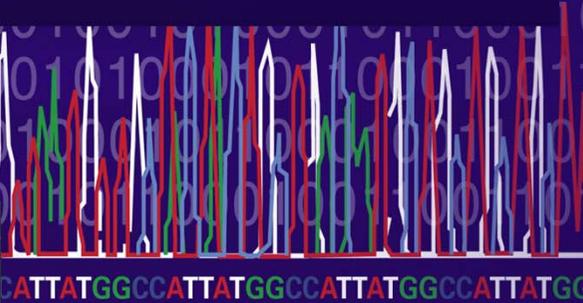
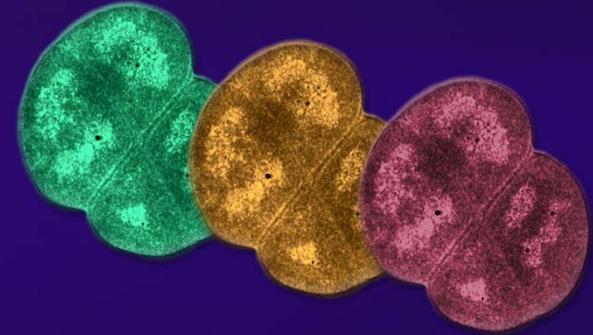
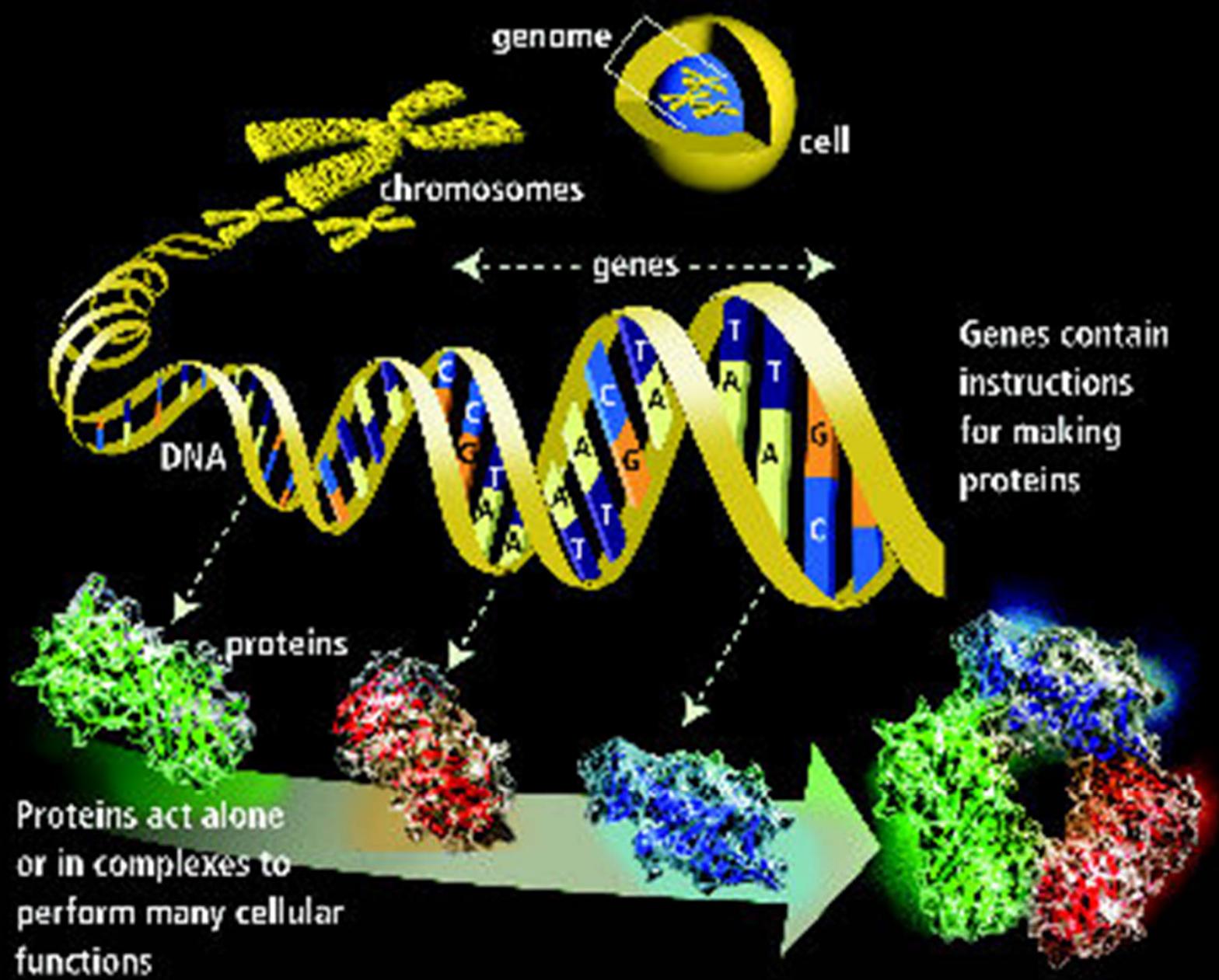
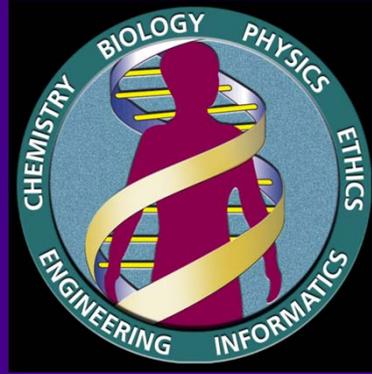


