

Textbook of Anatomy and Physiology for Nurses



System requirement:

- Windows XP or above
- Power DVD player (Software)
- Windows media player 10.0 version or above (Software)

Accompanying Photo CD Rom is playable only in Computer and not in DVD player.

Kindly wait for few seconds for Photo CD to autorun. If it does not autorun then please do the following:

- Click on my computer
- Click the **CD/DVD drive** and after opening the drive, kindly double click the file **Jaypee**

Textbook of **Anatomy and Physiology for Nurses**

SECOND EDITION

PR Ashalatha

BSc MBBS MS (Anatomy)
Assistant Professor
Department of Anatomy
Calicut Medical College
Calicut, Kerala, India

Co-author

G Deepa

MD (Physiology)
Assistant Professor
Department of Physiology
Sree Gokulam Medical College and
Research Foundation
Thiruvananthapuram
Kerala, India



JAYPEE BROTHERS MEDICAL PUBLISHERS (P) LTD

St Louis (USA) • Panama City (Panama) • New Delhi • Ahmedabad • Bengaluru
Chennai • Hyderabad • Kochi • Kolkata • Lucknow • Mumbai • Nagpur

Published by

Jitendar P Vij

Jaypee Brothers Medical Publishers (P) Ltd

Corporate Office

4838/24, Ansari Road, Daryaganj, **New Delhi** 110 002, India, Phone: +91-11-43574357, Fax: +91-11-43574314

Registered Office

B-3, EMCA House, 23/23B Ansari Road, Daryaganj, **New Delhi** 110 002, India

Phones: +91-11-23272143, +91-11-23272703, +91-11-23282021, +91-11-23245672, Rel: +91-11-32558559

Fax: +91-11-23276490, +91-11-23245683, e-mail: jaypee@jaypeebrothers.com, Website: www.jaypeebrothers.com

Branches

- 2/B, Akruti Society, Jodhpur Gam Road Satellite
Ahmedabad 380 015, Phones: +91-79-26926233, Rel: +91-79-32988717
Fax: +91-79-26927094, e-mail: ahmedabad@jaypeebrother.com
- 202 Batavia Chambers, 8 Kumara Krupa Road, Kumara Park East
Bengaluru 560 001, Phones: +91-80-22285971, +91-80-22382956, Rel: +91-80-32714073
Fax: +91-80-22281761, e-mail: bangalore@jaypeebrothers.com
- 282 IIIrd Floor, Khaleel Shirazi Estate, Fountain Plaza, Pantheon Road
Chennai 600 008, Phones: +91-44-28193265, +91-44-28194897, Rel: +91-44-32972089
Fax: +91-44-28193231, e-mail: chennai@jaypeebrothers.com
- 4-2-1067/1-3, 1st Floor, Balaji Building, Ramkote Cross Road
Hyderabad 500 095, Phones: +91-40-66610020, +91-40-24758498, Rel: +91-40-32940929
Fax: +91-40-24758499, e-mail: hyderabad@jaypeebrother.com
- No. 41/3098, B & B1, Kuruvi Building, St. Vincent Road
Kochi 682 018, Kerala, Phones: +91-484-4036109, +91-484-2395739, +91-484-2395740, e-mail: kochi@jaypeebrothers.com
- 1-A Indian Mirror Street, Wellington Square
Kolkata 700 013, Phones: +91-33-22651926, +91-33-22276404, +91-33-22276415
Fax: +91-33-22656075, e-mail: kolkata@jaypeebrothers.com
- Lekhraj Market III, B-2, Sector-4, Faizabad Road, Indira Nagar
Lucknow 226 016, Phones: +91-522-3040553, +91-522-3040554, e-mail: lucknow@jaypeebrothers.com
- 106 Amit Industrial Estate, 61 Dr SS Rao Road, Near MGM Hospital, Parel
Mumbai 400 012, Phones: +91-22-24124863, +91-22-24104532, Rel: +91-22-32926896
Fax: +91-22-24160828, e-mail: mumbai@jaypeebrothers.com
- "KAMALPUSHPA" 38, Reshimbag, Opp. Mohota Science College, Umred Road
Nagpur 440 009 (MS), Phones: Rel: +91-712-3245220, Fax: +91-712-2704275, e-mail: nagpur@jaypeebrothers.com

