Croat Med J 2005;46(1):161-164

Burmester G-R, Pezzutto A. (with contributions by Ulrich T, Aicher A). Color Atlas of Immunology. Stuttgart New York: Thieme; 2003. 322 pages; ISBN 0-86577-964-3; price: US$ 39.00

Field of medicine: Human immunology.

Format: Paperback pocket book.

Audience: This atlas is aimed to graphically present the subject matter, mostly in the field of human immunology, with a brief text-segment explanation. It can be useful to students of medicine and biosciences as a handbook that accompanies major immunology textbooks, as well as to physicians and biologists to refresh their knowledge or introduce them to the basis of human immunology.

Purpose: The book provides an overview of the basic knowledge of modern human immunology in words and pictures, with aspects of the immunological basis of diseases, presented through 131 color plates, 13 tables, and explanatory text paragraphs. As stressed by authors, this color atlas "graphically depicts" mechanisms of immune functions in order to explain the diverse interactions between basic principles, as well as laboratory and clinical applications of immunology so as to "create a vivid mental picture" understandable to all readers.

Content: The atlas is divided into three main segments: fundamental principles of human immunology, laboratory applications of essential laboratory tests, and the clinical immunology with clinical aspect of immunological diseases. The appendix contains a glossary of important terms, reference laboratory values, disease classifications, and tables including the lists of CD antigens, cytokines and chemokines.

The first part, *Fundamental Principles,* includes 13 chapters, starting with an overview of cells and organs of the immune system. The following several chapters provide a detailed description of major cells of acquired immune response (T and B lymphocytes), their development, antigen recognition, activation, differentiation, and effector-functions. This section also deals with other immune cells, including antigen-presenting cells, natural killer cells, monocytes and dendritic cells. The importance and complexity of the HLA system is emphasized in a separate chapter. Other important concepts of immune function, such as cell-to-cell interactions and leukocyte migration, innate immunity, and complement system are also explained. The first part ends with two chapters, one which analyzes immune tolerance and pathological immune mechanisms, including hypersensitivity and autoimmunity, and the other which describes induction, regulation, and mechanisms of apoptosis as a tool of a programmed cell death.

The second part, *Laboratory Applications,* deals with the most commonly used techniques to test immune system function in experimental and clinical medicine. This section is divided into four chapters, including assays to test antigen-antigen interactions, cellular immunity, humoral immunity, and molecular biological methods. "Conventional" methods such as precipitation, electrophoresis, agglutination, complement-binding assays are described along with "newer" techniques such as fluorescent-activated cell sorting, as well as different molecular-biology methods for gene expression analysis and DNA-sequencing.

The last part, *Clinical Immunology*, includes 19 chapters, aimed to explain the mechanisms of immune disturbances and essential immunological features of immune diseases, as well

as the manipulation of the immune response by vaccination and drugs. Separate chapters describe immunodeficiencies, hemolytic diseases and cytopenias, hematological diseases, tumor immunology, transplantation immunology, musculoskeletal diseases, autoantibody production, connective tissue diseases, skin diseases, respiratory diseases, renal diseases, heart diseases, neurological diseases, ophthalmic diseases, reproduction immunology, vaccinations, and immune pharmacology.

Highlights: Despite its pocket size, the atlas contains all essential information regarding human immunology. Nevertheless, the authors emphasize that the atlas can not cover "all areas of the immense field of immunology in their entirety" and that "the current edition cannot provide full coverage" of the "enormous developments in immunological research". Although some colleagues may prefer a more comprehensive presentation provided by a number of excellent textbooks accurate and easy-to-survey atlas may be very helpful if you are running between two lectures, two experiments, or two patients. The right side of the opened book carries an illustration, providing the schematic representation of immune processes described on the left side. This makes learning both easy and exciting.

Since the atlas, by definition, has to focus on the graphical presentation, it is very important that each of 131 color plates (photographs of patients with the characteristic features, CT scans, blood smears, and schematic illustration), although given in relatively small-size figures, is easy-to-understand, clear, informative, and high quality. The figures are designed in a way to "depict certain processes and their progression through time and different phases, as well as the interactions between a number of different substances and elements". All these complex requirements are successfully achieved without overloading the color plates with unnecessary details.

Related reading: A number of other pocket-size color atlases are available from the Thieme Flexibook: Color Atlas of Physiology, by A Despopoulos; Color Atlas of Cytology, Histology and Microscopic Anatomy, by W Kuhnel; Color Atlas of Biochemistry, by J Koolman; Color Atlas of Neuroscience: Neuroanatomy and Neurophysiology, by B Greenstein; and Color Atlas of Genetics, by E Passarge; and Color Atlas of Pathophysiology, by S Silbernagl.

Danka Grčević

BOOK REVIEW

Breit SN, Wahl SM, editors. Bone Morphogenetic Proteins: Regenaration of Bone and Beyond (Progress in Inflammation Research Series; Parnham MJ, series editor). Basel-Boston-Berlin: Birkhäuser Verlag; 2004. 310 pages; ISBN 3-7643-7139-0; price: US$164.00

Field of medicine: Bone biology.

Format: Hardcover book.

Audience: Academic and industrial biomedical researchers, biologists, pharmacologists, pathologists, neurologists, nephrologists, rheumatologists, orthopedic surgeons and other clinicians interested in this field.

Purpose: To provide an overall assessment of the bone morphogenetic proteins (BMPs) and theirinvolvement in molecular signaling during the development of various organs, with the emphasis on bone regeneration and repair. This book provides a wealth of information and can serve as a ready source for all interested readers.

