

**1<sup>st</sup>** Edition

# **Microbial Clues**

## **Clinical Cases in Diagnostic Microbiology**

As per the Competency Based Medical Education Curriculum (NMC)

**Aadam Najeeb  
Narayan Kamath  
Nadeem Amin**



# **Microbial Clues**

## **Clinical Cases in Diagnostic Microbiology**





# Microbial Clues

## Clinical Cases in Diagnostic Microbiology

A Case-Based MCQ Guide for MBBS Students Aligned with NMC CBME Curriculum

First Edition

**Dr. Aadam Najeeb** Ph.D. (Med. Micro)

Author

Ex. Tutor/Demonstrator, AIIMS, Bhopal, India  
Assistant Professor, Department of Microbiology  
NAMO Medical Education & Research Institute, Silvassa, India

**Dr. Narayan Kamath** Ph.D. (Med. Micro)

Co-Author

Ex - Lecture JJM Medical College, Davangere, Karnataka, India  
Ex. Assistant Prof. DY Patil Medical College, Navi Mumbai, India  
Ex. Associate Prof. World College of Medical Sciences, Jhajjar, Haryana, India  
Professor, Department of Microbiology  
NAMO Medical Education & Research Institute, Silvassa, India

**Dr. Nadeem A L Amin** MBBS, MD

Co-Author

Ex. Asst. Professor DY Patil Medical College, Navi Mumbai, India  
Ex. Consultant Microbiologist, RTPCR Lab, NMMC-MMT Hospital, Navi Mumbai, India  
Ex. Laboratory Director AVM Labs Al Khobar, Saudi Arabia  
Specialist-Microbiology, Health Assurance Hospitals, DHAMAN, Kuwait

Co-Editors

**Dr. Nagaraj Perumal** Ph.D. (Med. Micro)

Virology Scientist, State Virology Laboratory,  
Department of Microbiology, Gandhi Medical College  
Bhopal, India

**Dr. Anwar Alrashed** BSc, MBBS, KBFM, MRCGP(Int.), MSc

Family Medicine Consultant

Primary Healthcare Medical Services Specialist  
Health Assurance Hospitals, DHAMAN, Kuwait



**Title of the Book:** Microbial Clues: Clinical Cases in Diagnostic Microbiology

**First Edition- 2025**

**Copyright 2025 © Authors**

**Dr. Mohd. Aadam Bin Najeeb** Assistant Professor, Department of Microbiology NAMO Medical education & Research Institute, Silvassa, India.

No part of this book may be reproduced or transmitted in any form by any means, electronic or mechanical, including photocopy, recording or any information storage and retrieval system, without permission in writing from the copyright owners.

**Disclaimer**

The authors are solely responsible for the contents published in this book. The publishers don't take any responsibility for the same in any manner. Errors, if any, are purely unintentional and readers are requested to communicate such errors to the editors or publishers to avoid discrepancies in future.

**E-ISBN: 978-93-7020-370-9**

**MRP Rs. 830/-**

**Publisher, Printed at & Distribution by:**

Selfypage Developers Pvt. Ltd.,  
Paisley Circle, Novi, Michigan, USA.  
&

Pushpagiri Complex,  
Beside SBI Housing Board,  
K.M. Road, Chikkamagaluru,  
Karnataka, India.

Tel.: +91-8861518868

E-mail: info@ iipbooks.com

**IMPRINT: IIP Iterative International Publishers**

**For Sales Enquiries:**

Contact: +91- 8861511583

E-mail: sales@iipbooks.com

**Dedicated to my consistent support system**

***Talat Naaz & Inaayat Aadam***

**This one is for you.**

**Above all,**

**I thank the *Almighty* for the wisdom and guidance that made this work possible.**

# Note to Readers

## **To the Future Detectives of Disease: Why You Need "Microbial Clues"**

Hey there! As a student navigating the vast world of medicine, you're constantly learning to connect the dots. In infectious diseases, those dots are often invisible – tiny microbes causing big problems. That's exactly why "**Microbial Clues: Clinical Cases in Diagnostic Microbiology**" is a book you absolutely need to read.

## **Beyond the Textbooks: Real-World Learning**

You've probably spent hours memorizing bacterial names, viral structures, and fungal classifications. That's crucial, but true mastery comes from **applying that knowledge**. This book isn't just another textbook full of facts; it's a collection of **real patient cases** that put you in the hot seat.

Imagine this: a patient walks into the hospital with puzzling symptoms. What do you do? What tests do you order? How do you interpret the lab results that come back? "Microbial Clues" challenges you to become the **diagnostic detective**, guiding you through these exact scenarios.

