

Prakash's

Notebook of Microbiology

Including Parasitology and Entomology
for Undergraduate Students and PG Aspirants

Third
Edition

Key Features:

- **Minimum use of dictionary** Simple and easy language.
- **UG theory** Total 109 chapters are presented as per modern trend of medical education.
- **UG practical** All practical aspects like staining exercise, serological tests, biochemical tests, laboratory animals, specimens, etc., are covered.
- **Journal preparation** Neat, coloured, microscopical and schematic pictures/diagrams with proper labelling are useful for preparation of journal.
- **Parasitology and Entomology** No need to buy separate book for parasitology and entomology.
- **Recent advances** Recent topics like swine flu, bird flu, CCHF, Zika virus, Ebola virus, dengue virus, chikungunya virus, Chandipura virus, Nipah virus, SARS-CoV, MERS-CoV, PCR, vaccines, etc., are covered.
- **PG entrance and MCI level exam preparation** Total 2065 MCQs (chapter-wise, system-wise and image-based) from different competitive exams like AI, AllIMS, PGI and state level are covered with answers and explanations. This unique way of presentation of every chapter helps in PG entrance and MCI level exam preparation from the time of UG, there is no need to buy a separate book for such competitive exams.
- **Clinical microbiology** Useful as laboratory manual for routine laboratory testing like Gram stain, ZN stain, Widal test, VDRL test, etc.
- **No text format and no wasting of time** No any descriptive or text type writing, only point-wise presentation with maximum numbers of flow charts (including all parasitic life cycle), tables, bullets and numbering, which help in quick revision at the time of exam and to make the effective presentation in exam to score high.
- **Colour codes** All headings, subheadings and other details on particular point are available in specific colour forms, which minimise the use of colour marker or colour pen/pencil.
- **Eye-catching words** These are the "key-words" in every sentence highlighted by purple colour, which helps to refresh reader's memory very quickly at the time of exam.
- **Question bank** Clinical cases, essays/full questions, short notes and short questions are available at the end of each chapter, so no need to solve the sample papers.
- **Multi-subject approach** Covering of topics which are common between microbiology and other subjects like pathology (ARF, Coomb's test, phagocytosis, etc.), community medicine (communicable diseases, vaccines, etc.), ophthalmology (trachoma, etc.), ENT (otomycosis) and many more.
- **Preview page** Preview page is given before the starting of every system. It contains the common headings and subheadings of different topics, which makes the system easy to read, understand and remember, and useful to avoid mug up.
- **Green, sky blue, red and black arrows** In humans, all parasitic life-cycles which occur normally are presented with green arrows (→), occur with autoinfection are presented with sky blue arrows (↪) and cycle in which man act as dead-end host are presented with red arrows (→). Other types of cycles are presented with black arrows (→). This approach helps to discriminate between normal cycle and other cycle in human host and is also useful to remember the life cycle very easily.
- **Mnemonics** Minimise the burden on the reader for the facts which are difficult to remember.
- **Proper order:** Orderly arrangement of all headings and subheadings reduces the labour-intensive work of students.
- **No diversification of knowledge** Deep knowledge on particular topic is available on single platform, there is no need to refer to many sources to collect the entire answer of any question.
- **Standard and complete book** All above contents are available in one book and makes it the standard and complete book for microbiology, parasitology and entomology.
- **UG and pre-PG syllabi** This is the only book prepared according to UG and pre-PG syllabi.

Prakash Modi MBBS, MD (Microbiology)

is currently Professor and Head, Department of Microbiology, PDU Government Medical College, Rajkot, Gujarat. He was Associate Professor, Department of Microbiology, Shri MP Shah Government Medical College, Jamnagar, Gujarat. He has been serving since 2004 as a medical teacher in microbiology. He published initially the book *Vision of Bacteriology* in 2014, which received tremendous response from the students and later he published *Prakash's Notebook of Microbiology* in 2015 which has become the most popular book among its readers. He has an active role in research work with publication of nine original research articles in different international and national journals. He was an editor of *Journal of Research in Medical and Dental Science*, 2013-2016.



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E-mail: delhi@cbspd.com, cbspubs@airtelmail.in; Website: www.cbspd.com
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Prakash Modi

MD (Microbiology)

Professor and Head
Department of Microbiology
PDU Government Medical College
Rajkot 360001, Gujarat, India
E-mail: drprakash_md@yahoo.co.in

Ex-Assistant Professor and Ex-Associate Professor
Department of Microbiology
Shri M P Shah Government Medical College
Jamnagar 361001, Gujarat, India

Ex-Assistant Professor
Department of Microbiology
Government Medical College
Bhavnagar 364001, Gujarat, India



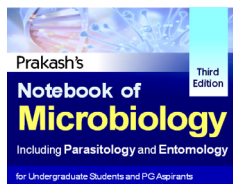
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4819/XI Prahlad Street, 24 Ansari Road, Daryaganj, New Delhi 110 002

