



### Mutations Activity

#### Mutation Demonstration

What is the take-home lesson from the game? \_\_\_\_\_

#### Acting Out

Explain what happens when each of the following events takes place.

*Insertion:* \_\_\_\_\_ *Deletion:* \_\_\_\_\_

*Substitution:* \_\_\_\_\_

#### Mutations

Explain what a mutation is. \_\_\_\_\_

Explain what can cause a mutation. \_\_\_\_\_

**DNA Manipulative:** For all sections, transcribe and translate the genetic information. Then assemble the enzyme.

1. Transcribe the following DNA molecule into mRNA and then into an amino acid sequence:

DNA: T A C - C A C - A C G - G G T - G T A - A C T

**Native Protein**

mRNA: - - - - -

amino acid sequence: - - - - -

**Does the substrate fit into the enzyme?** \_\_\_\_\_

2. This time, see what happens when a substitution of one nitrogenous base occurs.

DNA: T A C - C A C - A C G - G G T - G T C - A C T

**Substitution/Missense**

mRNA: - - - - -

amino acid sequence: - - - - -

**Doe the substrate fit into the enzyme?** \_\_\_\_\_ **Why/Why Not?** \_\_\_\_\_

3. This time, see what happens when a base is changed in another place on the DNA sequence.

DNA: T A C - C A C - A C T - G G T - G T A - A C T

**Substitution/Nonsense**

mRNA: - - - - -

amino acid sequence: - - - - -

**What happened to the protein?** \_\_\_\_\_

4. This time, see what happens when a base is changed in another place on the DNA sequence.

DNA: T A C - C A T - A C G - G G T - G T A - A C T

**Substitution/Silent**

mRNA: - - - - -

amino acid sequence: - - - - -

**Why was there no change to the original enzyme?** \_\_\_\_\_

5. Transcribe the following DNA molecule into mRNA and then into an amino acid sequence:

DNA: T A C - C A G - C A C - G G G - T G T - A A C

**Frameshift/insertion**

mRNA: - - - - -

amino acid sequence: - - - - -

**Why do frameshift mutations cause major protein changes?** \_\_\_\_\_



Types of Mutations

- Gene mutations produce a change in one gene. Point mutations produce gene mutations that involve a change in one or more nucleotides. Point mutations also occur at only one point in the DNA sequence. The diagram below shows an original chromosome and three possible point mutations.

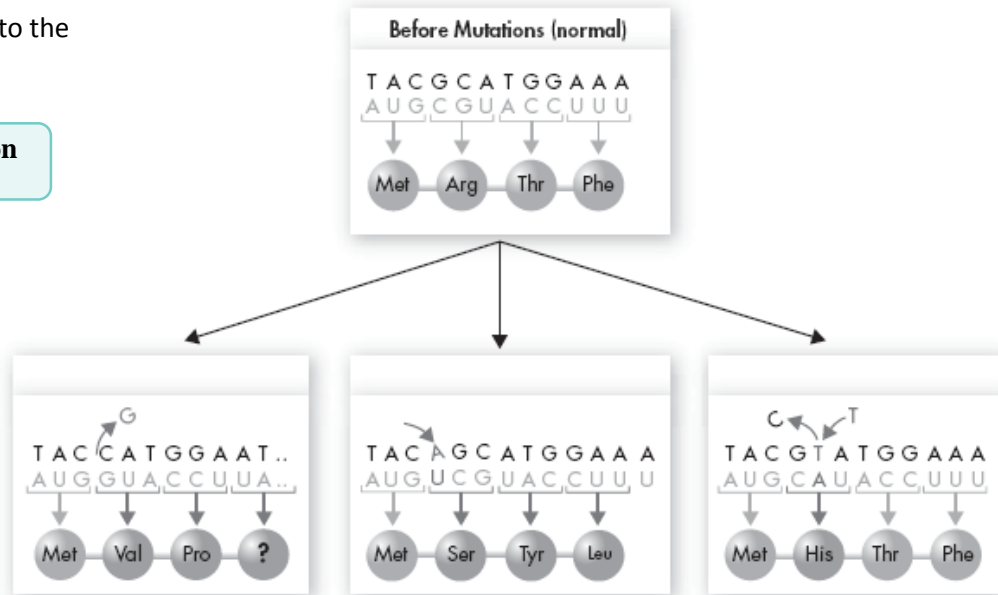
Use the words in the box to add headings to the three lower parts of the diagram.

**insertion      deletion      substitution**

Complete the sentences.

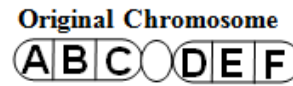
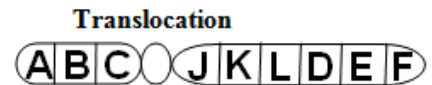
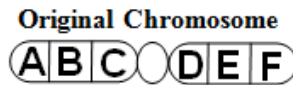
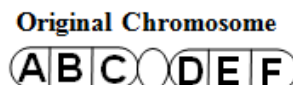
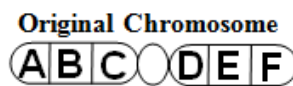
Use the terms from the box above.

- In a(n) \_\_\_\_\_, one base is changed to a different base.
- In a(n) \_\_\_\_\_, a base is inserted into the DNA sequence.
- In a(n) \_\_\_\_\_, one base is removed from the DNA sequence.
- Why is a frameshift mutation more damaging than a substitution? \_\_\_\_\_



- Mutations that change whole chromosomes are called chromosomal mutations. The diagrams below show chromosomal mutations. Each diagram represents an original chromosome and a possible mutation of the chromosome.

