

Lecture 23: Molecular Biology

1. Introduction

Ethics and Medicine in the Cold War
Molecular Biology: Century of the Gene?

2. Pre-history of DNA

Gregor Mendel's Peas
"genes": 1908
Thomas Morgan and *Drosophila*
Nucleic Acids
Beadle and Tatum: one gene, one enzyme
Oswald Avery: transforming factor = DNA
Hershey Chase: radiolabeled bacteriophages
Erwin Schrodinger, *What Is Life*

3. Watson and Crick

Crick, physics, and the Cavendish Laboratory
X-ray crystallography and Rosalind Franklin
James Watson, x-rays and bacteriophages
Watson & Crick, 25 April 1953
"central dogma"
DNA as the "Code of Life"
Meselson and Stahl: DNA replication
Retroviruses and Reverse Transcriptase

4. Genetic Engineering

Dreams of designer life
Fears: Aldous Huxley, *Brave New World*, 1932
Paul Berg, recombinant DNA, 1972
Asiolar, February 1975
Cambridge Experimental Review Board, 1976
Biotechnology, 1979-1979: somatostatin, insulin, interferon

5. Challenges of Recombinant Technology

IVF and "test tube babies," 1978
Harvard Oncomouse and patenting life, 1984
Stem Cells: Bone Marrow Transplant, 1968
Embryonic Stem Cells, 1998
Cloning: Dolly, 1996
Cloning as threat to human identity?
Government Regulation
California Stem Cell Research and Cures Initiative, 2004
Fears of private enterprise
Raelians and human cloning? 2004
Technological determinism and loss of control

Further Reading:

James Watson, *The Double Helix: A Personal Account of the Discovery of the Structure of DNA*, 1968.
Evelynn Fox Keller, *The Century of the Gene*, 2000.

Names and Dates:

Gregor Mendel (1822-1884)
August Weismann (1834-1914)
“genes” (1908)
Oswald Avery, smooth vs. rough pneumococcus, transforming factor, 1944
Alfred Hershey and Martha Chase, bacteriophage, 1952
Erwin Schrodinger, *What Is Life*, 1944
James Watson and Francis Crick, 1953
Matthew Meselson and Franklin Stahl, DNA replication 1959
Molecular Biology
Recombinant DNA
Aldous Huxley, *Brave New World*, 1932
Asilomar Conference, 24-27 February 1975
Harvard Oncomouse, 1984; patented 1988
In Vitro Fertilization & Test Tube Babies, 1978
Stem Cells
Embryonic Stem Cells