North America Office

1745, Pheasant Run Drive, Maryland Heights (Missouri), MO 63043, USA Ph: 001-636-6279734

e-mail: jaypee@jaypeebrothers.com, anjulav@jaypeebrothers.com

Central America Office

Jaypee-Highlights Medical Publishers Inc., City of Knowledge, Bld. 237, Clayton, Panama City, Panama Ph: 507-317-0160

Textbook of Anatomy and Physiology for Nurses

© 2010, PR Ashalatha

All rights reserved. No part of this publication and photo CD Rom should be reproduced, stored in a retrieval system, or transmitted in any form or by any means: electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the authors and the publisher.

This book has been published in good faith that the material provided by authors is original. Every effort is made to ensure accuracy of material, but the publisher, printer and authors will not be held responsible for any inadvertent error(s). In case of any dispute, all legal matters are to be settled under Delhi jurisdiction only.

First Edition: 2006

Reprint: 2007

Second Edition: **2010**

ISBN 978-81-8448-758-9

Typeset at JPBMP typesetting unit

Printed at

*I dedicate this work to
the medical and paramedical students
in their never-ending quest for knowledge;
past, present and future*

Foreword

It is indeed with a great sense of pleasure and privilege that I give this Foreword to the *Textbook of Anatomy and Physiology for Nurses* by Dr PR Ashalatha. The Author is a dedicated teacher in the subject of Anatomy for Medical, Nursing and Paramedical students of Calicut Medical College for several years. The BSc nursing students have always appreciated the efforts of this great teacher and her ability to make Anatomy and Physiology easily comprehensible and interesting. There was a long-felt need for a comprehensive textbook which is tailored to the needs of nursing students. The book has been largely directed to the broad and specific learning needs of the Nursing Students. Simplicity and clarity have been emphasized. The students can easily assimilate the logical sequence in which the subjects have been presented not only for them to understand the same but also to perform well in the examinations.

The presentation style and the diagrammatic presentations with neatly labeled diagrams which is short and sweet that makes the subject comprehensive and revision easy. The approach utilized in dealing with the subject of Anatomy and Physiology would be appreciated by other teachers as well. I have no doubt that it is a boon to the nursing students to possess this book. It can also be used for advanced learners and teachers for quick reference in Anatomy and Physiology.

I and my professional colleagues congratulate Dr PR Ashalatha on her great effort.

M. Sham Bhat

Prof (Mrs) Mary Sham Bhat

MSc (N) MPhil (N)

HOD and Professor in Medical–Surgical Nursing

Mangalore, Karnataka, India

Preface to the Second Edition

I am greatly pleased by the overwhelming response to the first edition of this Textbook and glad to note that students have liked it immensely. At the same time, a common suggestion was that the topics in Physiology were not adequate.

To overcome this, Dr Deepa has co-authored the topics in Physiology. She had helped in the preparation of the first edition too, but now the entire text in physiology has been thoroughly revised with the addition of new text and diagrams. The chapters Cardiovascular System and Endocrine System are almost rewritten. Dr Deepa is presently working as Assistant Professor of Physiology at Sree Gokulam Medical College, Thiruvananthapuram and I owe much to her in bringing out this second edition.

It is with pleasure that I bring out this book with an additional chapter on Medical Genetics. I thank Dr Arundhati Sharma, Associate Professor, Department of Anatomy and Genetics for encouraging me to write this chapter.

Several diagrams in previous chapters of Anatomy are modified and corrected. Photographs of various organs were taken during autopsy. They are also included.

I keep on record the secretarial assistance given by Mr Sajeesh and Mrs Vijitha of Calicut Medical Alumni Association. My heartfelt thanks to M/s Jaypee Brothers Medical Publishers (P) Ltd, New Delhi for bringing out the second edition of this Book.

Valuable suggestions and healthy criticism from students and teachers are most welcome to improve future editions.

