

1  **Chapter 10**

DNA: Chemical Nature of the Gene

2  **Characteristics of Genetic Material**

- ▶ Must contain complex information
- ▶ Must replicate faithfully
- ▶ Must encode phenotype

3  **Early studies of DNA**

4  **Discovery of transforming principle**

- ▶ Fred Griffith (1928)
  - ▶ Transformation

5  **Identification of principle**

- ▶ 10 years of research
  - ▶ Oswald Avery, Colin MacLeod & Maclyn McCarthy
  - ▶ Purify & characterize transforming principle
  - ▶
  - ▶ Many biologists still favored proteins

6  **Hershey-Chase experiment**

- ▶ T2 virus
- ▶ Radioactive isotopes
  - ▶ Phosphorous - DNA
  - ▶ Sulfur - Protein

7  **Watson & Crick???**

- ▶ Discovery of 3D structure of DNA?????

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- ▶ Rosalind Franklin
  - ▶ best X-ray diffraction pictures of DNA
  - ▶ Maurice Wilkins, a colleague disliked Franklin
  - ▶ estrangement led Wilkins to show Watson one of Franklin's best pictures (which hadn't been published)
  - ▶ "The instant I saw the picture my mouth fell open. The sneak preview "gave several of the vital helical parameters." Watson
  - ▶ Watson, Crick & Wilkins won the Nobel Prize (1962)
  - ▶ Rosalind died of ovarian cancer at the age of 37 (1958)

9  **RNA as genetic material**

- ▶ Fraenkel-Conrat & Singer

10  **DNA structure (primary)**

- ▶ Pentose sugar
- ▶ Phosphate
- ▶ Nitrogenous base
  - ▶ Purine or pyrimidine

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- ▶ Four types of nucleotides
- ▶

12  **DNA structure (secondary)**





- ▶ Double helix
- ▶ Antiparallel
- ▶ Complementary pairs
  - ▶ H bonds

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- ▶ Secondary structure

14  **B-DNA Helix**

This is only a guideline topics discussed in-class as well as the assigned pages from the text and supplemental material may also be on the exam.

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  - ▶ RNA
- 16  **Central Dogma of molecular biology**
  - ▶ DNA → RNA → Protein
- 17  **Special structures**
  - ▶ Single-stranded
    - ▶ DNA & RNA
- 18  **DNA Methylation**
  - ▶ Bacteria
  - ▶ Animals

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