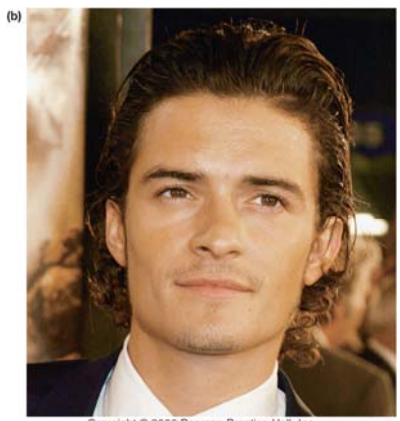
Chapter 8 DNA

- **DNA as the genetic material**
- **Watson-Crick model of DNA Structure**
- **Semiconservative model of DNA replication**

Genes



Genes --- Proteins --- Traits

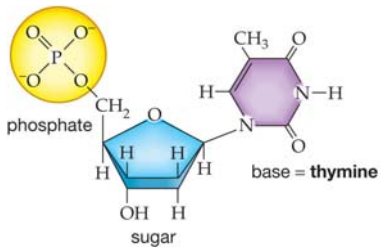
DNA – deoxyribonucleic acid

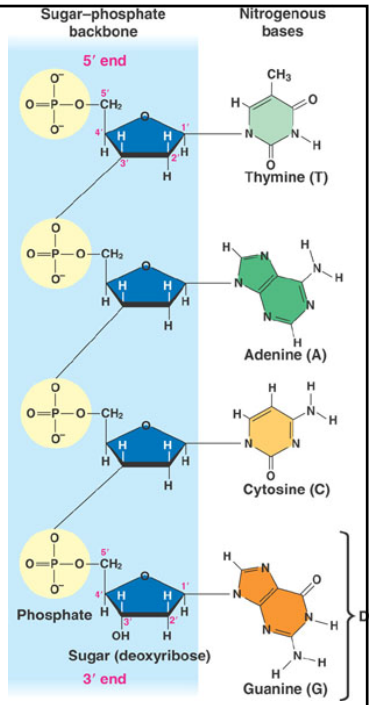
Monomer – Nucleotide
Deoxyribose
Phosphate
Nitrogenous Base (4)

Phosphodiester Bond

DNA has direction - 5' and 3' ends

Chromosomes are composed of DNA





Evidence Genes are Composed of DNA?

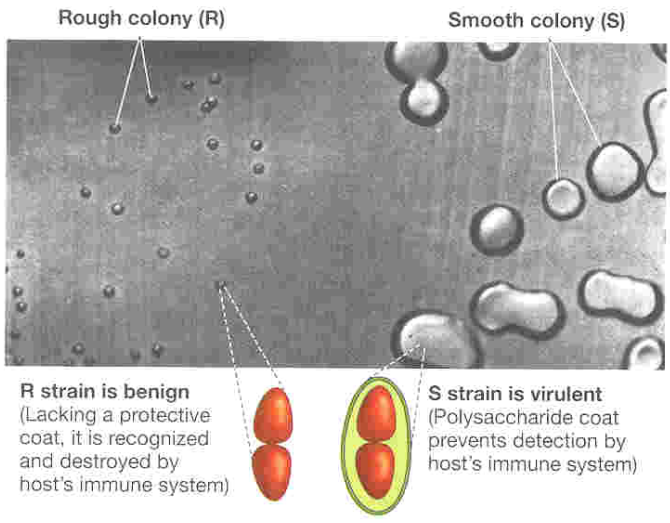
- DNA
  - Only four nucleotides
    - thought to have monotonous structure
- Protein
  - 20 different amino acids – greater potential variation
  - More protein in chromosomes than DNA

Bacterial Transformation Experiments

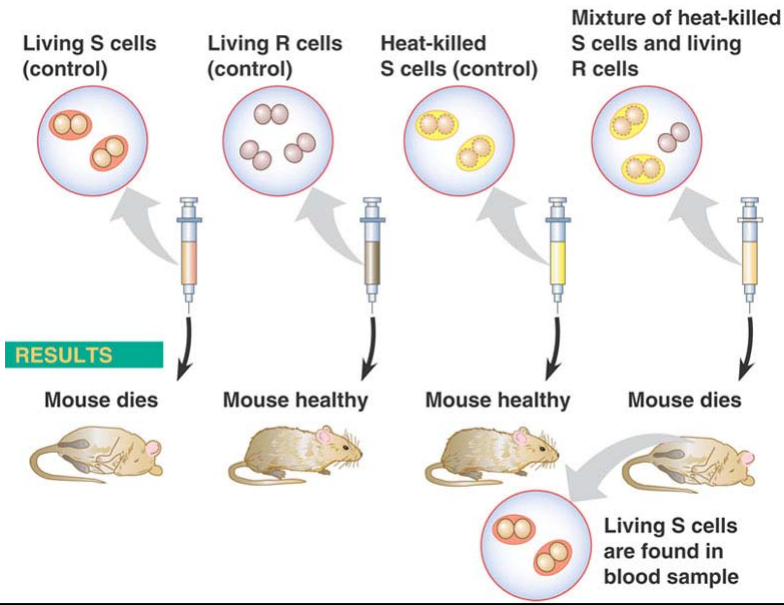
Fredrick Griffith (1928) –demonstrate the existence of "**Transforming Principle**," a substance able to confer a heritable trait from one strain of bacteria to another.

