

AS Biology: Units 2 & 3

Revision Session 3: Proteins

OBJECTIVES

- × Reaffirm knowledge on structure of proteins
- × Have an opportunity to ask teacher any questions about things not understood

Success criterion

- × Correctly answer questions and carry out tasks relating to protein structure

STARTER

- × Enzymes speed dating – refreshing memory from last week's tasks

PHONE A FRIEND

- ✘ What do you remember about proteins?
 - + Tell us one quick fact, then nominate someone else to give us a fact
 - + Starting with.....

BIG QUESTION

- ✘ If a protein contained a wrong amino acid, what might happen?
 - + Write this down and as you go through the lesson, keep thinking about it.
 - + Come up with as many ideas (and as elaborate answers) as you can.
 - + At the end, we'll see what ideas you have. When you know the answer(s), come up with some examples.

Why are Proteins **polymers?**

**Proteins consist
of long chains of
amino acids.**

What are the monomers of
proteins?

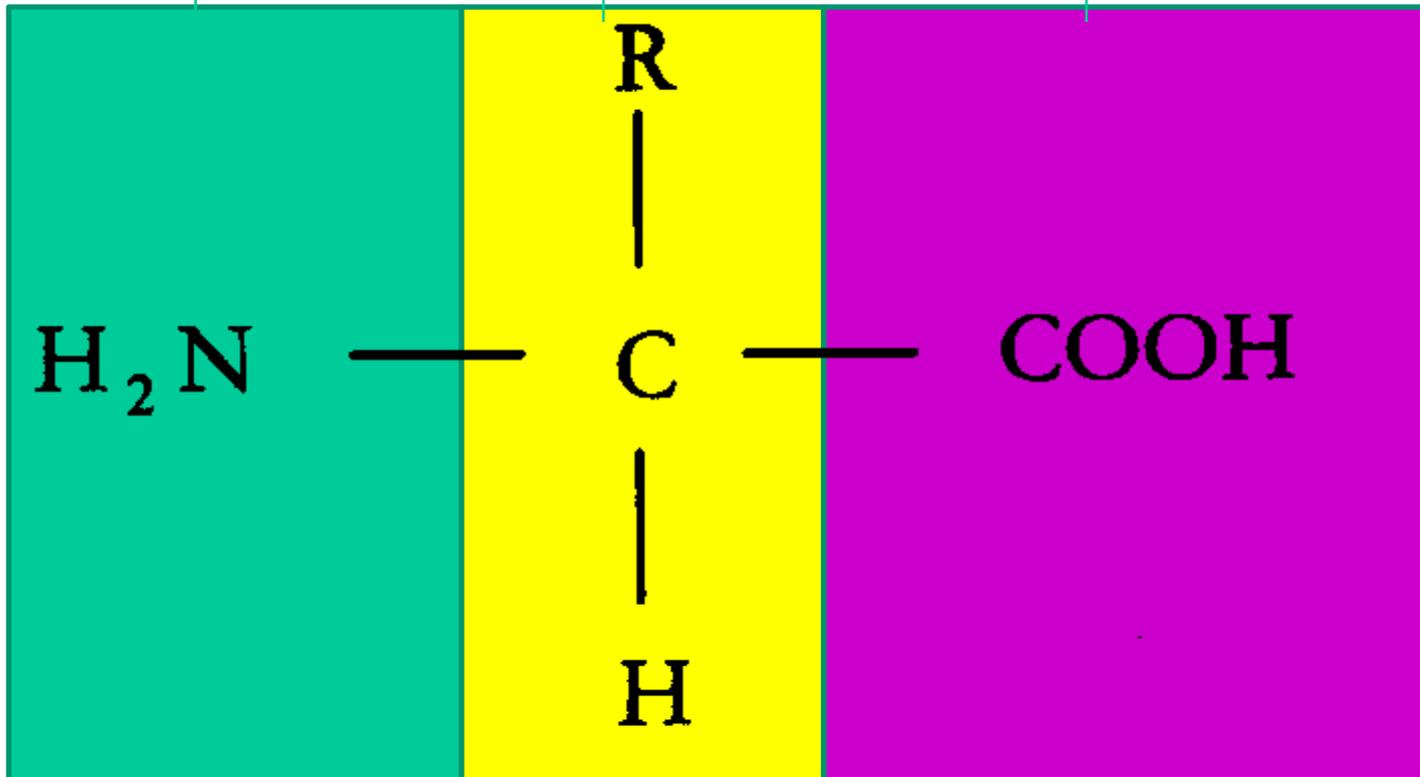
Amino acids

Structure of an amino acid

Amino group
(H₂N)

