# Cells and their structures

**1. Name the structure that controls exchange with a typical animal cell and state its role.**

The cell membrane regulates which substances enter and leave.

**2. Name the structure that is the main site of protein synthesis in cells. Explain what it does.**

Ribosomes join amino acids to make proteins.

**3. Name two structures common in typical photosynthetic plant cells that animal cells lack.**

A cellulose cell wall and chloroplasts.

**4. Explain how the nucleus and ribosomes contribute to making cell proteins.**

The nucleus contains genetic instructions. Ribosomes use copied instructions to assemble amino acids into proteins.

**5. Explain why skeletal muscle cells may contain many mitochondria.**

Aerobic respiration transfers energy to ATP in mitochondria. Muscle contraction has a high ATP demand.

# Worked solutions · Questions 6–10

**6. A cell appears 18 mm long in an image taken at ×300. Calculate its actual length in µm.**

Actual length = 18 ÷ 300 = 0.06 mm = 60 µm.

**7. Why do root hair cells generally lack chloroplasts? Give a reason tied to their surroundings.**

Roots generally grow underground where light does not reach them. Root hair cells are specialised for uptake rather than photosynthesis.

**8. A student identifies a green object as a chloroplast solely from its colour. Suggest one further piece of evidence and explain why.**

Look for it within a photosynthetic plant cell and check its size or structure against a reference. Colour alone does not uniquely identify an object.

**9. Image A shows a 20 µm cell at ×500. Image B shows a 50 µm cell at ×160. Which image is longer? Show your calculations.**

A: 20 × 500 = 10,000 µm or 10 mm. B: 50 × 160 = 8,000 µm or 8 mm. A is longer.

**10. Predict what happens to a typical plant cell placed in dilute water. Explain how the wall affects the outcome.**

Water can enter by osmosis. The vacuole expands and the cell becomes turgid as the wall resists further expansion.