Beyond the Human Genome Project

New Discovery Paths and Diverse Applications







In 2003 scientists in the Human Genome Project obtained the DNA sequence of the 3 billion base pairs making up the human genome

What we've learned so far from the Human Genome Project



The human genome is nearly the same (99.9%) in all people



Only about 2% of the human genome contains genes, which are the instructions for making proteins

Other Lessons from the Human Genome Project



Humans have an estimated 30,000 genes; the functions of more than half of them are unknown



Almost half of all human proteins share similarities with other organisms, underscoring the unity of life

Much is still unknown!

Explore how DNA impacts HEALTH



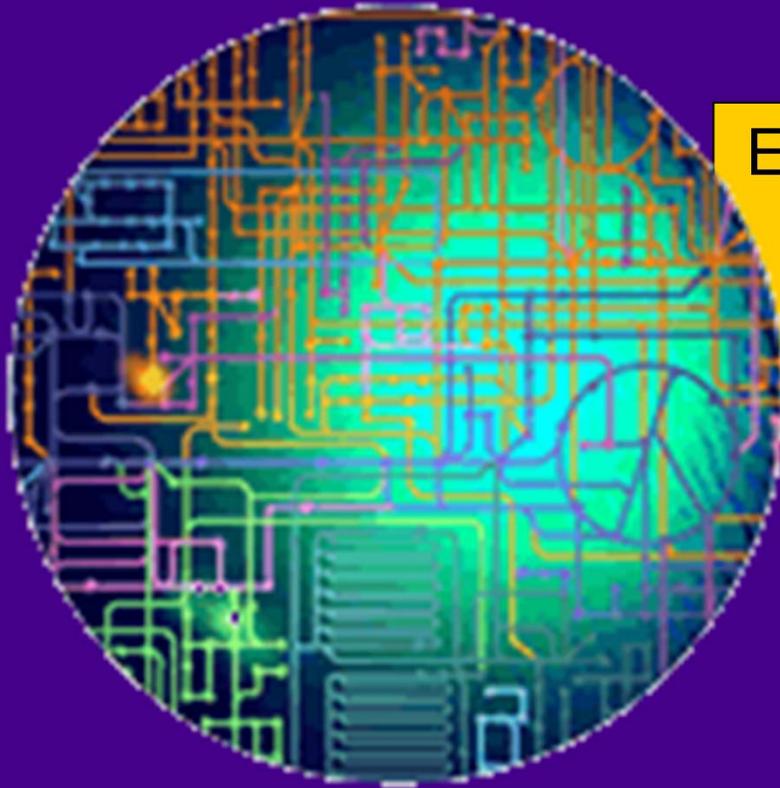
Identify and understand the differences in DNA sequence (A, T, C, G) among human populations

