

The Human Genome Project

The Human Genome Project officially began on October 1, 1990, though its beginnings go back as far as the 1980's. The human genome is the complete DNA and DNA proteins, including genes, in a particular organism (in this case humans) that determine a large scope of what makes that organism the creature that it is. The human genome involves many different aspects of the human organism including genes and proteins that determine looks, immune system and response, and most likely even many aspects of behavior patterns. This coordinated effort of the U.S. Department of Energy and the National Institute of Health (along with the help of many other agencies) was established with five main goals in mind. These goals, as defined by the founding coordinators, were to identify the 20,000 to 25,000 genes in human DNA, determine the sequencing of approximately 13 billion chemical base pairs that make up human DNA, store all found information in reliable databases, transfer all related technologies to the private sector, and address the ethical, legal and social issues (referred to as ELSI) that may arise as related to the project. The Human Genome Project was a thirteen-year project that is considered to have been completed as of 1993, though the analysis of the human genome and its uses and implications will continue for many years to come.

Many in the medical community and biotechnology industries are enthusiastic about the potential of the information derived from the effort. The benefits in medicine could help in the improved diagnosis as well as earlier detection and treatment of genetic disorders, familial disease and cancers, and for many other diseases and medical conditions in general. Doctors would have more information and resources available to better treat their patients. In areas where focus in the past may have been on treating and managing symptoms, there could instead be focus on more specific testing with earlier detection, prevention, and treatment with a much more individualized approach. Programs could be personally tailored to the individual in areas such as pharmacogenics (or so called "custom drugs") and specific gene therapies and gene replacement, and the avoidance of potential triggers of disease. There could also be benefits in the further study of environmental toxins and other types of exposure and its impact of on the human population in relationship to genetic changes, inheritable mutations and cancer risk. Even the area of forensics could be enhanced. DNA analysis can also be mapped out in what is referred to as a DNA profile or "DNA fingerprinting". Although there is still a possibility of more than one matching, it is much more precise than the standard DNA tests still widely used today .

Most of the areas of concern with the Human Genome Project have to do with ELSI (ethical, legal, and social issues), and there are many opposed to the idea for these reasons. The possibility of having an entire sequencing of the human genome could potentially be dangerous in how it is used by a vast array of groups including medical facilities, insurance companies and

agencies, employers, other private companies, and even our own government in a way that is harmful to the individual. For example, if your particular mapped genome shows an extremely high risk for a particular cancer with an early age onset and poor outcome, what if the information is shared? You could find yourself uninsured and unemployable. There are also implications involving reproduction and fetal genetic testing in which families and potential parents could make life-changing decisions based on possibilities and the reliability of a particular test. Individuals may also be forced to make tough decisions about their own health care and potential treatment with complicated, risky, and sometimes controversial treatments for problems that may or may not even arise. Another area in which genome mapping could have disastrous consequences is in society's perception of that individual and how they may be viewed by others or even themselves. Some groups are worried about the implications of the information in relationship to different communities or ethnic groups.

I personally feel that the benefits vastly outweigh the potential problems that could arise with the information derived from this project. Of course, as they say, with great knowledge comes great responsibility. There needs to be legislation in place to protect and ensure the individual's rights in regards to their privacy and the access, availability, and use of their information by different entities that should also include recourse that individuals can pursue when information is misused. Great care should also be emphasized with medical facilities and laboratories with strict standards in place in the handling and processing of genetic materials and information to ensure patient safety, accuracy, and privacy. Patients should be well informed of their choices, including the benefits and risks, and have access to counseling as needed. However, imagine a world in which the vast amount of cancer, genetic disease, autoimmune disorders, and any other array of medical problems and dysfunctions could be prevented, cured, "fixed" or even completely eliminated. There are infinite possibilities in the reduction human suffering and the cost (monetarily and otherwise) on individuals and society as a whole involved in caring for the sick and disabled which would be greatly reduced. With all the proper controls in place, the Human Genome Project has the potential to be one of man's greatest achievements.

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