

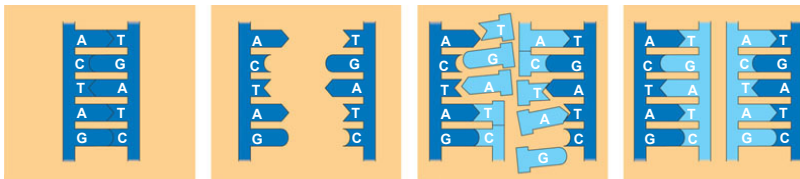
DNA Analysis: Part I. Genomic Sequencing

US275 Scientific Ethics
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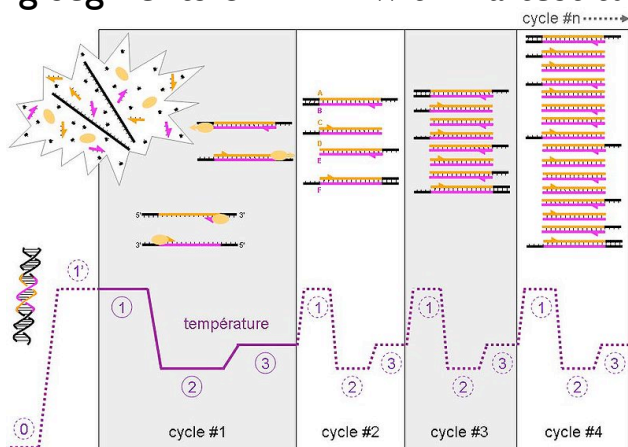
DNA is copied in a process called replication



- The two stands of the DNA molecule are complementary
 - one strand can be used as the template for building the other.

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Polymerase chain reaction is a process for copying segments of DNA within a test tube.



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The Human Genome Project sequenced the entire human genome from 1990 - 2003.

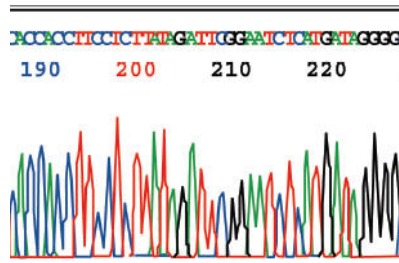
- 15 year project to identify all of the approximately 20,000 - 25,000 genes in human DNA
- joint effort by
 - U.S. Dept. of Energy
 - National Institutes of Health



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The Human Genome Project developed rapid techniques for sequencing entire DNA molecules.

- determined the sequence of the 3 billion nucleotide base pairs in human DNA
- Stored the information in database
- began addressing ethical, legal, and social issues



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The success of the Human Genome Project lead to the sequencing of other genomes

- E. coli bacteria
- Drosophila fruit fly
- laboratory mouse
- now over 7000 species have been sequenced
- available in databases

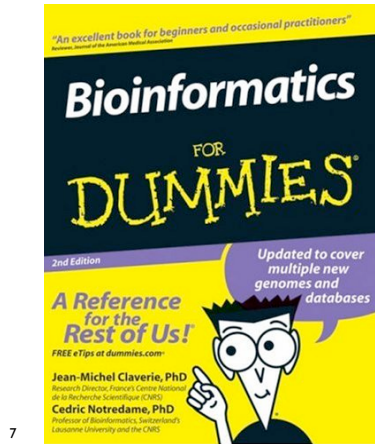
Genome Name	Species	Genome Size (Mb)	Sequencing Method	Year	Accession Number
1	Homo sapiens	2,850	Whole Genome Shotgun	2003	NCBI
2	Canis familiaris	2,800	Whole Genome Shotgun	2005	NCBI
3	Macaca mulatta	2,700	Whole Genome Shotgun	2005	NCBI
4	Alouatta palliata	2,700	Whole Genome Shotgun	2005	NCBI
5	Chimpanzee	2,800	Whole Genome Shotgun	2005	NCBI
6	Ornithyx nasutus	2,800	Whole Genome Shotgun	2005	NCBI
7	Elephas maximus	3,000	Whole Genome Shotgun	2005	NCBI
8	Ursus arctos	2,800	Whole Genome Shotgun	2005	NCBI
9	Ursus maritimus	2,800	Whole Genome Shotgun	2005	NCBI
10	Ursus spelaeus	2,800	Whole Genome Shotgun	2005	NCBI
11	Ursus schrenkii	2,800	Whole Genome Shotgun	2005	NCBI
12	Ursus thibetanus	2,800	Whole Genome Shotgun	2005	NCBI
13	Ursus mandchuricus	2,800	Whole Genome Shotgun	2005	NCBI
14	Ursus mandchuricus	2,800	Whole Genome Shotgun	2005	NCBI
15	Ursus mandchuricus	2,800	Whole Genome Shotgun	2005	NCBI
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17	Ursus mandchuricus	2,800	Whole Genome Shotgun	2005	NCBI
18	Ursus mandchuricus	2,800	Whole Genome Shotgun	2005	NCBI
19	Ursus mandchuricus	2,800	Whole Genome Shotgun	2005	NCBI
20	Ursus mandchuricus	2,800	Whole Genome Shotgun	2005	NCBI
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48	Ursus mandchuricus	2,800	Whole Genome Shotgun	2005	NCBI
49	Ursus mandchuricus	2,800	Whole Genome Shotgun	2005	NCBI
50	Ursus mandchuricus	2,800	Whole Genome Shotgun	2005	NCBI

• <http://www.ncbi.nlm.nih.gov/sites/genome>

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Bioinformatics is a new field involving the study of biological information using computers.

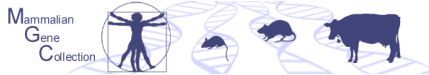
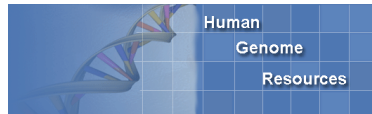
- Databases
- search algorithms
- data mining
- computer modeling



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Databases store the DNA information to be queried and analyzed by scientists.

- Human Genome
 - <http://www.ncbi.nlm.nih.gov/genome/guide/human/>
- Mammalian Gene Collection
 - <http://mgc.nci.nih.gov/>
- Genbank
 - <http://www.ncbi.nlm.nih.gov/Genbank/>

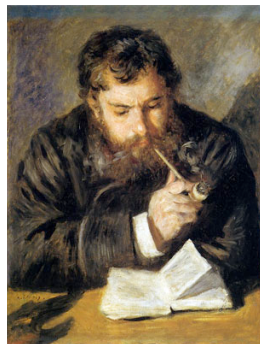


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Readings

DNA Sequencing (2011). National Human Genome Research Institute. National Institutes of Health.
<http://www.genome.gov/10001177>

A guide to your genome (2007). National Human Genome Research Institute. National Institutes of Health. NIH Publication no. 07-6284
<http://www.genome.gov/Pages/Education/AllAbouttheHumanGenomeProject/GuidetoYourGenome07.pdf>



The Reader
Claude Monet, 1872

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TO BE CONTINUED

- in DNA Analysis: Part 2 Genetic Testing

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Any Questions?

Email me at:
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<http://www.pippitbullennets.com/images/animated-question-mark.gif>

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