B1.2 Proteins

Checklist

What you should know

After studying this subtopic you should be able to:

- Draw a diagram of a generalised amino acid showing the alpha carbon atom with amine group, carboxyl group, R-group and hydrogen attached.
- Write the word equation for condensation reactions between amino acids to form dipeptides.
- Draw a generalised dipeptide after modelling the reaction with molecular models.
- Explain the difference between essential and non-essential amino acids.
- Recognise that there are 20 amino acids coded for in the genetic code.
- Name examples of polypeptides and know their function.
- Describe the effect of extreme pH and temperature on protein structure ('denaturation').
- Describe that the sequence of amino acids and the precise position of each amino acid within a structure determines the three-dimensional shape of proteins.

Higher level (HL)

- Explain the difference between conjugated (example: haemoglobin) and non-conjugated proteins (example: insulin).
- Explain that the secondary structure of a protein depends on hydrogen bonding in regular positions to stabilise alpha helices and beta-pleated sheets while the tertiary structure of a protein depends on hydrogen bonds, ionic bonds, disulfide covalent bonds and hydrophobic interactions.
- Describe the difference in shape between globular and fibrous proteins and understand that their shapes make them suitable for specific functions.
- Explain the form and function of insulin and collagen.
- Recall that the properties of R-groups as either hydrophobic or hydrophilic (polar or charged; acidic or basic) determine the properties of assembled polypeptides.