

Biotechnology Research

Stem Cell Research

A stem cell is a "generic" cell that can make exact copies of it indefinitely. In addition, a stem cell has the ability to produce specialized cells for various tissues in the body -- such as heart muscle, brain tissue, and liver tissue. Scientists are able to maintain stem cells forever, developing them into specialized cells as needed.

What Does It Involve?

What stem cell research strives to achieve is the cultivation and nurturement of stem cells, the basic cell of the body, enabling it to be reproduced to other specific parts of the body. The implications are obvious. Limbs and organs could be grown from scratch in a lab then used in transplants or to cure illnesses.

- **Embryonic stem cells** - these are obtained from either aborted fetuses or fertilized eggs that are left over from in vitro fertilization. They are useful for medical and research purposes because they can produce cells for almost every tissue in the body.
- **Adult stem cells** - these are not as versatile for research purposes because they are specific to certain cell types, such as blood, intestines, skin, and muscle. The term "adult stem cell" may be misleading because both children and adults have them.

By providing the raw material for virtually every kind of human tissue, new treatments for a wide range of human diseases including diabetes, heart disease, some forms of cancer, and Parkinson's disease can now be developed.

The Concerns

- One of the disadvantages of stem cell research when adult stem cells are concerns lies in the fact that adult stem cells cannot be manipulated as easily as embryonic stem cells. In other words, when dealing with stem cells extracted from an embryo, it is possible to "transform" them, if you will allow, into different types of cells that can be used to assist in repairing damaged cells caused by diseases.
- One of the major disadvantages of stem cell research using embryonic stem cells arises from the sheer level of controversy surrounding the use of such stem cells

The Benefits

- This research also benefits the study of development events that cannot be studied directly in a human embryo, which would cause major clinical consequences such as birth defects, infertility and pregnancy loss. A more complete understanding of normal development will ultimately allow the prevention or treatment of abnormal human development.
- Another advantage is the ability to test millions of potential drugs and medicine, without the use of animals or human testers. This requires a process of simulating the effect the drug has on a specific population of cells. This would tell if the drug is useful or problematic.
- Scientists see great potential for the use of human stem cells in the treatment of many medical conditions, ranging from Parkinson's and Alzheimer's diseases to diabetes, spinal cord injuries, and degenerative heart conditions.

The Human Genome Project is an international scientific research project. Its primary goals were to determine the sequence of chemical base pairs which make up DNA and to identify the approximately 25,000 genes of the human genome. They also want to understand it and complete a map of all their findings.

When Did This Start

The project began in 1990 initially headed by James D. Watson. A working draft of the genome was released in 2000 and a complete one in 2003, with further analysis still being published. A parallel project was conducted by the private company Celera Genomics. Most of the sequencing was performed in universities and research centers from the United States, Canada and Great Britain.

What Is Hoped To Be Achieved

While the objective of the Human Genome Project is to understand the genetic makeup of the human species, the project also has focused on several other nonhuman organisms such as *Escherichia coli*, the fruit fly, and the laboratory mouse. It remains one of the largest investigational projects in modern science. The mapping of human genes is an important step in the development of medicines and other aspects of health care.

Benefits

- elucidating the function of the large proportion of DNA we know little about
- discovering possible means of diagnosis for some genetic diseases,
- discovering possible treatments for currently untreatable genetic diseases
- discovering new tools and techniques for genetic research,
- generating the ability to go directly from a trait to a gene,
- identifying genetically validated therapeutic targets which would increase the cost-benefit ratio in pharmaceutical discovery,
- investigating the development of drug resistance in bacteria,
- investigating antigenic variation and host-parasite interaction at both the host and parasite level.

Concerns

- the cost – the money could be spent elsewhere,
- the anguish resulting from knowing that a person has an untreatable genetic disease,
- the use or misuse of genetic information by such organisations as insurance companies and employers,
- the ownership of genetic test results,
- the patenting of human genes and DNA,
- the increasing gap between rich and poor countries in the quality of life and the level of health and disease treatment,
- the exploitation of isolated populations in the search for disease genes,
- the ethics of accumulating genotypic profiles of people - are they able to be used for anything that the researcher wants,
- decisions about the ownership of data by 'affected' or donor individuals,
- the ethics of germ line gene therapy,
- the ethics of somatic gene therapy,
- the costs of genetic treatment versus benefit to the community.

Food Biotechnology

Modern biotechnology refers to various scientific techniques used to produce specific desired traits in plants, animals or microorganisms through the use of genetic knowledge. Since its introduction to agriculture and food production in the early-1990, biotechnology has been utilized to develop new tools for improving productivity. In 2005, twenty-one countries planted biotech crops covering a total of 222 million acres. These crops include soybeans, corn, cotton, canola, papaya, and squash that are improved versions of the traditional varieties. In addition, rapid-rise yeast and an enzyme used to make cheese are both commonly produced through biotechnology.

I visit these websites below

<http://www.spuc.org.uk/students/stemcells/>

http://en.wikipedia.org/wiki/Human_Genome_Project

<http://www.healthline.com/adamcontent/stem-cell-research#definition>

www.ask.com

I did not use google.com because it was not working and an error came up.

I used www.ask.com because it was giving me more details than the other websites.