- Which types of mutations can add genes to a chromosome?  
\_\_\_\_\_
- Which type of mutation can take genes away from a chromosome?  
\_\_\_\_\_
- Which type of mutation changes the order of the genes, but not the number of genes in a chromosome?  
\_\_\_\_\_

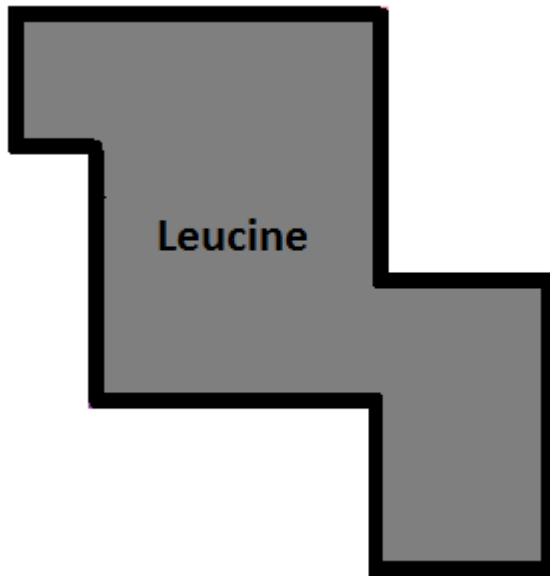
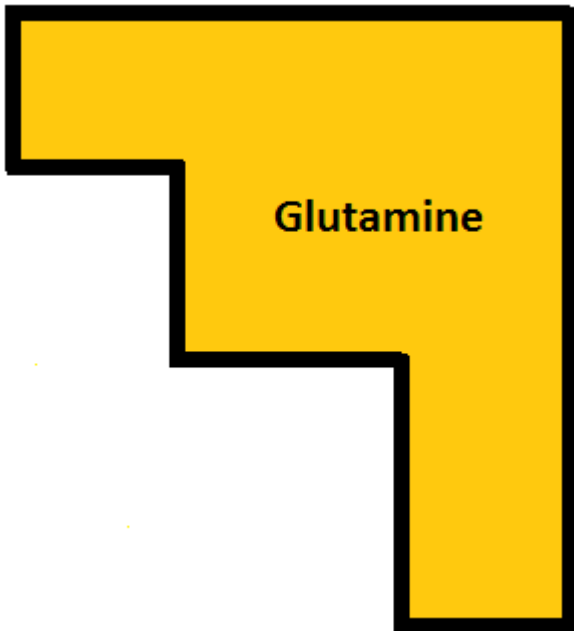
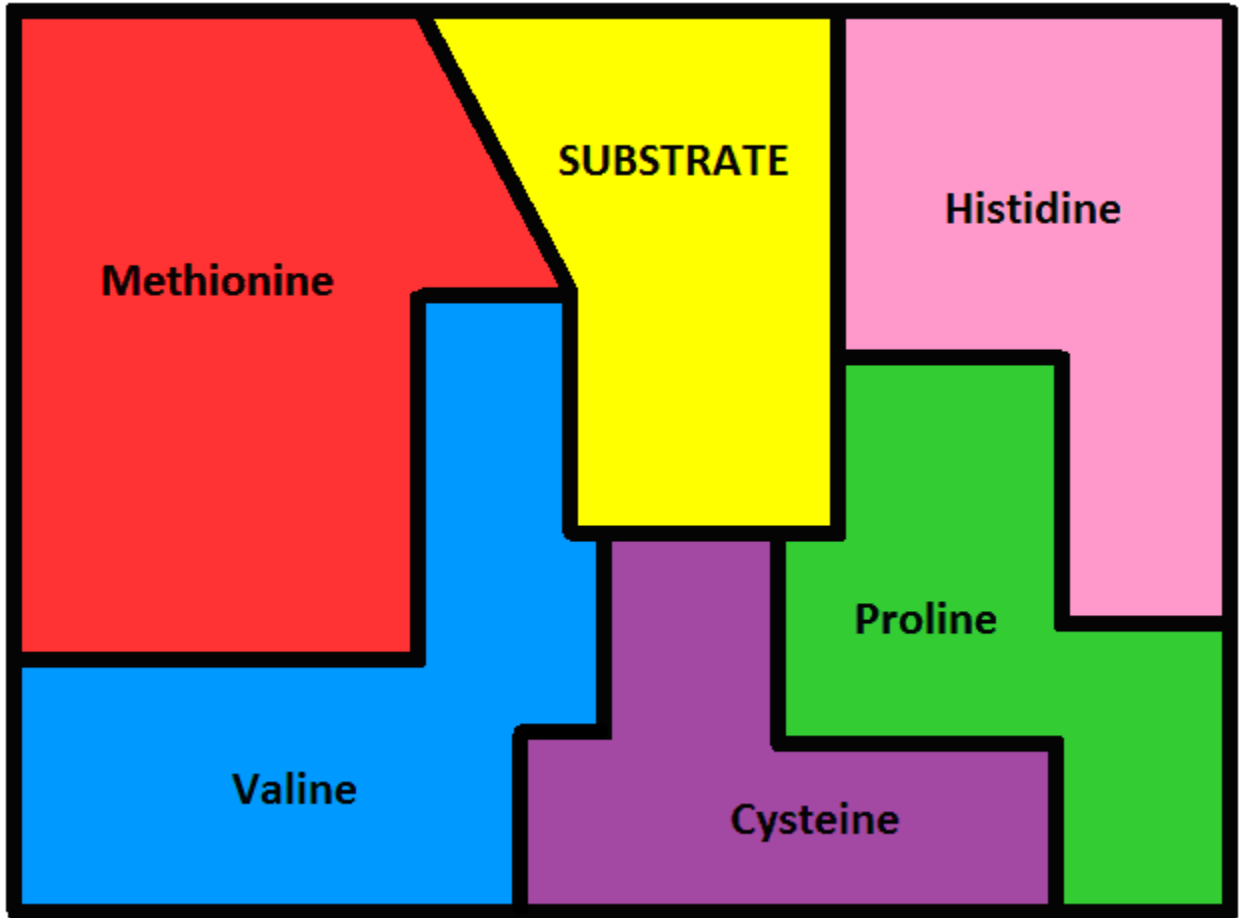


Mutation	Description
	Part of the chromosome is lost.
	Extra copies of a part of a chromosome are made.
	Part of a chromosome breaks off and attaches to another chromosome.
	Sections of a chromosome are reversed.