PR Ashalatha

Preface to the First Edition

Learning Anatomy has always been a Himalayan task for the medical and paramedical students. This is partly due to the lack of a simple and complete book on the subject.

The need of a simple and “easy to learn” book in the field of Anatomy and Physiology was constantly pointed out to me by my students and colleagues. In fact, the seeds of this idea were sown in me by Professor Mary Shyam Bhat, presently Vice Principal of Yenapoya Nursing College, Mangalore.

Rapid advances in scientific and technological fields have led to much more being expected from a modern nurse or a paramedic. This necessitates a rigorous and advanced training and understanding of modern scientific equipment and the theories behind it, demanding thorough knowledge, and expertise, which is in no way inferior to that of a doctor. This requires a sound understanding of the basic concepts in Anatomy and Physiology.

A humble attempt is being made to fulfil the long-felt need of a complete textbook in the field of Anatomy and Physiology, mainly for nursing and paramedical students and as a foundation for the medical undergraduates too. Details are included in an organised, methodical way, in a simple and easily understandable style keeping in mind the needs of the Asian students. All the relevant aspects of a topic like gross anatomy, histology and applied anatomy are given systematically, so that the students need not have to hunt for material in different books. There are nearly 450 simple diagrams, which will help in memorising the subject with ease and reproduce it in the examinations.

This book can be used as a reference for the paramedical students and nurses as it contains in places more details than may be needed for the purpose of passing the examination. A few model question papers are also included.

It is the constant encouragement of my students and the staff of Medical, Nursing and Pharmacy Colleges, Calicut, which has prompted me to embark on this difficult task. This work has been done in a very short time in the midst of heavy schedule of the department and it is very likely that there may be certain omissions and discrepancies in the text. I will be too pleased and thankful to invite valuable comments and suggestions to improve the work in future editions.

I am greatly indebted to Dr Deepa, Postgraduate Student in Physiology, Calicut Medical College, for the immense help rendered in the preparation of the manuscript, diagrams and charts in Physiology.

I also keep on record the secretarial assistance given by Mr Sajeesh and Mrs Vijitha of Calicut Medical College Alumni Association, in typing this manuscript. I thank Dr Shirly Vasu and her colleagues of the Department of Forensic Medicine, Medical college, Calicut, for permitting me to take photographs of various organs.

My particular thanks are due to the printers and publishers M/s Jaypee Brothers Medical Publishers (P) Ltd, New Delhi in bringing out this work in a short duration of time. This work would not have been possible, but for the unstinted co-operation and encouragement of my family members, especially my children Ashwin and Anjali. My husband Dr Jayakumar, Consultant Surgeon, National Hospital, Calicut has taken a keen interest at every stage in the preparation of this book and has given invaluable assistance in editing the text.

I hope the students will enjoy reading this book and not only benefit in mastering the subject but also achieve success in their academic goal.

PR Ashalatha

Contents

PART ONE: ANATOMY

SECTION A: GENERAL ANATOMY

1. Introduction to Anatomy	3
2. Primary Tissues	9
3. Special Connective Tissues	17
4. Nervous Tissue	22
5. Muscle Tissue	26
6. Lymphoid Tissue	30
7. Skin and its Appendages	38

SECTION B: MUSCULOSKELETAL SYSTEM

8. Osteology	45
9. Muscular System	79
10. Joints	109

SECTION C: THE ORGAN SYSTEMS

11. Cardiovascular System	127
12. Respiratory System	161
13. Digestive System	179
14. Urinary System	215
15. Reproductive System	225
16. Nervous System	247
17. Endocrine System	282
18. Sense Organs	292
19. Medical Genetics	306
20. Appendix	325
Model Question Paper-I	334

PART TWO: PHYSIOLOGY

21. Introduction to Physiology	347
22. Blood and Body Fluids	352
23. Nerve and Muscle	374
24. The Digestive System	381
25. The Respiratory System	396
26. The Cardiovascular System	408
27. The Endocrine System	427

28. Reproductive System	446
29. The Nervous System	457
30. Special Senses	466
31. Urinary System	472
32. Temperature Regulation	478
Model Question Paper-II	481
Annexure	483
<i>Index</i>	485