Ph: 011-23289259, 23266861, 23266867

Fax: 011-23243014

Website: www.cbspd.com

e-mail: delhi@cbspd.com; cbspubs@airtelmail.in

Corporate Office: 204 FIE, Industrial Area, Patparganj, Delhi 110 092

Ph: 011-49344934

Fax: 011-49344935

e-mail: publishing@cbspd.com; publicity@cbspd.com

Branches

- **Bengaluru:** Seema House 2975, 17th Cross, K.R. Road, Banasankari 2nd Stage, Bengaluru 560 070, Karnataka
Ph: +91-80-26771678/79 Fax: +91-80-26771680 e-mail: bangalore@cbspd.com
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Ph: +91-44-26260666, 26208620 Fax: +91-44-42032115 e-mail: chennai@cbspd.com
- **Kochi:** 42/1325, 1326, Power House Road, Opp KSEB Power House, Eranakulam 682 018, Kochi, Kerala
Ph: +91-484-4059061-65 Fax: +91-484-4059065 e-mail: kochi@cbspd.com
- **Kolkata:** No. 6/B, Ground Floor, Rameswar Shaw Road, Kolkata-700014 (West Bengal), India
Ph: +91-33-2289-1126, 2289-1127, 2289-1128 e-mail: kolkata@cbspd.com
- **Mumbai:** 83-C, Dr E Moses Road, Worli, Mumbai-400018, Maharashtra
Ph: +91-22-24902340/41 Fax: +91-22-24902342 e-mail: mumbai@cbspd.com

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to

*my elder brothers, Mr Asvin and Mr Arvind and
to all those who believe in hardwork, self-confidence, dedication, adventure and courage and
who are having sharp weapons like passion and consistency*

Preface to the Third Edition

Do not underestimate the power of microbes, absolutely true because human is trying to beat them since long time but they escape the human defence and continuously creating a problem to treat the infectious diseases. Clinical knowledge on infectious diseases served in this book shall help the clinicians to come out from these issues.

There are many books existing on the subjects but author is not satisfied with the way of presentation in all of them, that's why an attempt has been made to serve the entire material of microbiology including theory, practical, journal preparation, MCQs for pre-PG preparation, parasitology and entomology in one book like "ALL IN ONE" with presentation in point-wise, organised and in proper ordinal manner like notes hence title prefix is "notebook". This book will sort out many questions of students such as how to make examination effective, how to score high, why multiple books for one subject, why different books for UG and PG entrance examination, which are the important questions for examination, etc. After reading this book, all the students will surely realise that medical science wouldn't be tough if all books of medical subjects could be available in same format as *Prakash's Notebook of Microbiology including Parasitology and Entomology*.

This book is written in simple language and in precise manner. Changes made in this edition are placement of "**Learning heading and subheadings**" at the beginning of each chapter and addition of six new chapters like **miscellaneous topics (world days, health care related symbols), medical entomology, oncogenic microbes, bioterrorism, microbiology of water, milk and air, and image based MCQs**. Attempts have been made to guide the microbiologist from the laboratory to the bed side by putting clinical pictures of infectious diseases in chapters and by putting clinical case study at the end of chapter. **Question bank** is available at the end of each chapter, so no need to search extra sources of question papers (sample papers) for important questions for preparation of examinations. Extra efforts have been made to strengthen the PG entrance preparation from the time of undergraduation by increasing the numbers of MCQs (with answers and explanations) in three forms like MCQs for chapter review (given at the end of each chapter), MCQs for system review (chapter no. 108) and image based MCQs (chapter no. 109).

After the publication of 1st and 2nd editions, I got tremendous response from everywhere, especially from medical students and my friends/seniors who are serving as medical teachers in different colleges, I am thankful to all of them for encouraging me to go for 3rd edition. This task could not be possible without an eternal support from my wife Shweta Modi and my daughter Aarya Modi. Last but not least, again thank you to all those who were always at there for me to make this journey successful.

Attempt has been made to serve the complete knowledge but I don't claim for perfection. Suggestions are welcome from all students and teachers for any shortcomings in contents, which will help me to improve my work and to serve more quality material to students in subsequent editions.

Prakash Modi

MD (Microbiology)

Preface to the First Edition

Microbiology is a link between clinical subjects and non-clinical subjects like anatomy, physiology, pharmacology, biochemistry. In a busy curriculum of medical students, it is very difficult to spare enough time for textbook type material, where point-wise presentation is lacking and also to spare time for reference books. In last 10 years of my journey as a medical teacher, I always felt that medical students are looking for such books which having not only knowledge but also have exam-oriented approach, covering of practical aspects and detailed knowledge about a particular point on single platform which minimise the use of reference books. I kept all this in my mind when I was writing the book. Present knowledge is prepared with use of multiple cross references and attempt was made to put complete knowledge about a particular point on single platform. Book is useful for medical students and also for clinician to diagnose, to prevent and to treat the infectious diseases.

