FIFTH EDITION
Diagnostic Medical Parasitology
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Lynne Shore Garcia, M.S., MT, CLS, F(AAM)
LSG & Associates, Santa Monica, California

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As with the first four editions, I dedicate this book to Marietta Voge, a truly rare individual who was widely recognized as one of the world’s leading parasitologists. During her years as a diagnostic and research parasitologist at the University of California, Los Angeles, she touched the lives of many students and staff in a very special way. She was always more than willing to share her expertise with all who asked and volunteered this help over the years whenever contacted. She was always willing to donate a considerable amount of her personal time as a volunteer for various medical projects throughout the world.

She was a very special individual to work with, always interested in the person as well as the problem at hand. Her areas of teaching extended far beyond science. Whatever subject she was interested in received her total enthusiasm and dedication, and she had an exceptional ability to deal with detailed work. Her sense of fairness and professional integrity were remarkable; these ideals were shared with all who came in contact with her.

Her contributions to the field of diagnostic parasitology were numerous and included many classes, seminars, papers, and textbooks. The importance of working with Dr. Voge is hard to put into words. She was unique in her ability to allow a student to grow, both scientifically and personally. She could guide without constraints, teach without formal lectures, counsel without being judgmental, challenge without being unrealistic, tease without being cruel, and always be supportive regardless of the situation. She expected much from her students and employees and yet always gave considerably more than she received.

Scientific information gained from our association with her was invaluable; however, her impact on our lives was considerably more than scientific. She was always available for consultations and just to talk. She left all of us with a sense of having personally matured as a result of knowing and working with her over the years. She is missed by all of us, and yet her contributions in terms of teaching, consultations, volunteer work, professionalism, and friendship will remain with us forever.

I also dedicate this book to John Lawrence. He was an extraordinary individual, and without his original encouragement and assistance, the first edition of the book would never have been written.
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During the past few years, the field of diagnostic medical parasitology has seen dramatic changes, including newly recognized parasites, emerging pathogens in new geographic areas, bioterrorism considerations and requirements, alternative techniques required by new regulatory requirements, reevaluation of diagnostic test options and ordering algorithms, continuing changes in the laboratory test menus, implementation of testing based on molecular techniques, reporting formats, coding and billing requirements, managed care relevancy, increased need for consultation and educational initiatives for clients, and an overall increased awareness of parasitic infections from a worldwide perspective. We have seen organisms like the microsporidia change from the status of “unusual parasitic infection” to being widely recognized as causing some of the most important infections in both immunocompetent and compromised patients. More sensitive diagnostic methods for organism detection in stool specimens are now commercially available for Entamoeba histolytica, Entamoeba histolytica/E. dispar, Giardia lamblia, Cryptosporidium parvum, and Trichomonas vaginalis. Reagents are actively being developed for other organisms such as Dientamoeba fragilis and the microsporidia. We have seen Cyclospora cayetanensis coccidia become well recognized as the cause of diarrhea in immunocompetent and immunocompromised humans. We continue to see new disease presentations in compromised patients; a good example is granulomatous amebic encephalitis caused by Acanthamoeba spp., Sappinia diploidea, and Balamuthia mandrillaris. With the expansion of transplantation options, many parasites are potential threats to patients who are undergoing immunosuppression, and they must be considered within the context of this patient group. Transfusion-associated transmission of potential parasitic pathogens continues to be problematic. Transfusion in general is becoming more widely recognized as a source of infection, and donors are also more likely to come from many areas of the world where parasitic infections are endemic.

