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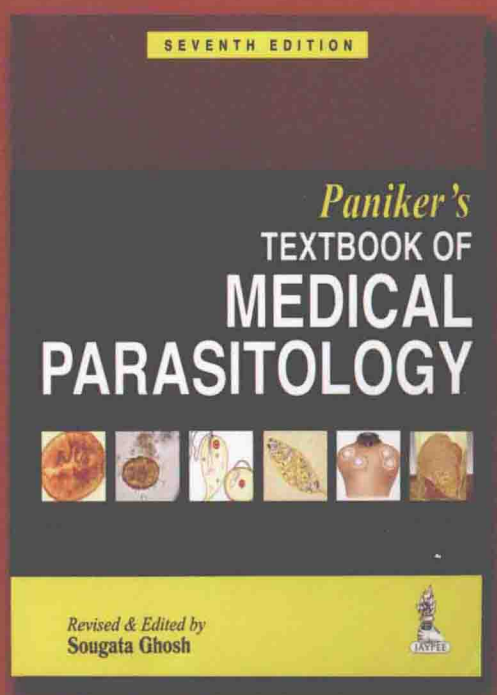
医学各专业本科生、研究生、长学制学生、留学生用

Paniker's Textbook of Medical Parasitology

医学寄生虫学

(第7版)

Sougata Ghosh



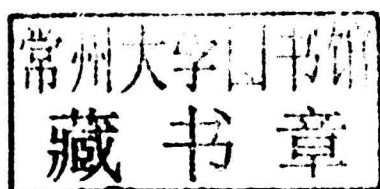
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Paniker's Textbook of
MEDICAL PARASITOLOGY

SEVENTH EDITION



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(第7版)

Paniker's Textbook of MEDICAL PARASITOLOGY

SEVENTH EDITION

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北京大学医学出版社



ANTONIE VAN LEEUWENHOEK

Born: 24.10.1632 - Died: 26.8.1723
Delft, Holland

This man, born poor, with little education, a draper in his hometown of Delft had surprising visitors! They included great men of science as well as the Royalty like the Tsar Peter the Great, Frederick the Great of Prussia and King James II of England. This was due to his hobby of grinding fine lenses through which he looked at various objects and brought forth the wonder world of small things that none had seen before. He kept clear descriptions and accurate drawings of what he saw and communicated them to the Royal Society in London. A strict check convinced the Society of their authenticity. The unlettered Antonie was elected a Fellow of the Royal Society! The papers sent by him over decades can still be seen in the Philosophical Transactions of the Royal Society.

The discoveries he made are legion. He described the first protozoan pathogen *Giardia*. He also discovered many types of bacteria, human and animal spermatozoa, and eggs of various animals realizing their importance in reproduction. He could not recognize the significance of the different types of bacteria, and to him, they were just 'little animalcules'. His fault was in being much before the time, for it took two centuries more for people to accept the microbial origin of infectious diseases. But that should not deter us from acknowledging the great contributions made by Leeuwenhoek to Biology and many other branches of Science. He was truly the **Founder of Microbiology**.

Preface to the Seventh Edition

The current edition of this book is written in a new user-friendly format in contrast to the classic narrative style of Dr. Paniker's Textbook of Medical Parasitology that has served medical students and teachers for more than 25 years since 1988.

Considering the advancement in the field of Parasitology, I have updated the text thoroughly, incorporating the recent epidemiological data and new diagnostic methods especially the molecular techniques and current treatment modalities. Almost all chapters have been revised and few new chapters like *Pneumocystis jirovecii*, Microsporidia, and *Balantidium coli* are added.

The main emphasis of the current edition is to make the text more comprehensive, colorful, and student-friendly. Diagrams of life cycle have been redrawn in a manner to facilitate the students reproduce them during examinations. Several new tables, flowcharts, and easy-to-remember boxes are given to equip the students for better answering of theory and oral questions during examinations. More microscopic view pictures, photographs of specimens, and diagnostic images have been added in a manner to favor better visible impressions of parasitic diseases. I have included "Key points" of important parasites in box formats to highlight "must know facts" that are pertinent to the topic.

Important MCQs and review questions carefully selected from various university examination papers have been added to test and reinforce understanding of the topic by the student.

The aim of the book remains to be compact, yet informative, and useful for both undergraduate and postgraduate students.