Effort is made to cover entire subject, however nobody is perfect and complete one. This book is also lack at somewhere. Suggestions, instructions and advice are invited from students, seniors and all readers to make the effort perfect and complete. During the journey of organisation of this book, I required help and support from friends, colleagues and family. I am very grateful to all of them for sparing their valuable time for me.

Prakash Gelotar (Modi)

MD (Microbiology)

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Tips to Start PG Entrance Preparation from the Time of Undergraduation

- ❖ **Theory:** Read theory first to clear the basics → Solve all questions (like case study, full questions, short notes and short questions) of “question bank” given at the end of each chapter → Check “chapterwise MCQs” given at the end of each chapter, by that way cover the all chapters of particular system and then → Solve the system-wise MCQs.
- ❖ **Group/pair study:** You will know which you don't know from the discussion with partner.
- ❖ **Mnemonic:** Should be limited.
- ❖ **Abbreviations:** Abbreviations are used in many MCQs, so remember the full forms.
- ❖ **Assessments:** Regular solving the NEET PG sample paper within the allotted time. This technique will help students in improving their speed and accuracy level. By this way, candidates can analyse their performance, expected score they can score and focus on weaker section.
- ❖ **Coaching:** Better to attend the coaching class than preparing at home.
- ❖ **MCQs pattern:** Few MCQs required knowledge of one chapter while few required knowledge of multiple chapters, so better to read all chapters (of particular system) before solving the MCQs.
- ❖ **Microbiology weightage in PG entrance:** Microbiology carrying approximately 20 marks in NEET PG, but questions based on infectious disease of other subjects such as community medicine, general medicine, surgery, skin, paediatrics etc., are also required basic knowledge of this subject, so eventually microbiology carrying around 40–50 marks burden.
- ❖ **Section ignored by students:** Epidemiology (covered in my second edition along with pathogenicity), resistance, virulence factors, prevention, treatment etc., sections are ignored by many students in microbiology but many MCQs are also the part of the section, so read it with university exam.
Example:
Q. Risk of pneumococcal meningitis is seen in -
(AIIMS-1999)
(a) Post splenectomy patient; (b) Patient undergoes neurological intervention; (c) Patient following cardiac surgery; (d) Patient with hypoplasia of lung.
Ans. (a) is the answer: Splenectomy is the precipitating factor for capsulated bacterial infection, but students are rarely reading such topics.
Must read: Remember food poisoning by heart because, almost in every year exam, there is a MCQ on food poisoning or microbes causing food poisoning.

Tips to Attend the Answers of MCQs

- ❖ **Time Management:** Don't waste the time to read the all MCQs at a time but read and attend the answer one by one.
- ❖ **Read all options:** Read all options at first, before encircling initial option, because some time after encircling first option you may realise that later option is more correct answer.
- ❖ **-ve marking:** Don't attend if you don't know the answer.
- ❖ **Most right answer:** Sometimes MCQ has more than one right options, but if it is required to tick only one option, then go for most right option.

Example:

Q. The most avidly complement fixing antibody is—
(AIIMS, May 2002)

(a) IgA (b) IgG (c) IgM (d) IgE

Ans. Options a, b and c are the right answers because IgA fixes the alternative pathway while IgG (++) and IgM (+++) fix the classical pathway. But IgM (option 'c') is the most correct answer, if single option is required to encircle.

- ❖ **Wrong options:** Options given along with MCQs are sometimes partially or completely written wrong due to any reasons but it may confuse the students and in this situation believe only in yourself and put confidence on your knowledge.

Example-1:

Q. All the following statements about staphylococci are true, except—
(AI 2010)

(a) Most common source of infection is cross infection from infected people; (b) About 30% of general

population is healthy nasal carrier; (c) Epidermolysin and TSS toxin are superantigen; (d) Methicillin resistance is chromosomally mediated

Ans. Option 'a' is the right answer, but option 'c' is partially correct because epidermolysin is not superantigen, only TSS toxin is a superantigen.

Example-2:

Q: C-reactive protein stands for— (AI 2011)

(a) Capsular polysaccharide in *Pneumococcus*; (b) Concanavalin-A; (c) Calretin; (d) Cellular

Ans. All options are wrong

In CRP, C stands for carbohydrate antigen of cell wall of *Pneumococcus* neither the capsular polysaccharide Ag nor other.

- ❖ **Confusing options:** Options given along with MCQs are sometimes look right but systematically not right.

Example:

Q. Hepatitis C virus is a— (AIIMS, May 2004)

(a) Toga virus; (b) *Flavivirus*; (c) Filo virus; (d) Retro virus

Ans. Option 'c' looks right but *Flaviridae* family has four genera like *Hepacivirus*, *Pegivirus*, *Pestivirus* and *Flavivirus* of which hepatitis C virus belong to genus *Hepacivirus* not *Flavivirus*. However, many authors considered common name as flavi virus to all viruses belong to *Flaviridae* family, so option 'c' is right.

- ❖ **No time waste:** If you don't know the answer, then don't waste the time, move to the next question. Also don't waste the time for MCQs with confusing options and wrong options.