

Carbohydrates and lipids

What is a covalent bond?

Carbohydrates and lipids

Why can carbon form such diverse compounds?

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Give the SI prefixes milli, micro and nano as powers of ten.

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What is a condensation reaction?

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What happens to water in hydrolysis?

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Name the bond formed in polysaccharides, polypeptides and nucleic acids.

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Pentose or hexose: how do you tell from a ring diagram?

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Alpha-glucose versus beta-glucose

It forms up to four covalent bonds, single or double, with other carbons and non-metals, building chains, branches and rings.

A bond in which two atoms share a pair of electrons.

A reaction that links two monomers by a covalent bond, releasing a water molecule.

milli = 10^{-3} , micro = 10^{-6} , nano = 10^{-9} .

Glycosidic, peptide and phosphodiester bonds respectively.

A water molecule is split; its -H and -OH are added to the monomers as the bond breaks.

The -OH on carbon 1 is below the ring in alpha and above the ring in beta.

Count all carbon atoms, including those outside the ring: five = pentose (ribose), six = hexose (glucose).

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Four properties of glucose that suit its use

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Why are starch and glycogen compact?

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Why is glycogen's branching useful?

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How does cellulose's structure give strength?

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What is a glycoprotein?

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How do the A, B and O antigens differ?

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Define lipids.

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What is a triglyceride made from?

Coiling and branching during polymerisation pack many alpha-glucose units into a small space.

Soluble, easily transported, chemically stable, and yields energy when oxidised in respiration.

Beta-glucose in alternating orientation gives straight chains, bundled and cross-linked by hydrogen bonds into microfibrils.

Many chain ends, so glucose can be added or removed quickly by condensation or hydrolysis.

All share the same basic carbohydrate chain. The A and B antigens each add a different extra sugar to it; group O has neither.

A protein with carbohydrate chains attached, facing out from the plasma membrane; used in cell-cell recognition.

One glycerol and three fatty acids, joined by condensation (ester bonds), releasing three water molecules.

Substances in living organisms that dissolve in non-polar solvents but are only sparingly soluble in aqueous solvents.

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What is a phospholipid made from?

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**Saturated, monounsaturated,
polyunsaturated**

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**Why do unsaturated fatty acids have
lower melting points?**

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**Why are triglycerides good long-term
energy stores?**

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**How does adipose tissue help
endotherms in cold habitats?**

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Why do phospholipids form bilayers?

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**How do you identify a steroid from a
diagram?**

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**Why can oestradiol and testosterone
enter cells directly?**

No C=C double bonds; one C=C; two or more C=C.

One glycerol linked to two fatty acids and one phosphate group.

About twice the energy per gram of carbohydrate, insoluble, stored without water and chemically stable.

C=C double bonds bend the chain, so chains pack less closely and less energy is needed to melt them.

They are amphipathic: hydrophilic heads face water on both sides, hydrophobic tails face inwards.

Fat conducts heat poorly, so a thick layer (e.g. blubber in seals) insulates and reduces heat loss.

They are non-polar steroids, so they diffuse through the hydrophobic core of the phospholipid bilayer.

Four fused carbon rings: three with six carbons and one with five.