

PREFACE

From the simple acts of brewing beer and baking bread has emerged a field now known as biotechnology. Over the ages the meaning of the word biotechnology has evolved along with our growing technical knowledge. Biotechnology began by using cultured microorganisms to create a variety of food and drinks, despite its early practitioners not even knowing of the existence of the microbial world. Today, biotechnology is still defined as any application of living organisms or bioprocesses to create new products. Although the underlying idea is unchanged, the use of genetic engineering and other modern scientific techniques has revolutionized the area.

The fields of genetics, molecular biology, microbiology, and biochemistry are merging their respective discoveries into the expanding applied field of biotechnology, and advances are occurring at a record pace. Two or three years of research can dramatically alter the approaches that are of practical use. For example, the simple discovery that double-stranded RNA can block expression of any gene with a matching sequence has revolutionized how we study and apply genetic interactions in less than a ten-year period.

This rapid increase in knowledge is very hard to incorporate into a textbook format, and often instructors who teach advanced molecular biology classes rely on the primary research to teach students novel concepts and applications. This type of teaching is difficult and requires many hours to plan and organize.

The new partnership between Academic Press and Cell Press has adopted a solution to teaching advanced molecular biology and biotechnology courses. The partnership combines years of textbook publishing experience with the most relevant and high impact research. What has emerged is a new teaching paradigm. In *Biotechnology*, the basic ideas and methodologies are explained using very clear and concise language. These techniques are supplemented with a wide variety of diagrams and illustrations to simplify the complex biotechnology processes.

These basics are then supported with a *Biotechnology* online study guide that not only tests the student's knowledge of the textbook chapter, but also contains primary research articles. The articles are chosen from the Cell Press family of journals, which includes such high-impact journals as *Cell*, *Molecular Cell*, and *Current Biology*. The articles expand upon a topic presented in each chapter or provide an exemplary research paper for that particular chapter. The entire full-color research article is included online.

In addition to the article itself, the *Biotechnology* study guide includes a synopsis of the research paper. The synopsis includes a thorough discussion of the relevant background information. This material is often absent from primary research articles because their authors assume that readers are also experts. Then each synopsis breaks the paper into sections, explaining each individual experiment separately. Each experiment is explained by defining the underlying hypothesis or question, the methods used to study the question, and the results. The final section of the synopsis provides the overall conclusions for the paper. This approach reinforces the basic scientific method. The instructor does not have to find an article, create a presentation on the background, and then work with the student to explain each of the methods and results. The study guide synopsis provides all of this information already.

The online format ensures that only the most recent papers are associated with the chapter. The combination of the online study guide with the newest relevant research and a solid basic textbook provides the instructor with the best of both worlds. You can teach students the basic concepts using the textbook, and then use the relevant research paper to stretch the student's knowledge of current research in the field of biotechnology.