## **What "Microbial Clues" Will Do for You:**

- 1. Bridge Theory and Practice:** You'll see how all those lectures and lab sessions translate directly into diagnosing and treating actual patients. This is where microbiology comes alive!
- 2. Sharpen Your Clinical Reasoning:** Each case is a puzzle. You'll learn to think critically, synthesize information, and make informed decisions, just like seasoned clinicians.
- 3. Boost Your Confidence:** By tackling diverse cases, you'll gain confidence in interpreting lab reports, understanding antimicrobial susceptibility, and ultimately, contributing to better patient care.
- 4. Prepare You for the Wards:** When you hit your rotations, you'll be one step ahead, already familiar with the kind of diagnostic dilemmas you'll face.
- 5. Make Learning Engaging:** Forget dry facts! These cases are designed to be compelling, making the learning process interactive and memorable.

Think of "**Microbial Clues**" as your essential training manual for cracking the code of infections. It will equip you with the practical skills and critical thinking needed to excel in your medical career. Dive in, and start uncovering those microbial mysteries!

**Note:** It is widely acknowledged that human errors are inevitable, and no book is completely free of them. We warmly invite readers to share feedback, suggestions, updates, or corrections regarding any errors.

*Dr Aadam Najeeb*  
Author  
aadamnajeeb@gmail.com

# Preface

As the President of the Indian Association of Medical Microbiologists (IAMM), it is with great pride and enthusiasm that I present *Microbial Clues: Clinical Cases in Diagnostic Microbiology*, a comprehensive resource meticulously crafted to advance the study and practice of medical microbiology for MBBS students and aspiring healthcare professionals.



This book is a testament to the IAMM's commitment to fostering excellence in medical education by bridging the gap between theoretical knowledge and clinical application.

*Microbial Clues: Clinical Cases in Diagnostic Microbiology* is designed to align with the National Medical Commission's Competency-Based Medical Education (CBME) curriculum, offering a structured and case-based approach to mastering the complexities of microbial infections. The book spans critical topics, including gastrointestinal infections (*Salmonella*, *Shigella*, *E. coli*, *Yersinia*, *Vibrio*, *Aeromonas*, *Campylobacter*, *Helicobacter pylori*, *Clostridioides difficile*), leprosy (*Mycobacterium leprae*), and bacterial skin and soft tissue infections (*Bacillus anthracis*, *Actinomyces*, non-venereal treponematoses, *Pseudomonas aeruginosa*, *Erysipelothrix rhusiopathiae*, *Burkholderia* species). Each chapter is thoughtfully organized into sections covering clinical presentation, diagnosis, treatment, complications, and public health aspects, ensuring a holistic understanding of infectious diseases.

What sets this book apart is its innovative use of case-based Multiple-Choice Questions (MCQs), carefully curated to reflect real-world clinical scenarios and aligned with NEET PG standards.

This book is not merely a study aid but a dynamic tool that encourages critical thinking and clinical reasoning. It equips students to navigate the intricacies of microbial infections, from identifying pathogens to implementing effective management strategies, all while emphasizing the importance of public health measures in infection control. *Microbial Clues* is an invaluable companion for students, educators, and practitioners seeking to deepen their understanding of diagnostic microbiology in a clinical context.

I extend my heartfelt gratitude to the contributors, reviewers, editorial team and at last but not the least author of this book, my PG student (*Dr Aadam Najeeb*) whose expertise and dedication have made this book a reality. I am confident that *Microbial Clues: Clinical Cases in Diagnostic Microbiology* will inspire and empower the next generation of medical professionals to tackle the challenges of infectious diseases with confidence and precision.

A handwritten signature in blue ink, appearing to read 'Mahantesh B. Nagamoti'.

**Dr. Mahantesh B. Nagamoti** MD(Micro), Ph.D. (Med. Micro)  
President Indian Association of Medical Microbiologists (IAMM)  
Professor of Microbiology, J. N. Medical College, KAHER

# Foreword

It's a privilege to introduce "**Microbial Clues: Clinical Cases in Diagnostic Microbiology**," a remarkable book penned by one of our distinguished faculty members. This book truly exemplifies the dedication to excellence we champion at our Medical College and across the state's healthcare initiatives.



In the dynamic world of medicine, accurate and timely diagnosis of infectious diseases is absolutely critical. This isn't just about identifying a pathogen; it's about understanding its implications for patient health and public well-being. "**Microbial Clues**" tackles this challenge head-on by offering a practical, case-based approach to diagnostic microbiology. It moves beyond theoretical concepts, immersing readers in the kind of real-world scenarios that define clinical practice.

This isn't your typical textbook. Instead, it's a meticulously crafted journey through complex clinical puzzles. Each case serves as an opportunity to hone critical thinking skills, connecting laboratory findings with patient symptoms, and ultimately leading to informed diagnostic decisions. This format will be incredibly valuable for medical students, residents, and even seasoned practitioners looking to sharpen their diagnostic acumen. It perfectly aligns with our commitment to fostering highly skilled healthcare professionals who are ready to face the complexities of modern medicine.

The author's expertise and passion for the subject shine through every page. The cases are well-structured, the explanations clear, and the discussions insightful, making intricate microbiological concepts accessible and engaging. This book will undoubtedly become an essential resource, not just within our institution but across the broader medical community, significantly contributing to improved patient outcomes through enhanced diagnostic capabilities.

