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THE HUMAN GENOME PROJECT- A REVIEW

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ABSTRACT
The Human Genome Project is also referred to as HGP and involves a global collaboration to gain more information about human genes. This project began around 1990 and was sponsored by the National Human Genome Research Institute. The point of this project is to make more genes available for research. Genes are very difficult to understand, because they are so complex and basically define what we are. A better understanding of genes and our DNA can lead to revolutionary medical advancements.

KEY WORDS: Human Genome, DNA, Gene maps.

INTRODUCTION
The Human Genome Project is a 15 year effort coordinated by the Department of Energy and the National Institutes of Health to search and identify the location and makeup of each of the 80,000 genes in human DNA.[1-4] This knowledge will allow doctors to treat diseases and clone humans; however there are consequences of such advances in medicine. This paper provides the negatives and potential benefits of the Human Genome Project. The following examples will help society make an educated decision as to whether or not the continuation of the Human Genome Project is morally correct. Some of the potential negatives of the project include: insurance and job discrimination, identity crisis, changing nature, doctors having to change their practice, effecting the future of many families in a negative way, needing to patient human genes which would be impersonal, and the question as to where do we draw the line in scientific advancement. Some of the positive benefits include: perfect pro-creation and the ability to reassemble bad genes that cause diseases into perfectly functional genes.[5,6] Because the eventual decision to continue the Human Genome Project is based on the moral standing of our society, society should make the final decision. Therefore education on the topic is critical to fully understand the significance of this fairly new advancement in scientific knowledge.

The Beginning and Organization
To begin, an understanding of what a Genome is will help realize why it is so important. A Genome is all the DNA in an organism, including its genes. Genes carry information of the making all the proteins required by all organisms. These proteins determine, among other things, how the organism looks, how well its body metabolizes food or fights infection, and sometimes even how it behaves.[7]

DNA is made up of four similar chemicals (called bases and abbreviated A, T, C, and G) that are repeated millions or billions of times throughout a Genome. The human Genome, for example, has 3 billion pairs of bases. The particular order of these four chemicals is extremely important. The order underlies all of life's diversity, even dictating whether an organism is human or another species such as a fruit fly, rice, or yeast, all of which have their own genomes and are themselves the focus of Genome projects. Using organisms that are related through similar DNA sequences, we can gain insights from non-human genomes that often lead to new knowledge about human biology.[8-10]

In 1990, the Human Genome Project began as a $3 billion, 15 year effort to determine the sequencing of the 3 billion DNA building blocks that underline all life's diversity.[3,7] The first five year plan, originally intended

to guide research in FY's 1990-1995, was revised in 1993 due to a pleasant surprise in progress, and the next plan outlined goals through FY 1998. The third and newest plan was developed during a series of individual and joint DOE and NIH workshops held over the past two years. If successful, the completion of the human DNA sequence on 2003 will coincide with the 50th anniversary of Watson and Crick's description of the fundamental structure of DNA. The analytical power arising from the reference DNA sequences of entire genomes and other genomes resources is anticipated to jump start what has been predicted to be the "biology century" by observers as diverse as Microsoft's' Bill Gates and United States President Bill Clinton. Already revolutionizing biology, Genome research provides a vital thrust to the increasing productivity and pervasiveness of the life sciences[2]. Current and potential applications of Genome research address national needs in molecular medicine, waste control and environmental cleanup, biotechnology, energy sources, and risk assessment.

OBJECTIVES OF HGP

There are six main objectives / areas of work of the human genome project.

- Human gene maps and mapping of human inherited diseases
- Sequencing of human genome
- Development of bioinformatics
- Comparative genomics
- Functional genomics
- Development of new DNA technologies

Advantages[3-8]

a) In the field of molecular - medicine it will help to improve diagnosis of diseases, early detection of genetic diseases and gene therapy. Genetic has also the potential to reveal the differences between the individuals so that suitable treatment can be prescribed and national drug design can be undertaken. Thus treatment can be more focused and effective based on individual requirement.

b) DNA forensics can be used in identifying war victim's particularly dead soldiers whose bodies are mutilated beyond recognition. It can provide full proof results in ascertaining disputed parentage, criminal justice can be more effective with the help of DNA forensics and people who commit murder of rape can be provided with evidences against them.

c) In the field of agriculture and livestock breeding understanding of plant and animal genome will help us to create stronger and more .disease resistant plant and animals. It will also help in the development of bio pesticide and edible vaccines incorporated into food products.

Disadvantages of HGP[3-8]

(i) It may lead to parents attempting to determine which character their off spring shall inherit. This will lead to the development of designer baby.

(ii) This may restrict the human gene pool and interface with natural selection and loss of diversity among the human population.

(iii) Misuse of genetic information may violate genetic privacy Also health or life insurance policies may be deemed to an individual on the basis of his genetic information

(iv) It can be misused for developing weapon of mass destruction.

(v) It could also develop racial discrimination.

(vi) The success of HGP may widen the gap between developed and developing, as only the rich countries alone would be able to enjoying the advance medical treatment.

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