Name: \_\_\_\_\_

Per: \_\_\_\_\_

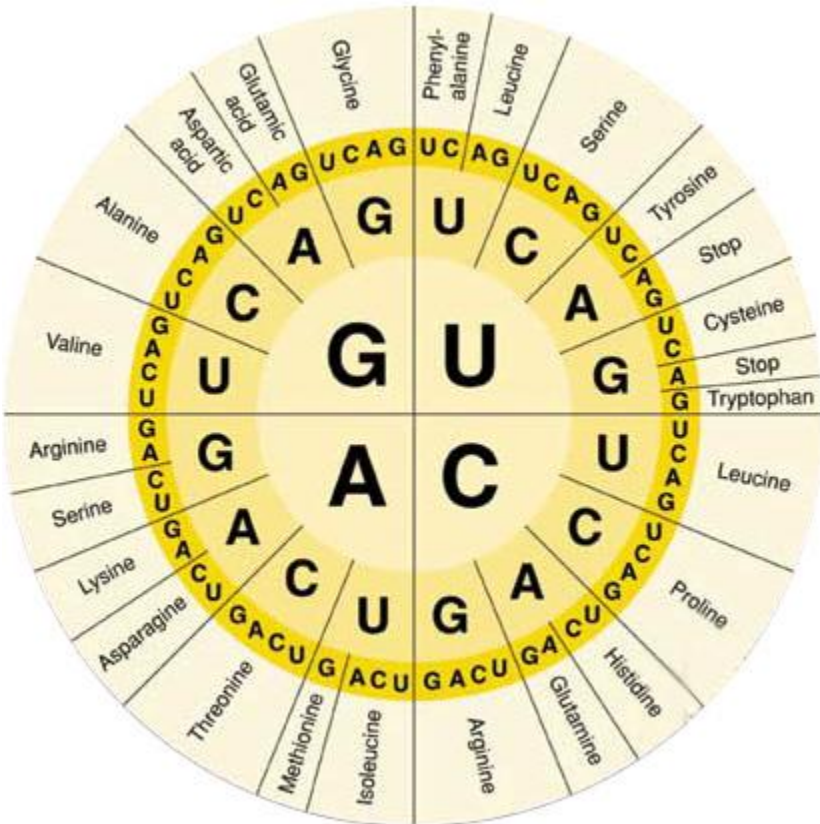
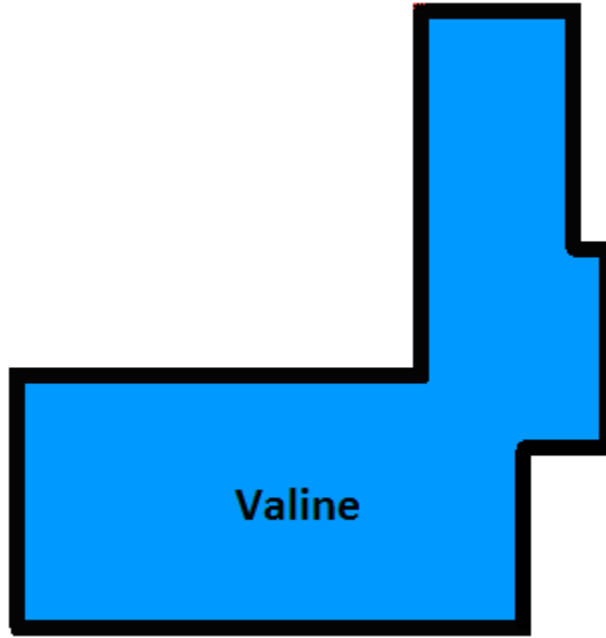
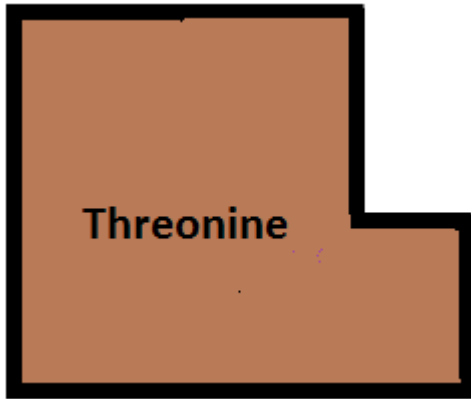




# DNA and Protein Synthesis

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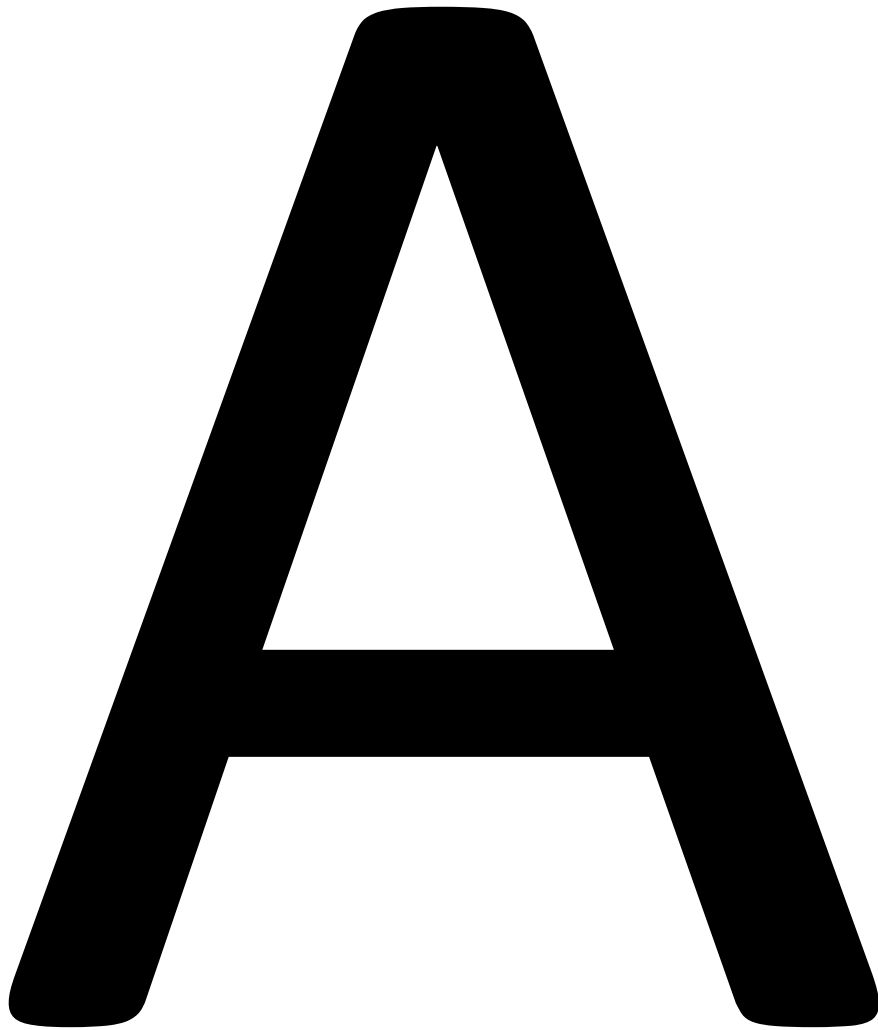


