

#### Ms. Amal AL-Ayedh

# Introduction to genomics Lab 1

#### **The Human Genome Project**





#### **The Genome**

The totality of genetic information of an organism that is encoded in the DNA (or, for some viruses, RNA)



The genome (inside the cell) contains all of an organism's genetic instructions

## DNA

# (Deoxyribonucleic Acid)

# DNA is made up of repeating molecules called <u>Nucleotides</u>



# **DNA Nucleotide**



#### Nitrogenous bases in DNA and RNA

Pyrimidines





# **A HISTORY OF DNA**

Discovery of the DNA double helix

A. Frederick Griffith – Discovers that a factor in diseased bacteria can transform harmless bacteria into deadly bacteria (1928)

- B. Rosalind Franklin X-ray photo of DNA. (1952)
- C. Watson and Crick described the DNA molecule from Franklin's X-ray.
  (1953)







#### **1962: Nobel Prize in Physiology and Medicine**





James D. Watson



Francis H. Crick



Maurice H. F. Wilkins



What about? Rosalind Franklin





## Aims of the Human Genome Project

- identify all the approximate 20,000 25,000 genes in human DNA.
- determine the sequences of the 3 billion chemical base pairs that make up human DNA.
- store this information in databases.
- improve tools for data analysis.
- address the ethical, legal, and social (ELSI) issues that arise from genome research.

## Milestones:

 1990: Project initiated as joint effort of U.S.
 Department of Energy and the National Institutes of Health

■ June 2000: Completion of a working draft of the entire human genome

■ February 2001: Analyses of the working draft are published

April 2003: HGP sequencing is completed and
 Project is declared finished two years ahead of schedule

# Benefits of Human Genome Project research

- improvements in medicine.
- microbial genome research for fuel and environmental cleanup.
- DNA forensics.
- improved agriculture and livestock.
- better understanding of evolution and human migration.
- more accurate risk assessment.



# How is each area benefited specifically by the Human Genome Project?

- Improvements in medicine: improved diagnosis of disease.
- Microbial research: new energy sources, bio fuels.
- DNA forensics: identifying potential suspects at a crime scene.







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"You've left DNA sonsples all over the place?"

# How is each area benefited specifically by the Human Genome Project?

- Agriculture: more nutritious produce.
- Evolution and human migration: study migration of different population groups based on female genetic inheritance.
- Risk assessment: reduce the likelihood of heritable mutations.







