Study Guide

Chapter 4: la tournée des cellules

Campbell Biology in Focus 4.2-4.7

This is a dense chapter (refer to pages 91-92 for core content for each section).

**Chapter Main Ideas:**

1. Various types of cells have unique components, but are all influenced by their surface area and volume.
2. Eukaryotic cells’ nuclei and endomembrane systems code for, produce, and modify cellular products.
3. Specialized membrane-bound organelles provide metabolic potential and specialization.
4. Cells cytoskeletons and extracellular connections enhance a cell’s responsiveness and connectivity.

Chapter 4.2: *Types of Cells and Unique Features.*

* **Figure 4.4**: Prokaryotic Cell, Plasma Membrane, Cytoplasm, Nucleoid, Cell Wall
* **Figure 4.5:** Hydrophobic and Hydrophilic regions
* **Figure 4.6:** Refer to the Surface Area-Volume ratio as cell volume increases.

Conceptual Understanding #1: *I can explain and evaluate the importance of surface area and volume for cells and plasma membranes.*

Chapter 4.3: *Eukaryotic Nucleus*

* **Figure 4.8:** Nucleus, nuclear envelope, nuclear pore, chromoatin (protein and DNA complex), nucleolus
* **Figure 4.9:** Ribosome’s, big and small subunit

Conceptual Understanding #2: *I can explain the importance of the nucleus (and parts) in organizing and condensing genetic information*.

Chapter 4.4: *Endomembrane System/Protein Production*

* **Figure 4.10**: Endoplasmic reticulum, smooth and rough ER (broad functions for each).
* **Figure 4**.**11**: Golgi apparatus, transport vesicle, *cis🡪 trans* side, overall function of apparatus.
* **Figure 4.13**: Lysosomes, autotrophy
* **Figure 4.15**: Summarize the roles of endoplasmic reticulum, golgi apparatus, vesicles, ribosome.

Conceptual Understanding #3: I can explain the general production and modification of cellular products in the endomembrane system.

Chapter 4.5: *Membrane-Bound Organelles*

* **Figure 4.16:** Theory for endosymbiosis, evidence for it.
* **Figure 4.17**: Mitochondria, inner and outer membrane, intermembrane space, density in cells
* **Figure 4**.**18**: Chloroplast, thylakoid, granum, stroma

Conceptual Understanding #4: I can provide evidence to support endosymbiosis, which explains how membrane-bound organelles enhanced eukaryotic cellular capacities.

Chapter 4.6: *Cellular Skeleton*

* **Figure 4.21 A**: motor protein (**dyneins**), microtubule
* **Table 4**.**1:**
  + Microtubules: structure, 1 cellular role/function
  + Microfilaments: structure, 1 cellular role/function
  + Intermediate filaments: structure, 1 cellular role/function

Conceptual Understanding #5: I can explain how various component of the cytoskeleton enable cells to be mobile, dynamic organisms.

Chapter 4.7: *Extracellular Connection*

* **Figure 4.25:** Plant Cell Wall, Plasmodesmata
* **Figure 4.26**: Extracellular matrix, inegrins and collagen, (role for connectivity)
* **Figure 4**.**27**: Tight junctions and desmosomes, gap junctions

Conceptual Understanding #6: I can provide examples of how various molecular units enhance multicellular organisms’ connectivity.