# DNA and Protein Synthesis

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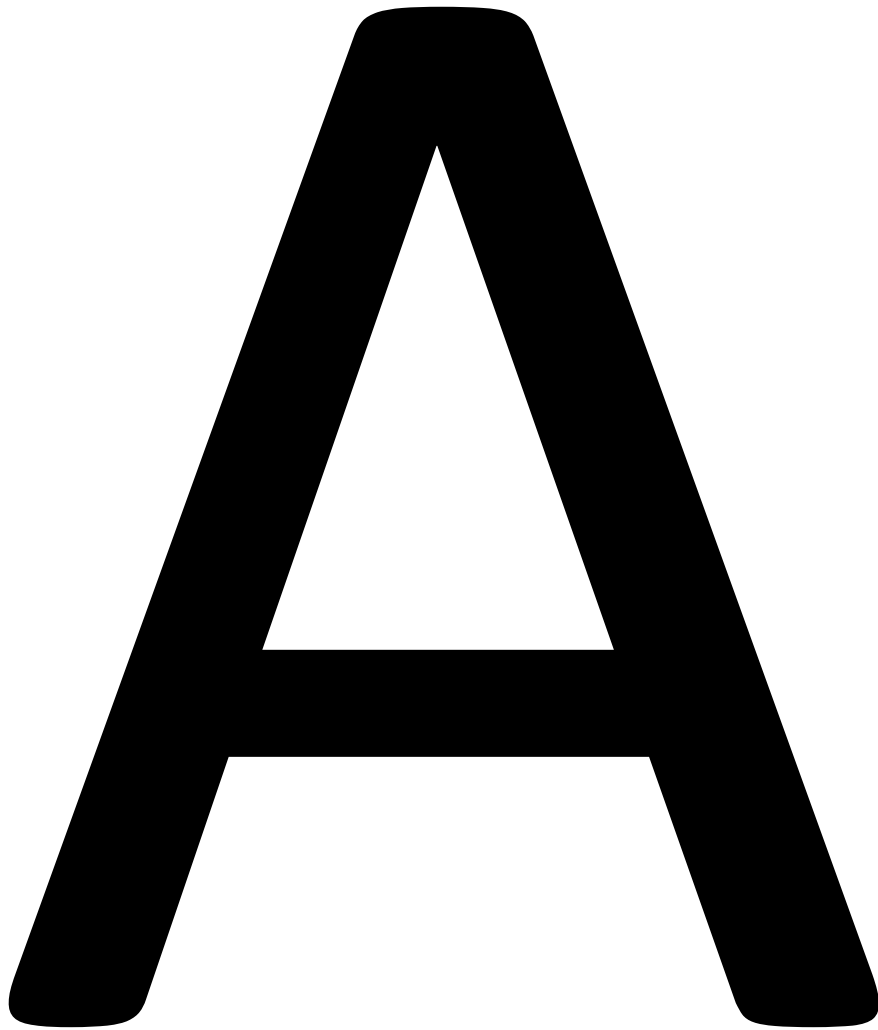


# DNA and Protein Synthesis

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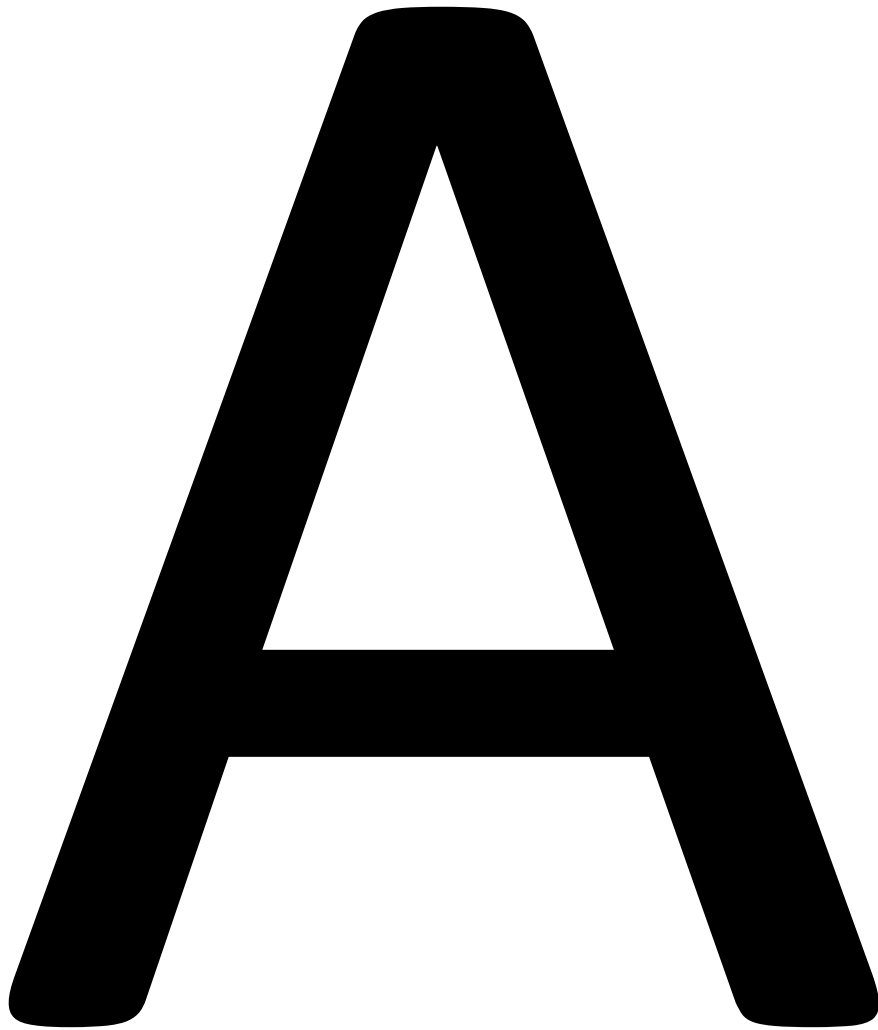


