

FOURTH EDITION

MOLECULAR BIOLOGY TECHNIQUES

A CLASSROOM LABORATORY MANUAL

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Molecular Biology Techniques: A Classroom Laboratory Manual, Fourth Edition is a must-have collection of methods and procedures that creates a single, continuous, comprehensive project teaching students modern molecular techniques. It is an indispensable tool for introducing advanced undergraduates and beginning graduate students to recombinant DNA technology. The techniques used in basic research and biotechnology laboratories are covered in detail. Students gain hands-on experience from start to finish in PCR-based gene cloning, expressing and purifying recombinant protein, as well as analyzing changes in gene expression. The fourth edition also contains new cutting-edge laboratory sections on modulating gene expression in a mammalian cell line using RNAi and CRISPR-Cas9 for use in a separate or follow-up 15-week semester course. This course-based undergraduate research experience (CURE) approach to experiments has been student and instructor-tested for years. Students follow a cloning project through to completion, culminating in the purification of recombinant protein. It takes advantage of the properties of the enhanced green fluorescent protein, where students can actually visualize their results in both *E. coli* and mammalian cell lines.

In addition, *Molecular Biology Techniques: A Classroom Laboratory Manual, Fourth Edition* contains ideas for advanced alternatives within the framework of the existing project, guiding instructors and experienced research students towards enhanced applications of some of the basic tools introduced to in the text.

Key Features

- Student-tested labs have been proven successful in real classroom laboratories.
- Exercises involve a cloning project that parallels a real research lab experience.
- The CURE approach to experiments gives students an overview of the entire process, including underlying theory, principles, and experimental guidelines.
- The prep list appendix contains necessary recipes and catalog numbers, providing staff with detailed instructions.
- Pre-lab quiz questions and in-class discussion questions are also included.
- Advanced alternatives provide suggestions for more experienced students, who are familiar with the basic techniques, to design and carry out individualized experiments.

Cover Image

The cover artwork was designed by Electra Scott, using knowledge of EGFP and molecular cloning gained while performing many of the experiments described in this book during her undergraduate studies in biochemistry at The University of Tampa, Tampa, FL.



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