Human Genome Project

By Sharon Fabian

The Human Genome Project had big goals. Scientists running the project hoped to identify all of the genes in human DNA and to determine the sequence of the three billion chemical bases that the genes are made of. Not too long ago people would have said that those goals were impossible to meet.

Then in 2003 an announcement was made. Scientists announced that the goals of the Human Genome Project had been met - years ahead of schedule!

The human genome is the series of chemical bases that make up our DNA that makes up our genes. Genes are basic units of heredity. They are in every one of our cells, and they determine what traits we inherit from our ancestors. They also determine how likely it is that we will inherit certain medical conditions.

It was hoped that if the entire human genome could be mapped out, a database could be established for use by doctors and researchers.

For the Human Genome Project, scientists studied cells from several people who were all anonymous volunteers. Since there are small differences among the genes of different people, they would have to combine the results from all of the people studied. The scientists took tiny bits of genetic materials from each of the cells. They looked for patterns in the chemicals. They logged all of their information into a huge computer program. Bit by bit they completed their database.

The project would never have been possible without the computers. The pieces of information that the scientists logged in numbered in the billions. Just one list of the three billion chemical bases in human DNA could fill up a stack of books as tall as a skyscraper.

Before the project was even completed, the scientists were already thinking of follow-up experiments and practical applications. In the future, they hoped to look into the genomes of animals, plants, and even microscopic creatures.

Doctors especially wanted to look into ways that the information could be used to treat diseases. If they knew that certain genes were associated with particular diseases, then they could warn people of risks they might face. The genetic information could help doctors to diagnose diseases, too. There might even be new therapies and new drugs thanks to this information. They hoped to learn more about certain widespread diseases such as cancer and Alzheimer's disease.

Doctors weren't the only ones who were enthusiastic about the new data. Farmers hoped to discover ways to keep their animals healthier. They also hoped to find new varieties of crops that were more resistant to diseases and insects.

Genetic information could even be used in the field of forensics. It could be used to identify criminals or to clear wrongly accused suspects.

Environmentalists thought the information would be useful in identifying endangered species. It might provide useful knowledge to the producers of new biofuels.

The announcement that the project was completed also stirred up new controversies over the uses of genetic information. Who should have access to the information? Should insurance companies be allowed to use the information to set health insurance rates? What about genetically modified foods? And, the big question, what about cloning?

People will be debating these questions for years to come. In the meantime, scientists will continue to learn more and more about the human genome. They may study the mouse genome and maybe even the rose bush genome.
And hopefully, people in many fields will find ways to put lots of that information to good use.

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Questions

1. One goal of the Human Genome Project was to determine the sequence of ______.
   A. the chemical bases that human genes are made of
   B. the chemical elements in the human body
   C. the chemical elements in the periodic table
   D. the genes in one chemical element

2. The goals of the Human Genome Project were ______.
   A. never met
   B. finally met many years after the deadline
   C. met on schedule
   D. met ahead of schedule

3. Genes are ______.
   A. chemical elements
   B. basic units of heredity
   C. only found in humans
   D. very rare

4. In order to map out the human genome, scientists studied ______.
   A. many cells from one person
   B. one cell
   C. cells from millions of people
   D. cells from several people

5. Scientists looked for ______ in the chemicals of the cells they studied.
   A. errors
   B. water
   C. carbon
   D. patterns

6. Information learned through the Human Genome Project may help ______.
   A. doctors
   B. farmers
   C. forensic scientists
   D. all of the above

7. The results of the Human Genome Project stirred up controversy about ______.
   A. cloning
   B. genetically modified foods
   C. insurance company practices
   D. all of the above
8. Future studies of genomes could provide information about _____.
   A. living things
   B. plants only
   C. living and non-living things
   D. animals only

Before scientists had tools like computers and powerful microscopes, how do you think they learned about genetic traits?

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Scientists predict that the information from the Human Genome Project will bring about changes in fields including medicine, farming, forensics, and environmentalism. What are some changes that you think we might see in the future as a result of new genetic information?

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