

Book Review 'Biotechnology Textbook'

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Abstract

This book was prepared for makes it easier for students to understand the basic material in biotechnology courses. This book also includes practice questions to test students' understanding of the problem with every material contained in the book. The science of biotechnology has developed hundreds of years ago. At that time, ancient people explored a lot to meet their food needs. In that era, people were not yet aware of the science of biotechnology

Key words: biotechnology; recombinant DNA; gene cloning

Summary

This book was prepared for makes it easier for students to understand the basic material in biotechnology courses. This book also includes practice questions to test students' understanding of the problem with every material contained in the book. The science of biotechnology has developed hundreds of years ago. At that time, ancient people explored a lot to meet their food needs. In that era, people were not yet aware of the science of biotechnology. However, the experiments they carried out indirectly opened the development way of conventional biotechnology through the use of microorganisms to convert raw materials into food products. Raw materials change process into food products produced by these ancient communities with the help of microorganisms, we now know it as fermentation technology. The science of biotechnology itself cannot be separated from many other branches of science, not only biology but also physics and chemistry. Branch of biology supports the development of biotechnology from conventional to modern including physiology, biochemistry, genetics, microbiology, virology, immunology, enzymology, cell culture, tissue culture, molecular biology and so on. All these supporting sciences are interrelated to support biotechnology applications in various fields.

Conventional biotechnology products are products that have been circulating around for a long time in society. Conventional biotechnology tends to utilize the entire organism at the cellular level. Therefore, on biotechnology conventionally, the use of each organism is limited to utilization microorganisms only. As research in the field of biotechnology develops, the term cloning is no longer used only limited to the creation of new individuals, but developed into terms which is more acceptable to science based on ethics and religious norms which is adhered to. Cloning is redefined to be a process carried out for duplicate both genes, cells and organisms asexually. The results of cloning are genetically identical replicas of genes, cells or organisms which is cloned. Cloning of

organisms in the form of plants through plant tissue culture becomes clones that are legal and acceptable to society. Genetic engineering is the basis of biotechnology which includes gene manipulation, gene cloning, recombinant DNA, genetic modification technology and modern genetics. In genetic engineering, identification, replication, modification and transfer of genetic material from cells, tissues and organs are carried out. The technique most widely used to carry out genetic engineering is the DNA recombination technique to create recombinant DNA. Genetical manipulation allows gene manipulation so that gene expression can be adjusted to the researcher's target. Genetically engineered products can also be used for certain purposes. This genetic engineering technique has been widely used for produces food, agricultural, livestock and other health products by forming transgenic/GMO (Genetically Modified Organism). Genetically engineered products usually have superior phenotypes because in the process genes have been inserted that code for the superior characteristics of an organism. For example, genetically engineered products in the agricultural sector have advantages in the form of resistance to pests and diseases, resistance to dryness, more attractive appearance, more complete nutrition than original non-GMO products and so on. These things can be achieved because in genetic engineering there is a process of transferring genetic material from a source very diverse with high precision and control in a shorter time.

Hybridoma is defined as a fusion of cells in an organism that aims to get the combined properties of both stem cells. This hybridoma technology is considered one of the best ways to produce monospecific antibodies or monoclonal antibodies in vitro. Hybridoma technique is done by combining myeloma cells with specific lymphocyte cells. The hybrid cell has the combined properties of both original cells, namely produces specific antibodies derived from specific lymphocyte cells. These hybrid cells have the property of being able to live continuously, which is this

characteristic obtained from myeloma cells. Antibodies are protective compounds from the immune system in action neutralize antigens (foreign objects) in the form of pathogens that enter the body. Antibodies are the most important part of the adaptive immune system. The importance of antibodies role against antigens that enter the organism's body make research related to antibodies increasingly develop. One of still being developed is the production of monoclonal antibodies, both ones used as health therapy, disease diagnosis, or just for want knowing the characteristics of the target antigen. The development of biotechnology in the food and industrial sectors has actually been going on for a long time. However, the development of biotechnology in the food and industrial sectors in the past was only limited to the use of microorganisms as food product fermentation agent. Application of

conventional biotechnology in the food sector generally produces fermented food products such as tempeh, tofu, soy sauce, nata de coco, wine, beer, cheese, kimchi, saurkraut and etc. The application of modern biotechnology in the food and industrial sectors utilizes genetic modification techniques to manipulate genomes of microorganisms used in food products.

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