I extend my sincere congratulations to the author for this outstanding contribution to medical education and clinical practice. "**Microbial Clues**" is a testament to the high calibre of faculty we are proud to have, and it reflects our shared vision for advancing healthcare through knowledge and innovation.

A handwritten signature in blue ink, appearing to be 'V. K. Das', written over a horizontal line.

**Dr. V. K. Das** MBBS, D.H.H.M., MBA (H.M.), MBA (Pharma Marketing)  
Consultant (Dept. of Health & Family Welfare D&NH and DD)  
CEO (Medical Education, AYUSH, NACO D&NH and DD)  
Addl. CEO (PM-JAY D&NH and DD)

# Foreword

It is with immense pleasure and profound pride that I write this preface for "**Microbial Clues: Clinical Cases in Diagnostic Microbiology**," a remarkable book authored by our esteemed faculty member.

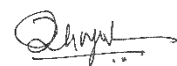


In the ever-evolving landscape of medicine, the ability to accurately diagnose infectious diseases is paramount. This requires not only a deep understanding of microbiology but also the critical thinking skills to connect laboratory findings with clinical presentations. "**Microbial Clues**" addresses this vital need by offering a unique and invaluable approach to learning diagnostic microbiology.

This book is not a conventional textbook; instead, it's a meticulously curated collection of **real-world clinical cases** that challenge the reader to think like a seasoned diagnostician. Each case presents a puzzle, guiding students, residents, and even practicing clinicians through the intricacies of microbial identification, antibiotic susceptibility testing, and the interpretation of complex laboratory results. The case-based format fosters a dynamic learning experience, bridging the gap between theoretical knowledge and practical application.

The author's dedication to clarity and comprehensiveness shines through every page. The cases are thoughtfully designed, accompanied by clear explanations, relevant background information, and insightful discussions that illuminate the diagnostic process. This book will undoubtedly serve as an indispensable resource for anyone seeking to sharpen their skills in diagnostic microbiology and, by extension, enhance patient care.

I extend my heartfelt congratulations to the author for creating such an impactful and timely contribution to medical education. "**Microbial Clues**" is a testament to their expertise, passion, and commitment to fostering the next generation of skilled healthcare professionals. I am confident that this book will be widely adopted and highly valued by students and practitioners alike, leaving a lasting mark on the field of diagnostic microbiology.

A handwritten signature in black ink, appearing to read 'R. Goyal'.

**Dr. Ramchandra Goyal** MBBS, MD, FIAPSM, FIPHA  
Dean & Professor

NAMO Medical Education and Research Institute & NAMO Hospital

# Prologue

It is with great pleasure and a profound sense of affirmation that I write this prologue for "**Microbial Clues: Clinical Cases in Diagnostic Microbiology**," a significant new work by one of our very own distinguished faculty members.



In the demanding environment of a tertiary care hospital and medical college, timely and accurate diagnosis of infectious diseases is not merely an academic exercise; it is a cornerstone of effective patient management, directly influencing treatment outcomes, hospital length of stay, and the prevention of healthcare-associated infections. Our microbiology laboratory is often the first line of defence, providing the crucial "clues" that guide clinical decisions.

This book, "**Microbial Clues**," is an exceptional contribution precisely because it bridges the gap between theoretical knowledge and the daily realities faced by our clinicians and laboratory professionals. By presenting a rich array of real-world clinical cases, it offers a pragmatic and interactive learning experience. It guides the reader through the entire diagnostic journey—from initial patient presentation to sample collection, laboratory processing, interpretation of results, and ultimately, the formulation of an appropriate treatment plan. This case-based methodology is helpful for fostering the critical thinking and problem-solving skills essential for high-quality patient care.

I foresee this book becoming an indispensable resource for medical students, resident doctors across various specialties, and certainly dedicated laboratory technicians and microbiologists. Its practical focus will empower them to more confidently navigate the complexities of infectious disease diagnosis, leading to more precise therapies, reduced antibiotic resistance, and ultimately, better health outcomes for our patients. It serves as an excellent training tool, enhancing the diagnostic capabilities of our entire hospital team.

I commend the author for their dedication in compiling such a comprehensive and clinically relevant volume. "**Microbial Clues**" is a testament to the high standards of expertise and commitment to patient care that we uphold at *NAMO Hospital* and *NAMO Medical Education and Research Institute*. I am confident that this book will significantly elevate the diagnostic proficiency of healthcare professionals, both within our institution and far beyond.



**Dr. Darshankumar Mahyavanshi** MBBS, MD, MBA, AFIH  
Medical Superintendent & Professor  
NAMO Medical Education and Research Institute & NAMO Hospital

# Message from Author

## A Personal Invitation to the World of Microbial Discovery

Welcome to "**Microbial Clues: Clinical Cases in Diagnostic Microbiology.**" As the author, it's my immense pleasure to invite you on a journey that I hope will transform your understanding and appreciation for the intricate, often hidden, world of microorganisms.