Avery MacLeod and McCarty – determine the transforming principle was DNA.

Streptococcus Pneumoniae



Griffith Experiment



Griffith's Conclusion

- The "stuff" that controlled the bacterial traits could be passed from one strain to another.
- The "stuff" survived heat treatment and was probably a chemical.
- He named the stuff

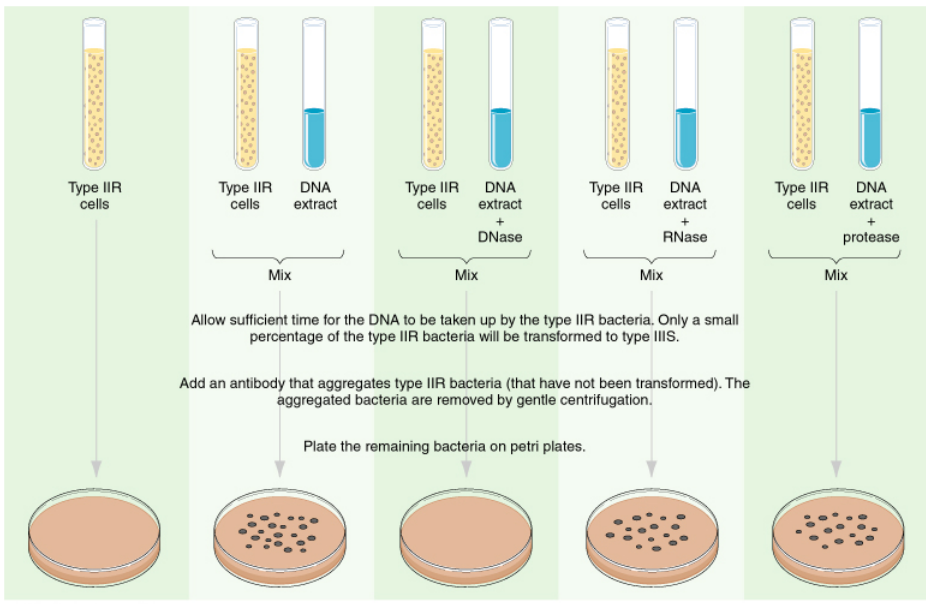
  "The Transforming Principle"

Transforming Principle = Gene

Avery Experiment

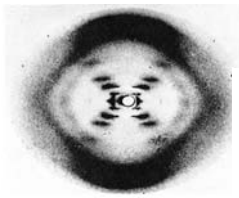
- What biomolecule makes up “transforming Principle”
- Partially purified DNA from smooth bacteria could transform rough into smooth.
- What component of there preparation was the transforming principle.
- Treat the sample with digestive enzymes specific for different molecules
  - Protease – specifically destroys protein
  - DNase – specifically destroys DNA
  - RNase – specifically destroys RNA

Avery Experiment

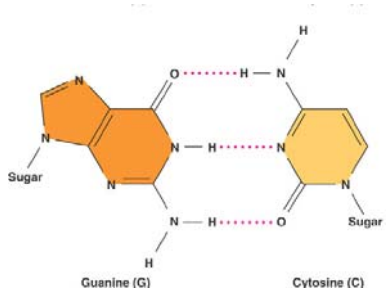


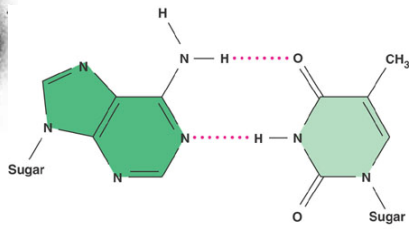
Watson and Crick Model

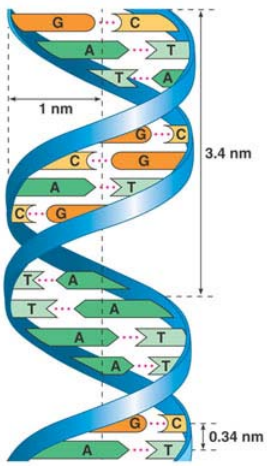
- Franklins X-Ray Data
  - DNA is Double Helix
- Watson and Crick
  - Base Pairing



