Cell Signaling





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3	Stages of Cell Signaling:
(h)	<u>Reception</u> : Detection of a signal molecule (ligand) coming from outside the cell
G.	Transduction: Convert signal to a form that can bring about a cellular response
3.	Response: Specific cellular response to the signal molecule

General Biology

Unit 2 Pre-Test

Section 1: Short Answer Essays

- 1.) (5 pts each, 75 pts total) Write a short answer essay for each of the following questions. The actual test will contain 15 of these questions.
 - a) List 3 major differences between prokaryotic and eukaryotic cells.

L'ro carnotic Eukaryotic * larger, * Has nucleus complex * no osqa ۰ ۲ b) Explain the relationship between surface area and volume in biological systems. Provide at least one specific example. le area tam large surta ls must (ol volume ratio. Allows rate of chemical excl entionn ex: sha c) Describe the difference between free and bound ribosomes. arrs proten t man Free-transla ill Inside the rough ER Bon transl ate 6 d) Describe how endoplasmic reticulum and golgi bodies coordinate the production is mell and distribution of extracellular proteins. Be as specific as possible. translates proten through the men Bound ribsome - sent by veside to CÍS of the rough Golgi body where it is modified by macromoleu eside to plasma membrane w

e) Describe the difference between rough and smooth endoplasmic reticulum. Be sure to include the function of each in your answer.

Kough FR-site et extracelluler protein translation and modification. Smooth ER-detoxities, synthesizes lipids Describe the endosymbiotic theory. What organelle(s) are involved? Mitochondria and chloroplasts were ingested digisted by early enlargotic cells and subjugate to produce energy (ATP) while being provided sale environment. Both bureting

g) Explain how one can differentiate between the extracellular and intracellular sides of the plasma membrane.

Extracellular side - carbohydrates (blood type Intracellular side - cytoskeletar made Proten

 Which organelles are exclusive to either animal or plant cells? Please include at least five examples.

i)

null

plasmodesm

Describe in detail how the concept of selective permeability applies to the plasma membrane. Please include properties and characteristics of compounds involved.

ective permeability - ronly allows small nonpolas compoundo Through. Polar compour

require a protein internediaryport

Describe the fluid mosaic model. What is meant by each term in the phrase? j) Fluid - lateral movement of Tipids on the plasme membrane - tinctinelity. Mosaic - membrane is composed of differen macromoleculos - a majority is protei k) Describe how phospholipids are amphipathic. How does this help the formation of the plasma membrane? heal: polar Phospholipido bare a polarad vonpoler component. hed group orient outside while tail go inside. The bilans allows for a 1) Describe the correlation between lipid movement and temperature within the plasma membrane. How does cholesterol influence this dynamic? CAULO Cholesterol is a temperature and butter. At high temps, the membra more Fluid. At low tenps, the me more rigid. Cholesterol manages m) Describe the difference between integral and peripheral proteins. Where would each be found and how would they be used? Provide examples. Integral protein

ice lecture



n) Describe how carbohydrates are used within the plasma membrane to provide a sense of "self" and encourage the orientation of proteins.

onove ' U Ve See fire

o) What is diffusion? How does it relate to concentration? What specific term is used to describe the diffusion of water?

Difference is the natural, energetic novement of a compound from a high concentration to a low concentration (Down its gradient) Diffusion of water: osmosis.

p) Describe the movement of compounds in each of the following scenarios:

Permeable to water only.

igodolEHigh water 7 [Low water Permeable to solute only.

Claw solute] (high solute) q) Describe what is meant by a hypertonic/hypotonic solution. What would happen to a blood cell placed in this environment? (The actual test will only include one of the two terms) hypertonic - high relative concentration of solute within solution. Water fim out of cellall will shrivel. hypotinic - la relatile concentration. Water r) Describe facilitated diffusion. Provide an example. flows into the cellit bursts. Protein mediated diffusion where a protin helps a comprised go dom its natural concentration gradient tim high to law. s) Compare and contrast active and passive transport. Provide an example of each. LSSIVE Active Wo energy requirement Requires energy high - low concertation Low -> high concentration against conc. gradent with grad Describe the general function of the sodium-potassium (Na⁺/K⁺) ATPase pump. What is its purpose? Punp releases 3 Nat and accepts 2 /ct te establish an electrochemical

gradient. This gradient is used for cell actin potential and f general energy. Makes the ce perform like a battery.

u) What is the difference between endocytosis and exocytosis? Provide at least one specific example of endocytosis.

ndocytosis - miside cell Exocytosis - outside cell Endocytosis - phagocytosis pirocytosis

v) Describe the difference between paracrine and endocrine signaling.

ndocin For reaching goes through vasculative ising hormones/ works only a surrou

w) Describe the process of signal transduction. Be sure to include the three major stages.

Receptin, transductin, response

Section 2: Matching

2.) (1 pt each, 15 pts total) Match the organelle with its description.

cell wall	a) channels through which ions, sugars, and small molecules can pass
chloroplasts	h) protosta planta, balna maintain abana
chromatin	b) protects plants, helps maintain shape
cytoskeleton	c) responsible for intracellular digestion and chromatin recycling of cellular materials
gap junctions	d) site of cellular respiration
golgi body	e) complex of DNA and proteins
lysosomes	f) supports cell, regulates activities
mitochondria	g) region where ribosome are formed
nuclear pore	h) site of photosynthesis
nucleolus	i) responsible for storage of materials
nucleus	j) translates proteins
ribosomes	k) modifies and packages proteins for transport
rough ER	transport
smooth FR	I) control center of cell, contains DNA
	m) site of protein translation
	n) synthesize lipids, detoxifies drugs and poisons
	 o) controls what enters and leaves the nucleus

Section 3: Diagram

3.) (1 pt each, 10 pts total) Write the letter that corresponds with each of the following structures. The actual test will feature either an animal or plant cell, not both.



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Chromatin	Nuclear envelope
Cytoskeleton	Nucleolus
Flagellum	Plasma membrane
Golgi body	Rough ER
Mitochondria	Smooth ER

Section 3: Diagram

4.) (1 pt each, 10 pts total) Write the letter that corresponds with each of the following structures. The actual test will feature either an animal or plant cell, not both.



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Cell wall	Mitochondria
Central vacuole	Nuclear envelope
Chloroplast	Nucleolus
Chromatin	Rough ER
Golgi body	Smooth ER