## Why "Microbial Clues"?

In the dynamic realm of clinical medicine, accurately diagnosing infectious diseases is paramount. It's a process akin to detective work, where every patient symptom, every lab result, and every microscopic observation serves as a crucial **clue**. My goal in writing this book was to move beyond rote memorization and immerse you in the exciting, challenging, and deeply rewarding process of **diagnostic microbiology in action**.

## The Power of Case-Based Learning

This book isn't a traditional textbook; it's a collection of real-world clinical cases, each presenting a unique diagnostic puzzle. You'll be challenged to:

- **Connect the dots** between clinical presentations and potential microbial culprits.
- **Interpret complex laboratory data**, from Gram stains and culture results to molecular assays.
- **Think critically** about the "why" and "how" behind microbial identification and antimicrobial susceptibility testing.
- **Develop a systematic approach** to problem-solving in infectious disease diagnostics.

Each case is designed to simulate the decision-making process you'll encounter in the clinic or the laboratory, fostering the practical skills essential for effective patient care.

## My Hope for You

Whether you're a medical student just beginning your journey, a resident honing your diagnostic acumen, a laboratory professional refining your skills, or a seasoned clinician seeking to refresh your knowledge, I believe this book will serve as an invaluable resource. My deepest hope is that by engaging with these cases, you'll not only enhance your knowledge but also cultivate a passion for the fascinating world of microbes and the vital role diagnostic microbiology plays in safeguarding human health.

Thank you for embarking on this journey with me. May these "microbial clues" empower you to become an even more astute and confident diagnostician.



**Dr. Aadam Najeeb**

Author

Assistant Professor, Department of Microbiology  
NAMO Medical Education & Research Institute, Silvassa, India

# Message from Co-Author

As a co-author of *Microbial Clues: Clinical Cases in Diagnostic Microbiology*, I am thrilled to welcome you to this collaborative journey into the heart of diagnostic microbiology. This book, born from a shared vision under the National Medical Microbiology Teaching Association (NMMTA), is designed to transform the complexities of microbial diagnostics into an engaging, practical, and empowering learning experience for MBBS students, residents, and medical professionals.



Our 2500+ case-based Multiple-Choice Questions (MCQs), meticulously crafted and aligned with the National Medical Commission's Competency-Based Medical Education (CBME) curriculum, bring real-world clinical scenarios to life. Covering pathogens like *Salmonella*, *Mycobacterium leprae*, and *Bacillus anthracis*, each case mirrors the challenges faced in clinics and laboratories, fostering critical thinking and diagnostic precision. These cases are not mere questions but pathways to mastery, encouraging you to synthesize microbiology, pathology, and clinical medicine, sharpen problem-solving skills, and understand the rationale behind diagnostic tests and treatments.

This collaborative effort reflects the teamwork essential to patient care, where clinicians and microbiologists unite to unravel infectious disease mysteries. Whether you're preparing for NEET PG, refining clinical expertise, or deepening your understanding of public health, *Microbial Clues* is your trusted companion. Our hope is that these cases inspire a profound appreciation for diagnostic microbiology's role in improving patient outcomes and advancing global health.

Thank you for embarking on this investigative journey. May these *Microbial Clues* empower you to become a confident, insightful diagnostician, ready to make a difference in the fight against infectious diseases.

A handwritten signature in blue ink, appearing to read 'N. Kamath'.

**Dr. Narayan Kamath**

Co- Author

Professor, Department of Microbiology  
NAMO Medical Education & Research Institute, Silvassa, India

## Message from Co-Author

As a co-author of *Microbial Clues: Clinical Cases in Diagnostic Microbiology*, I am honoured to contribute to this vital educational resource for MBBS students. My work focused on ensuring the clinical cases that reflect diverse, real-world scenarios, covering bacterial infections like *Mycobacterium leprae* and *Pseudomonas aeruginosa*. Aligned with the NMC CBME curriculum, this book's case-based MCQs are designed to sharpen diagnostic skills and prepare students for NEET PG and clinical practice. Collaborating with the team has been inspiring, and I hope *Microbial Clues* empowers students across the globe to excel in microbiology.



A handwritten signature in blue ink, appearing to read 'Nadeem A L Amin'.

**Dr. Nadeem A L Amin**  
Co-Author  
Specialist-Microbiology,  
Health Assurance Hospitals, DHAMAN, Kuwait

## Message from the Co-Editor

As Co-Editor of *Microbial Clues: Clinical Cases in Diagnostic Microbiology*, I am thrilled to present this invaluable resource for MBBS students and medical professionals. Crafting this book has been a journey of passion, uniting expertise to create 2500+ case-based MCQs that bring microbiology to life. Aligned with the NMC's CBME curriculum, it empowers learners to master diagnostic skills through real-world scenarios, preparing them for NEET PG and clinical practice. My heartfelt thanks to our contributors and team for their dedication. May *Microbial Clues* inspire you to excel in the fight against infectious diseases!



A handwritten signature in blue ink, appearing to read 'Anwar Al Rashed'.