# DNA and Protein Synthesis

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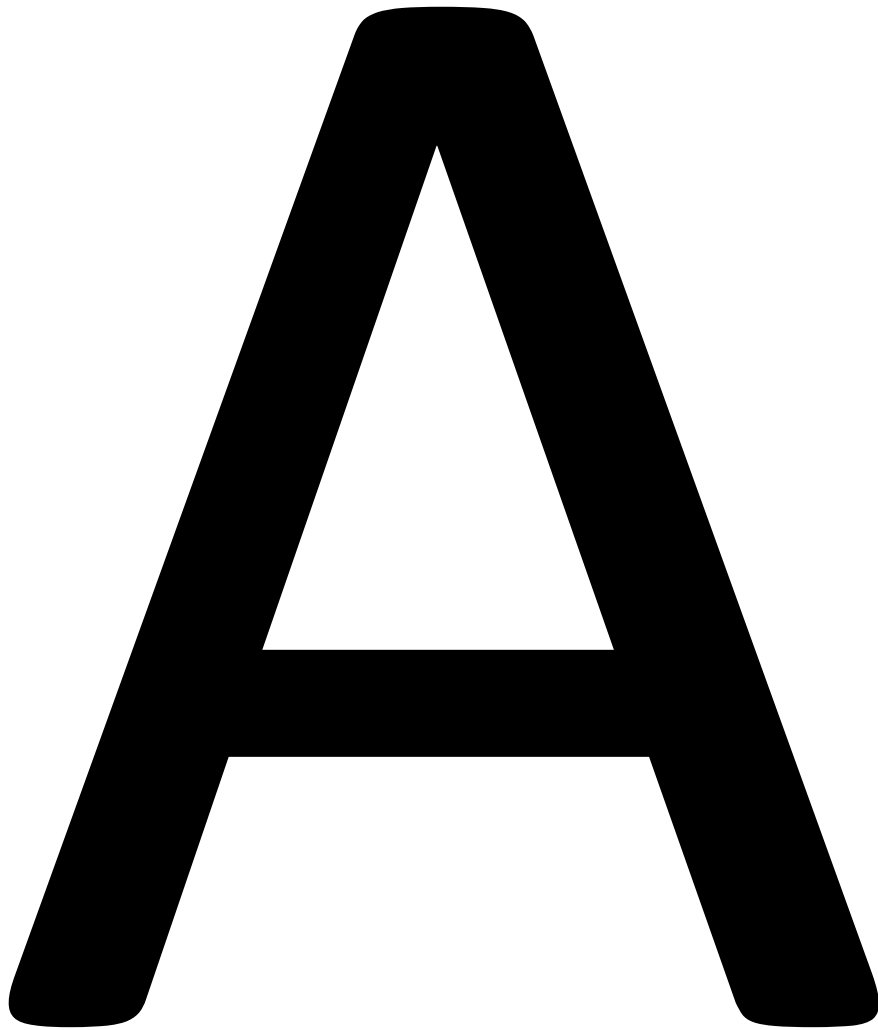


# DNA and Protein Synthesis

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Name: \_\_\_\_\_

Per: \_\_\_\_\_

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DNA and Protein Synthesis

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Name: \_\_\_\_\_

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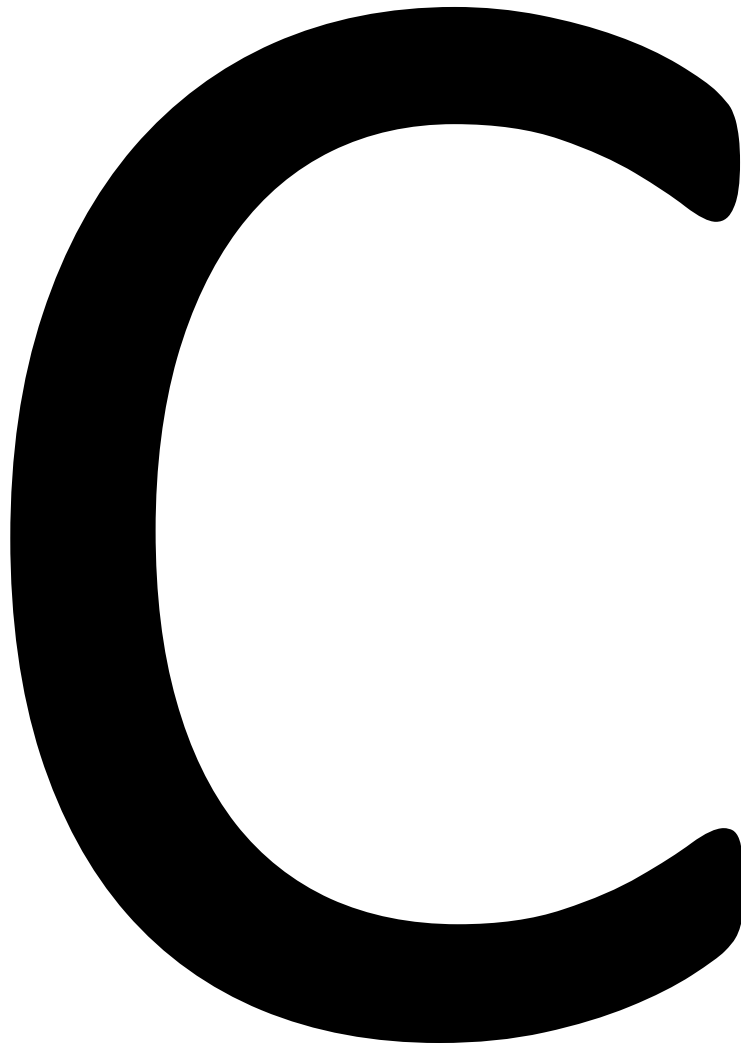


