issues associated with MP techniques. Recently, it has been realized that the use of combined preservation techniques is more reliable and versatile, such as combining MP with photochemical processes, other physical and chemical treatments, etc. for ensuring a longer shelf life of fruits and vegetables. The concerned chapter however has failed to provide a note on it.

Chapter 12 gives a brief summary on fermentation preservation of foods. Being an effective technique used in extending the shelf life of foods for millennia, the chapter should have commenced with a historical note. When historians report that cheese was produced in 6000 BC itself (in Iraq), it would have been more interesting to the readers if a timeline of similar events that have occurred in history related to fermentation was provided. Further, the chapter is incomplete as several prime topics are left uncovered. For example, the author has described only the lacto-fermentation, where details of bacteriocins such as nicins, lacticin, etc. are not discussed. In my opinion, in the post-genomic age of microbiology, this chapter could have been written better covering all the information pertaining to fermentation preservation for improving the safety, quality and composition of food products. Chapter 13 on packaging of food products elaborates the importance of packaging along with its associated aspects such as packaging materials, tactics, requirements, etc. All these modules have adequately been described, providing a good amount of exposure to the readers who are unaware of the role of packaging in maintaining hygiene of food materials. Chapter 14 summarizes the non-thermal methods of food preservation. Different non-thermal methods such as high pressure, pulsed electric field, oscillating magnetic field, ultrasound, pulsed light and ozonation-mediated processing are detailed in the chapter. For reasons unknown, much emphasis is given to high-pressure processing, whereas other techniques are only briefly summarized. The use of non-thermal processes in combination with other preservation technologies presents a number of potential benefits to food preservation, but this aspect has not been discussed anywhere in the chapter.

Chapter 15 on functional foods describes the nutraceutical aspects of food materials along with the different methods available for processing and preserving these foods. I enjoyed reading this chapter in particular, as it discusses a completely new aspect in an interesting way. In my opinion, this chapter would serve as an important resource material not only for those who are associated with food sciences, but also provides preliminary leads to researchers who are working in nutritional genomics. Food laws and regulations are defined in chapter 16, which discusses the national and international food laws and regulatory systems. More emphasis has been given to Indian food laws, but equal importance should have been provided to international laws too, as this would help the readers have a comparative understanding on national and international laws related to food safety.

Taken together, the book under review is a quality output from subject experts from various Indian and international institutes and organizations. It is well organized and the choice of paper for printing and binding is worth appreciating. The only drawback is with the printing, which appears like a photocopy. The editors could have encouraged the authors to provide actual photographs in support of their essays, e.g. photographs of actual food processing machinery, types of packed foods, etc. Lack of coloured illustrations is also another shortcoming. Regardless, this book is an excellent contribution to the area of food science and technology.

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Annual Review of Cell and Developmental Biology, 2013. Randy Schekman, Larry Goldstein and Ruth Lehmann (eds). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, CA 943030-0139, USA. Vol. 29. 651 pp. Price: US$ 97.00.

This volume begins with an interesting and thought-provoking introduction. Rather than describing the contents in the *Annual Reviews*, the editors discuss the sociology of publications. More specifically, the tendency of scientists to publish in competitive or 'high impact factor' journals is debated. The unfortunate scenario where many review committees and academic institutions favour candidates who publish in 'prestigious journals', based on impact factors (IFs) and personal cash incentives for publishing in high IF journals is highlighted. In response to the flawed manner in which IF is used to judge scientific merit, recommendations of San Francisco Declaration of Research Assessment are prominently discussed. At the end, the modus operandi for submission and evaluation of reviews in the *Annual Review of Cell and Developmental Biology* is detailed.

