

Preface

This book is different. To our knowledge, there is no text designed for instruction at the introductory or even advanced level that is comparable to this manual. We have attempted to create a text that consists of a series of laboratory exercises, beginning with basic techniques and culminating in the utilization of previously acquired technical experience and experimental material. Thus, this manual provides a continuum of experiments using the same biological material throughout, which is beneficial in understanding a common sequence of technical stages used in biotechnology in a framework which is suited to instructional methodologies.

This manual is an outgrowth of an introductory laboratory course for senior undergraduate and first year graduate students in the biological sciences at The University of Tennessee, which was designed to provide students with an in-depth experience and understanding of selected methods, techniques, and instrumentation used in modern biotechnology. A continuum was established by using two principal organisms: the bacterium *Escherichia coli* and the yeast *Saccharomyces cerevisiae*. In addition, a single plasmid (pRY121) and a single enzyme (β -galactosidase) for demonstrating various biotechnological manipulations were utilized. Because our main objective was to provide a step-by-step laboratory course for students, there are aspects of molecular biology and biotechnology which are not included.

To facilitate the use of this manual by diverse undergraduate institutions, we have provided a suggested weekly schedule based on a fifteen-week format, which we have found useful at The University of Tennessee; ensured ready availability of the few microbial cultures (*Escherichia coli* and *Saccharomyces cerevisiae*) necessary for this course; attempted to design the course for a minimum number of reagents and supplies; and do not propose work with radioactivity.

The continued impact of recombinant DNA technology in both academic and industrial research has resulted in a substantial change in the curriculum of graduate and undergraduate biology programs. This increased emphasis on new technology required a novel and contemporary method of instruction. It is our hope that this manual will aid academic institutions in their efforts to establish a laboratory course in molecular biology and biotechnology.

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