

Second Edition

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# Manual of Practical Pathology

As per the latest  
CBME Guidelines | Competency Based  
Undergraduate Curriculum  
for the Indian Medical Graduate

aims to make practical pathology easier to understand, retain and remember for the medical and dental students. This edition of the manual has been structured according to the latest CBME Guidelines | Competency Based Undergraduate Curriculum for the Indian Medical Graduate prescribed by National Medical Commission. This book, based on 30 years' of teaching and laboratory experience of the author, will also be useful for nursing and laboratory technology students. The content has been prepared and revised after taking advice and suggestions from many experienced teachers of pathology as well as the concerned students. A large number of diagrams, charts and graphs have been included to make the subject easy to follow. This book should serve as a complete guide for the students to surge through their studies and examinations with conviction and dexterity.

**Pradeep Kumar NS** MD is Professor, Department of Pathology, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry. He has worked in different medical colleges throughout his career of over 30 years as a dedicated teacher of pathology in different positions. He was examiner and papersetter for undergraduate and postgraduate students of different universities in Karnataka, Andhra Pradesh, Tamil Nadu, Kerala, as well as Thailand and Kingdom of Saudi Arabia. He has good experience in clinical laboratory science also. He attended several national and international conferences and workshops; and has to his credit more than 25 research papers published in national and international journals. Currently, he is working at King Faisal University, Saudi Arabia (affiliated to Groningen University, the Netherlands), to study the advantages and limitations of another teaching method "problem-based learning". His field of interest is to study difficulties of medical students in teaching and learning.

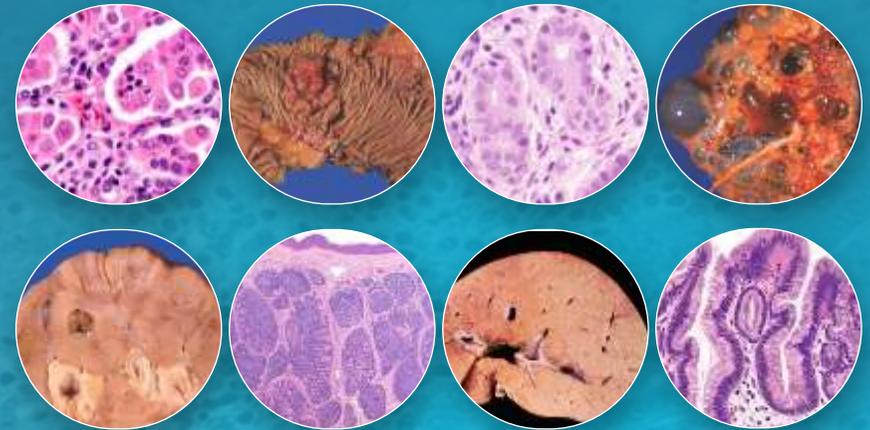


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## Foreword

**I**t is my privilege to introduce this wonderful book written by my teacher and colleague. I have known Dr Pradeep Kumar for 24 years and have witnessed the immense efforts and energy invested by him to bring out this book. He is a caring and kind teacher with lot of patience. His dedication to teaching and engaging students in learning is commendable.

This book is unique as it illustrates the practical pathology comprehensively yet in a simple manner. It is an asset for the undergraduate and postgraduate medical students, especially budding pathologists as well as laboratory technicians. The author has shared his extensive practical knowledge in this book. The book also highlights the biochemical and microbiological investigations, apart from cytology, histopathology, autopsy and hematology, which can be handy during the practical examinations. The very special and interesting part of this book is the histopathological technique in which the plastination technique has been included to help the students in learning how to preserve the body parts for a long time and to use it as a student teaching module.

I wholeheartedly recommend *Manual of Practical Pathology, 2/e* which can enrich the young minds with explicit practical knowledge. I wish this book will have many more reprints and new editions in future.

**Dr Banushree CS** MD, DNB, MNAMS

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## Preface to the Second Edition

**I**t gives me immense pleasure in presenting the second edition of my book *Manual of Practical Pathology*. It is because of the support given by my professional colleagues, my students and my teachers, for which I am thankful to them. I am also thankful to my senior colleagues and my students who gave me suggestions to improve this book. I have prepared this book as per the new CBME Guidelines 2019 and made it more clinically oriented. I have included in this edition of the book pathological specimens with explanations, notes on postmortem examination, serological and biochemical investigations as per the MCI Guidelines, and some more histopathology slides. I request my professional colleagues and students to send me their comments so that I can improve this book further as per the suggestions. I request you all to support this edition of the book as much as my first edition.