Ten of the 22 reviews are related to developmental biology. This is my classification and not implied or attempted by the editors. The topics are varied and newer aspects and perspectives are outlined in areas that have been subject of extensive investigations for more than two decades. The reviews related to development include: (1) Molecular and cellular processes involved in body axis formation and patterning with focus on chicken embryo as a model system. The authors Bénazéraf and Pourquié review aspects of gastrulation and formation of the anterior part of the body axis, extension of axis and formation of posterior body and regulation of segment number and axis length. Although the topics covered in the review have been the subject of extensive investigation for several years, several questions remain to be answered, as indicated by the authors in the various sections and conclusions. How physics may be integrated into the field of morphogenesis is also refered to in the concluding section. Findings in other embryonic model systems have been discussed with respect to convergence and divergence of specific developmental mechanisms. (2) The central role that physical forces and extracellular matrix mechanisms play in various aspects of embryonic development. Mammoto *et al*. in the review entitled 'Mechanobiology and developmental control', discuss control of cell-fate switching pattern formation and tissue development in the embryo. The review also details how these mechanical signals contribute to tissue homeostasis and developmental control throughout adult life. In the concluding section, the

authors suggest that mechanical forces could be as crucial as chemical factors for various aspects of development. (3) Developmental functions of mitogen-activated protein kinases (MAPKs) with respect to osteoblast differentiation. MAPKs play a crucial role in several biochemical pathways. Greenblatt *et al*. discuss in detail ERK, p38 and JNK in osteoblasts. In the concluding remarks, their potential use in therapies is discussed. (4) Organogenesis of pancreas. Shih *et al*. review lineage determination to morphogenesis. Various aspects of the biology and biochemistry of the pancreas have been the subject of extensive investigations. An overview of pancreatic lineage determination, organogenesis and future implications of research in this area for treatment of diabetes mellitus by cell replacement is provided. In the section on 'Future prospects' the authors outline some of the unsolved aspects that remain to be addressed, notwithstanding the extensive research in this area. (5) Different aspects of kin conflict in plant seed development. Various aspects of maternal–offspring relationships in species have been the subject of extensive investigation. The review by Haig examines various aspects related to parent–offspring conflict such as control of seed size, genomic imprinting in endosperm and embryos, DNA methylation, and aspects of crosses and function of siRNAs. *Arabidopsis* has been used as a model system. In the concluding section entitled 'Future issues', unsolved problems that need to be addressed are discussed. (6) Mechanisms of oriented neuronal migration in the developing brain. Evsyukova *et al*. discuss various facets of neuronal migration. Tables that detail genes regulating critical neuronal migration and analysis of signalling pathways regulating critical neuronal migration are highly informative, particularly to researchers working on these genes. (7) Neurobiology of the vision with emphasis on synaptic laminae in visual system by Baier. The article has several excellent illustrations depicting complex neurophysiological processes. How various proteins interact with their receptors to bring axons and dendrites into spatial register is highlighted. (8) Influence of microbiomes in metazoan development. Lee and Brey focus on *Drosophila* modeling of gut–microbe interactions. The 'Historical perspective' section traces early pioneering work by Louis Pasteur and Elie Metchinkoff. The review details extensive work related to the role of subcommensal microbioter in host physiology of *Drosophila*. (9) Various aspects of cell and developmental biology of arbuscular mycorrhiza (AM) symbiosis. AM which is a symbiosis between fungi and land plants, is perhaps the most widespread symbiosis. The article by Gutjahr and Parniske reviews aspects such as mutual recognition of the symbiotic partners, intra-radical development of AM, arbuscule development and regulation of AM development of nutrient availability. (10) Spermatogonial stem cell renewal and development. Kanatsu-Shinohara and Shinohara review spermatogonial self-renewal, spermatogonial stem cells and their environment, characteristics of spermatogonial stem cells and development and differentiation of spermatogonial stem cells. The table on spermatogonial stem cell transplantation and culture in different animal species is a handy reference and would be of interest to researchers in the area. Future directions indicate the need for improvement and development of experimental protocols in the area of spermatogonial stem cell research.

