Journal of
Bioengineering & Biomedical Science

Vijaya Krishna. J Bioengineer & Biomedical Sci 2011, 1:2
DOI: 10.4172/2155-9538.1000e101

Editorial Open Access

Biosensors

Vijaya Krishna Varanasi*

Post doctoral research , Washington State University, USA

Open access refers to unrestricted access via the Internet to articles published in scholarly journals such as “Journal of Bioengineering and Biomedical Science” (JBBS). OMICS Publishing Group strongly supports this open access initiative and all articles published by OMICS Publishing Group are freely accessible to everyone immediately after publication. Some of the special features of OMICS group journals include digital formatting, audio listening, language translation and ability to share views on articles via social networking. There are many benefits of open access model where the end users including researchers, patients, students, clinicians and policy makers can have immediate access to latest research findings throughout the world. Open Access articles are cited much more than the non-open access articles [1] and have greater visibility in the scientific community and public. With Open Access, bioengineering and biomedical science research can overcome national and professional barriers and provide an opportunity for the research community to improve their citation impact, readability and reach while also facilitating interdisciplinary research [2].

Our understanding about the functioning of living organisms in detecting trace amounts of biochemicals in complex systems has increased over the years. Scientists have been trying to replicate similar mechanisms artificially. Researchers have developed new techniques for analyzing chemicals using bioreceptors from biological organisms. In the past few decades, we have seen tremendous breakthroughs being made in the development of biosensors and biochips to identify and quantify various biomolecules. The age of biosensors started in the year 1962 by Leland C. Clark who developed the first enzyme electrodes. It has come a long way since then and researchers from various disciplines such as biology, physics, chemistry, material science and other related areas have pooled their efforts to develop various biosensors having applications in medicine, agriculture, biotechnology as well as in the military and bioterrorism prevention efforts [3]. Biosensors find a wide range of real world applications [4]. Potential applications are basically clinical and nonclinical. A major application is in blood glucose sensing because of its market potential at the global level. Other applications include artificial organs, fruit ripening, pollution monitoring, and fermentation processes. However, commercial adoption has been slow because of potential biosensor contamination.

Various definitions and terminologies exist depending on the area of their application. Biosensors are known as immunosensors, optrodes, chemical canaries, resonant mirrors, glucometers, biochips, and biocomputers. A biosensor can be defined as a device consisting of two parts, bioreceptor (or bioelement) and a transducer. The analyte on reaction with the bioreceptor induces an effect measured by the transducer, which in turn converts the data into a measurable electrical signal [5]. The bioelement is very specific to the analyte to which it is sensitive

The most common types of bioreceptors used in biosensing are based on 1) antibody/antigen reactions, 2) nucleic acid interactions, 3) enzymatic reactions, 4) cellular interactions (i.e. microorganisms, proteins) and 5) interactions using biomimetic materials (synthetic bioreceptors). Depending on the type of transducer, the biosensors can be of many types such as: resonant biosensors, optical detection biosensors, thermal-detection biosensors, ion-sensitive field-effect transistor (ISFET) biosensors, and electrochemical biosensors. Recently, a hydrogen peroxide biosensor based on hemoglobin was developed by researchers at Nanjing University, China having applications in drug delivery, medical diagnostics and bio-encapsulation [6]. Optical biosensors have been applied extensively in many fields, for biotechnology quality control, in clinical analysis, environmental control, fermentation monitoring, product control in the food and beverage industry etc [7].

A whole new class of biosensors has emerged during the last few years due to advances in micro electromechanical systems (MEMS), which involve the transduction of mechanical energy and are based on mechanical phenomena. More research efforts are needed to address the following issues [3]: (1) contamination: Leakage of bioreceptors and chemicals used in the biosensors need to be prevented; (2) immobilization of biomolecules: the behavior of enzymes when absorbed on the surface of the transducer is not well understood; (3) sterilization: It’s a catch-22 situation, if a sterilized probe is used, some sensor’s thermo sensitive biomolecules may be destroyed resulting in decreased sensitivity to analytes whereas there is a scope for contamination if nonsterile probes are used ; (4) uniformity of biomolecule preparation for more selective and wider detection range; (5) cost-effective: research should be focused on the development of low-cost biosensors which could be used in various applications. At present, with the threat of bioterrorism looming the world over, the development of portable and low-cost biosensors is the need of the hour. We also need to develop new applications or enhance the performance of conventional biosensors with nanotechnology. I hope the “Journal of Bioengineering & Biomedical Science” (JBBS) from OMICS Group makes a positive impact in this area. The knowledge and expertise of the editors and editorial board members of JBBS ensures high quality research articles and allows for a comprehensive review of scholarly works that span broad spectrum of issues concerning bioengineering and biomedical science. The JBBS addresses the development of engineering solutions to both biological and clinical questions.

References

1. Eysenbach G (2006) The open access advantage. J Med Internet Res 8: e8.
2. Ahuja DS (2010) Open Access Publishing: The Future of Rehabilitation Research. Int. J Physiotherapy and Rehabil 1: 05-08.
3. Mohanty SP, Kougianos E (2006) Biosensors: A tutorial review. IEEE Potentials March-April 35-40.

***Corresponding author:** Vijaya Krishna Varanasi, Post doctoral research, Washington State University, USA, E-mail: vijaya.varanasi@gmail.com

Received December 13, 2011; **Accepted** December 14, 2011; **Published** December 14, 2011

Citation: Vijaya Krishna V (2011) Biosensors. J Bioengineer & Biomedical Sci 1:e101. doi:10.4172/2155-9538.1000e101

4. Castillo J, Gáspár S, Leth S, Niculescu M, Mortari A (2004) Biosensors for life quality Design, development and applications. Sensors and Actuators B 102: 179–194.

5. Vo-Dinh T, Cullum B (2000) Biosensors and biochips: advances in biological and medical diagnostics. Fresenius J Anal Chem 366: 540–551.

6. Xuan J, Jia XD, Jiang LP, Abdel-Halim ES, Zhu JJ (2011) Gold nanoparticle-assembled capsules and their application as hydrogen peroxide biosensor based on hemoglobin. Bioelectrochemistry.

7. Patel PN, Mishra V, Mandloi AS (2010) Optical Biosensors: Fundamentals & Trends. J Engineer Res Stud 1: 15-34.