Introduction

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“Biotechnology” undoubtedly is a fascinating field with far-reaching legal, economic and ethical implications for mankind. In this Volume 12 of the Second Edition of “Biotechnology” an experienced and diverse team of authors comprising scientists from academic research and industry, regulators and journalists examines the potential implications biotechnology may have from various angles. The perspective is thoroughly international and with many critical comparisons and views expressed. It is an indispensable reading for everyone seriously concerned with the potential risks and benefits of modern biotechnology and the more general problems associated with the introduction of a new technology into society.

From about 20 different technical and scientific disciplines including biochemistry, classical genetics, protein chemistry, microbiology etc., further biologically derived tools such as genetic engineering and hybridoma technology have been developed, which are often referred to as “modern biotechnology” and which represent the most exciting advance in the biological sciences this century. However, there is evidence that this new technology is not understood by the public, that there is a tendency to think of biotechnology as fundamentally different from other technologies. The speed of its introduction seems to frighten some onlookers, and the safety of genetic modification is questioned. Hence the public demands regulation for its protection.

Not surprisingly therefore, since the pioneering phase of modern biotechnology we have seen the production of an enormous quantity of political, scientific, socio-economic and ethical literature evaluating the different aspects of biotechnology. There are also the questions of patenting “life” – needed for the protection of investments and rejected as “unmoral” by other interests and fears with regard to biotechnology have to be linked to ambiguous attitudes towards technology in general.

The contributions compiled in the five parts of this book are an attempt to cover the mainstream of thoughts and developments with respect to biotechnology from an international and multidisciplinary perspective:

Part I guides the reader into biotechnology and starts with an introduction into technology assessment in a fundamental way and not limited to biotechnology, only. Then the different concepts of risk assessment applied today are discussed and evaluated and are followed by a detailed introduction to biosafety issues in research and production. The introduction to biotechnology is concluded by combining the terms ”biotechnology” and
“bioethics” and the development of thoughts about what ethical biotechnology might be.

Part II focuses on the practical aspects of applying modern biotechnology in research and to the production of goods. It addresses the different expectations and needs of users of modern biotechnology, consumers and regulators who have to serve all interests appropriately. The topics range from structured risk assessment of rDNA products mainly in the food sector and the regulations applied to a safe development of transgenic plants to biomedical product development and a comparison of the different regulatory environments for modern biotechnology in the US, Japan and Europe.

Part III covers both intellectual property protection and bioinformatics. One chapter focuses on what “patent protection” actually is, and why lack of patent protection prevents investment into R & D confining activities to reengineering and copying. Only an effective use of intellectual property rights enables industry to recover the enormous costs involved in developing new products and processes. Because modern biotechnology is highly information-dependent, the availability of high-quality, up-to-date and comprehensive information is an important requirement on almost each level of R & D, production development and in intellectual property protection. Therefore, databases are an essential tool in biotechnology.

Part IV evaluates prospects for biotechnology in the developing world and specifically in the Asian-Pacific region. It is discussed in detail, to which extent the disjunction of priorities between the industrial and developing world influences the potential of biotechnology to solve health- and food supply-related problems in the developing world. Many countries in the Asian-Pacific region are in a state of rapid transformation from agricultural to industry- and service-based economies. The data available indicate that biotechnology has achieved a high priority status in the whole region which has become a strong contender to the development of biotechnology in North America and Europe.

Part V is an attempt to analyze the role of the public in the development of biotechnology and to compare the differing views in some key countries like France, USA and Germany. The focus is put on the activities of interest groups, the role of the media and the political responses. The concluding chapter in this book is a historical review of events and decisions in time relevant to the development of modern biotechnology with specific emphasis on the European perspective. However, this chapter is not limited to but goes well beyond biotechnology. In a narrative form it represents a case study in how societies cope with new knowledge in the last quarter of the twentieth century.

Everybody knows the fairy-tale of the innocent maiden and the ugly and horrible beast which turned out to be something honest and trustworthy after being treated with goodwill and trust rather than with fear and repulsion. But, unfortunately, there is no evidence for who is the beauty and who is the beast. Is it the innocent and trusting public which is confronted with a flourishing science threatening human life, the environment and the integrity of God’s creation? Or is it a pure and beneficial science promising progress in many human problems which is rejected by an ignorant and distrustful public?

Hopefully, this comprehensive book will provide the interested reader with sufficient evidence to make him understand that biotechnology is neither a beauty nor a beast, and that science and technology are not a subsystem of our society in the sense that they could be regarded separately from other subsystems. Understanding this and the points made in this book may help the reader to find his own views and positions based on an educated choice not only towards biotechnology but also to “technology” in a broader sense.

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