issues, not only for basic ageing researchers, but also for health care professionals who are inclined to learn more about the role of systems biology in ageing and health. The book includes an introduction and 13 chapters with 36 figures and nine tables. In each section, leading experts have shared their scientific knowledge about their field of expertise related to ageing, covering a broad range of topics such as ageing networks, modulating mTOR, diet-microbiota-health, etc. In every chapter, the authors entail the reader on a journey through the current advances in ageing with a cover image that represents a nutshell of the core topic.

The “Introduction” provides a background of systems biology, its importance in the field of biology as well as a brief description of each chapter contributed by different authors. The first chapter entitled “Introduction to the Theory of Aging Networks” describes systems biology and its use in the perception of the dynamics of ageing using network mathematics. The chapter starts with a history of network analysis and ends with possible genes and protein systems that control an organism’s life span using graph theory.

The second chapter, “Applications to Aging Networks”, includes additional network concepts and applications of the systems biology of ageing. These concepts and models have been used on two model organisms namely, *Saccharomyces cerevisiae* and *Caenorhabditis elegans*.

In the third chapter, “Computational Systems Biology for Aging Research”, study of the ageing process is discussed through the dynamic computational modelling using differential equations. It also describes how different computational models can illustrate complicated age-related disorders allied with unhealthy ageing using this platform.

Chapter 4 entitled “How Does the Body Know How Old It Is? Introducing the Epigenetic Clock Hypothesis” starts with biological clocks which assist in controlling circadian cycles, seasonal rhythms and other normal processes such as growth, development, sexual development, etc. in both animals and plants. A number of ageing clocks have been projected in this section such as cellular senescence suprachiasmatic nucleus, involution of the thymus, the hypothalamus, etc. Finally, the author suggests a novel epigenetics based candidate for an ageing clock, which is the state of chromosome methylation especially in stem cells. However, this hypothesis needs to be validated.

In the fifth chapter, “The Great Evolutionary Divide: Two Genomic Systems Biologies of Ageing” the authors describe two different types ageing in species. This section also provides an evolutionary argument that ageing in various species with frequent sexual recombination is moderately diverse. One type of systems biology of ageing spotlights the effects on
mutants, transgenic, combinations, *etc.* The patterns of ageing related to genome-wide effects, as well as genetic drift on the abundant polymorphic loci have also been commented on.

The sixth chapter entitled “Development and Ageing: Two Opposite but Complementary Phenomena” discusses two different and corresponding aspects of ageing. To compare from the evolutionary point of view, several systems biology techniques to represent ageing-related networks for human and murine models have been used. Finally, validation of the DevAge molecular model has also been dealt with.

An individual’s health deficits accumulate during the life span and may be reflected in ageing, which is discussed in the chapter entitled “Aging as a Process of Deficit Accumulation: Its Utility and Origin”. Here, the frailty index which is related to the biological age of the individual. A stochastic dynamics framework has been applied to model the standard recovery time that expands with age.

The eighth chapter entitled “Low-Grade Systemic Inflammation Connects Aging, Metabolic Syndrome and Cardiovascular Disease” describes the connection of ageing with metabolic syndrome like diabetes and cardiovascular disease and its constant association with inflammatory conditions. The mechanistic target of rapamycin (mTOR), of the PI3K family, is extensively discussed for nutrient response pathway and is also shown to modulate the ageing process. The next chapter entitled “Modulating mTOR in Aging and Health” discusses the ageing process in evolutionarily different organisms as the mTOR activity is thought to prolong the life process from lower to higher organisms like yeast to rodents. Presently, scientists are studying the clinically accepted mTOR complexes and related signaling network which, may provide new promises for interference in human ageing and age-related diseases through the modulation of a particular pathway.

Chapter 10 entitled “Melatonin and Circadian Oscillators in Aging - A Dynamic Approach to the Multiply Connected Players” describes melatonin and its relation to ageing from the systems biology point of view. This hormone plays a vital role in modulating the mitochondrial electron flux, the redox balance as well as inhibits unnecessary free radical development. It also controls the essential circadian clocks and is necessary for high-amplitude rhythms. This chapter also discusses the association of the failure of melatonin release and rhythms to aging and age-related disease.

