

CHAPTER 3 STRUCTURE AND FUNCTION OF THE CELL

CHAPTER OVERVIEW: This chapter introduces the parts of the eukaryotic cell which will be developed in future chapters to explain the functions performed by particular tissues and organs. The phenomena associated with diffusion and osmosis across a semi-permeable membrane are explained. The processes of protein synthesis and cell division, both mitotic and meiotic (including cytokinesis), are described in some detail.

OUTLINE

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1	I. How We Learn About Cells, p. 58	
	II. Plasma Membrane, p.58	Fig. 3.1, p.58
	A. Physical Barrier Marking Limit of Cell	
	B. Chemical Composition of Plasma Membrane	
	1. Lipid Bilayer	Fig. 3.2, p.60
	a. Phospholipids	
	b. Cholesterol	
	2. Proteins	Fig. 3.3, p. 61
	a. Integral or Intrinsic v. Peripheral or Extrinsic Proteins	Fig. 3.4, p. 62
	b. Channel Proteins	Fig. 3.5a, p. 63
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	2). Voltage-gated	
	c. Receptor Molecules	Fig. 3.5b, p. 63
	d. G-Proteins; Intracellular Messages	
	3. Marker Molecules	Fig. 3.5c, p. 63
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	C. Fluid Mosaic Model of the Membrane	Fig. 3.2, p.60
2	III. The Nucleus, p. 61	
	A. Nuclear Envelope	Fig. 3.6, p. 64
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	2. Nuclear Pores	

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- B. Encloses Cellular DNA
 - 1. DNA + Associated Histone Proteins = Chromatin
 - 2. Chromatin Forms Chromosomes During Cell Division
 - 3. Directs Cellular Processes in Uncondensed Form Clinical Note, p.61
- C. Encloses Nucleoli Fig.3.6, p.64
 - 1. Areas High in RNA
 - 2. Sites of Ribosome Subunit Construction
- 3 IV. Cytoplasm, p. 63
 - A. Cytosol, p. 63
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 - a. Complex Solution - Colloid
 - b. Rich in Protein
 - 2. Cytoskeleton Fig. 3.7, p.65
 - a. Tubulin and Microtubules
 - b. Actin and Microfilaments
 - c. Intermediate Filaments
 - 3. Cytoplasmic Inclusions, p. 63
 - a. Chemical Aggregates
 - b. Not Surrounded by Membrane
 - B. Organelles, p. 64
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 - 2. Ribosomes
 - a. Made of Protein and rRNA Fig. 3.8, p. 66
 - b. Catalyze Peptide Bond Formation
 - 3. Endoplasmic Reticulum (E.R.), p. 66 Fig. 3.9, p. 67
 - a. Connections to Nuclear Envelope
 - b. Rough E.R.
 - 1. Ribosomes Attached
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	2. Detoxification Rxns.	
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- a. Using RNA Nucleotides
 - b. Adenine Pairs with Thymine or Uracil
 - c. Guanine Pairs with Cytosine
 - 2. Types of RNA
 - a. Messenger (mRNA)
 - b. Transfer (tRNA)
 - c. Ribosomal (rRNA)
 - 3. Transcription Units and Genes
 - a. More DNA in Genes than Codes for mRNA
 - b. Post-Transcriptional Processing
 - 1). Bringing Exons Together
 - 2). Removing Introns
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 - 2. Ribosome Catalyzes Peptide Bonds Between Amino Acids Attached to tRNAs
 - 3. Growing Protein Stays With Ribosome Until End of mRNA Reached - Polyribosomes Possible
 - a. tRNA's Released When Ribosome Position on mRNA Shifts
 - b. Protein and Ribosome Subunits Freed When "Stop" Codon Encountered
 - 4. Post-Translational Processing in Golgi Apparatus
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