Content: The book is divided into thirteen chapters, each consisting of a short introduction, several titled paragraphs dealing with the specific topic and the list of references at the end.

The first chapter introduces the family of BMPs (osteogenetic proteins) and describes their role as growth differentiation factors in bone remodeling and cartilage repair. Their role in the development of other, extraskeletal organs and signal transduction mechanisms are briefly described.

The second chapter gives a detailed survey of BMP receptors, their structure, expression, mechanisms of activation, and possible gene targeting approach. It also describes the structure, activation, and function of downstream Smad proteins and points to the potential therapeutic use of BMPs.

The third chapter discusses the role of BMPs in different biological proceses, gene disruption or overexpression found in different malformations, which helped identify the function of specific BMPs and their receptors. There is also a brief description of a group of proteins called cartilage derived morphogenetic proteins, CDMPs (growth differentiation factors, GDFs), also members of the BMP family.

The fourth chapter focuses on the role of BMPs in the development of various organs and tissues, gives information about their importance in molecular mechanisms of pattering, (such as neural and somite), and describes the role of specific BMPs in the development of different organs in detail.

The fifth chapter reviews the data on the role of BMPs in articular cartilage repair from the standpoint of both *in vitro* culture studies (such as studies of anabolic activity of exogenous BMPs on chondrocytes or studies on endogenous BMPs in cartilage) and studies of repair in various animal models (such as canine osteochondral defect repair studies, rabbit studies, and large animal studies).

In the sixth chapter, the role of BMPs in craniofacial reconstruction is described. BMPs or BMP genes can be used for the reconstruction of mandibular continuity defects because of their potential to replace autogenous bone, as shown in dogs and rodents. The author discusses the use of autogenous bone grafts and problems that occur in harvesting these grafts due to limitations concerning the donor. These problems can be overcome by prefabrication of a bone graft, thus creating a bone graft in an accessible soft tissue area of an animal, a process in which BMPs are used. New possibilities in dental surgery and implant dentistry are also described, depending on recombinant BMP approval.

The seventh chapter gives a short overview of the usage of osteogenic protein-1 (OP-1 or BMP-7) in the treatment of long bone fractures. Important studies and trials are briefly described.

In the eight chapter the first commercially available recombinant human BMP (rhBMP-2) is described, including methods of its application in different concentrations and carriers. The most interesting paragraph deals with the efficacy of rhBMP-2 in patients with degenerative disc disease. The problem of the best vehicle to use for the delivery of the protein to the desired location is pointed out as the main reason for a certain delay in commercial accessibility of rhBMP-2. The question is still under discussion.

The ninth chapter describes the role of BMPs in the development of the skeleton, especially in the molecular signaling during joint formation, as well as prenatal and postnatal development of the joint. The emphasis is given to their role in various joint conditions: degenerative and inflammatory diseases, infectious arthritis, and tumors.

The tenth chapter discusses the importance of BMP-7 and its signaling in the process of kidney development. Relevant gene knockout and *in vitro* experiments are briefly described. There is also information on other BMPs, BMP receptors and BMP antagonists involved in kidney development. At the end of the chapter, the role of BMP-7 in the repair and regeneration of adult kidney is described, in the light of its possible use as a therapeutic factor in acute and chronic renal failure, as well as because of its ability to reduce renal damage associated with ischemia, nephrotoxic agents, obstruction, and diabetes.

The eleventh chapter deals with the role of BMPs in the central and peripheral nervous system: their role in crucial developmental events, such as pattering, segmentation, neural fate decisions, synapse formation and growth, regulation of neurotransmiter phenotype, and their neuroprotective role, together with their potential therapeutic use in neural diseases.

The twelfth chapter focuses on tumor-related alterations of BMP signaling, describes their expression level in tumor tissues, as well as their importance for tumor diagnosis and

prognosis. Furthermore, it discusses the alterations of biological role in molecular signaling of some members of the BMP family which could affect the proliferation of tumor cells, suggesting that BMP signaling could be a target for future cancer therapy.

The final chapter deals with BMPs as a new therapy for rapid bone healing. The results are promising but due to high costs of such therapy and possible problems with protein therapy, other therapeutic alternatives, such as the use of prostaglandin E_2, are explored.

Highlights: The book provides an excellent overview on BMPs, based on experimental and clinical information, which can rarely be seen in a single book. Some topics examined in the book, such as the alteration of BMP signaling in cancer, neuroprotective role of BMPs, clinical application of BMPs in tissue regeneration, especially rapid bone healing, and skeletal malformations are very interesting and provide ideas for possible future therapeutic solutions. The text is accompanied by schematic, histological and radiological images and photographs. At the end of most chapters there are concluding remarks which help the reader to summarize the given information. The index at the end of the book enables quick orientation and selective reading.

Limitations: Although each chapter begins with a short introduction, it cannot provide a complete overview of rather complex processes and mechanisms. The aim of the book is not to be a student textbook appropriate for acquiring the basic concepts of BMP family but requires a certain amount of previous knowledge about this topic. Thus, only readers with specific interest in regenerative medicine could fully benefit from this unique book.

Related reading: Other books from the Progress in Inflammation Research Series: Vukičević S, Sampath KT. Bone morphogenetic proteins – from laboratory to clinical use (2002); Breit SN, Wahl SM. TGF-a and related cytokines in inflammation, (2001); and Berg WB van den, Miossec P. Cytokines and joint injury (2004).

Daniela Salopek