The subsequent chapter, “Diet-Microbiota-Health Interactions in Older Subjects: Implications for Healthy Aging” suggests that with the help of a healthy lifestyle and modern medicine, people can live longer. The chapter also relates the adult microbial population correlates, markers of inflammation and co-morbidity as well as the nutritional status and finally concludes with the significance of the microbial population and related metabolites in a healthy ageing process with the importance of diet modulation.

In chapter 12, entitled “Systems Biology Approaches in Aging Research”, systems biological advancements have been discussed. Features of the chief methodology such as refined mathematical and computational tools, mathematical modelling and data sets, *etc* have been detailed. It has been suggested that the present systems biological methods from other research fields can be worked out for new age-specific systems biological research methodology.

The last chapter provides an investigational proof for rapamycin on survival and carcinogenesis in the mouse model. It shows that rapamycin is a molecule for pharmacological intervention that can necessitate life period expansion and cancer deterrence.

In conclusion, the editors have succeeded in bringing new systems biology perspectives to clinicians and basic scientists working in ageing and health research. Although seemingly aimed at ageing scientists and systems biology experts, this book should be read by everyone, especially those who work in clinical segments.

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Angiogenesis, lymphangiogenesis and clinical implications, G. Marone, F. Granata, editors (Karger, Basel, Switzerland) 2014. 232 pages. Price: US$221.00 / CHF 188.00 / EUR 157.00
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This book is part of an ongoing series “Chemical Immunology and Allergy”. Angiogenesis is not a new
area, as the importance of new vessel formation in wound healing, tumour progression and metastasis has been recognized for a fairly long time. However, the subject has evoked considerable research attention in the recent years due to better understanding of its role in various diseases and the potential to translate this into therapies. As outlined in the Preface, the book aims to provide the reader with a comprehensive understanding of the factors involved in angiogenesis and lymphangiogenesis, especially in the context of diseases.

The book is concise, and arranged into 13 chapters. The first chapter provides a brief overview of the history of research in this area. It is an interesting chapter, and gives a fair idea of how new the field is and how much of the progress is recent.

The next eight chapters discuss the various aspects of the basic understanding of angiogenesis and lymphangiogenesis, as a biological phenomenon. This area has made significant advances and the topics have been well covered by the respective authors. Much of the new understanding has come from the advances in the fields of immunology and cell biology. Chapter 2 addresses the immune cells which are the main source of the vascular epithelial and placental growth factors (VEGF and PGF), the angioptietsins and semaphorins. Cells of both innate and adaptive immune systems, such as mast cells, macrophages, dendritic cells, basophils, eosinophils and some T cell subsets all contribute to the process. These molecules directly regulate the development of new blood and lymph vessels. Cytokines, chemokines and other mediators produced by immune cells also indirectly influence this process. This detailed chapter though well written has three poorly labelled diagrams and would have benefitted with more illustrations, especially for a non-immunology readership.

Chapters 3 and 4 discuss the role of neutrophils and semaphorins, both of which are crucial molecules in tumour angiogenesis and are, therefore, possible targets for therapy. While the diagrams on semaphorins are good, the neutrophil ones are less so.

In Chapter 5, chemokines and their receptors have been described. These are a large group of about 50 molecules in humans, which with their 20 receptors act directly on endothelial cells and also recruit leukocytes that in turn secrete the angiogenic mediators. These have specific complex expression patterns, although there is also redundancy. These play a nuanced pro- and anti-angiogenic role(s). All these aspects are well covered by the authors with clear diagrams.

The next chapter deals with the plasminogen activation system. Plasminogen/plasmin, their activators and inhibitors and cell receptors play an important role in proteolysis of the extracellular matrix. This is an important component of new vessel formation. This chapter discusses the more recent evidence regarding the role of this system in the angiogenesis process.