Reviews on stem cell biology include: (1) Tissue-level coordination of stem cell dynamics. Stem cells play an important role in ensuring the function of organs during the lifetime of adult animals. Stem cell niches and how they promote stemness and direct stem cell behaviour have been investigated extensively. O'Brien and Bilder examine what is known about higher-order mechanisms for inter-niche coordination in epithelial organs and consider the potential existence of stem cell territories and how tissue architecture may influence niche coordination. (2) How hormones affect stem cell biology in organs such as ovary, intestine, hematopoietic system and mammary gland? Gancz and Gilboa review the hormones that control the four stem cell-based systems in three different model organisms. They address several aspects that are crucial for understanding how stem cells and their niches form and function. In the 'Perspectives' section, the authors dwell upon the current status and future lines of research. (3) microRNA control of mouse and human pluripotent stem cell behaviour. Greve *et al*. review the mechanisms by which the single family of microRNAs expressed by pluripotent cells and other microRNAs regulate different aspects of the pluripotent stem cell programme in mouse and human. The section on 'Future directions' indicates unanswered questions that could direct research in this area.

Cytoskeletal elements are the subject of two reviews. They include: (1) Cytoskeletal dynamics in *Caenorhabditis elegans* axon regeneration with emphasis on microtubule cytoskeleton by Chisholm. (2) Role of microtubules in cell migration, where Etienne-Manneville reviews the function of microtubules in persistent cell migration and of the migration associated signals that promote microtubule network polarization. Two reviews focus on kinesins. In the review by Walczak *et al*., several unanswered questions related to microtubule depolymerization with focus on kinesin-8 and 13 are addressed. In the review by Scholay, the diverse oligomeric status of kinesin-2 and its function related to cell development and transport are discussed.

Cell nucleus and nuclear organization have been areas of intense research in cell biology. Important aspects of nuclear organization have been established and reviewed extensively. In a review in this area by Politz *et al.*, the focus is on heterochromatin. More specifically, the evidence that heterochromatin formation and compartmentalization may drive nuclear organization is examined.

Two reviews are in the area of membranes. Extensive research has led to the identification of proteins that facilitate various membrane processes in cells such as fusion, fission and membrane curvature generation. The review by McNew *et al.* focuses on dynamin-related proteins that are key players in membrane fusion. In the second review by Rossman and Lamb, mechanism of membrane scission and the ways in which enveloped viruses use these systems to mediate the release of budding viruses are discussed.

In the area of neurophysiology, how diverse natural products such as aspirin, morphine, menthol, capsicum, thiosulphinates and isothiocyanates have been used as probes of pain pathway is discussed by Julius in the article entitled 'TRP (transient receptor potential) channels and pain'.

In mathematical modelling of eukaryotic cell migrations, Danuser *et al*. discuss explicit mathematical models of cell migration and evaluate their ability to integrate experimental data. In the concluding section entitled 'What lies

ahead', the authors argue the need to build an integrated model for cell migration.

As is the trend in recent volumes of the *Annual Review of Cell and Developmental Biology*, all reviews have excellent and informative illustrations. Figures have been designed by the authors based on their perception of a particular area. Very few figures have been adapted from original papers. Most of the references (limited to 175) are recent and most of the reviews do not dwell on historical background, even in areas that have been the subject of extensive investigations for several decades. In some reviews, the information provided in the tables would be informative to researchers in the field. The unanswered questions posed in the areas where research has been active for decades, though from the perspective of the authors of the reviews, would be of interest to researchers who intend to initiate work in these areas. Information such as related articles in other *Annual Reviews* and article titles in the *Annual Review of Cell and Developmental Biology* in volumes for the past five-years is an excellent value-addition.

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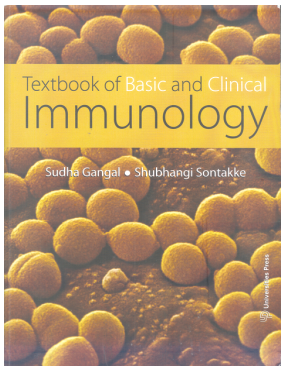


Textbook of Basic and Clinical Immunology. Sudha Gangal and Subhangi Sontakke. Universities Press (India) Pvt Ltd., 3-6-767/1/A and 3-6-754/1, Himayatnagar, Hyderabad 500 029, India. 2013. 572 pp. Price: Rs 800.

