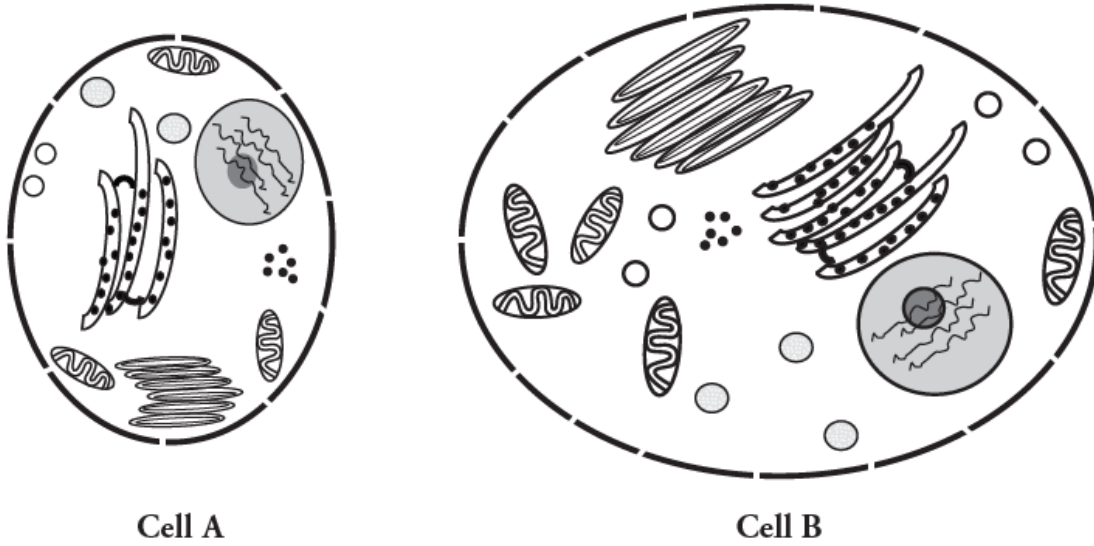


What determines the size of a cell?

Does having big cells make an organism bigger or better?

Would having larger cells be an advantage to an organism? If so, why do cells divide rather than continue growing?

**These are the questions answered in this Lab**



- 1.) Which cell has a larger surface area (more cell membrane surface)? \_\_\_\_\_ (1 Mark)
- 2.) If the cells were 3D, which cell has a larger volume? \_\_\_\_\_ (1 Mark)
- 3.) Which cell has a larger diameter? \_\_\_\_\_ (1 Mark)
- 4.) If cell A has a surface area of 100 and a volume of 10 what would be the surface area to volume ratio? \_\_\_\_\_ (1 Mark)
- 5.) If cell B has a surface area of 150 and a volume of 30 what would be the surface area to volume ratio? \_\_\_\_\_ (1 Mark)
- 6.) Which cell has the larger surface area to volume ratio? \_\_\_\_\_ (1 Mark)
- 7.) Imagine a glucose molecule entering the cell membrane. Would that molecule be able to reach the **mitochondria** faster if the cell had a smaller volume or a larger volume? Explain. (1 Marks)

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- 8.) As the mitochondria metabolize the glucose, they produce carbon dioxide waste. Would the CO<sub>2</sub> molecules be able to leave the cell faster if the cell had a smaller volume or larger volume? Explain. (1 Marks)

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- 9.) Consider your answers to the previous questions. Is bigger always better for a cell? Explain. (1 marks)

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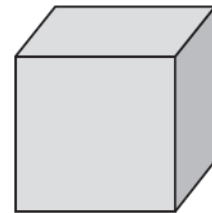
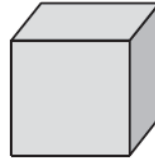


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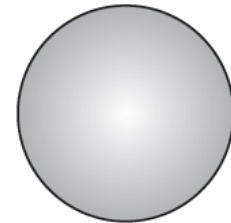
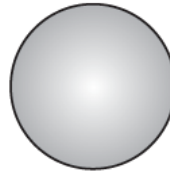
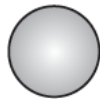


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9.) Complete the tables below finding the missing surface area to volume ratio (all ratios should have x:1 as answers.) **To do this divide the surface area by the volume.** (5 Marks)



<b>Side</b>	1 cm	2 cm	4 cm
<b>Surface area</b>	6 cm <sup>2</sup>	24 cm <sup>2</sup>	96 cm <sup>2</sup>
<b>Volume</b>	1 cm <sup>3</sup>	8 cm <sup>3</sup>	64 cm <sup>3</sup>
<b>Surface Area-to-Volume Ratio</b>			96:64 = 1.5:1



<b>Diameter</b>	1 cm	2 cm	4 cm
<b>Surface area</b>	3 cm <sup>2</sup>	13 cm <sup>2</sup>	50 cm <sup>2</sup>
<b>Volume</b>	0.5 cm <sup>3</sup>	4.2 cm <sup>3</sup>	34 cm <sup>3</sup>
<b>Surface Area-to-Volume Ratio</b>			

10.) Did the ratio of surface area to volume ratio decrease or increase as the cell grew in size? \_\_\_\_\_ (1 Mark)

11.) If the Surface area to volume ratio of a cell **decreases** as it gets bigger this means the cell becomes \_\_\_\_\_ (more/less) efficient. (1 Mark)

12.) Considering your answer to Question 11, is it more desirable for a cell to have a **small surface area-to-volume ratio** or a **large surface area-to-volume** ratio? Explain your answer in terms of the functions of a cell. (2 Marks)

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13.) Which cell is more efficient, a cell with a diameter of 1 um or a cell with a diameter of 0.5 um? Why? (2 Marks)

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