Understand what all the **GENES** do

Discover the functions of human genes by experimentation and by finding genes with similar functions in the mouse, yeast, fruit fly, and other sequenced organisms



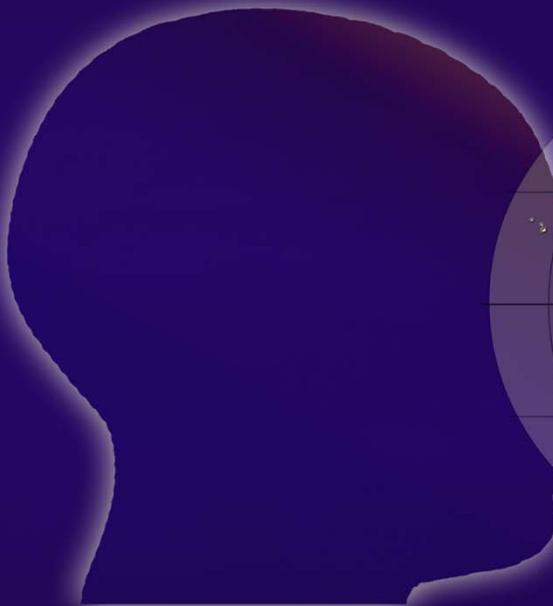
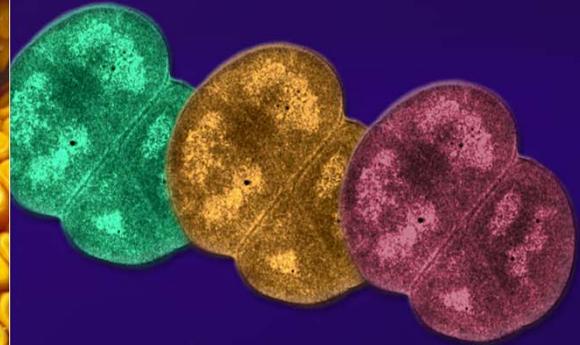
Understand how the genome enables life



Explore life at the ultimate level of the whole organism instead of single genes or proteins.

The DOE Genomes to Life program provides a foundation for this understanding by using the information found in the genomes of microbes, life's simplest organisms, to study how proteins—the products of genes—carry out all activities of living cells.