My endeavor will be successful, if the book is found to be useful for faculty and students.

Expressions and emotions fail to find words to express thanks to my parents. I thank them for being a constant source of inspiration and motivation.

I am grateful to all the colleagues in my department for their valuable suggestions during preparing the texts.

I am especially indebted to the Director and Staff of School of Tropical Medicine, Kolkata for providing mounted specimens.

I gratefully acknowledge the help of Mr Jitendar P. Vij (Group Chairman), Mr Ankit Vij (Managing Director), Mr Tarun Duneja (Director Publishing) and Mr Sabyasachi Hazra for their professional help and guidance during the project.

The insight and skills of Dr Sakshi Arora (Chief Development Editor) along with her team helped in polishing this book to best meet the needs of students and faculty alike.

Lastly I acknowledge the support extended by my family members during revising the book.

All suggestions are welcome and may be emailed to: s_ghosh2006@rediffmail.com

SOUGATA GHOSH

Preface to the First Edition

Parasitic infections continue to account for a large part of human illness. Antimicrobial drugs and vaccines that have made possible the effective control of most bacterial and viral diseases have not been as successful against parasitic infections. The numbers of persons afflicted by parasites run into many millions. Malaria still affects over 500 millions, pinworm and whipworm 500 millions each, hookworm 800 millions and roundworm a billion persons. Filariasis, leishmaniasis and schistosomiasis remain serious public health problems. Infections due to opportunist parasites are becoming increasingly evident in the affluent countries.

In recent years there has been a resurgence in the study of parasitic infections. Much new knowledge has been gained making possible precise diagnosis and more effective control of parasites and the diseases they cause.

This textbook attempts to present the essential information on parasites and parasitic diseases, with emphasis on pathogenesis, epidemiology, diagnosis and control. Every effort has been made to incorporate recent advances in the subject.

It is hoped that medical students, teachers and physicians will find this book useful. Their comments and suggestions for improvement of the book will be most welcome.

SHANTHI, East Hill Road
Calicut, Kerala 673 006

CK JAYARAM PANIKER

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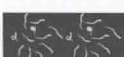
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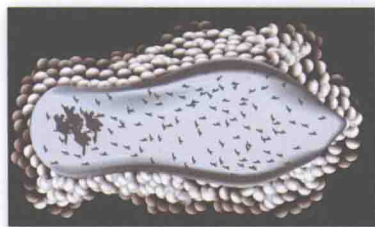
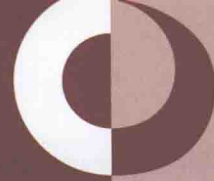
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General Introduction: Parasitology

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Introduction

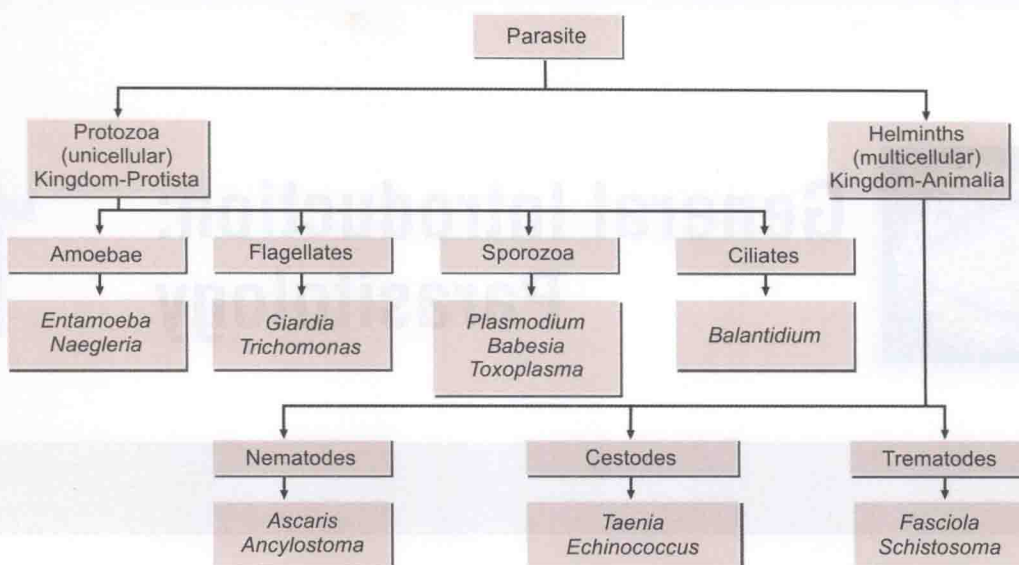
Medical parasitology deals with the parasites, which cause human infections and the diseases they produce.