R Group = a range of
chemical groups –
different in each
amino acid

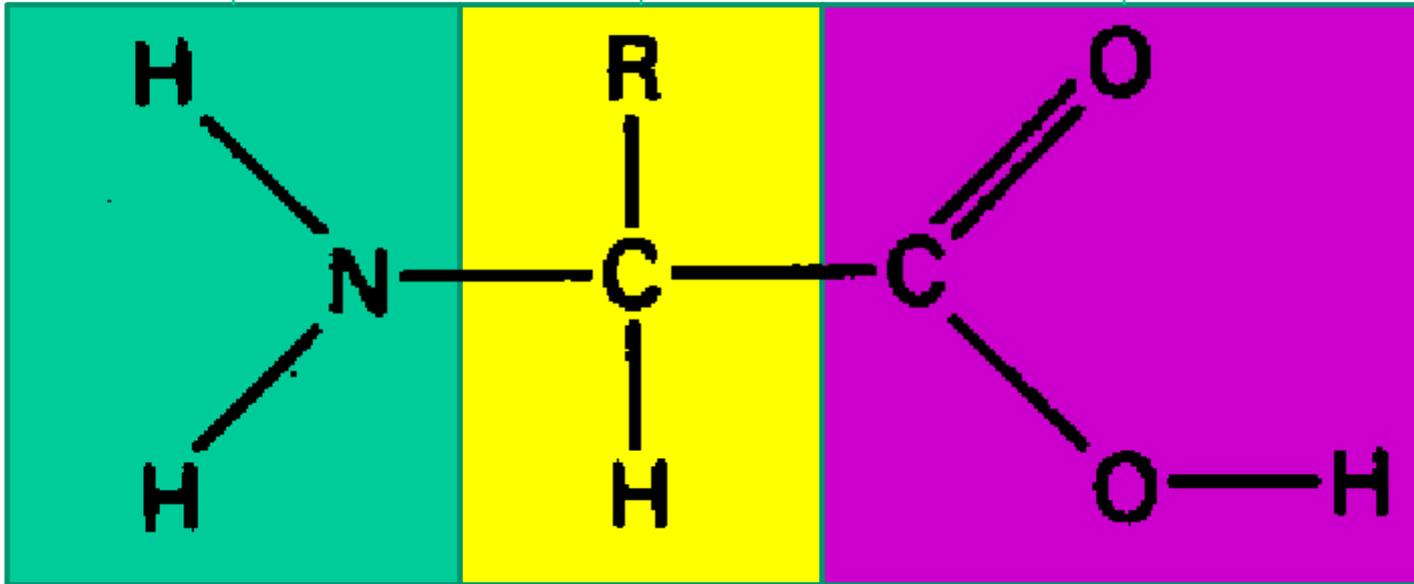
Carboxyl
group
(COOH)



Amino group
(H₂N)

R Group = a range of
chemical groups –
different in each
amino acid

Carboxyl
group
(COOH)



There are over **20** naturally occurring amino acids, which **differ** in the composition of the **R group**.

Two amino acids may be **linked** together by a **condensation reaction** to form a **‘dipeptide’**.

What is the bond called that joins the two amino acids? **Peptide bond**

If a dipeptide is two amino acids linked together, what is it called when three or more amino acids link together?

Polypeptide

Remember from last lesson...a
condensation reaction means
H₂O is released

What would be the opposite of a
condensation reaction?