DNA and Protein Synthesis

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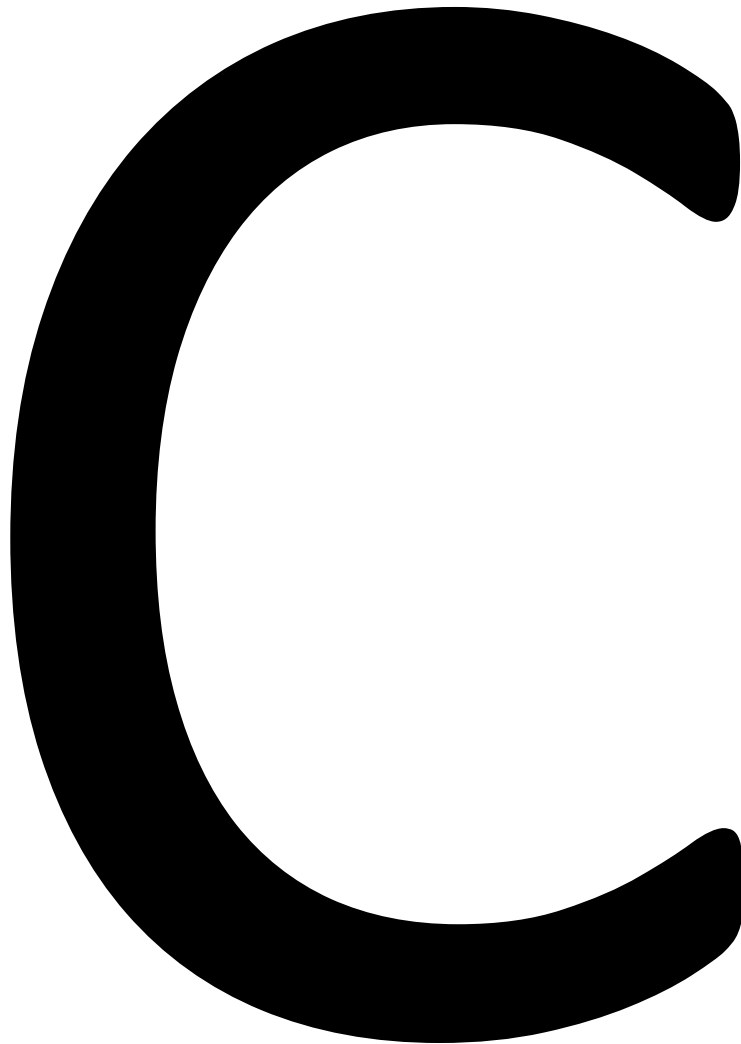


DNA and Protein Synthesis

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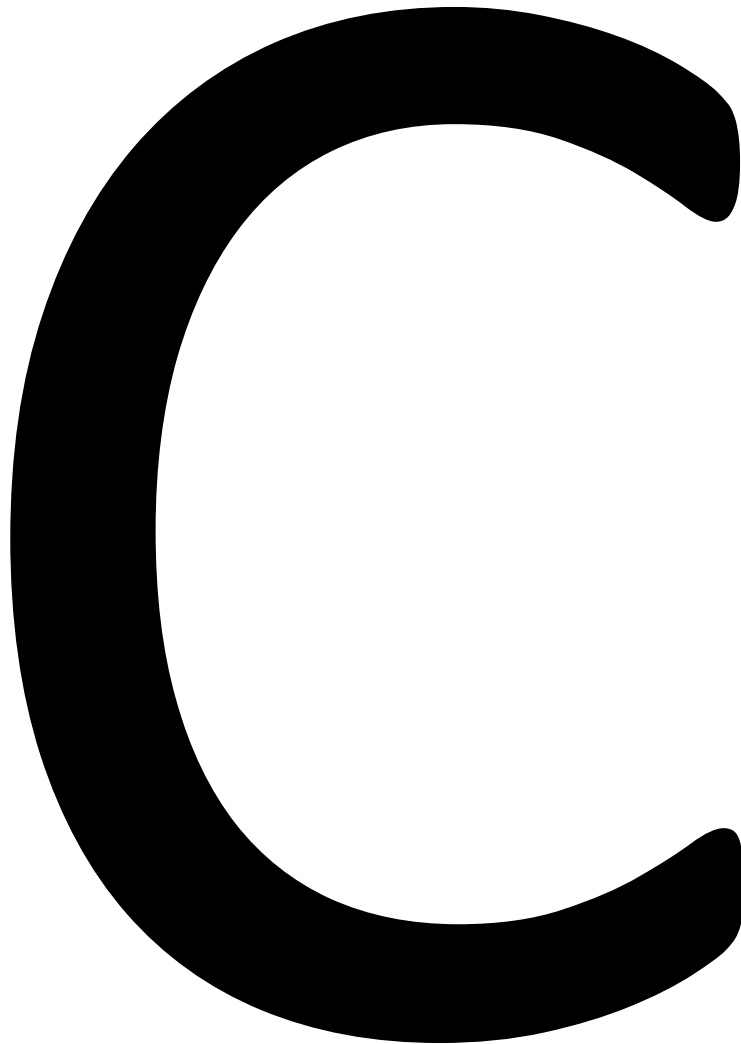