**Dr. Anwar Al Rashed**  
Co-Editor  
Family Medicine Consultant  
Primary Healthcare Medical Services Specialist  
Health Assurance Hospitals, DHAMAN, Kuwait

## Message from the Co-Editor

It is an honor to be part of this wonderful project, *Microbial Clues: Clinical Cases in Diagnostic Microbiology*, as a co-editor. I am sincerely grateful to the lead editors for the opportunity to contribute to a book that brings microbiology to life in a practical, engaging, and exam-oriented format.

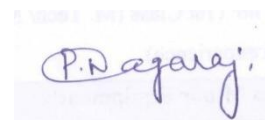


Having had the privilege of teaching medical students at AIIMS Bhopal and currently working in the field of virology and infectious disease diagnostics, I have always believed that learning becomes meaningful when it connects theory with real clinical situations. This book does exactly that. With its case-based questions, previously asked NEET PG MCQs, and easy-to-remember mnemonics, it is designed to help you think like a clinician—not just memorize facts.

Our goal is simple: to make your NEET PG preparation smarter, more integrated, and clinically relevant. I hope this book helps you gain not only marks but also the confidence to approach diagnostic challenges with clarity and critical thinking.

Wishing you all the best as you move forward in your medical journey. Keep learning, stay curious, and trust the process.

Warm regards,

A handwritten signature in blue ink that reads "P. Nagaraj". The signature is written in a cursive style.

**Dr. Nagaraj Perumal**  
Co-Editor

Virology Scientist, State Virology Laboratory,  
Department of Microbiology, Gandhi Medical College,  
Bhopal, India

# List of Contributors



**Dr. Mahantesh B. Nagamoti** MBBS, MD, Ph.D.  
Professor, Dept of Microbiology  
KAHER's JNMC, Belagavi, India



**Dr. Jyoti Nagamoti** MBBS, MD, Ph.D.  
Professor, Dept of Microbiology  
KAHER's JNMC, Belagavi, India



**Dr. Jyoti Amol Pawar** MBBS, MD  
Professor, Dept. of Microbiology,  
D.Y.Patil Medical College & Hospital,  
Nerul, Navi Mumbai, India



**Dr. Swetha T S** MBBS MD  
Consultant Microbiologist  
Metropolis Healthcare Limited, Thrissur, India



**Dr. Atiya Kausar** MBBS, MD  
Associate Prof. Dept. of Microbiology  
Sri Siddhartha Medical College,  
SSAHETumkur, India



**Dr. Firoz Abdul Hakkim** MBBS, MD  
Specialist Pulmonology  
Health Assurance Hospitals, Dhaman, Kuwait



**Dr. Anil Kumar Kodavala** MBBS, DNB  
Consultant Internal medicine  
(Respiratory medicine)  
Health Assurance Hospitals, Dhaman,  
Kuwait



**Dr. Abdul Wadhood Saleemullah** MBBS, MD  
Senior Registrar- Internal Medicine  
Health Assurance Hospitals, Dhaman, Kuwait



**Dr. Aamir Majeed Malik** MBBS, MD  
Internal Medicine Specialist  
Health Assurance Hospitals,  
Dhaman, Kuwait



**Dr. Gandhi Dharmarajan** MBBS, MD  
Senior Registrar, Dept. of Anaesthesia  
Health Assurance Hospitals,  
Dhaman, Kuwait



**Dr. Naeem Abdul Kadir Chougale** MBBS, MD  
Consultant, Dept. of Anaesthesia  
JJ hospital Mumbai, India



**Dr. Repaka Pratyusha** MBBS, MD  
Ex. Associate Prof. KIMS, Amalapuram, Andhra Pradesh Specialist Paediatrician Health Assurance Hospital, Dhaman, Kuwait



**Dr. Ayesha Shaikh** MBBS, MD  
Registrar, Anaesthesia & Critical Care Al Salam Hospital, Kuwait City, Kuwait



**Dr. Maqdad Taaqi** Ph.D., RRT, BSRT  
Assistant Professor, Respiratory Therapy, Health Sciences Center, Kuwait university



**Dr. Kuldeep Singh** MBBS DCH (UK) MRCPI  
(Ireland) MRCPCH (UK) PGC  
Immunology and Immunogenetics (UK)  
Paediatrician, Health Assurance Hospitals,  
Dhaman, Kuwait



**Dr. Zaid Fayaz Memon** MBBS  
Tutor MGM Medical College, Panvel,  
Mumbai, India



**Dr. Gayasuddin Khan** MBBS  
Tutor MGM Medical College, Panvel,  
Mumbai, India



**Dr. Ganesh Kamalakar Vernekar** MBBS, PGDGM, PGDHHM  
Central Government Medical Officer  
DMHS, DNH, DD, India



**Dr. Anugula Amritha** MBBS, MD, DNB  
Senior Resident, Dept. of Microbiology  
Maulana Azad Medical College, New Delhi,  
India



**Dr. Bhavikakumari Patel** MBBS, MD, DIPC  
Assistant Professor, Dept of Microbiology  
GMERS Medical College, Valsad, India