Hydrolysis – H₂O would be
gained by the amino acid

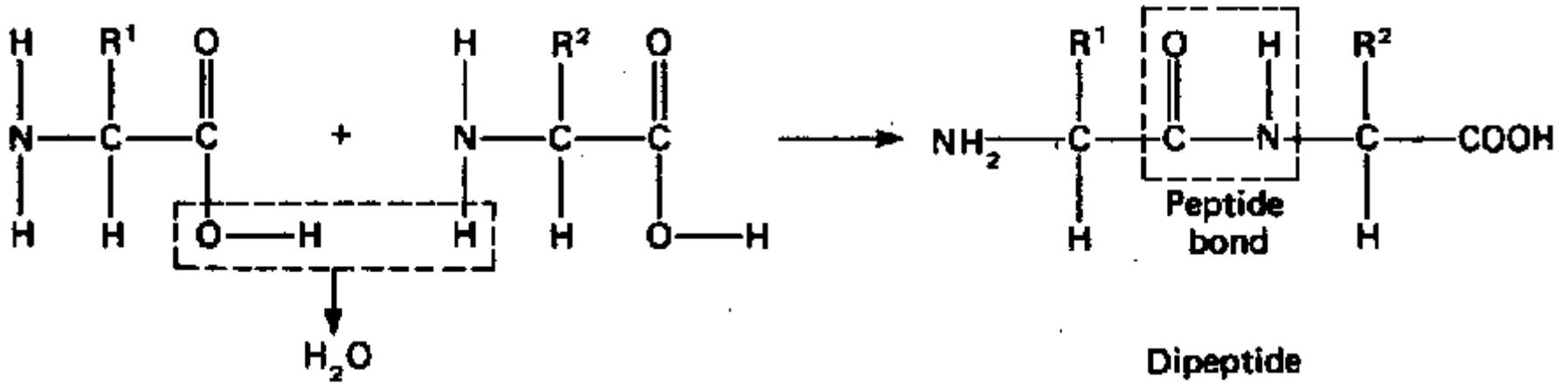


Fig. 1.5(b) Formation of a dipeptide

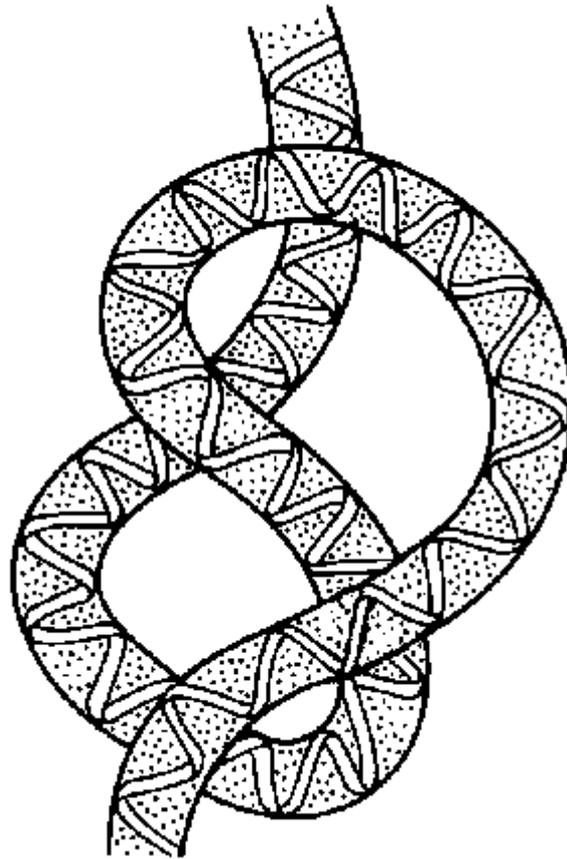
Since the amino acids may be joined in any sequence there is an almost infinite variety of possible proteins.

- The **chain of amino acids** is referred to as the protein's **primary structure**.

	Lysine	Aspartic acid	Cysteine	Alanine	Tyrosine	Lysine	Glutamic acid	Valine	Glycine	
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- The **chain is folded (often into an (alpha) α -helix)** to give the **secondary structure**.

- The secondary structure is **folded on itself** to form the **tertiary structure**.
- The shape is maintained by different bonds (e.g. Disulfide bonds)



- **The combination of a number of polypeptide chains along with associated non-protein groups results in the quaternary.**
- **The structure depends on the function**
- Different structures between globular proteins (e.g. Enzymes) and fibrous proteins (e.g. Collagen)

