Name _____ Date _____ Class _____

MiniLab

CHAPTER 9

Investigate Cell Size

Could a cell grow large enough to engulf your school? What would happen if the size of an elephant were doubled? At the organism level, an elephant cannot grow significantly larger, because its legs would not support the increase in mass. Do the same principles and limitations apply at the cellular level? Do the math! Need a calculator!

Procedure

1. Read and complete the lab safety form.
2. Prepare a data table for surface area and volume data calculated for five hypothetical cells. Assume the cell is a cube. (Dimensions given are for one face of a cube.)

Side length (S)

- Cell 1: 0.00002 m (the average diameter of most eukaryotic cells)
- Cell 2: 0.001 m (the diameter of a squid's giant nerve cell)
- Cell 3: 2.5 cm
- Cell 4: 30 cm
- Cell 5: 15 m

3. Calculate the surface area for each cell using this formula: length × width × number of sides (6).
4. Calculate the volume for each cell using this formula: length × width × height.

$SA = 6s^2$

$V = s^3$

Data and Observations

Surface Area $= 6s^2$ Volume $= s^3$ $\frac{SA}{V}$ ratio

Cell #	Side length (S)			
1	m	m^2	m^3	
2	m	m^2	m^3	
3	cm	cm^2	cm^3	
4	cm	cm^2	cm^3	
5	m	m^2	m^3	

Analysis

1. **Cause and Effect** Based on your calculations, confirm why cells do not become very large.

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2. **Infer** Are large organisms, such as redwood trees and elephants, large because they contain extra-large cells or just more standard-sized cells? Explain.

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