Diverse Applications of DNA Data and Technologies



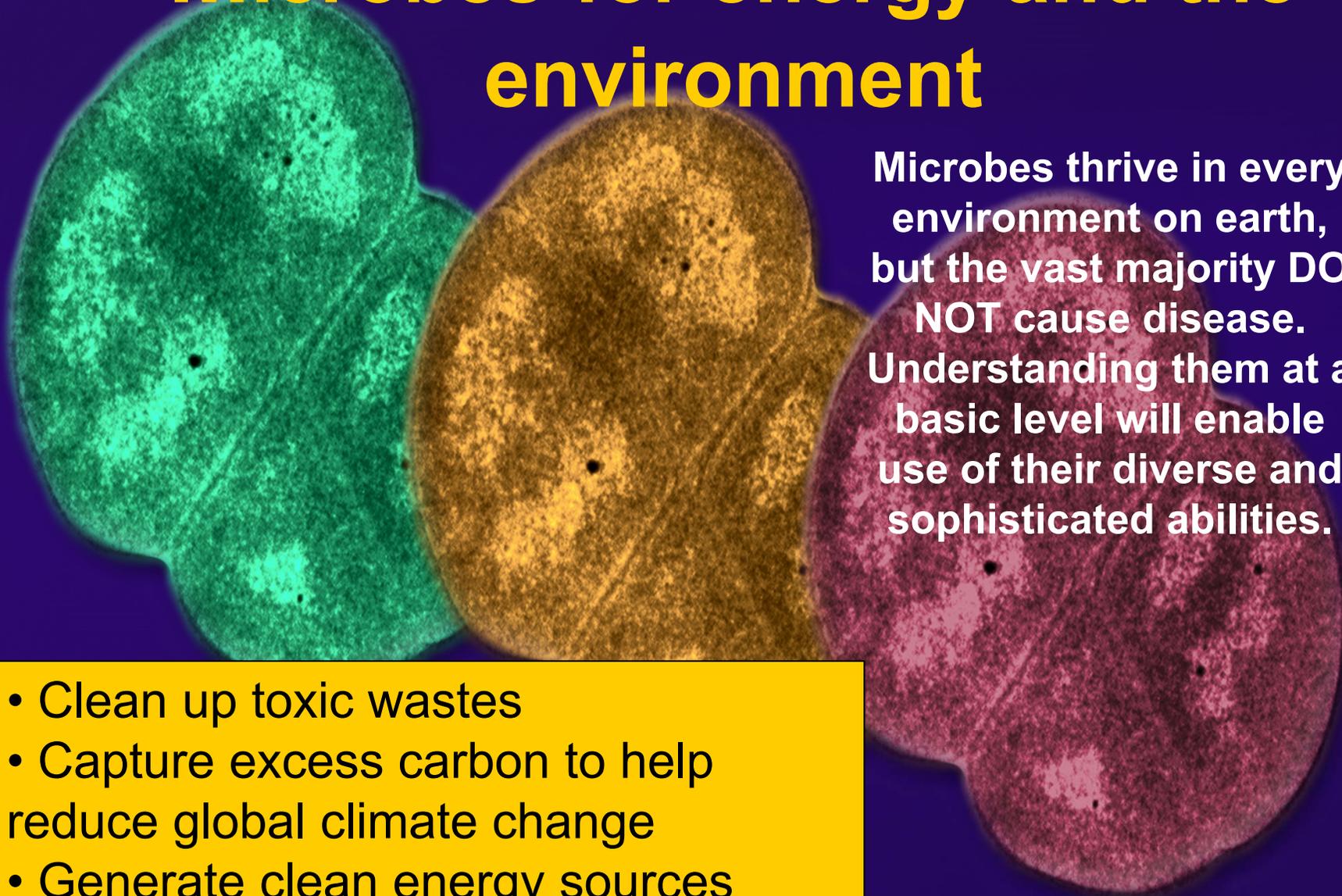
Medicine Energy Environment Agriculture Identification Bioanthropology

Medicine



- Develop more accurate and rapid diagnostics
- Design customized treatments

Microbes for energy and the environment



Microbes thrive in every environment on earth, but the vast majority DO NOT cause disease. Understanding them at a basic level will enable use of their diverse and sophisticated abilities.

- Clean up toxic wastes
- Capture excess carbon to help reduce global climate change
- Generate clean energy sources (e.g., hydrogen)

Bioanthropology

- Understand human lineage
- Explore migration patterns through time



Agriculture, livestock breeding, bioprocessing

- Make crops and animals more resistant to diseases, pests, and environmental conditions
- Grow more nutritious and abundant produce
- Incorporate vaccines into food products
- Develop more efficient industrial processes

DNA identification

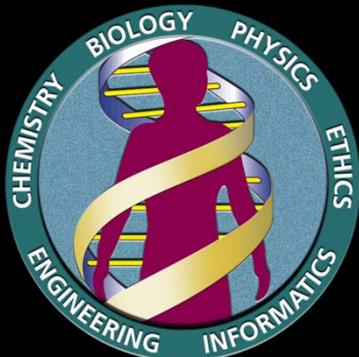


- Identify kinships, catastrophe victims
- Exonerate or implicate people accused of crimes
- Identify contaminants in air, water, soil, food
- Confirm pedigrees of animals, plants, foods, wines

This presentation is a companion to the
**BEYOND THE HUMAN GENOME
PROJECT** poster produced by the U.S.
Department of Energy Human Genome
Program

Free copies available

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