**Pradeep Kumar NS**

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## Preface to the First Edition

**T**his practical book is designed to provide practical guidance to pathology students. This book contains simplified presentations, with tables and diagrams to help the students. This is my first practical book of long-term effort for it. I am writing this book with 14 years of my teaching experience.

As an examiner to various universities, what I have seen is many students who read the subject and understood but they feel difficulty in putting it in a proper way. That is why I have given most frequently asked questions at the end of each topic. Therefore, it will be helpful for them to prepare for the exam. I hope this book will help the students preparing for their practical examination.

This is my first effort. I request my senior professors, my colleagues, juniors and my students to give your suggestions and opinions about this book, so that I can improve this book. I have included some applied and clinical pathology topics in this book as it is necessary for the students to know about it and every time some clinical pathology questions will be asked in the exams.

**Pradeep Kumar NS**



## Acknowledgments

**F**irst, I want to thank my colleagues Dr Banushree, Dr R Bhatt, Dr Vijaya, Dr Vani and Dr Sumanth for their suggestions and contribution to bring out this practical book.

I express deep gratitude to my wife Deepa, son Shrenik, daughter Advika, and the entire Shiroorkar family, who have been a source of constant inspiration in this work. My thanks to my brothers Seshanna, Sreenivasha, Nagendra, Pushparaj, and sister Anusuyamma, for their encouragement.

I record my heartfelt thanks to head of our department and dean of our institution who are helping me in various aspects. My thanks to my entire departmental colleagues for their guidance.

It is with great respect, I express my sincere thanks to Dr (Prof) AJ Valiath for his encouragement, guidance and blessings.

I want to thank Dr Gangadhar DS, Dr Ragupathy, Dr Balamurugan, Dr (Prof) Sucharitha and Dr Koteswary for their encouragement.

I am extremely thankful to Dr Umesh Chandra Das, Dr Swarupa Rani R and Dr Altaf Khadri for their valuable help.

My heartfelt thanks to Dr Harindrakumar and Dr Shankariah for their wholehearted cooperation during the completion of this work.

Finally, with all my humbleness and sincerity I thank all those who have helped me directly or indirectly in completing this work.

I would like to acknowledge all those who have been involved in the preparation of this book, especially Mr SK Jain (Chairman and Managing Director), Mr Varun Jain (Director), Mr YN Arjuna (Sr. Vice President—Publishing, Editorial and Publicity), Mrs Ritu Chawla (GM Production), and Mr Parmod Kumar (DTP operator) of CBS Publishers & Distributors for their all-time support in bringing out this book in record time.

I hereby wish all the readers of the book all the best in their endeavors.

**Pradeep Kumar NS**



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## History of Pathology

**H**istory of pathology started along with other medical specialties. Evidence suggests that people in those prehistoric ages suffered from different diseases and the treatment was brutal and ineffective. Hippocrates (460–370BC) was a Greek Physician gave scientific explanation to diseases. He is known as father of scientific medicine. Cornelius Celsus (30BC–38AD) wrote many volumes including pathology. He described four cardinal signs of inflammation. Giovanni Batista Morgagni performed 600 autopsies, described their findings and correlated them with their clinical manifestations. Microscope changed the concept of disease from organ level to cell level. Rudolf Virchow is the first person to use microscope for all autopsy studies. He was called as father of cellular pathology. Karl Landsteiner (1868–1943) developed the field of blood transfusion and tissue transplantation. From 20th century to till date the development of techniques like florescent microscopy, immunohistochemistry, production of monoclonal antibodies, polymerase chain reaction, etc. improved the understanding of pathology.

### History of Indian Pathology

An oldest written document about medicine in India is *Atharvaveda* written around 1100 BC. It contains herbal medicine for diseases. *Acharya* Charaka (300BC)—identified 500 herbal medicines in Himalayan region. He wrote a medical text called *Charaka Samhita*. He is known as the father of Indian medicine. *Sushruta* in 600 BC Identified 700 Medicines. He explained the surgical procedures and instruments in his textbook *Sushruta Samhita*. *Vagbhata* probably lived in Sindh area at 6TH Century and he practiced Ayurveda.

Vasant Ranji Konalkar was the first pathologist from India. After getting medical degree from Mumbai, he studied MD Pathology form university of London and came back to India. He did extensive research in the field of leprosy, cancers, blood banking, etc. He demonstrated the carcinogenicity of tobacco and radiation. He received *Padmashree* and *Padmabushan* from government of India. Contributions came from many more Indians in the field of medicine and pathology and made it rich.

