

## BOOK REVIEW

### Understanding Biotechnology

Alufzio Borém, Fabrício Santos, and David Bowen

By Eduardo Romano<sup>1</sup>\*

Published in Portuguese, English, Mandarin and Korean, this book has been adopted as official text book by seven North American universities (University of Minnesota, Minneapolis, MN; American River College, Sacramento, CA; North Dakota State Univ., Fargo, ND; Colgate Univ., Hamilton, NY; Trinity Univ., San Antonio, TX; Texas A&M Univ., College Station, TX; Shoreline Community College, Seattle, WA and Arizona State Univ., Phoenix, AZ) as well as several Brazilian universities. **Biotechnologia Simplificada** (*Understanding Biotechnology*) approaches the most important biotechnological applications, presupposing only basic knowledge about genetics on the part of the reader. *Understanding Biotechnology* was edited in a way that enables laymen as well as professionals in genetics to understand biotechnology in simplified form. It begins with a chapter on *Historical aspects*, which describes the evolution of scientific knowledge in biology, peaking in the development of biotechnology. The next chapter, *Genetic engineering*, describes techniques of establishing constructions (chimeric genes) used in the production of genetically modified organisms, popularly known as transgenic. In the following chapter on *Biotechnology in agriculture and animal husbandry*, the reader finds concisely and pertinently presented examples of genetically modified, herbicide-tolerant, insect-resistant

varieties for the production of bioplastic and nutraceuticals. The authors then discuss the main methods of genic transformation, including the biolistic, *Agrobacterium* and microinjection methods, among others. Illustrated with figures and diagrams, this chapter gives the reader a holistic overview of the different transformation methods.

*Biosafety* as a set of proceedings to reduce the risks transgenic organisms pose to health and environment is approached next within the context of Brazilian legislation.

Taking the reader into the different possibilities with biotechnological techniques, the publication also covers *Animal Cloning* by nuclear transference, the technique used in 1997 to clone the sheep Dolly. *Gene therapy* and *Pharmacogenomics* outline auspicious areas of novel therapies and medicines being developed from underlying studies on molecular and genomic biology which open up prospects for the treatment and/or cure of important human diseases.

The chapter *Molecular Markers* deals with the use of DNA as a form of individual identification, similar to a digital fingerprint at the chromosome level. RFLP, RAPD and microsatellite markers are addressed in a way that enables the reader to conceive their application in fatherhood tests and crime solution, as specified in the chapter *Forensic DNA*.

*Bioremediation*, in other words, the decontamination

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or environmental depollution by transgenic microorganisms, is one of the applications of biotechnology that can clearly be beneficial to the environment, a subject that is impartially approached by the authors. In the chapter *Biotechnology and Biodiversity*, the two areas are presented as complementary and not antagonistic. Intelligibly, the authors describe how biodiversity can be used as raw material for biotechnology, and how to use this in environmental conservation.

The last chapters of *Understanding Biotechnology* deal with *Bioremediation*, *Patents*, *Bioinformatics*, *Bioethics* and *Genomics*. Among these, Bioethics addresses issues of moral and ethical aspects of the use biotechnology in the development of products and services in today's society. Without drawing a line of what is morally acceptable by society, the authors provide the reader with the elements to form an opinion on these topics in which

subjectivity is an inherent factor. Nevertheless, the authors clearly point out the viewpoint of the scientific community that has led to the reprobation of research aiming at reproductive cloning of human beings.

*Understanding Biotechnology* ends with a Glossary, with the commonly used technical expressions in biotechnology, helping the reader to relate to less known or terms of doubtful meaning. Basing their point of view on the fundamentals of scientific facts, the authors found a way to translate the sophisticated achievements in biotechnology into a plain understandable language, without losing the rigor of information.

Finally, I would like to compliment the authors on their success in the realization of this work, above all the coordinator, Dr. Aluísio Borém, who has, with commitment and dedication, managed to contribute with one more relevant publication to the international academic world.



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