

Biomolecules

They are all **carbon**-based molecules which means they have 6 electrons and they can bond with 4 other elements.

There are **four large biomolecules** : Proteins, Lipids, Carbohydrates and Nucleic Acids.

Polymers

Polymers are macromolecules made of building blocks (called monomers). These are joined together by dehydration reactions but can be broken down by hydrolysis reactions which require water molecules.

Proteins

—> polymers made of 20 amino acids which we get from what we eat

—> they are structural, storage, contractile, transport (give oxygen to our cells) and enzymes.

—> every amino acids will have an alpha carbon (middle C attached to H), amino group (-NH₂) and carboxyl group (-COOH).

We can make polypeptide which means that we attach each amino acid by groups of water usually (H₂O) which we can take off by adding a covalent liaison

We can find that some groups in the amino acids will be **polar** (which means that water will be attracted to the group) and some are **non polar** which means that they water won't be attracted) etc... with time you get a protein made up of the amino acids firstly that are the same and then at the extremities the R groups (which are groups that are different between the different amino acids).

Three steps to making them :

- **Primary** : order of amino acids specified by the gene —> gives the protein's structure

- **Secondary** : Portions of protein coil and fold : two kinds of secondary structure units —> alpha helix and beta pleated sheet = hydrogen bonds occur at regular intervals between the polypeptides

- **Tertiary** : Interactions with the R groups between side chains of amino acids, some proteins are complete, other create many polypeptides subunits which creates the quaternary structure

- **Quaternary** : two proteins will come together for example haemoglobin

Lipids

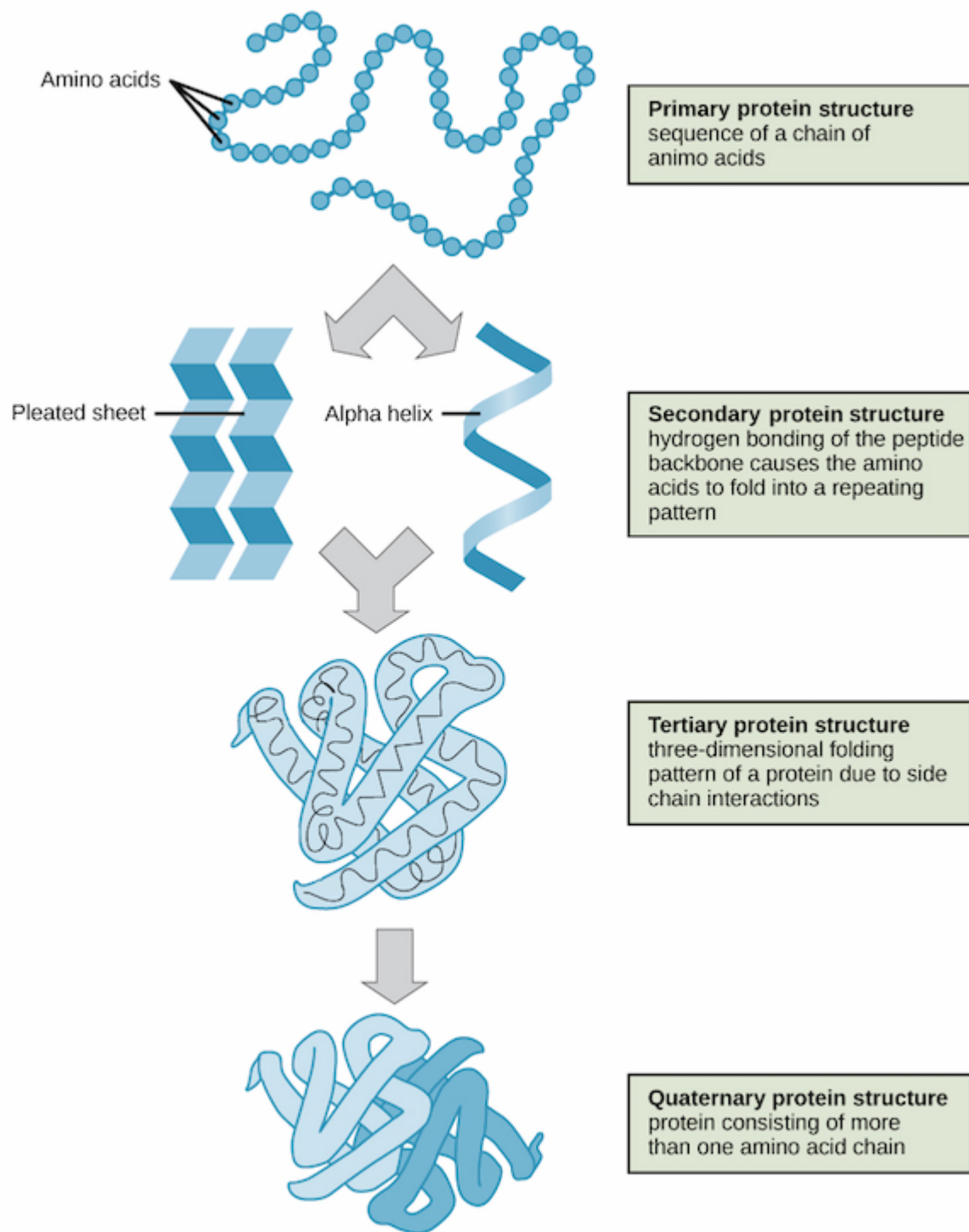
—> fat found in butter, oil = triglyceride

—> all insoluble in water : hydrophobic

—> not true polymer because they don't have repeated monomers

Fats and oils contain 2 subunits : **glycerol** (three polar -OH groups) and **fatty acids** (long chain hydrocarbons) used for long-term energy storage. Fats are able cushions to our organs because for example the fat around our kidneys are very good and the ones around our ovaries (protect organs).

We break down the fat by enzymes to get energy! But they also provide the surroundings which are the cell membranes.



Where does the energy come from ?

—> Hydrocarbons which have carbons and hydrogen = energy between the bonds of the elements which is from where we get energy

Saturated tail : hydrogen all around the triglycerides —> 3 fatty acids which are straight and can go one over another (good fats) —> maximum number of H elements

Unsaturated tail : double bonds which make