With expanding regulatory requirements related to the disposal of chemicals, laboratories are continuing to review the use of mercury compounds as specimen fixatives and learning to become familiar with organism morphology when using substitute compounds. Permanent staining of fecal smears confirms that none of the substitute fixatives provide results of the same quality found with the use of mercuric chloride-based fixatives. However, the key issue is whether the intestinal parasites can be identified using these alternative fixa-
tives, not how “perfect” they look. Many fixative options are now available, including single-vial collection systems, some of which are coupled with their own stains. Requirements also mandate that any laboratory using formalin must have formalin vapor monitored as both an 8 h time weighted average and 15 min readings. Most laboratories are now familiar with the regulations on protection of health care workers from blood and other body fluids and have implemented specific changes that are no longer optional. Although laboratories were already using many of the safety recommendations, these regulations delineate in detail what must be done and documented. Regulatory information based on new shipping requirements is also included.

On the basis of excellent suggestions and comments regarding features of the fourth edition of this book, the following changes have been made in this edition: a new chapter has been added that contains a large number of parasite medical case histories (case history, study questions, correct answer and discussion, and illustrative material); some of the life cycles have been redrawn, and new life cycles have been added; algorithms have been expanded; new tables and figures have been added throughout the book; additional drawings and photographs have been added; extensive updated text information is included, all of which was taken from a comprehensive literature review of all aspects of diagnostic medical parasitology; additional examples of unusual parasitic infections are included; the chapter on arthropods has been expanded and includes additional photographs and drawings and expanded text; the chapter on the immunology of parasitic infections has been enlarged, and updated information on both antigen and antibody detection methods continues to be included in this edition; the chapter on histologic identification of parasites has been greatly expanded with diagrams of various parasites and their visual presentations in tissue sections along with greatly enhanced legends for all images; diagnostic methods using newer immunoassay and “dipstick” technology are described; and the chapter on quality control has been expanded to include information on instrumentation and equipment, safety regulations, quality control and quality systems information, continuous quality improvement, and managed care considerations. The appendixes have been expanded to contain more information on artifacts; expanded lists and photographs of products and commercial suppliers; algorithms for ordering specific tests that complement the ova and parasite examination; flowcharts for processing stool specimens; quality control recording sheets for use in the laboratory; and general references and relevant websites. One of the most important expanded areas of the fifth edition is found in appendix 8. This section contains information that has been published within months prior to the final printing of this edition. This “late breaking” synopsis of very recent publications can assist the reader in having access to the latest information available. I encourage you to review this section as you read various chapters throughout the book.

The approach to the fifth edition of the book is similar to that for the first four editions. My objective is to provide the user with clear, concise, well organized, clinically relevant, cost effective, and practical quality procedures for use in the clinical laboratory setting. To use and fully understand these methods for the parasites discussed, it is imperative that the user also understand information related to life cycle, morphology, clinical disease, pathogenesis, diagnosis, treatment, epidemiology, and prevention. My intent is to provide a comprehensive discussion of both aspects of the field of diagnostic medical parasitology: first, a comprehensive discussion of the individual parasites, and second, relevant diagnostic methods designed to detect and identify the organisms present. I believe that the book fulfills these objectives and provides readers, whether
they are laboratorians, physicians, or other health care professionals, with not only comprehensive but also very practical information.

It is also important for readers to understand that there are many diagnostic test options available to the clinical laboratory; not every laboratory will approach the diagnosis of parasitic infections in the same way. The key to quality and clinically relevant diagnostic work is a thorough understanding of the pros and cons of each option and how various options may or may not be relevant for one’s particular geographic area, laboratory size and range of expertise, client base, number and type of patients seen, personnel expertise and availability, equipment availability, educational initiatives, and communication options, just to name a few variables. However, it is also important to understand the regulations and technical recommendations that govern and guide this type of laboratory work; many of these guidelines are related to coding and reimbursement, proficiency testing, and overall clinical relevance.

The use of product names is not intended to endorse specific products or to exclude substitute products. Also, because of possible advances and changes in the therapy of parasitic infections, independent verification of drugs and drug dosages is always recommended. The diagnostic procedures are intended for laboratory use only by qualified and experienced individuals or by the personnel under their direct supervision. Every effort has been made to ensure accuracy; however, ASM Press and I encourage you to submit to us any suggestions, comments, and information on errors found.
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