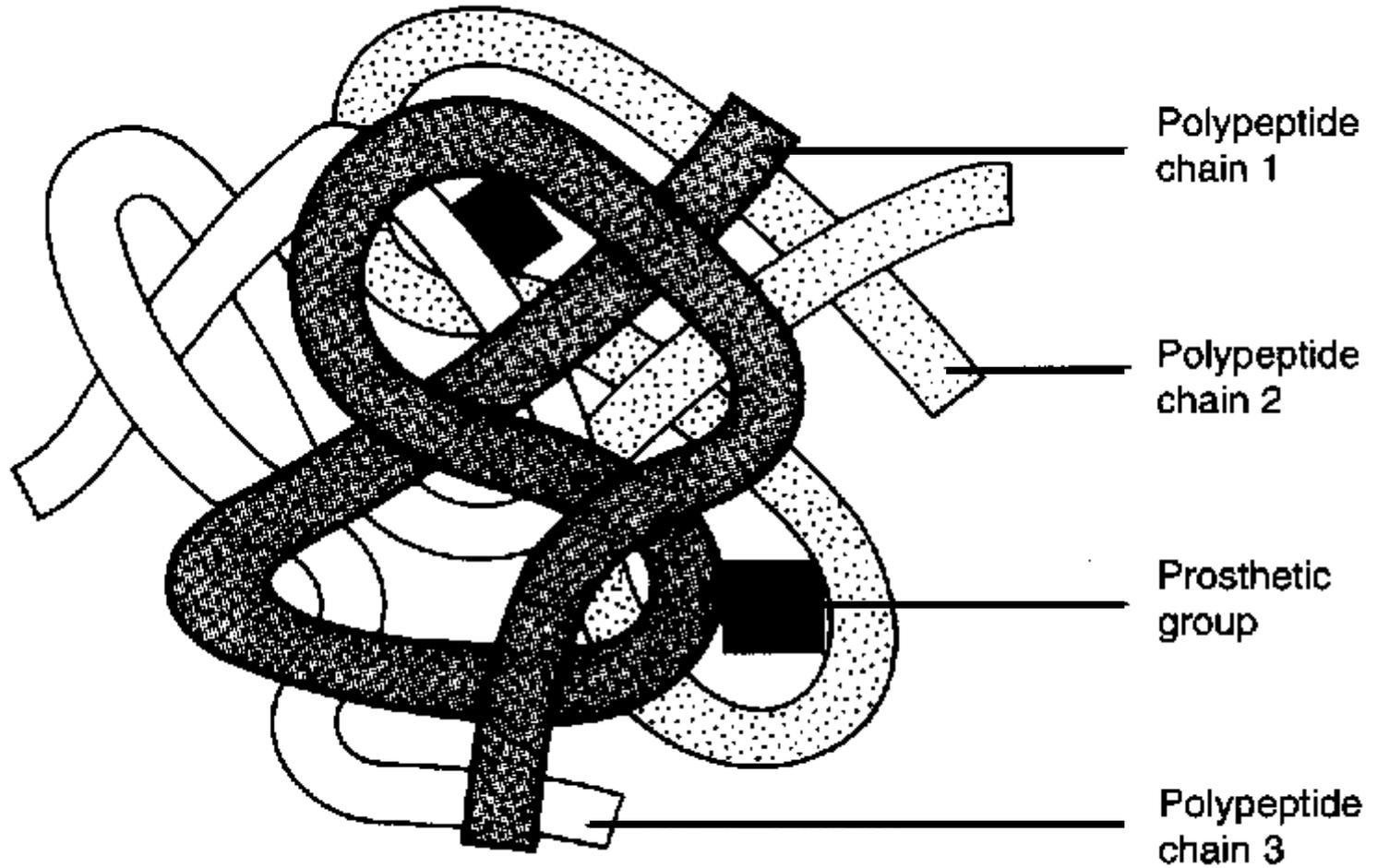
Use your knowledge of tendons and proteins to suggest what features that fibrous proteins (such as collagen which is found in tendons) might have that suit their function. What about globular proteins?

Discuss in pairs

- Polypeptide chains wound together into rope-like structure – strength & elasticity
- Resistant and stable

Globular proteins – polypeptide chains wound into a ball – influences shape of active site

Quaternary Structure Of A Protein



WORKSHEETS

- 1) Protein structure crib sheet
- 2) Exam Questions
- 3) Homework - key word/key point definitions

Use the books provided to find the answers

Shout if you need help!

DEFINITIONS FOR HOMEWORK

Protein

Amino acid

Amino acid generalised structure

Dipeptide

Polypeptide

Primary structure of proteins

Secondary structure of proteins

Tertiary structure of proteins

DEFINITIONS FOR HOMEWORK

Monomer

Polymer

Carbohydrate

Monosaccharide

Disaccharide

Polysaccharide

Condensation

Hydrolysis

Glycosidic bond

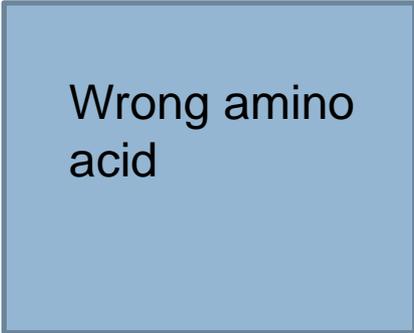
α -Glucose structure

β -Glucose structure

PLENARY – BIG QUESTION IDEAS

Mutations

Example –
sickle cell
anaemia



Wrong amino
acid

Enzymes
not
working