**Dr. Soumya S** MBBS, MD  
Associate Prof., Dept of Microbiology  
KAHER's JNMC, Belagavi, India



**Dr. Vishwashanti S Vatkar** MBBD MD  
Prof & Head, Dept of Microbiology  
SSPM Medical College and Lifetime Hospital,  
Sindhudurg, India



**Dr. Rubina G. Mulla** MBBS, MD  
Assistant Prof., Dept of Microbiology  
KAHER's JNMC, Belagavi, India



**Dr. Aniket D Manoli** MBBS MD  
Associate Prof., Dept. of Community Medicine, KLE  
Jagadguru Gangadhar Mahaswamigalu Moorusavirmath  
Medical College and Hospital, Hubballi, Karnataka,  
India



**Dr. Ranjeeta** MBBS, MD  
Associate Prof, Dept of Microbiology  
L N Medical College & J K Hospital,  
Bhopal, India



**Dr. Priyanka Narayankar** MBBS, MD  
Assistant Prof., Dept. of Microbiology,  
M.V.J Medical College & Research Hospital,  
Dandupalya, Hoskote Taluk, Bengaluru, India



**Dr. Dipa Patil** MBBS, MD  
Assistant Prof., Dept of Microbiology  
JNMC, Belagavi, India



**Dr. Ayan Kumar Das** Ph.D.  
Assistant Prof., Dept of Microbiology  
Hamdard Institute of Medical Sciences and Research,  
New Delhi, India



**Dr. Shashikala Ramaswamy** MSc, PhD  
Reader & Head Dept. of General pathology  
and Microbiology, Bharati Vidyapeeth  
Dental College and Hospital, Navi Mumbai,  
India



**Dr. Pragati Aniket Manoli** MBBS, MD, MBA  
Associate Prof., Department of Microbiology  
KLE Jagadguru Gangadhar Mahaswamigalu  
Moorusavirmath Medical College and  
Hospital, Hubballi, India

# Acknowledgement

The creation of *Microbial Clues: Clinical Cases in Diagnostic Microbiology* has been a collaborative endeavour, driven by the collective expertise, dedication, and passion of an exceptional team of contributors, editors, and authors. This book, designed to empower MBBS students with practical and clinical insights into diagnostic microbiology under the National Medical Commission's Competency-Based Medical Education (CBME) curriculum, would not have been possible without their tireless efforts. We express our deepest gratitude to all who have contributed to making this resource a reality.

We extend our heartfelt thanks to the chapter contributors, whose expertise and commitment to medical education have enriched the content with diverse, case-based scenarios and rigorous MCQs. Their meticulous work in crafting questions that bridge theory and clinical practice has ensured the book's alignment with NEET PG standards and its relevance to aspiring medical professionals. We sincerely thank: Dr. Mahantesh B. Nagamoti, Dr. Jyoti Nagamoti, Dr. Jyoti Amol Pawar, Dr. Kuldeep Singh, Dr. Atiya Kausar, Dr. Swetha TS, Dr. Aamir Majeed Malik, Dr. Firoz Abdul Hakkim, Dr. Anil Kumar Kodavala, Dr. Abdul Wadhood Saleemullah, Dr. Naeem Abdul Kadir Chougale, Dr. Gandhi Dharmarajan, Dr. Ayesha Shaikh, Dr. Zaid Fayaz Memon, Dr. Gayasuddin Khan, Dr. Shashikala Ramaswamy, Dr. Anugula Amritha, Dr. Pragati Aniket Manoli, Dr. Soumya S, Dr. Rubina G. Mulla, Dr. Dipa Patil, Dr. Nagaraj Perumal, Dr. Ranjeeta, Dr. Ganesh Kamalakar Vernekar, Dr. Bhavikakumari Patel, Dr. Vishwashanti S. Vatkar, Dr. Aniket D Manoli, Dr. Priyanka Narayankar, Dr. Ayan Kumar Das, Dr. Repaka Pratyusha, Dr. Maqdad Taaqi, Dr. Spurthi G S and Dr. Faizan Chitapure.

We are immensely grateful to our co-editors, **Dr. Anwar Al Rashed** and **Dr. Nagaraj Perumal**, for their unwavering dedication and editorial expertise. Their meticulous review ensured the elimination of redundancies, grammatical precision, and alignment with the CBME curriculum, making *Microbial Clues* a cohesive and high-quality educational tool. Their vision and collaborative spirit have been instrumental in shaping this book.

Our profound appreciation also goes to our co-authors, **Dr. Narayan Kamath** and **Dr. Nadeem A L Amin**, whose scholarly contributions and clinical insights enriched the book's content. Their efforts in crafting unique cases and ensuring academic rigor have made this resource invaluable for students and educators alike.

Finally, we thank the broader medical education community for their feedback and encouragement, which have guided us in creating a resource that we hope will inspire and empower the next generation of healthcare professionals to excel in diagnostic microbiology. At last but not the least I would like to extend my heartfelt gratitude to my wife and my daughter for their consistent support and motivation to complete this book.

