



## Amino-acids and proteins

Answer all the questions below then check your answers

1. Proteins are polymers made from which type of monomer?

- a) Sugars      b) Fatty acids      c) Amino acids      d) Nucleotides

2. Fill in the Blanks to complete the sentence below:

Amino acids contain two key functional groups: an \_\_\_\_\_ group and a \_\_\_\_\_ group.

3. Match the amino acid with its R-group:

Amino acid
Glycine
Alanine

R-group
$\text{CH}_3$
-H

4. True or False:

All amino acids have the same basic structure, differing only in their R- side group.

5. What type of reaction do amino acids undergo when they link together?

6. Why can so many different proteins be formed from only about 20 amino acids?

7. Where are proteins found in living organisms? Give a few examples.

8. What is a dipeptide?

9. What is the name of the bond that forms between two amino acids?

10. Draw a simple diagram showing the displayed formula of the two amino acids glycine and alanine reacting to form a dipeptide. Label the amino group, carboxyl group, peptide bond, and water molecule that is released.

11. How is the formation of a peptide bond similar to the formation of an ester or amide bond in other polymers?

13. What is the difference between a polypeptide and a protein?

*Answer: Polypeptides are generally smaller chains of amino acids (up to ~50). Proteins are larger and often consist of multiple polypeptide chains folded into a specific 3D structure. The distinction isn't always strictly defined.*

15. Can a single type of amino acid form a polypeptide? Explain how.

## Answers

1. Proteins are polymers made from which type of monomer?

a) Sugars      b) Fatty acids      c) Amino acids      d) Nucleotides

Answer: c) amino acids

2. Fill in the Blanks to complete the sentence below:

Amino acids contain two key functional groups: an \_\_\_\_\_ group and a \_\_\_\_\_ group.

Answer: amino, carboxyl

3. Match the amino acid with its R-group:

Amino acid	R-group
Glycine	CH <sub>3</sub>
Alanine	-H

4. True or False:

All amino acids have the same basic structure, differing only in their R- side group.

Answer: True

5. What type of reaction do amino acids undergo when they link together?

Answer: Condensation reaction

6. Why can so many different proteins be formed from only about 20 amino acids?

Answer: The different amino acids can be linked together in many different sequences and chain lengths, leading to a vast number of possible combinations.

7. Where are proteins found in living organisms? Give a few examples.

Answer: Muscles, skin, tendons, enzymes, spider webs, silk (any valid examples from the webpage)

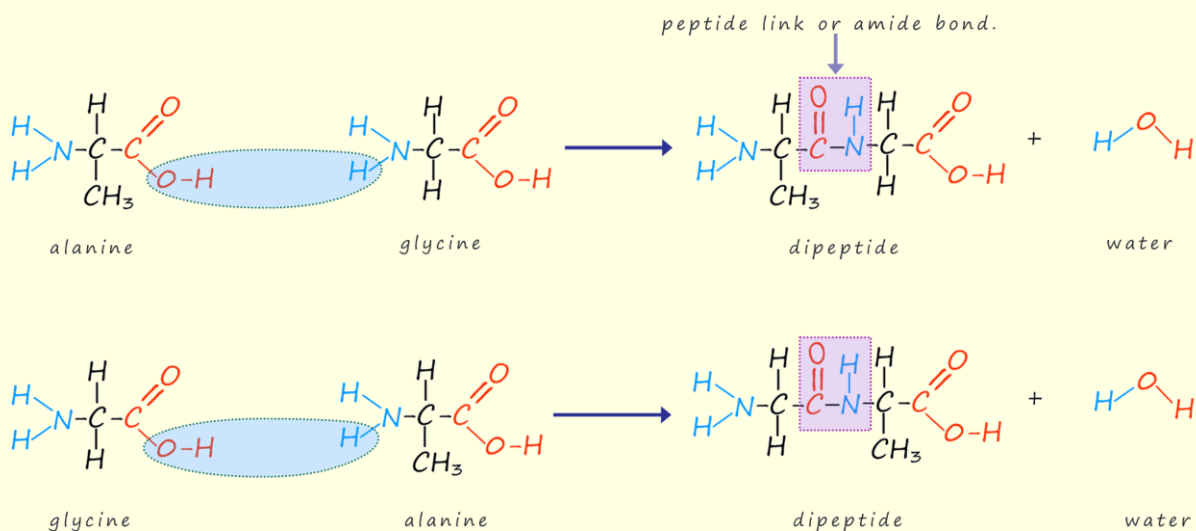
8. What is a dipeptide?

Answer: A molecule formed when two amino acids link together.

9. What is the name of the bond that forms between two amino acids?

Answer: Peptide bond (or amide link)

10. Draw a simple diagram showing the displayed formula of the two amino acids glycine and alanine reacting to form a dipeptide. Label the amino group, carboxyl group, peptide bond, and water molecule that is released.



11. How is the formation of a peptide bond similar to the formation of an ester or amide bond in other polymers?

Answer: All three involve a condensation reaction where a small molecule (often water) is eliminated, forming a link between two monomers.

13. What is the difference between a polypeptide and a protein?

Answer: Polypeptides are generally smaller chains of amino acids (up to ~50). Proteins are larger and often consist of multiple polypeptide chains folded into a specific 3D structure. The distinction isn't always strictly defined.

15. Can a single type of amino acid form a polypeptide? Explain how.

Answer: Yes. Multiple molecules of the same amino acid can link together through condensation reactions, forming a polypeptide chain where the repeating unit is that specific amino acid.