# Practical Microbiology

Third Edition

is the thoroughly updated and revised edition of the book, which has been redesigned and recast as per the latest CBME Guidelines | Competency Based Undergraduate Curriculum for the Indian Medical Graduate. The chapters in the book have been modified from the traditional organism-based teaching to system-based teaching.

The uniqueness of the book is in the clinical case-based exercises and student activities after each practical to assess their learning and practical knowledge. The text is presented in a simple and lucid manner. The text is illustrated with eight colour plates containing 50 figures, computer-drawn figures and photomicrographs. These make the book colourful and the readers can have a better understanding. It will continue to serve as an ideal practical workbook for all MBBS and BDS students.

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Accreditation Board for Hospitals and Healthcare Providers (NABH), New Delhi; Assessor, National Accreditation Board for Education and Training (NABET), New Delhi, has more than 45 years of teaching experience in microbiology to medical and dental undergraduate and postgraduate students. Besides conducting and supervising research in microbiology, he has published Twelve textbooks on microbiology, parasitology and mycology, and 150 research articles in several indexed national and international journals of repute. The results of his research on malaria parasites and *Klebsiella pneumoniae* have been cited in *World Health Organization WHO/MAL/83.10003* and *Topley & Wilson's Microbiology and Microbial Infections, Bacteriology* Vol 2, 10th ed, 2005, respectively. He has supervised a number of PG students of PhD, MD and MS. In appreciation of outstanding research carried out by him in India on bacteriocins of *Klebsiella pneumoniae*, he was awarded Smt. Kunti Mehrotra Award of Indian Association of Pathologists and Microbiologists in 1983. In recognition of significant contribution to the advancement of medical sciences, he was elected Member of National Academy of Medical Sciences (India) in 1985. He has been a Visiting Professor at University of Mauritius in 1989. He was awarded WHO fellowship on Laboratory Aspects of HIV/AIDS and STD at Community Health Surveillance and Laboratories Administration, Baltimore, Maryland (USA) in 1992. He was honoured by Indian Medical Association, Kaithal, Haryana, on the eve of Doctors' Day on 01.07.1999. He has been examiner for BDS, MBBS, MD, DNB and PhD microbiology of a number of universities. His biography including academic activities and research work has been published in *Who's Who in Medicine and Healthcare* 2011–12 (8th edition), NJ 07922, USA, distinguishing him as one of the leading healthcare professionals from ground the world.



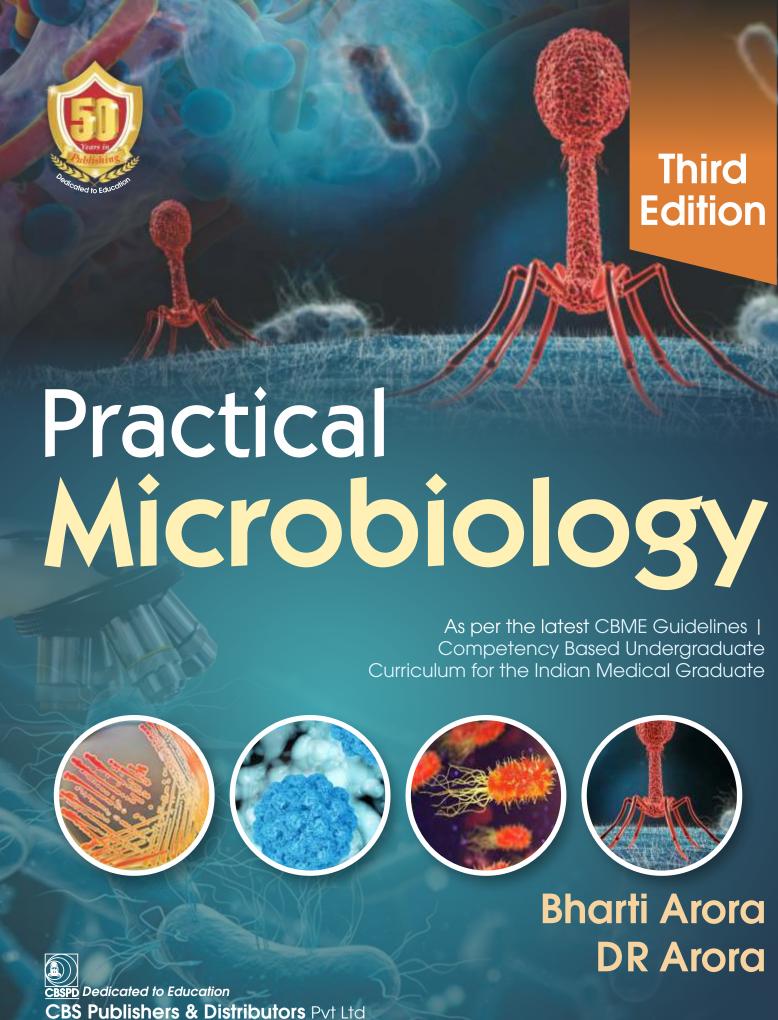
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Competency based Undergraduate Curriculum for the Indian Medical Graduate

