

Water, carbohydrates and lipids

What is a dipole?

Water, carbohydrates and lipids

Why do ions dissolve in water?

Water, carbohydrates and lipids

Name two substances transported dissolved in xylem or phloem sap.

Water, carbohydrates and lipids

Name the three monosaccharides and three disaccharides you need to know.

Water, carbohydrates and lipids

Which bonds join glucose units in amylose?

Water, carbohydrates and lipids

What bonds are in amylopectin and glycogen?

Water, carbohydrates and lipids

Why is glycogen suited to being an energy store?

Water, carbohydrates and lipids

Where is glycogen stored?

Charged ends of water molecules are attracted to the ions and surround them, keeping them dispersed.

A molecule with a slightly positive end and a slightly negative end, because its electrons are shared unevenly.

Glucose, fructose, galactose. Maltose, sucrose, lactose.

Xylem: mineral ions. Phloem: sucrose (also amino acids).

α -1,4 glycosidic bonds in the chain and α -1,6 glycosidic bonds at the branch points.

α -1,4 glycosidic bonds only, giving an unbranched chain that coils into a helix.

In liver and muscle cells (animals).

Insoluble, compact, and highly branched so many free ends allow rapid hydrolysis to glucose.

Water, carbohydrates and lipids

What is a condensation reaction?

Water, carbohydrates and lipids

What is hydrolysis?

Water, carbohydrates and lipids

Maltose, sucrose and lactose: what is each made from?

Water, carbohydrates and lipids

What colour changes does the Benedict's test show as reducing sugar concentration rises?

Water, carbohydrates and lipids

What does iodine solution show for starch?

Water, carbohydrates and lipids

What does semi-quantitative mean in Core practical 1?

Water, carbohydrates and lipids

What does a triglyceride consist of?

Water, carbohydrates and lipids

How many water molecules are released when a triglyceride forms?

A reaction in which a molecule of water is used to break a bond, for example a glycosidic bond.

A reaction joining two molecules by forming a bond and releasing a molecule of water.

Blue → green → yellow → orange → brick-red (heated in a water bath).

Maltose: glucose + glucose. Sucrose: glucose + fructose. Lactose: glucose + galactose.

Concentration is estimated by matching colour to standards of known concentration, not measured exactly.

Yellow-brown to blue-black, darker as starch concentration increases.

Three, one per ester bond (condensation).

One glycerol molecule joined to three fatty acids by three ester bonds.

Water, carbohydrates and lipids

What is a saturated lipid?

Water, carbohydrates and lipids

Why are unsaturated lipids often liquid at room temperature?

The heart, blood vessels and haemoglobin

Why can large animals not rely on diffusion alone?

The heart, blood vessels and haemoglobin

What is mass transport?

The heart, blood vessels and haemoglobin

What is a double circulation?

The heart, blood vessels and haemoglobin

Why do arteries have elastic fibres?

The heart, blood vessels and haemoglobin

Why do veins have valves?

The heart, blood vessels and haemoglobin

How are capillaries adapted for exchange?

C=C double bonds kink the chains, so they pack less closely and have a lower melting point.

One whose fatty acids have no C=C double bonds in the hydrocarbon chain.

Movement of fluid (blood) in bulk through vessels over long distances by pressure from a pump.

Small surface area to volume ratio, long diffusion distances and a high metabolic rate.

To stretch and recoil, evening out the pressure surge from the heart so blood flow is smooth.

Blood passes through the heart twice per circuit: right side to the lungs, left side to the body.

Wall one cell thick (short diffusion distance), narrow lumen, large total cross-sectional area (slow flow).

To prevent backflow of blood, since blood pressure in veins is low.

The heart, blood vessels and haemoglobin

Name the four valves of the heart.

The heart, blood vessels and haemoglobin

Why is the left ventricle wall the thickest?

The heart, blood vessels and haemoglobin

What do the tendinous cords do?

The heart, blood vessels and haemoglobin

Give the three stages of the cardiac cycle.

The heart, blood vessels and haemoglobin

When do the semilunar valves open?

The heart, blood vessels and haemoglobin

How do you calculate the length of the cardiac cycle?

The heart, blood vessels and haemoglobin

Describe the structure of haemoglobin.

The heart, blood vessels and haemoglobin

In what main form is CO₂ carried in the blood?

It pumps blood to the whole body at high pressure.

Tricuspid and bicuspid (atrioventricular), and the aortic and pulmonary (semilunar) valves.

Atrial systole, ventricular systole, cardiac diastole.

They hold the atrioventricular valves in position so they are not forced back into the atria.

$60 \div \text{heart rate (beats per minute)}$ gives the time in seconds.

When ventricular pressure exceeds pressure in the aorta or pulmonary artery, during ventricular systole.

As hydrogencarbonate ions (HCO_3^-) in the plasma, formed using carbonic anhydrase.

A protein of four polypeptide chains, each with a haem group containing Fe^{2+} that binds one O_2 .

The heart, blood vessels and haemoglobin

How does haemoglobin act as a buffer?

The heart, blood vessels and haemoglobin

What is the Bohr effect?

The heart, blood vessels and haemoglobin

Why is the oxygen dissociation curve S-shaped?