**-The Editorial Team**

# List of Contents

<b>Section 1: General Microbiology</b>	<b>1 - 129</b>
Chapter 1 Microscopy	1
Chapter 2 Bacterial Taxonomy	10
Chapter 3 Morphology & Physiology of Bacteria	19
Chapter 4 Laboratory Diagnosis of Bacterial Infections	27
Chapter 5 Molecular Bacteriology	36
Chapter 6 Bacterial Pathogenesis	44
Chapter 7 General Bacteriology	52
Chapter 8 General Virology	60
Chapter 9 General Parasitology	68
Chapter 10 Overview of Mycology	76
Chapter 11 Microbiology of Normal Flora	84
Chapter 12 Epidemiology of Infectious Diseases	93
Chapter 13 Immunity	101
Chapter 14 Antigens	109
Chapter 15 Antibody	116
Chapter 16 Antigen-antibody Reactions	123
<b>Section: 2 Immunology</b>	<b>130 - 185</b>
Chapter 17 Complement	130
Chapter 18 Components of Immune System Organs, Cells and Products	137
Chapter 19 Immune Responses: Cell-mediated and Antibody-mediated	144
Chapter 20 Hypersensitivity	151
Chapter 21 Autoimmunity	158
Chapter 22 Immunodeficiency Disorders	163
Chapter 23 Transplant & Cancer Immunology	172
Chapter 24 Immunoprophylaxis	179
<b>Section 3: Hospital Infection Control</b>	<b>186 - 193</b>
Chapter 25 Healthcare-associated Infection	186
<b>Section 4: Bloodstream and Cardiovascular System Infections</b>	<b>194 - 279</b>
Chapter 26 Cardiovascular System Infections	194
Chapter 27 Enteric Fever	202
Chapter 28 Rickettsial Infections	210
Chapter 29 Brucellosis, Leptospirosis, and Borreliosis Infections	218

Chapter 30	HIV/AIDS	226
Chapter 31	Viral Hemorrhagic Fevers and Arboviruses	236
Chapter 32	Malaria and Babesiosis	246
Chapter 33	Visceral Leishmaniasis and Trypanosomiasis	254
Chapter 34	Filarial Nematodes (Wuchereriabancrofti, Brugiamalayi, Brugiatimori)	262
Chapter 35	Systemic Candidiasis and Systemic Mycoses	270
<b>Section 5: Gastrointestinal (GI) Infection</b>		<b>280 - 357</b>
Chapter 36	Gastrointestinal Infective Syndrome	280
Chapter 37	Food Poisoning	290
Chapter 38	Gastrointestinal Infections due to Enterobacteriaceae	299
Chapter 39	Cholera, Halophilic Vibrio, and Aeromonas Infections	309
Chapter 40	Miscellaneous Bacterial Infections of Gastrointestinal System	317
Chapter 41	Viral Gastroenteritis	327
Chapter 42	Intestinal Protozoan Infections	335
Chapter 43	Intestinal Helminthic Infections	346
<b>Section 6: Hepatobiliary System</b>		<b>358 - 387</b>
Chapter 44	Infective Syndromes of Hepatobiliary System and Abdomen	358
Chapter 45	Viruses Causing Hepatitis	370
Chapter 46	Amoebic Liver Abscess	379
<b>Section 7: Skin, Soft Tissue and Musculoskeletal System Infections</b>		<b>388 - 463</b>
Chapter 47	Infective Syndromes of Skin, Soft Tissue, and Musculoskeletal Systems	388
Chapter 48	Staphylococcus Aureus and Coagulase- Negative Staphylococcal Infections	398
Chapter 49	Beta-hemolytic Streptococcal Infections	406
Chapter 50	Clostridial and Non-sporing Anaerobic Infections	414
Chapter 51	Leprosy	422
Chapter 52	Anthrax, Actinomyces, Non-venereal Treponematoses, and Other Bacterial SSTIs	430
Chapter 53	Viral Exanthems and Other Cutaneous Viral Infections	438

Chapter 54	Parasitic Infections of Skin, Soft Tissue, and Musculoskeletal System	446
Chapter 55	Fungal Infections of Skin, Soft Tissue and Musculoskeletal System	455
<b>Section 8: Respiratory Tract Infections</b>		<b>464 - 544</b>
Chapter 56	Infective Syndromes of Respiratory Tract	464
Chapter 57	Bacterial Pharyngitis	472
Chapter 58	Bacterial Lobar Pneumonia	478
Chapter 59	Bacterial Atypical (Interstitial) Pneumonia	485
Chapter 60	Tuberculosis and Nontuberculous Mycobacteria Infections	492
Chapter 61	Pertussis (Bordetella Pertussis)	501
Chapter 62	Infections due to Non-fermenting Gram-negative Bacilli	507
Chapter 63	Myxovirus Infections of Respiratory Tract	514
Chapter 64	Coronavirus Infections	521
Chapter 65	Miscellaneous Viral Infections of the Respiratory Tract	530
Chapter 66	Parasitic and Fungal Infections of the Respiratory Tract	537
<b>Section 9: Central Nervous System Infections</b>		<b>545 - 598</b>
Chapter 67	Infective Syndromes of the Central Nervous System	545
Chapter 68	Bacterial Meningitis	553
Chapter 69	Tetanus	561
Chapter 70	Viral Meningitis and Myelitis (Part-1)	568
Chapter 71	Viral Meningitis and Myelitis (Part-2)	576
Chapter 72	Viral Encephalitis and Encephalopathy	584
Chapter 73	Parastic and Fungal Infections of the Central Nervous System	591
<b>Section 10: Urogenital Tract Infection</b>		<b>599 - 613</b>
Chapter 74	Infective Syndromes of Urinary Tract	599
Chapter 75	Infective Syndromes of Genital Tract and Sexually-Transmitted Infections	607
<b>Section 11: Miscellaneous Infective Syndrome</b>		<b>614 - 642</b>
Chapter 76	Ocular and Ear Infections	614
Chapter 77	Congenital Infections	621
Chapter 78	Organisms with Oncogenic Potential	628
Chapter 79	Zoonotic Infections	636



