Preface

Over the past decades, biosensors have emerged from the laboratories into the everyday life of many millions of people around the world. Like some other sensors, they were first developed for the detection of particular low-molecular species, i.e., metabolites or disease biomarkers, which had a predominant importance for clinical diagnostics, pharmacy and the health care industry. To some extent, the peculiarity of biosensors was due to the application of biochemical items (enzymes, antibodies, nucleic acids) that played a role similar to that of litmus paper in pH measurement or mercury in the clinical thermometer. Biologists and medics who used to deal with such biological tissues easily adapted to the unusual functioning of living things as measuring devices. Contrary to that, chemists and physicians could not accept the "vitality" of biosensors, with their sensitive but not stable response and their high sensitivity to experimental conditions.

The situation has changed rather quickly. The broad dissemination of glucometers, mass production of warning devices for military purposes, and DNA diagnostics tools have transformed biosensors into a remarkable but rather habitual sign of the progress and made the representatives of science and technology more lenient to their lively temper. Time has flown, and nobody would now say that a biosensor is a kind of scientific trick with no sense in real life. The human genome project, environmental monitoring, even searching for live evidence in space needed hi-tech products based on biosensing principles, but they are far from the good old glucose electrode described by L. Clark in 1962.

About 10 % of current publications in analytical chemistry journals consider research related to biosensors. Many of them illustrate the indisputable point about the interdisciplinary approaches and convergence trends in modern natural sciences. However, the comprehension of this trend does not facilitate the study of biosensor development, which assumes the knowledge and skills from many relative disciplines such as biochemistry, medicine, materials sciences, electrochemistry, analytical chemistry, microbiology, etc. Most researchers involved in the development of biosensors began their careers as biologists. Sometimes they considered biosensors as a kind of applied by-product of their principal research interests in the basic sciences. However, the development of sophisticated signal

transducers and modern tendencies of miniaturization and automation call for a serious attention to other aspects of biosensors that is often beyond the scope of life sciences.

The interdisciplinary character complicates the consideration of biosensors as a subject of study. This book is addressed to the post-graduate students and young researchers who are specializing either in chemistry or biology but are also interested in biosensors. Here, the biosensors are considered to be a variety of combinations of biochemical recognition elements and physical signal transducers so that anyone can specify the chapter most appropriate for his/her own interest and basic level of knowledge. To provide the inside of biosensor functioning, some of the most popular and instructive examples are considered as a case study. Besides the general information, reviews and monographs on the special aspects of biosensors are referred to and summarizing tables are provided.

Most certainly, it is impossible to cover all the issues and application areas related to biosensor development. This book is mostly aimed at stirring interest and providing background for those who need some stimuli to begin working in this inexhaustible field of science.

And, last but not least, I would like to address my heartfelt thanks to my teachers who supported me all the way and to my patient and all-forgiving family.

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