Chapters 7, 8 and 9 deal with the role of neutrophils, eosinophils and T regulatory cells which directly, through their capability to secrete various pro- and anti-inflammatory cytokines regulate/ modulate angiogenesis both physiologically as well as pathologically.

The last four chapters deal with the clinical aspects. Although the book title is somewhat suggestive of providing an understanding of the current status of therapies based on the advances on this subject, this part constitutes less than quarter of the book and is far from satisfactory. The only disease conditions that have been addressed are obesity, multiple myeloma, prostate cancer, asthma and chronic obstructive airway disease, while angiogenesis blocking therapies have been approved in colorectal cancer and renal cell carcinoma as well. A more general discussion on these therapies would have been useful for the general oncologist.

Although the book is well presented overall, it has some of the advantages and disadvantages of multi-author books. There is some amount of repetition in content and quality of writing, especially of illustrations is variable. The small introductory paragraph in smaller print at the start of each chapter is often redundant. Many chapters dive into the topics without any overall background and the concluding remarks at the end of each chapter in many cases do not add to the content.

In conclusion, this is a well brought book, with more emphasis on basic mechanisms than the clinical aspects. Hence it may be of greater interest to biologists working in the area than clinicians.

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This book addresses three main aspects of electrodiagnosis, i.e., nerve conduction, electromyography and evoked potentials. These are discussed in terms of their technique, recording, interpretation and clinical applications.

The book starts off from the history to various practical aspects of clinical neurophysiology presented in a concise manner. Keeping the needs of postgraduate students, the authors at the end of each chapter have included important “learning points”. While many clinicians develop a mental block when it comes to understanding basics of electrophysiology, its importance in having a sound understanding of the basics has been stressed. The authors introduce the readers to this very aspect starting with what is voltage, etc. The difference between monopolar and bipolar recordings and how the electrode tip can affect recordings has been explained well in the second chapter.

For the chapter on nerve conduction studies, they start with the basic anatomy and physiology and then the actual principles of nerve conduction. These are supported with drawings showing electrode placement with the associated responses. One of the important aspects covered in this book is about variables in recording and the normative data seen in Indian population. This would give a quick reference to what a normal or an abnormal recording is. Furthermore, tables have also been included to summarize tests for diagnosis.

The chapter on EMG (electromyography) is the highlight of this book. This being a difficult area in clinical practice, it would require considerable amount of skill and practice. Also, since the variables in recording are many, it would require patience and a rapport with the patients to make them relax and activate the muscles accordingly. Being aware of the pitfalls that one would encounter while recording, the authors have introduced the subject from the basics (anatomy, type of electrodes to be used, etc).

Since the subject is vast the authors have employed a practical approach by providing tables, line diagrams, recordings, path images, photographs, technique, overview of investigations and learning points.

Evoked potentials form the next part of this book. Though the importance of evoked potentials has considerably reduced with the advent of CT/MRI, it still forms a major armament in any diagnostic laboratory. Hence, the popular evoked potentials i.e., Visual Evoked Potentials (VEP), Brainstem Auditory Evoked Potentials (BAEP), Somatosensory Evoked Potentials (SSEP), Motor Evoked Potentials (MEP) and Cognitive Evoked Potentials have been discussed. The MEPs are relatively new and one would require understanding the differences between magnetic and electrical stimulation and the stimulation coils to be chosen and their respective positioning. Certain precautions to be taken before using this method have also been discussed. The importance of using this technique particularly for establishing central conduction is well explained. The therapeutic application of rTMS, a field in its nascent stage has also been included.

One chapter, “Electrodiagnosis in Pediatric Practice” has been dedicated to the difficulty in performing tests in the paediatric group with their normative values being different from that in adults. This chapter also includes nerve conduction studies, needle EMG, evoked potentials and their relevance to clinical diagnosis, along with the precautions to be taken.

The book ends by summarizing the various neurological diseases with relevance of using electrodiagnostic methods for assessing and correlating them with disease progression (limitations and strengths).

Overall, this is a well-rounded book of practical importance for any neurologist. Inclusion of audio of recordings, particularly the EMG recordings in future editions may add further value.

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