

# DNA Function

# DNA

- DNA stands for deoxyribonucleic acid.
- DNA is one of two nucleic acids found in the cell.



# DNA

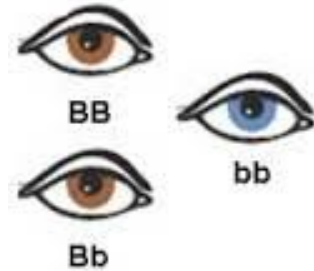
DNA contains a CODE for making PROTEINS which determine TRAITS



DNA



PROTEIN



TRAITS

# DNA Replication

DNA Replication copies DNA for new cells

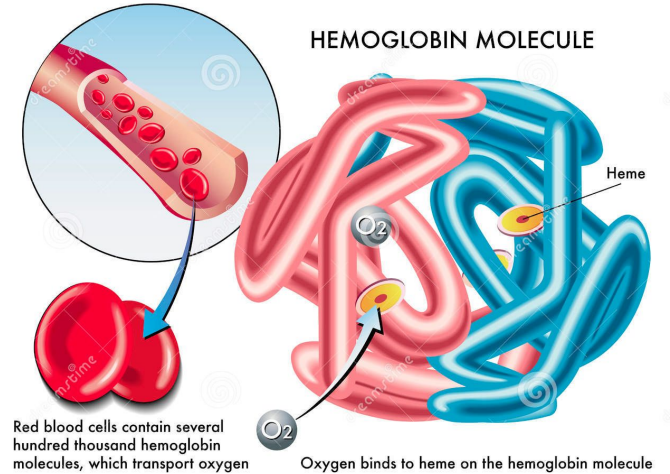
- DNA is needed in EVERY CELL to make proteins
- The cell must pass on an EXACT COPY of its DNA for the new cell to function
- DNA is copied (REPLICATED) during S-Phase



# Protein Synthesis

## Importance of Protein Synthesis:

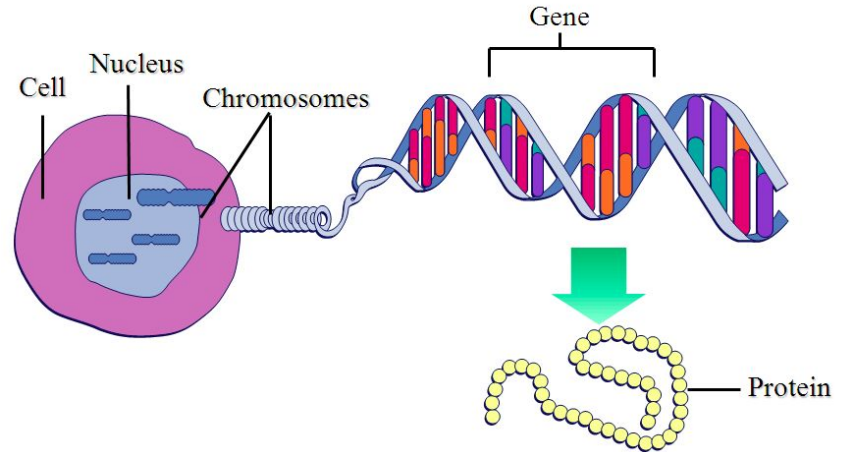
- Every inherited trait is controlled by one or more proteins
- Each cell must produce different proteins, based on its function
  - For example, only blood cells make **hemoglobin** (a protein)



# How is DNA used to make protein?

DNA structure controls the production of proteins!

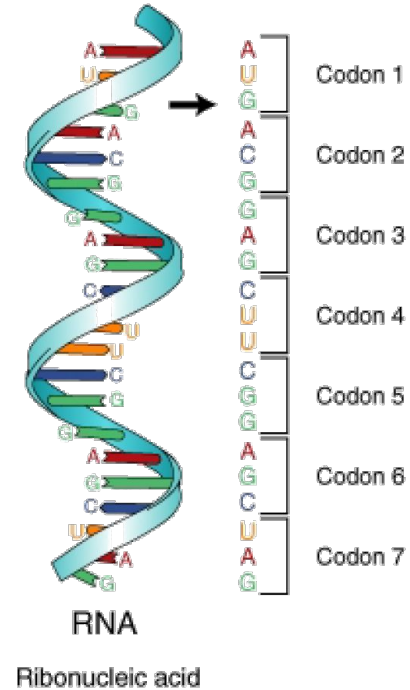
- A gene is a region of DNA which contains a code for production of proteins



# How is DNA used by the cell to make proteins?

Each **gene** is composed of a specific sequence of **nucleotides**

- This can be expressed by writing the order of nitrogen bases
  - Example: ACTGACTTTCAGCCA
- Every **three bases** is called a **codon**
  - A **codon** is like a **word** and a **protein** is like a sentence



# Protein Synthesis

Cells respond to their environment by making different types and amounts of protein.

- The cell produces proteins that are structural (form part of cell parts, such as organelles)
- The cell produces proteins that are functional (such as enzymes or hormones)





# Protein Synthesis

- All of an organism's cells have the same DNA.
- What makes each cell DIFFERENT is the expression of genes (**CELL DIFFERENTIATION!**)
  1. Multicellular organisms begin as **UNDIFFERENTIATED** masses of cells
  2. Only SPECIFIC genes are activated → produces different TYPES of cells
  3. **Gene regulation** is the process that determines which genes will be expressed
    - determined by the history of the cell  
OR the cell's environment

