How developments in molecular biology might help the survival of mankind (800 wor...

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Developments in molecular biology has brought tremendous benefits to the survival of mankind and the technology promises major breakthrough in some of the most challenging problems facing humanity currently. Some of the application of molecular microbiology includes prevention and treatment of diseases, production of new protein products in addition to modification of plants and animal genotypic composition to produce the desired phenotypic traits. This paper discusses how molecular biology could help in enhancing the survival of humanity. Molecular biology technology provides viable techniques of preventing and treatment of potentially lethal and life limiting diseases. These diseases include genetic infections transmitted from parents to the future generations and pathogenic infections caused by viruses, bacteria and fungi among other microbes. Some of the most lethal genetic disease includes Pompe disease, cystic fibrosis, and muscular dystrophy among other harmful inheritable disorders. Most of these genetic infections are not curable and patients die at tender age. Molecular biology technology has provided cure for Pompe disease, a once lethal muscular disease in newborn babies. The cure for the disease was developed from milk of genetically modified rabbits to produce alpha- glucosidase, a human enzyme that treats the condition (Van den Hout, et al 2000). Restriction Fragment Length Polymorphism (RFLP) analysis, a technology in molecular biology is currently applied in medical research for identifying polymorphisms that are associated with causing specific genetic disorders (Tait, 1999). The technology is used to screen carriers and people infected with genetic disease. In addition, genetic counselors apply the technique to screen the DNA of people from families with history of genetic disorders to establish the

chance of transmitting the disease to the children. This enables people to make informed choices about the danger of bearing children with genetically transmitted infections. Viral diseases pose a serious threat to the existence of human beings. Some of the current lethal viral diseases include AIDS, different strains of influenza and hepatitis. Developments in molecular biology have enabled production of vaccines against some of these viral infections. This has enhanced survival and prolonged the life expectancy of people in the globe. In production of viral vaccines using this technology, viral strains that cause mild symptoms in human beings are used as vectors to carry the gene from a pathogenic virus that causes the targeted disease. The introduced recombinant virus in the body of the host produces proteins and RNA and since it cannot cause disease, the host is not affected. In response, the immune system of the host produces antibodies to fight both the pathogen and the cloned virus molecule. In the process, the body of the host develops immunity to fight future pathogenic viral infections (Oliver& Webb, 2001). Current developments in production of viral vaccines have eliminated the need for finding a naturally occurring virus for vaccination that were used in inoculation against diseases such as small pox in the last century. Viruses such as vaccinia could be used to transport genes isolated from other viruses and increase production of antibodies that identify and inactivate the products of genes. This technology is being experimented for producing effective vaccines against HIV/AIDS (Geursen 2007). Food insecurity is a major problem facing many developing countries today. Lack of enough food in these countries causes high levels of malnutrition, child and maternal mortalities in addition to reduced life expectancy (Tait, 1999).

Moreover, lack of food reduces the working potential of the population resulting to high prevalence of poverty. The increasing birth rate in these countries and reduced agricultural production are some of the main factors that cause food insecurity in various parts of the globe. Developments in molecular biology have resulted into technology that has increased the food production and enhanced nutritional value of both plant and animal products. Crop and animal diseases in addition to unfavorable environmental conditions are some of the factors that have reduced agricultural production immensely in the world. Techniques in molecular biology provide a pragmatic approach of enhancing agricultural production through manipulation of beneficial properties of species of agricultural importance. The objective of this research is to identify and isolate genes of desired traits and introduce the genes into animal and plant species used for producing food (Tait, 1999). In this respect, molecular biology methods facilitate the introduction and the establishment particular desired traits in plants and animals of agricultural importance. Some of the desirable traits introduced into plants and animals include high production, resistance to diseases and adverse climatic conditions. Other desirable traits include resistance to insects and other parasites that attack production of the plants and animals. In developing countries, molecular biology techniques have also been used to enhance nutritional value of plants such as potatoes, bananas and cassava (Tait, 1999). Nutrients such as vitamins and proteins have been introduced in these plants through biotechnology. This technology has reduced incidents of diseases caused by nutritional deficiencies especially in young children and pregnant women. These are some of the benefits of

molecular biology and although some applications are still faced with safety concerns, the technology provides solutions to some of the most challenging problems threatening the survival of humankind. References Geursen, Robert. (2007). Medicines for mankind: today’s research tomorrows cures. Brussels, Belgium: European Federation of Pharmaceutical Industries and Associations. Oliver, J., and Webb, D. (2001). The role of molecular biology in pharmacodynamic research. Science Direct, International congress series, 1210: 160-169. Tait, Robert. (1999). The applications of molecular biology. Current Issues In Molecular Biology, 1 (1): p 2-12. Van den Hout, et al. (2000). First clinical test with recombinant human alpha-glucosidase from rabbit milk shows therapeutic effect in Pompe patients. American Journal of Human Genetics, 67(10): 54-68.