

TB9 – Monomers and Polymers

One of the most interesting parts of biochemistry, is that the whole variety of life as we know it, is made from the same **fundamental building blocks**. From blue whales to mammoths, humans to worms, they all use the same biochemical principles, and building blocks. They all use **DNA** and **RNA** to code for genetic information. Organisms also contain **proteins**, to give them structure, such as the protein keratin in hair, and to act as **hormones** like insulin, and **enzymes** like amylase.

MONOMERS AND POLYMERS

Monomers are the fundamental units which make up larger molecules. Larger molecules made from many monomers joined together are called **polymers**.

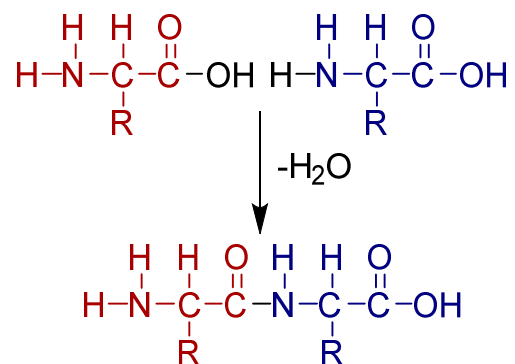


Many biochemical structures exist as large polymers, made from monomer units. **Amino acids** are monomers which make **polypeptide** polymers, such as **proteins**. DNA and RNA are examples of **nucleic acids**, these are polymers made from **nucleotide** monomers.

Monomer	Polymer
Monosaccharides	Polysaccharides (Starch and cellulose)
Amino acids	Polypeptides
Nucleotides	Nucleic acids (DNA and RNA)
Ethene	Polyethene

FORMING POLYMERS

Polymers are formed when the monomer subunits react and bind together. This process is repeated many times to give large, polymeric chains. One very important reaction in polymerisation is called a **condensation reaction**. In a condensation, two molecules join together, and a molecule of water is eliminated. Such as the example below, in which two amino acids have condensed together to form a dipeptide. If this process was repeated by adding more amino acids, and removing water, then a polypeptide could form.



It is possible for the reverse reaction to occur as well, adding water to break down a larger molecule. This reaction is called a **hydrolysis reaction** (*hydro-* water, *lysis-* splitting), and can split certain chemical bonds apart.