BIOPHYSICS

2K19/B1/005
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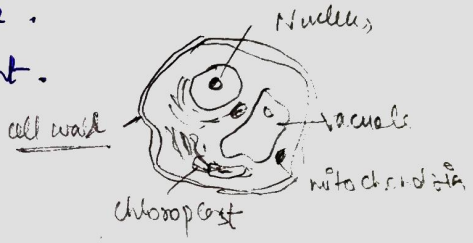
Q1 The cell wall is constituted of polysaccharides which includes cellulose, hemicellulose & pectin.

Plants do not have property of moving hence they need protection from temp, wind, moisture variation.

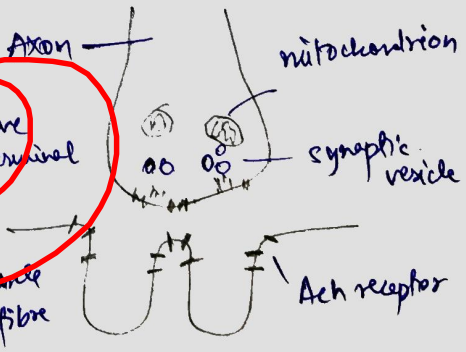
The layer surrounding the cell membrane is known as cell wall. major functns include:

- ↳ high tensile strength, so that it can withstand alternate internal osmotic pressure.
- ↳ flexibility for partial movement.
- ↳ protection
- ↳ definite shape to the cell.



Q3 Neuromuscular junction, site of communicatn (chemical) between a nerve fibre and a muscle cell. Ach is synthesised in the pre-synaptic terminal using chlorine and acetyl-CoA and enzymes. It goes through series of modificatns before being packaged in vesicles.

Upon depolarisation, an action potential travels down axon, causing voltage-gated calcium to open, resulting in influx of ions in nerve terminal.



Q4 Goldman - Hodgkin - Katz (GHK) voltage equation, is used in cell membrane physiology, to determine the reversal potential across a cell's membrane.

Eqn for M monovalent +ve ionic species and A negative:

$$E_m = \frac{RT}{F} \ln \left(\frac{\sum_i^n P_{M_i^+} [M_i^+]_{out} + \sum_j^m P_{A_j^-} [A_j^-]_{in}}{\sum_i^n P_{M_i^+} [M_i^+]_{in} + \sum_j^m P_{A_j^-} [A_j^-]_{out}} \right)$$

If membrane separating two K_2NaCl - solutions:

$$E_{mNaK_2Cl} = \frac{RT}{F} \ln \left(\frac{P_{Na}[Na^+]_{out} + P_K[K^+]_{out} + P_{Cl}[Cl^-]_{in}}{P_{Na}[Na^+]_{in} + P_K[K^+]_{in} + P_{Cl}[Cl^-]_{out}} \right)$$

Q5

Active Transport	Passive Transport
→ circulates from region of lower concentration to higher concentration.	→ circulates from higher concentration to lower concentration region.
→ requires cellular energy.	→ does not requires cellular energy.
→ dynamic in process.	→ it is a physical process.
→ highly selective in nature	→ partly non-selective.
→ carrier proteins are reqd.	→ carrier proteins are not reqd.
→ transports various molecules in the cell.	→ involved in the maintainance of eqbm level inside the cell.
→ transpires in one direction.	→ transpires bidirectionally.
→ types → exocytosis, endocytosis, Na-K pump.	→ Ex: osmosis, diffusion.

Q6

Mitochondria are known as the powerhouses of the cell. They are organelles that act like a digestive system which takes in nutrients, break them down, and creates energy rich molecules for the cell.

These are shaped perfectly to maximise productivity. They are made of two membranes (outer & inner).

Using oxygen to release energy, cell are reduced and eventually broken down.