

# MANUAL OF CLINICAL MICROBIOLOGY

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## PREFACE

In the past decade, great strides have been taken in the field of clinical microbiology. A section of Clinical Microbiology has been formally approved by the Medical Microbiology and Immunology Division of the American Society for Microbiology. The many members of this group have worked to keep all areas of clinical microbiology up to date by the presentation of papers at local, state, and national meetings, by regular publication of a newsletter for clinical microbiologists, and, finally, by the preparation of this *Manual of Clinical Microbiology*.

The majority of the authors who have contributed to this book are leaders in the field of clinical microbiology and are particularly knowledgeable in the specialized areas they have written about. These experts have endeavored to include the information vital to students, teachers, technologists, and investigators in such areas as bacteriology, mycology, parasitology, and virology.

The compilation of clinical material in this volume has truly been a cooperative effort. The information in each chapter has been critically examined by several very competent microbiologists. However, a book of this size will inevitably have errors and weaknesses, and we shall welcome corrections, modifications, and suggestions for future editions.

We, the co-editors, acknowledge with grateful appreciation the contributions of the Editorial Board, the Section Editors, and, of course, the authors.

John Blair  
Edwin Lennette  
Joseph Truant

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# Chapter 1

## Introduction

JOSEPH P. TRUANT

### PURPOSE AND RATIONALE OF CLINICAL MICROBIOLOGY

The primary purpose of a manual of clinical microbiology should be to give direction and guidance in the isolation and identification of disease-producing organisms and wherever possible to provide data on drug susceptibility which will assist the physician in the selection of a therapeutic regimen. The information presented herein has been compiled by over 100 leading clinical microbiologists and in the main represents the most recent updating of clinical microbiological techniques.

The authors and editors have strongly stressed the necessity for the clinical microbiologist and the physician to be acutely aware of the indigenous flora of man (*see* Chapter 2) in order to interpret correctly the data obtained by direct smear and culture of clinical specimens. Furthermore, the reader must pay particular attention to the collection of an adequate specimen (*see* Chapter 3) in order to insure that the clinician will make an adequate evaluation of the microbiological report. Essential prerequisites are the following: (i) collect specimens before chemotherapy if possible; (ii) obtain material aseptically from the anatomic site where the pathogen(s) is most likely to be found; (iii) avoid contamination of specimens; (iv) take into consideration the stage of the disease process; (v) inform the laboratory of the clinical considerations to assist the technologist in the selection of adequate media and procedures (*see* Chapter 4).

The reader is strongly advised to make frequent reference to section X, Chapters 74, 75, and 76, which provide details on media, reagents, stains, and test procedures. Information on the appropriate methods for dealing with a specific organism or group of pathogens may be found in the chapter dealing with a particular isolate.

### KEY TO CLASSIFICATION

A great many publications of historical and practical value have appeared relative to the classification of microorganisms. Since clinical microbiologists and clinicians need to speak the same language when referring to pathogens, it is necessary to recommend a classificatory key

which contains the scientific names of the commonly occurring human pathogens. The key which is referred to most commonly in this country is that which appears in the seventh edition (or eighth edition to be published in 1970) of *Bergey's Manual of Determinative Bacteriology*. We are indebted to the publishers, The Williams & Wilkins Co., and to the Board of Trustees of *Bergey's Manual* for permission to draw so freely on the contents of the *Manual*, and particularly to Dr. R. E. Buchanan for his advice and very kind assistance.

The relevant information from *Bergey's Manual* is reproduced in Fig. 1-4. Figures 5 and 6 show the "current" classification of viruses. The reader is referred to the chapters dealing with individual groups of organisms for recent changes in taxonomic designations.

### SAFETY PRECAUTIONS

A large number of disease-producing agents are present, either in clinical specimens or in pure culture, within various areas of a clinical microbiology laboratory. A summary of the laboratory-acquired infections which have been documented for the period of 1950 to 1965 has been published by Pike et al. (1). These authors discuss the variety of sources for laboratory infections and indicate that in a high proportion of cases the agent was transferred via the aerosol route. Therefore, it is extremely important that laboratory directors and technologists pay particular attention to aseptic procedures and that a safety hood be used whenever one is working with highly infectious material. It is not our intent to describe measures or recommend apparatus which will reduce the possibility of laboratory-acquired infections, but the reader is strongly advised to survey the literature and become knowledgeable in the setting of guidelines for laboratory safety.

Since infections may result from the inadequate disposal of contaminated material, it is good practice to discard all material in a receptacle which has a cover; autoclaving or incineration is necessary. A solution of disinfectant (e.g., 5% phenol) may be used for certain contaminated articles. The laboratory supervisor is advised to