## THE BOOK

Unlock the secrets of diagnostic microbiology with *Microbial Clues: Clinical Cases in Diagnostic Microbiology!* This essential guide for MBBS students and medical professionals offers 2500+ meticulously crafted clinical cases in a case-based Multiple-Choice Question (MCQ) format, covering all the sections of microbiology like General Microbiology, Immunology, Hospital Infection Control, Bloodstream and Cardiovascular System Infections, Gastrointestinal (GI) Infection, Hepatobiliary System, Skin, Soft Tissue and Musculoskeletal System Infections, Respiratory Tract Infections, Central Nervous System Infections, Urogenital Tract Infections and Miscellaneous Infective Syndromes covering all Bacterial, Viral, Parasitic and Fungal Infections. Aligned with the National Medical Commission's Competency-Based Medical Education (CBME) curriculum and NEET PG standards, this book is your key to mastering microbiology through real-world scenarios.

Case-based learning is the cornerstone of clinical excellence, transforming theoretical knowledge into practical skills. By engaging with diverse cases across clinical presentation, diagnosis, treatment, complications, and public health, *Microbial Clues* sharpens your diagnostic acumen and critical thinking. Each case is unique, with reshuffled options to enhance learning, making it an ideal tool for exam preparation and clinical practice.

For medical graduates and professionals, this book is a game-changer. It equips you to confidently tackle infectious diseases, from gastrointestinal syndromes to skin infections, while fostering a deep understanding of public health strategies. Whether you're preparing for NEET PG or aiming to excel in patient care, *Microbial Clues* is your trusted companion for success.

## THE AUTHOR



**Dr. Aadam Najeeb**, the lead author of *Microbial Clues: Clinical Cases in Diagnostic Microbiology*, is a distinguished microbiologist and educator whose expertise and passion for teaching have profoundly shaped this educational resource. An alumnus of Jawaharlal Nehru Medical College (J.N.M.C.), Belagavi, Karnataka, Dr. Aadam Najeeb earned his Ph.D. in Medical Microbiology, establishing a strong foundation in the study of infectious diseases. His academic journey is complemented by a robust professional career, marked by significant contributions to medical education and antimicrobial resistance (AMR) surveillance. Currently serving as an Assistant Professor in the Department of Microbiology at NAMO Medical Education and Research Institute, Silvassa, Dr. Aadam Najeeb is deeply committed to advancing microbiological education. His prior role as a Tutor in the Department of Microbiology at the prestigious All India Institute of Medical Sciences (AIIMS), Bhopal, honed his ability to translate complex microbiological concepts into accessible, clinically relevant knowledge for students. Dr. Aadam Najeeb's expertise extends beyond academia. He serves as the Nodal Officer for AMR Surveillance under the National Programme on AMR Containment by the National Centre for Disease Control (NCDC), Delhi, and as a Resource Person for Healthcare-Associated Infection (HAI) Surveillance at NAMO Hospital, Silvassa. These roles underscore his dedication to combating antimicrobial resistance, a critical challenge in modern medicine, and inform the practical, case-based approach of this book. A prolific researcher, Dr. Aadam Najeeb has published numerous research papers in indexed journals, contributing to the global understanding of microbial pathogens and their clinical management. His editorial experience, including five years as the editor of a student microbiology journal and logbook, has equipped him with the skills to craft *Microbial Clues* as a meticulously organized, high-quality resource aligned with the National Medical Commission's Competency-Based Medical Education (CBME) curriculum and NEET PG standards. Renowned for his engaging and inspiring teaching style, Dr. Aadam Najeeb has earned the admiration of students throughout his career. His zeal for education is evident in the carefully curated case-based Multiple Choice Questions (MCQs) in this book, designed to bridge theoretical microbiology with real-world clinical practice. *Microbial Clues* reflects his vision of empowering MBBS students and medical professionals to excel in diagnostic microbiology with confidence and precision.



Selfpage Developers Pvt Ltd

E-ISBN: 978-93-7020-370-9



MRP Rs. 664/-