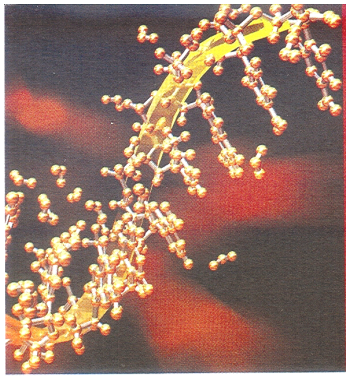
The book under review is a useful addition to immunology literature. The book is divided into 27 chapters dealing with major sub-areas of immunology. The introductory chapter gives a historical perspective of immunology and essentially provides a summary of different areas covered in the book. This book is organized in three parts: the first 16 chapters deal with basic immunology, chapters 17 and 18 deal with immunological methods and chapters 19 to 26 cover clinical immunology. The final chapter is on vaccine. The subject matter is organized in a way that it holds the attention of the reader. Avoidance of unnecessary jargons in the book makes the subject of immunology truly student-friendly.

The chapters on basic immunology deal with innate immunity, cells and organs of the immune system, antigens, antibodies, antigen presenting cells and antigen presentation, major histocompatibility complex, B cell biology, T cell biology, immunoglobulin gene rearrangement, T cell receptor and T cell receptor gene rearrangement, cytokines, chemokines, cell signalling and trafficking, complement system, and effector function of antibodies, and cells of the immune system. The subjects are concise and ensure that the reader will not lose interest half way through. Special mention may be made about the chapter on complement, which emphasizes salient feature of complement structure, function and chemistry for easy understanding. It would have been useful to have a chapter on immunological memory for more complete treatment of the subject.

The two chapters dealing with immunological methods will provide the students an introduction to immunological techniques and enable them to find more specific applications in detailed texts available elsewhere. This section, however, does not deal with important topics like immuno histochemistry, and immunocytochemistry. Cellular assays and monoclonal antibodies are well covered.

The chapters dealing with clinical immunology as well as general principles, also deal with immune response against specific diseases important in the Indian context. These diseases are tuberculosis, leprosy, pneumonia, influenza, AIDS, malaria, leishmaniasis, and filariasis. Immune responses against the causative organisms of these diseases have been described in some detail and would be useful for both students of medicine and immunology.

The chapter on tumour immunology describes basic biology of cancer and its



Nicked DNA molecule; source: OSDATA.

immunobiology. Students will get a good introduction to this important area. It will enable them to explore specialized texts in journals and other scholarly publications. The chapter on tolerance and autoimmunity deals with central and peripheral T and B cell tolerance, and their causes and consequences. Various factors like genetic, environmental, lifestyle, drugs and infections, suspected to have a role in autoimmunity have been discussed. Autoimmune diseases like myasthenia gravis, Grave's disease, Hashimoto's thyroiditis, insulin-dependent diabetes mellitus, systemic lupus erythematosus, rheumatoid arthritis and multiple sclerosis have been introduced. Immunological disorders like type I, II, III, IV hypersensitivity and diseases associated with different types of hypersensitivity have been described. Acquired and inherited immunodeficiency diseases are dealt in a separate chapter which various diseases, their causes, and the cells and molecules that are affected, are discussed in some detail. The last chapter of the book describes various types of vaccines, their delivery systems and highlights the challenges.

This book is useful both for medical students and basic biologists interested in immunology. The authors have done a commendable job. The quality of the book is summed up well in the foreword written by R. A. Mashelkar. This book should find a place in all libraries of medical schools, universities and science colleges. Serious students and teachers would much benefit having their own personal copy.

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