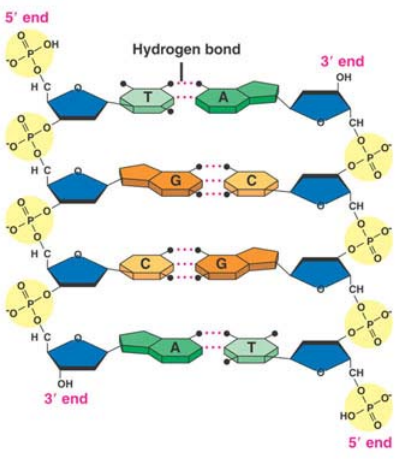
(b)



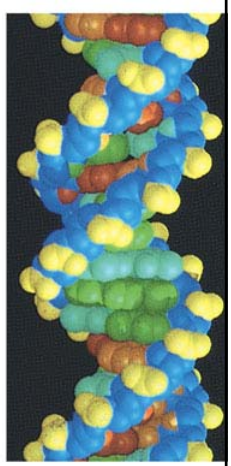




(a) Key features of DNA structure

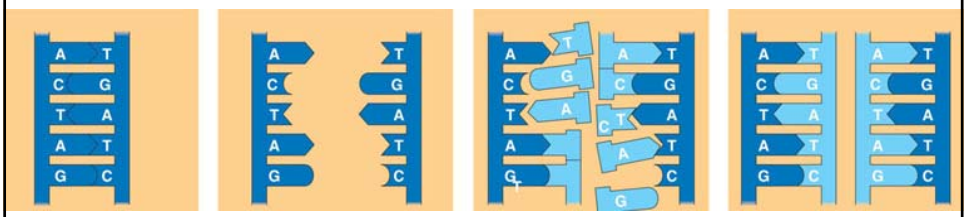


(b) Part a c em ca structure



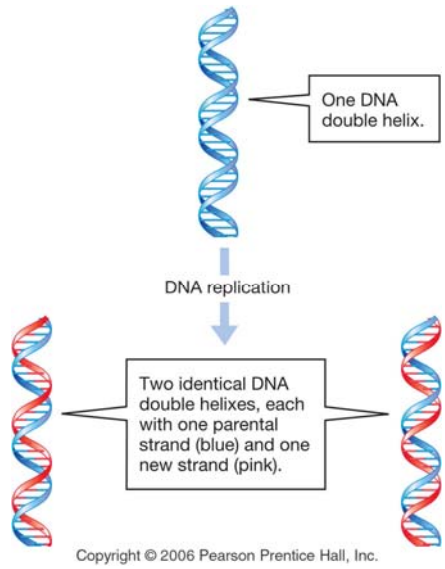
(c) ace-f ng mode

DNA Replication

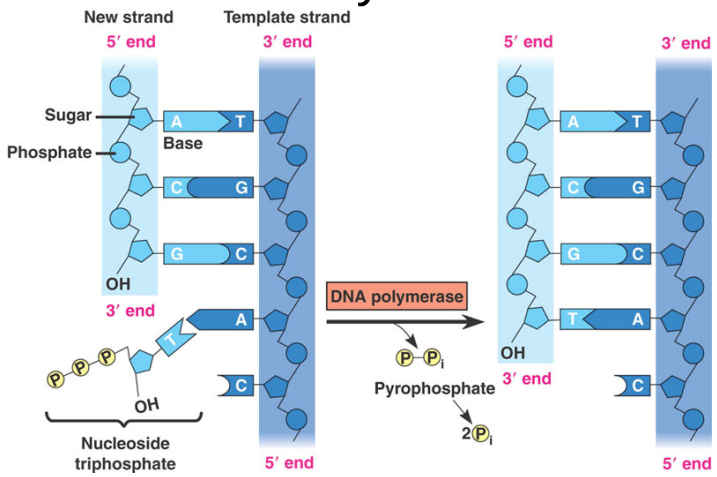


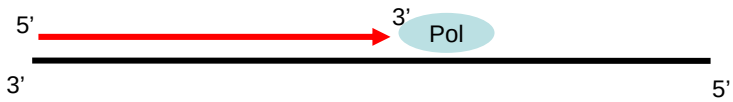
Semiconservative Replication

Semiconservative



DNA Polymerase





Leading and Lagging Strands