DNA and Protein Synthesis

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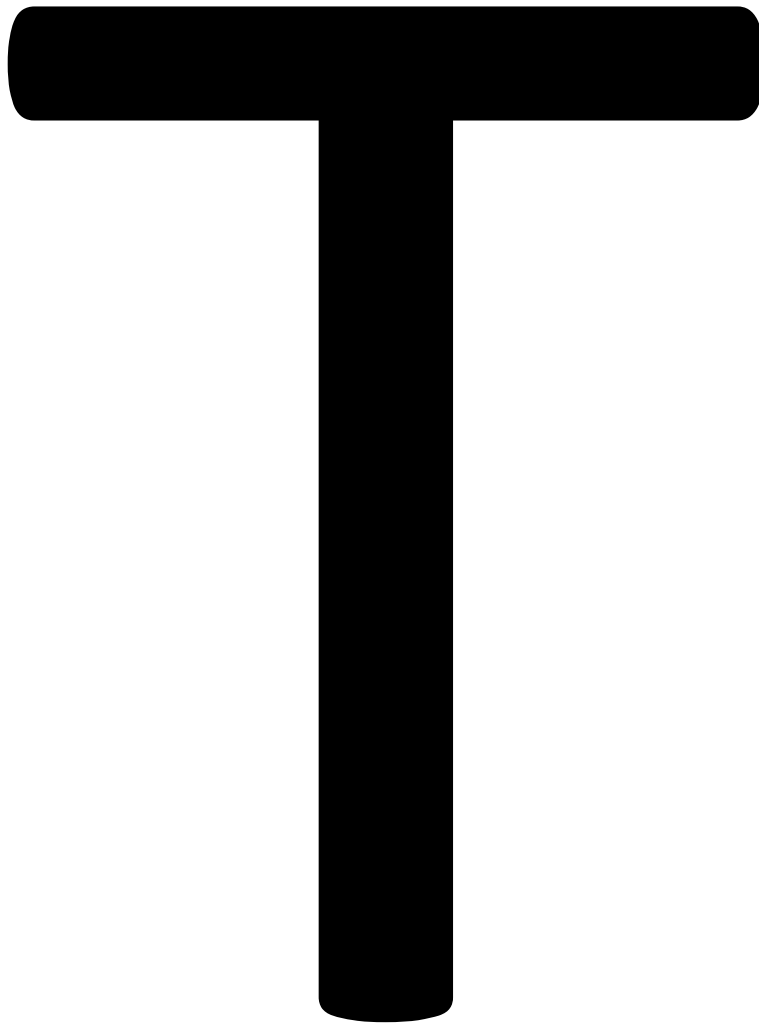


# DNA and Protein Synthesis

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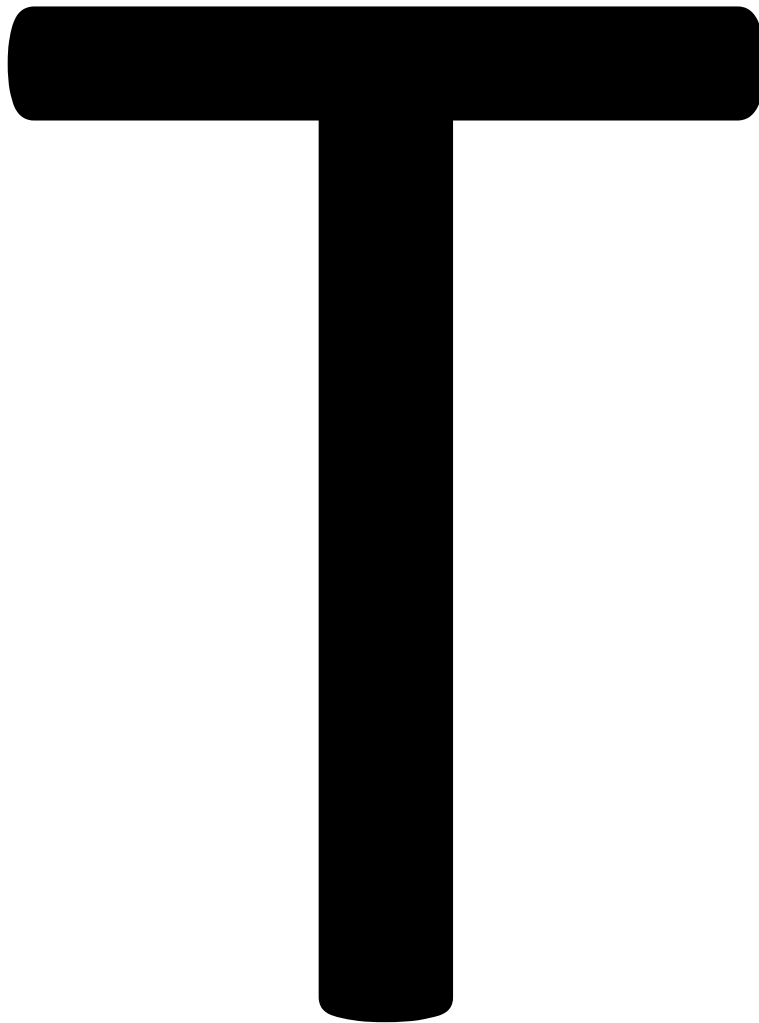


# DNA and Protein Synthesis

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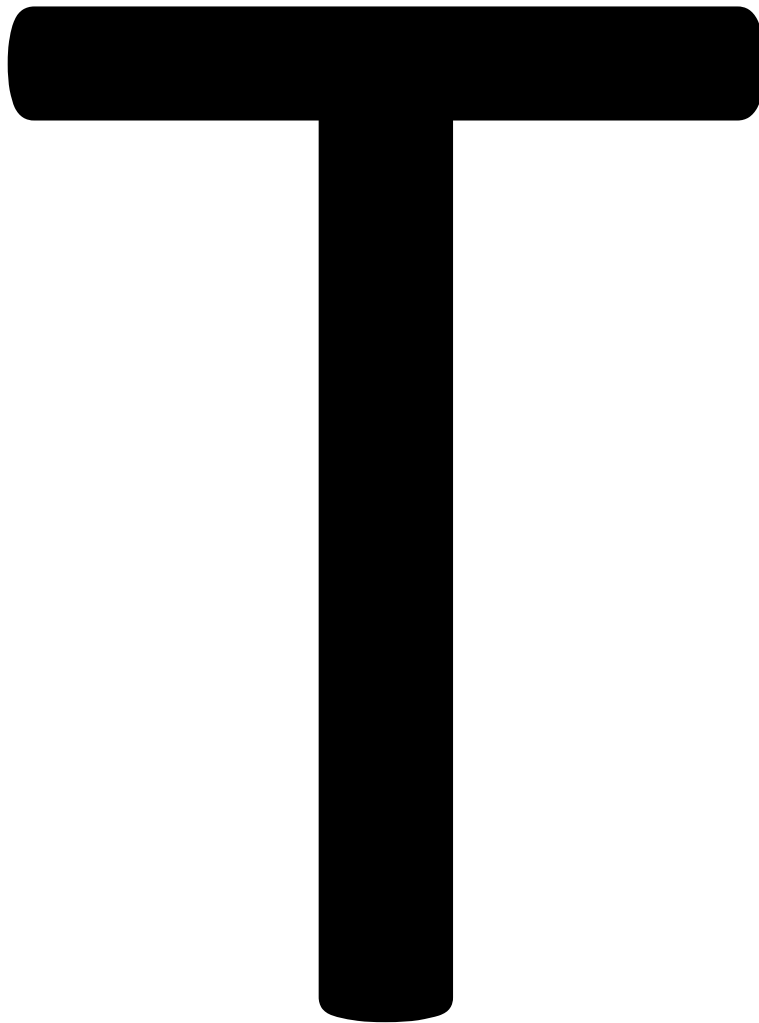