The heart, blood vessels and haemoglobin

How does fetal haemoglobin differ in affinity from adult?

Cardiovascular disease and its causes

Give the four events leading to atherosclerosis.

Cardiovascular disease and its causes

What is a foam cell?

Cardiovascular disease and its causes

Why does atherosclerosis raise blood pressure?

Cardiovascular disease and its causes

What does thromboplastin do?

Higher CO_2 (lower pH) shifts the curve to the right: lower affinity, so more oxygen is unloaded.

It binds H^+ ions released when carbonic acid dissociates, preventing a large fall in pH.

Higher affinity for oxygen: curve to the left, so it loads oxygen at the low pO_2 of the placenta.

Cooperative binding: once one O_2 binds, the shape changes so the next binds more easily; flattens when nearly full.

A macrophage that has taken up large amounts of LDL cholesterol in the artery wall; part of the atheroma.

Endothelial dysfunction, inflammatory response, plaque formation, raised blood pressure.

Released by platelets/damaged tissue; catalyses the conversion of prothrombin to thrombin.

The plaque narrows the lumen and the artery wall loses elasticity.

Cardiovascular disease and its causes

What does thrombin do?

Cardiovascular disease and its causes

How can a blood clot cause a heart attack?

Cardiovascular disease and its causes

List the risk factors for CVD in the specification.

Cardiovascular disease and its causes

Give three ways smoking increases CVD risk.

Cardiovascular disease and its causes

What is a risk factor?

Cardiovascular disease and its causes

What is a free radical?

Cardiovascular disease and its causes

How do antioxidants work?

Cardiovascular disease and its causes

What does vitamin C do to DCPIP?

A thrombus blocks a narrowed coronary artery, cutting oxygen to cardiac muscle, which dies.

An enzyme that converts soluble fibrinogen to insoluble fibrin.

Carbon monoxide reduces oxygen transport; nicotine raises heart rate and blood pressure; chemicals damage the endothelium.

Genetics, diet, age, gender, high blood pressure, smoking and inactivity.

A highly reactive molecule that damages cells and oxidises LDL cholesterol.

Something linked to an increased probability of developing a disease, not a guarantee of it.

Reduces it, turning it from blue to colourless.

They neutralise free radicals, reducing LDL oxidation and endothelial damage.

Cardiovascular disease and its causes

In Core practical 2, what does a smaller volume of juice needed mean?

Cardiovascular disease and its causes

Why must vitamin C solutions be fresh?

Health risks, evidence and treatment

How do you calculate a mortality rate?

Health risks, evidence and treatment

Why does a correlation not prove causation?

Health risks, evidence and treatment

What is the difference between incidence and prevalence?

Health risks, evidence and treatment

What makes a study valid?

Health risks, evidence and treatment

Why is a large sample better?

Health risks, evidence and treatment

Why is self-reported diet data a weakness?

Vitamin C is destroyed by heat, light and oxidation.

A higher concentration of vitamin C in the juice.

A confounding variable could cause both, or the link could be due to chance.

$(\text{Number of deaths} \div \text{population}) \times 100\,000$, giving deaths per 100 000 people per year.

It measures what it claims to measure, with other variables controlled.

Incidence: new cases in a time period.
Prevalence: all current cases at one time.

It relies on memory and honesty, so it may be inaccurate.

It reduces the effect of chance and anomalies, so results are more reliable.

Health risks, evidence and treatment

Which risks do people tend to underestimate?

Health risks, evidence and treatment

Give two reasons perceived risk differs from actual risk.

Health risks, evidence and treatment

What does LDL do?

Health risks, evidence and treatment

What does HDL do?

Health risks, evidence and treatment

Give two types of evidence that LDL causes CVD.

Health risks, evidence and treatment

Why does evidence on cholesterol sometimes conflict?

Health risks, evidence and treatment

How do you calculate BMI?

Health risks, evidence and treatment

What does a high waist-to-hip ratio indicate?

Media coverage and personal experience
(or enjoyment of the behaviour, delay
before harm).

Familiar, voluntary, slow-acting lifestyle
risks such as diet, inactivity and smoking.

Carries cholesterol from tissues back to the
liver; high HDL is protective.

Carries cholesterol from the liver to tissues;
high LDL raises CVD risk.

CVD has many risk factors, so some people
with high cholesterol are unaffected and
vice versa.

Population studies and genetic conditions
with high LDL; plus mechanism and statin
trials.

More abdominal fat, linked to higher CVD
risk.

Mass in kg $\div$ height in m squared.

Health risks, evidence and treatment

What is a limitation of BMI?

Health risks, evidence and treatment

What do antihypertensives do?

Health risks, evidence and treatment

How do statins work?

Health risks, evidence and treatment

**What is the main risk of anticoagulants
and platelet inhibitors?**

Health risks, evidence and treatment

**How do platelet inhibitors differ from
anticoagulants?**

Lower blood pressure, reducing damage to the endothelium and strain on the heart.

It does not distinguish muscle from fat.

Bleeding and bruising (and stomach irritation with aspirin).

They reduce cholesterol production in the liver, lowering blood LDL.

Platelet inhibitors stop platelets sticking together; anticoagulants interfere with the clotting cascade.