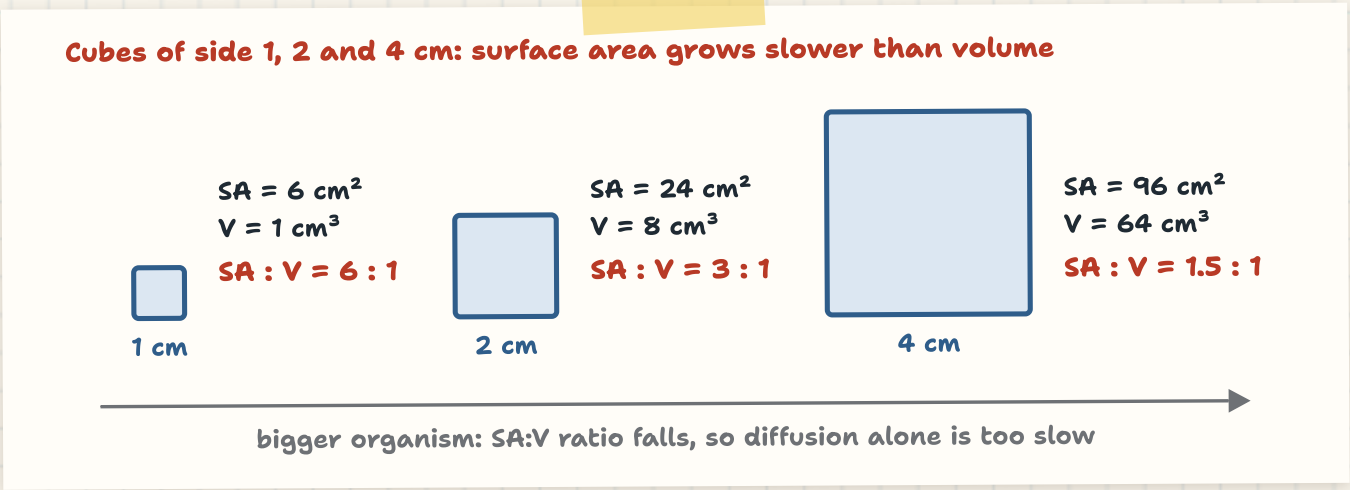
Surface Area to Volume Ratio Explained

As an organism gets bigger its volume rises faster than its surface area, so the surface area to volume ratio falls.



Key terms

surface area to volume ratio	surface area divided by volume, always with surface area first.
surface area of a cube	6 × (side × side), because a cube has six faces.
volume of a cube	side × side × side.
diffusion	net movement of particles from a region of higher to lower concentration.
exchange surface	a surface that substances cross; it needs a large surface area compared with the volume it serves.
diffusion distance	how far substances must travel; it is longer in a larger organism.

I can...

- [ ] Relationship between size of an organism or structure and surface area to volume ratio

EXAM TRAP

It is the ratio that falls as size increases, not the surface area. A bigger organism has a larger surface area but a much larger volume, so write the ratio with surface area first (24 : 8 = 3 : 1, not 1 : 3).

4 marks: what earns them

1. Surface area = 24 cm squared and volume = 8 cm cubed (both required)
   Not: surface area of one face only (4); volume given as 6
2. Surface area to volume ratio = 3 : 1
   Not: 1 : 3 or 8 / 24 (wrong way round)
3. As size increases, volume increases faster than surface area, so the surface area to volume ratio decreases
   Not: larger organisms have a larger surface area so a larger ratio; surface area decreases
4. Surface area is too small for the volume of cells / diffusion distance is long, so diffusion is too slow to supply the needs of all the cells
   Not: it cannot diffuse, with no reference to surface area, volume or distance

Remember

Area over volume, area first.

Volume grows faster than area.

Big means a smaller ratio, so diffusion is too slow.

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