

Molecular Basis of Inheritance Part 2

Chapter 16

Overview:

- Review of DNA Structure
- DNA Replication
 - How is a strand of DNA copied to make 2 identical copies?

DNA Replication and Base Pairing

- The **relationship** between **structure** and **function** is manifested in the **double helix**.
- Watson and Crick noted that the **specific base pairing** suggested a possible **copying mechanism** for genetic material

Replication of DNA

- Replication occurs when DNA is **not condensed** into discrete chromosomes
- There are 46 Chromosomes in a human cell
- All 46 chromosomes comprise approximately **6 billion base pairs**
 - If you were to write all the bases as letters into books the size of "Campbell Biology", the human genetic code would amount to about 1,200 textbooks

How does 1 DNA molecule become 2?

- During DNA replication:
 - **Original DNA molecule** is the **template** for making an exact copy
- But, is the new DNA molecule?
 - 1) a **completely new copy** of the original- "**Conservative Model**"
 - 2) **half** the original template and **half** a new copy- "**Semiconservative Model**"
 - 3) **mixed pieces** of original and new- "**Dispersive Model**"

The "Semiconservative" Model

- Watson and Crick's **semiconservative model** of replication
- Predicts that when a double helix replicates, **each daughter molecule will have:**
 - 1) **1 old strand** ("conserved" from "parent" molecule) and
 - 2) **1 newly made strand**

The Basic Principle: Base Pairing to a Template Strand

- Since the two strands of DNA are complementary, **each strand acts as a template** for building a new strand in replication
- In DNA replication, the parent molecule **unwinds**, and two new daughter strands are built based on base-pairing rules

Mhr Answer Key

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