Code	Competency	Chapter	Page no
MI 1.2	Student should be able to describe the use, care and handling of microscope.	01	3
MI 1.2	Student should be able to perform Gram staining and identify the bacteria.	02	7
MI 1.2	Student should be able to perform Ziehl-Neelsen staining and identify the acid-fast bacteria.	03	13
MI 1.2	Student should be able to perform Albert's staining and identify <i>Corynebacterium diphtheriae</i> .	04	18
MI 1.2	Student should be able to perform spore staining and identify the spores.	05	21
MI 1.2	Student should be able to perform capsule staining (India ink staining) and identify capsules.	06	24
MI 1.2	Student should be able to perform the hanging drop preparation and identify motility of bacteria.	07	27
MI 1.5	Student should be able to follow standard precautions and transmission-based precautions for healthcare associated infections and choose appropriate method of sterilization and disinfection in the laboratory, and in clinical and surgical practice.	d 08	30
MI 1.1	Student should be able to identify the liquid culture media and their role in diagnosis.	09	45
MI 1.1	Student should be able to identify the solid culture media and their role in diagnosis.	10	49
MI 8.10	Student should be able to demonstrate the appropriate sample collection and method to perform the laboratory tests for the detection of microbial agents causing infectious diseases.	11	58
MI 1.1	Student should be able to describe various culture techniques for isolation of bacteria.	12	66
MI 1.1	Student should be able to perform various biochemical tests for identification of bacteria.	13	70
MI 1.6	Student should be able to describe the method of antimicrobial susceptibility testing and role of antimicrobial agents in various infections.	14	78
MI 1.8 and 8.15	Student should be able to describe the antigen–antibody reactions (conventional).	15	87
MI 1.8 and 8.15	Student should be able to describe the antigen-antibody reactions (newer).	16	102
MI 1.2	Student should be able to demonstrate appropriate collection of stool sample and its preservation.	17	113
MI 1.2	Student should be able to perform stool routine microscopy.	18	116
MI 1.2, MI 3.2 and MI 8.15	Student should be able to identify the faecal eggs, trophozoites, cysts and oocysts of different parasites.	19	123
MI 2.6 and MI 8.15	Student should be able to perform blood smear examination for malaria parasites and <i>Leishmania</i> .	20	129

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MI 1.1 and 1.2	Student should be able to describe the laboratory diagnosis of fungal infections.	21	141
MI 1.1 and 1.2	Student should be able to identify and describe the laboratory diagnosis of <i>Candida albicans</i> .	22	145
MI 1.2 and 1.1	Student should be able to identify and describe the laboratory diagnosis of <i>Cryptococcus neoformans</i> .	23	148
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MI 1.1 and 1.2	Student should be able to identify and describe the laboratory diagnosis of dermatophytes.	26	157
MI 1.1	Student should be able to describe the laboratory diagnosis of viral infections—microscopy, cultivation, serology and molecular tests.	27	163
MI 4.3, 8.15 and 1.2	Student should be able to identify and describe the laboratory diagnosis of <i>Staphylococcus</i> .	28	173
MI 4.3	Student should be able to identify and describe the laboratory diagnosis of <i>Streptococcus pyogenes, S. agalactiae</i> and enterococci.	29	180
MI 4.3, 8.15 and 1.2	Student should be able to identify and describe the laboratory diagnosis of <i>Streptococcus pneumoniae</i> .	30	186
MI 1.2, 5.3 and 8.15	Student should be able to identify and describe the laboratory diagnosis of <i>Neisseria</i> .	31	189
MI 6.2	Student should be able to identify and describe the laboratory diagnosis of <i>Corynebacterium diphtheriae</i> .	32	193
MI 1.2, 6.3 and 8.15	Student should be able to identify and describe the laboratory diagnosis of <i>Mycobacterium tuberculosis</i> .	33	198
	Student should be able to identify and describe the laboratory diagnosis of anaerobes.	34	203
MI 4.1	Student should be able to identify and describe the laboratory diagnosis of <i>Clostridium</i> .	35	208
MI 1.2, 3.2 and 8.15	Student should be able to identify and describe the laboratory diagnosis of <i>Escherichia coli</i> .	36	213
MI 1.2, 6.2 and 6.3	Student should be able to identify and describe the laboratory diagnosis of <i>Klebsiella</i> .	37	216
MI 7.3	Student should be able to identify and describe the laboratory diagnosis of <i>Proteus</i> .	38	219
MI 1.2, 3.2 and 8.15	Student should be able to describe laboratory diagnosis of Shigella.	39	222
MI 3.3 and 3.4	Student should be able to identify and describe the laboratory diagnosis of <i>Salmonella</i> .	40	226
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MI 2.3 and 8.15	Student should be able to discuss clinical diagnosis, causative agents, pathogenesis and laboratory diagnoses of cardiovascular system.	45A	252
MI 3.2 and 1.2	Student should be able to discuss clinical diagnosis, causative agents, pathogenesis and laboratory diagnoses of gastrointestinal system.	45B	254
MI 6.2	Student should be able to discuss clinical diagnosis, causative agents, pathogenesis and laboratory diagnosis of respiratory system.	45C	258
MI 5.3 and 8.15	Student should be able to discuss clinical diagnosis, causative agents, pathogenesis and laboratory diagnoses of central nervous system.	45D	261
MI 4.1, 4.3, 8.15 and 1.2	Student should be able to discuss clinical diagnosis, causative agents, pathogenesis and laboratory diagnoses of skin and soft tissue.	45E	263
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