# DNA and Protein Synthesis

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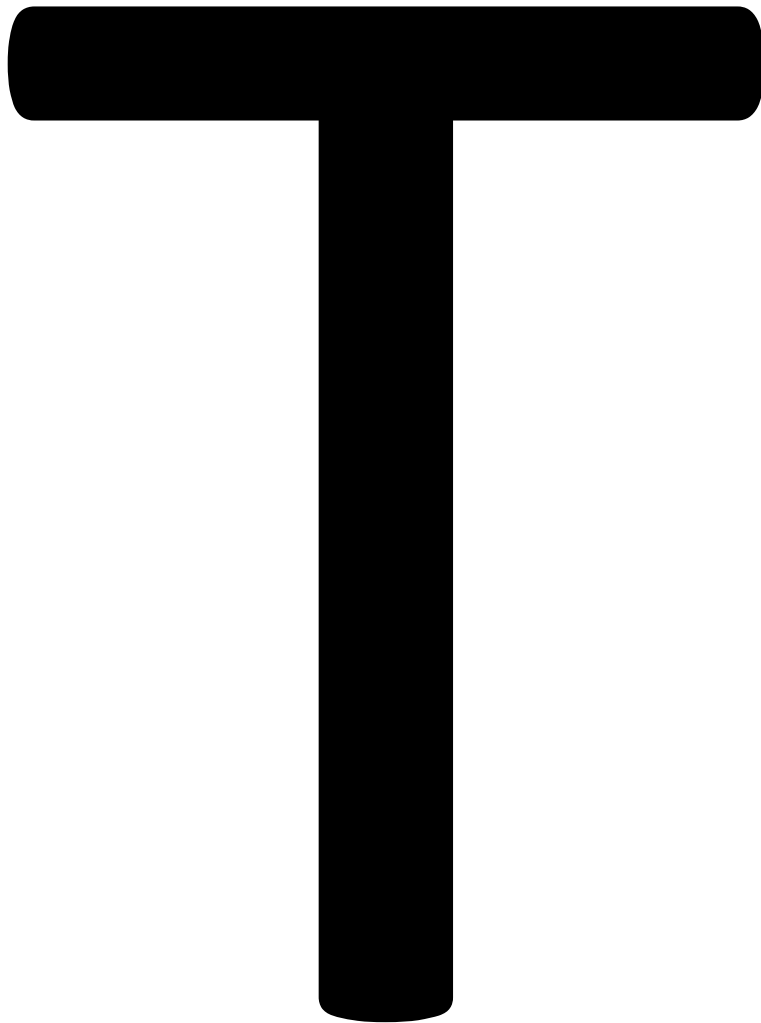


# DNA and Protein Synthesis

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DNA and Protein Synthesis

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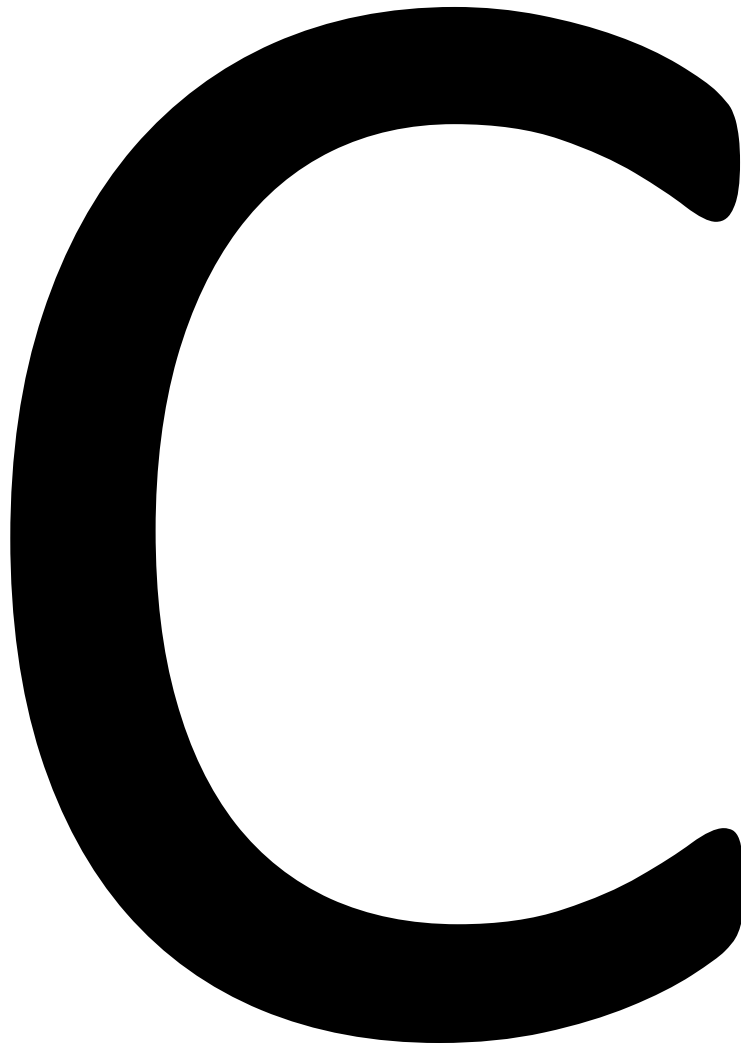
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DNA and Protein Synthesis

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# DNA and Protein Synthesis

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