Topic 8: Exchange and Transport in Animals

Edexcel · GCSE Biology · Revision Notes

Specification reference: 8.1–8.10

Note: Sections marked ★ HIGHER TIER ONLY are for Higher tier students only. Foundation tier students should focus on the unmarked sections.

8.1–8.3 The Heart and Blood Vessels

The heart is a double pump that circulates blood around a double circulatory system.

- Right side: pumps deoxygenated blood to lungs (pulmonary circulation).
- Left side: pumps oxygenated blood to body (systemic circulation).
- Heart has four chambers: right atrium, right ventricle, left atrium, left ventricle.
- Valves (atrioventricular and semilunar) prevent backflow.
- **Arteries**: thick elastic walls, carry blood at high pressure away from heart.
- **Veins**: thinner walls, valves, low pressure, carry blood to heart.
- **Capillaries**: one cell thick; exchange of nutrients, gases and waste with tissues.
- **Coronary heart disease**: cholesterol plaques narrow coronary arteries. Risk factors: smoking, diet, inactivity. Treatments: statins, angioplasty, bypass surgery.

Key Terms

Double circulation: Two separate circuits: one to the lungs, one to the body

Systole: Contraction of the heart muscle

Diastole: Relaxation of the heart muscle

8.4–8.5 Blood and the Lungs

- **Red blood cells**: no nucleus, biconcave, packed with haemoglobin to carry oxygen.
- **White blood cells**: phagocytes (engulf pathogens) and lymphocytes (produce antibodies).
- **Plasma**: transports CO2, urea, hormones, digested nutrients.
- **Platelets**: cell fragments; involved in blood clotting.

Gas exchange in lungs: O2 diffuses from alveoli into capillaries; CO2 diffuses from capillaries into alveoli. Alveoli have: large surface area, thin walls, good blood supply, moist lining.

Required Practical 7: Investigate the effect of exercise on breathing rate and heart rate.

8.6–8.10 Digestion and Absorption

Digestion breaks large insoluble molecules into small soluble ones.

- **Mechanical digestion**: teeth and stomach churning break food into smaller pieces.
- **Chemical digestion**: enzymes break down molecules.
- Amylase (mouth, pancreas) → starch into sugars.

- Protease (stomach, pancreas) → proteins into amino acids.
- Lipase (pancreas) → fats into fatty acids and glycerol.
- Bile (from liver) → emulsifies fats into small droplets, increasing surface area for lipase.

Villi in the small intestine: highly folded with microvilli; greatly increase surface area for absorption. Have good blood supply and thin walls.

Exam Tip: Villi have a large surface area and thin walls — these two features are essential for efficient absorption. Always mention both!