- It is broadly divided into 2 parts—
 - Protozoology
 - Helminthology.
- The pioneer Dutch microscopist, **Antonie von Leeuwenhoek of Holland** in 1681, first introduced single lens microscope and observed *Giardia* in his own stools.
- **Louis Pastuer** in 1870, first published scientific study on a protozoal disease leading to its control and prevention during investigation of a epidemic silk worm disease in South Europe.
- A seminal discovery was made in 1878 by **Patrick Manson** about the role of mosquitoes in filariasis. This was the first evidence of vector transmission.
- Afterwards, **Laveran** in Algeria discovered the malarial parasite (1880), and **Ronald Ross** in Secunderabad and Calcutta in India, showed its transmission by mosquitoes (1897). A large number of vector-borne disease have since then been identified.
- By mid-twentieth century, with dramatic advances in antibiotics and chemotherapy, insecticides and antiparasitic drugs, and improved lifestyles, all infectious diseases seemed amenable to control.

Parasites

Parasites are living organisms, which depend on a living host for their nourishment and survival. They multiply or undergo development in the host.

- The term '**parasite**' is usually applied to **Protozoa** (unicellular organisms) and **Helminths** (multicellular organisms) (Flowchart 1.1).
- Parasites can also be classified as:
 - **Ectoparasite:** Ectoparasites inhabit only the body surface of the host without penetrating the tissue. Lice, ticks, and mites are examples of ectoparasites. The term **infestation** is often employed for parasitization with ectoparasites.
 - **Endoparasite:** A parasite, which lives within the body of the host and is said to cause an infection is called an endoparasite. Most of the protozoan and helminthic parasites causing human disease are endoparasites.
 - **Free-living parasite:** It refers to nonparasitic stages of active existence, which live independent of the host, e.g. cystic stage of *Naegleria floweri*.
- Endoparasites can further be classified as:
 - **Obligate parasite:** The parasite, which cannot exist without a host, e.g. *Toxoplasma gondii* and *Plasmodium*.



Flowchart 1.1: Type of parasites

- **Facultative parasite:** Organism which may either live as parasitic form or as free living form.
- **Accidental parasites:** Parasites, which infect an unusual host are known as accidental parasites. *Echinococcus granulosus* infects man accidentally, giving rise to hydatid cysts.
- **Aberrant parasites:** Parasites, which infect a host where they cannot develop further are known as aberrant or wandering parasites, e.g. *Toxocara canis* (dog roundworm) infecting humans.

Host

Host is defined as an organism, which harbors the parasite and provides nourishment and shelter to latter and is relatively larger than the parasite.

- The host may be of the following types:
 - **Definitive host:** The host, in which the adult parasite lives and undergoes sexual reproduction is called the definitive host, e.g. mosquito acts as definitive host in malaria. The definitive host may be a human or any other living being. However, in majority of human parasitic infections, man is the definitive host (e.g. filaria, roundworm, hookworm).
 - **Intermediate host:** The host, in which the larval stage of the parasite lives or asexual multiplication takes place is called the intermediate host. In some parasites, 2 different intermediate hosts may be required to complete different larval stages. These

are known as **first and second intermediate hosts**, respectively.

- **Paratenic host:** A host, in which larval stage of the parasite remains viable without further development is referred as a paratenic host. Such host transmits the infection to another host.
- **Reservoir host:** In an endemic area, a parasitic infection is continuously kept up by the presence of a host, which harbors the parasite and acts as an important source of infection to other susceptible hosts, e.g. dog is the reservoir host of hydatid disease.
- **Accidental host:** The host, in which the parasite is not usually found, e.g. man is an accidental host for cystic echinococcosis.



Parasites with man as intermediate or secondary host

- *Plasmodium* spp.
- *Babesia* spp.
- *Toxoplasma gondii*
- *Echinococcus granulosus*
- *Echinococcus multilocularis*
- *Taenia solium*
- *Spirometra* spp.

Zoonosis

The word **zoonosis** was introduced by Rudolf Virchow in 1880 to include the diseases shared in nature by man and animals.