Second Textbook of Anatomy and Physiology

for Health Professionals

This textbook on human anatomy and physiology covers the syllabi for paramedical and allied health sciences in a thorough, yet concise manner. The text matter has been systematically organized into eleven sections. Each section begins with a brief overview highlighting the topics covered and has been further divided into various chapters. It is hoped the book will be useful in laying a strong foundation for paramedical and allied health sciences undergraduate students.

- Unique compendium with an integrated approach of studying anatomy and physiology developed and updated as per the syllabus of Paramedical and Allied Health Sciences
- Fundamentals of anatomy and physiology covered in concise yet comprehensive manner in simple and easy-tounderstand language making it an essential asset for every student.
- 'A picture is worth more than a thousand words.' Hence, this book incorporates 600+ four-color diagrams to make the learning and reading experience more engaging. All diagrams are easy to reproduce in the examinations.
- A new chapter, "Introduction to Chemistry of Life" has been added.
- Histology of important structures has been added as "Histology Plates" along with histological photomicrographs to provide a new dimension for an integrated learning.
- Clinical correlations and applied anatomical and physiological concepts have been separately highlighted as clinical aspects boxes to help the students in understanding the correlations of basic sciences with clinical scenarios.

Indu Khurana MD is presently Dean-cum-Principal, and Professor of Physiology, World College of Medical Sciences and Research, Jhajjar. Formerly she was Senior Professor and Head, Department of Physiology at Pt. BD Sharma Post Graduate Institute of Medical Sciences (PGIMS), and Dean, Faculty of Pre-clinical Sciences, University of Health Sciences (UHS), Rohtak. She is Founder President of Association of Physiologists of Haryana and possesses a rich teaching experience of about 40 years. She has published extensively in national and international journals with discovery of a new reflex, the 'Oculodepressor Reflex' (ODR) and three distinct patterns of Oculorespiratory reflex (ORR) to her credit. For her valuable contribution in the physiology of oculovisceral reflexes, she has been bestowed with excellence awards by American Academy of Ophthalmology (AAO) and Strabismological Society of India (SSI). She has also been honored with excellence award by Association of Physiologists of



Haryana for her exemplary contribution in the field of physiology.

She is an established author having published many successful books, mainly Textbook of Medical Physiology for Postgraduates, Medical Physiology for Undergraduate Students, Textbook of Anatomy and Physiology of Eye, Essentials of Medical Physiology, Textbook of Human Embryology, and Fundamentals of Anatomy and Physiology for Diploma Nursing. She has also contributed many chapters for Modern System of Ophthalmology, a postgraduate reference book.

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Allied Health Sciences, Textbook of Anatomy and Physiology for Health Professionals and Fundamentals of Anatomy and Physiology for Nursing and Allied Health, published by Oxford University Press, Malaysia. She has also contributed four chapters on physiological aspects in postgraduate level textbooks.

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Textbook of

Edition Textbook of Anatomy and Physiology

for Health Professionals









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for Health Professionals

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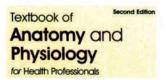


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Preface

This book has been conceptualized by keeping in view the syllabi of Allied Health Sciences courses. The book contains concise exposition of the basic and applied text on human anatomy and physiology, which has proved to be a boon for understanding the fundamentals of the subject by the students of nursing and other Allied Health Sciences. The text matter is aimed at providing an insight into how the body is structured, how it functions and how the alterations in normal structure and functioning result in disease. To achieve this aim, the text on core and applied aspects of human anatomy and physiology has been skillfully intermingled and presented in an adorned form. It is hoped, that the book will fulfill its aim of laying a strong foundation for students of Allied Health Sciences.

The book has been organized into 11 sections and each has been subdivided into various chapters. Section one is on 'Introduction to Anatomical terms; Organization of the Body' and rest ten sections are devoted to the various organ systems of human body.

The salient features of the book are as follows:

- The text has been organized in such a way that students can easily understand, retain and reproduce it. Various levels of headings, subheadings, bold face and italics given in the text will be helpful in quick revision of the text.
- The exposition of the text is such that every student will find it easy to conceptualize it.
- A brief list of contents given in the beginning of each chapter provides a clear layout of the text.
- The text has been well illustrated with high quality colored line diagrams, which provide vivid and lucid details.
- The important information has been highlighted with the help of plenty of tables and flowcharts.
- To emphasize the clinical significance of anatomy and physiology, the relevant applied aspects have been covered
 adequately in each chapter and have been highlighted separately as "Clinical Aspects".
- The histological features of various structures have been highlighted as 'Histology Plates' to help the students in getting acquainted with its importance in the study of anatomy and physiology.
- "Also know" boxes contain additional important information.

I would like to thank all faculty members and students who helped me with healthy criticism during the making of this book. Having Dr. Arushi Khurana, MD, former Chief Resident, Department of Internal Medicine, University of Connecticut, USA and Fellow, Hematology – Oncology, Massey Cancer Center, Virginia Commonwealth University, Richmond, VA, as coauthor has been very useful while composing the applied aspects. I bow with reverence to my teachers for grooming me for this task. I wish to express indebtedness to my husband Dr. AK. Khurana, Sr. Professor Regional Institute of Ophthalmology, PGIMS, Rohtak; my son, Aruj K Khurana, Vitreo Retinal Surgeon, NEI, Rishikesh; daughter-in-law, Dr. Bhawna Piplani Khurana, Oculoplastic Surgeon, Rishikesh; and Son-in-law Dr. Gurukripa Kowlgi, MD Internal Medicine, University of Connecticut, USA and Fellow, Cardiovascular Diseases Pauley Heart Center, Virginia Commonwealth University Richmond, VA.

I am highly thankful to Dr. (Mrs.) Ritu Singh, Trustee, and Dr. Narender Singh, Chairman, World College of Medical Sciences and Research, Jhajjar for encouragement and infusing academic atmosphere.

Finally and perhaps most importantly, I would like to express my special appreciation to Mr Satish Kumar Jain (Chairman) and Mr Varun Jain (Managing Director), M/s CBS Publishers and Distributors Pvt Ltd for their wholehearted support in publication of this book. I have no words to describe the role, efforts, inputs and initiatives undertaken by Mr Bhupesh Arora, Vice-President, Nursing for helping and motivating me.

Textbook of Anatomy and Physiology for Paramedical Students

I would like to thank Dr Mrinalini Bakshi (Sr. Content Developer and Editor) for her editorial support on this project. I personally thank Ms Nitasha Arora (Project Manager), Ms Neetu Jindal (Asst Production Manager), Mr Nitish K Dubey (Sr. Editor) and all the production team members Mr Ashutosh Pathak, Mr Chaman Lal, Mr Phool Kumar, Mr Bunty Kashyap, Mr Prakash Gaur, Mr Prabhat Ranjan, Ms Tahira Parveen, Ms Babita Verma, Mr Raju Sharma, Mr Vikram Chaudhary and Manoj Chaudhary for devoting laborious hours in designing and type-setting of the book.

Sincere efforts have been made to verify correctness of the text. However, inspite of best efforts, some inaccuracies, ambiguities and typographical mistakes are likely to be noticed by the readers. Therefore, feedback and suggestions from the teachers and students are invited for improving the future editions. Feedbacks received will be highly appreciated and duly acknowledged.

Indu Khurana

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