

**Name: Nida Zaffar**

**ID # 15771**

**Question # 3**

**Give properties of cell membrane structure?**

**CELL MEMBRANE:**

Cell membrane is an outer most boundary surrounding the cell that separates and protects the cell from the external environment and provides a connecting system between the cell and its environment is called plasma membrane.

**PROPERTIES OF CELL MEMBRANE:**

Cell membrane has several important properties.

1. Cell membrane is thin enclosure that form closed boundaries. The membrane is only two molecules thick and surrounds the entire cell. In addition, eukaryotic cells also contain membrane bounded organelles within the cell such as mitochondria, endoplasmic reticulum, Golgi complex, lysosomes etc.
2. Cell membrane is made up of lipids, proteins, and carbohydrates. The ratio of lipid to protein depends on cell type and activity.
3. The cell membrane consists of a phospholipid bilayer. The lipid molecules are amphipathic; they contain both polar and non-polar regions. In an aqueous environment while the non-polar regions aggregate inside the membrane.
4. This makes the membrane mostly hydrophobic, it serves as a barrier for polar or charged molecules.
5. The cell membrane is held together by non-covalent interactions. the lipids and proteins are held together by intermolecular bands, although they are weaker than covalent bonds, the collective aggregate of all the forces make the membrane an effective barrier
6. Membranes are fluid like:
  - Due to relatively weak intermolecular bonds, lipids and most proteins are in constant state of lateral motion.
7. Proteins diversify the properties of cell membranes :

- Proteins function as transporters (pumps channels etc.) enzymes, receptors and mediate energy storage.
8. Membranes have polarity :
- Membranes create a separation of charge, which means they induce an electric dipole moment between the two sides of the membrane. This creates an electric potential difference.
9. Membranes are not symmetric structures :
- The density and distribution of protein is not symmetric, this means that the two faces of the membrane are never identical.

## **QUESTION # 2**

**What is portal triad? Give clinical significance of portal.**

### **PORTAL TRIAD:**

A portal triad is also known as portal canal; it is distinctive arrangement within lobules. It is responsible for transporting blood from parts of the gastrointestinal tract to the liver. Blood flow to the liver is unique and it receives both oxygenated and deoxygenated blood.

- It is composed of three major tubes. Branches of the hepatic artery carry oxygenated blood to the hepatocytes, while branches of the portal vein carry blood with nutrients from the small intestine. The bile duct carries bile products away from the hepatocytes, to the larger ducts and gall bladder.
- There are six portal triads, composed of branches from the portal vein and hepatic artery as well as bile ductules.
- Portal areas are located on the corners of liver lobules. Portal areas are normally surrounded by larger areas packed with hepatic cords and sinusoids.
- It consists of the following five structures.
  - Proper hepatic artery that supplies oxygen.
  - Hepatic portal vein,
  - One or two small bile ductules.
  - Lymphatic vessels.
  - Branches of vagus nerve.

**Clinical significance of portal:**

Bile secreted many substance and then these substances eliminated in the feces. And because of the color of feces diseases may be diagnosed one of these is bilirubin which is a greenish yellow pigment. This is the end product of hemoglobin degradation. It provides an important tool for clinical diagnosis of both hemolytic blood disease and various types of liver diseases.

Bilirubin concentration increases in the blood if the endocrine function of the liver is damaged either by physical blockage of the bile ducts or hepatocyte damage, or dysfunctions of conjugation. Due to increase secretion of bilirubin the skin color changes to yellowish which shows the person is suffering from jaundice and can be associated with itching, mental status changes, edema.

The liver is highly vascular and is the main site for portal channels patients with portal hypertension often shows signs of vein clogging at the points of portal channel. This leads to esophageal varices, rectal hemorrhoids and caput medusae.

**QUESTION # 3:**

**Differentiate between the following:**

<b><u>SMOOTH ENDOPLASMIC RETICULUM</u></b> <b><u>(SER)</u></b>	<b><u>ROUGH ENDOPLASMIC RETICULUM</u></b> <b><u>(RER)</u></b>
<ol style="list-style-type: none"><li>1. The SER doesn't have ribosomes attached to it. That's why they have smooth look and surface.</li><li>2. The SER are dispersed in the cytoplasm.</li><li>3. The SER have multiple tubes combine together.</li><li>4. The SER is involved in the production of fats and lipids.</li></ol>	<ol style="list-style-type: none"><li>1. The RER has ribosome attached to it, which give it a rough look and surface.</li><li>2. The RER is found attached to the nuclear membrane.</li><li>3. The RER has multiple sheets combine together.</li><li>4. The RER are not involved in the production of fats and lipids.</li></ol>

<b><u>LYSOSOMES</u></b>	<b><u>PEROXISOMES</u></b>
<ol style="list-style-type: none"><li>1. Lysosomes are cytoplasmic</li></ol>	<ol style="list-style-type: none"><li>1. Peroxisomes are smaller sub-</li></ol>

<p>organelles found in most of the eukaryotes.</p> <ol style="list-style-type: none"> <li>2. They are surrounded by a single membrane and are simple sacs that contain very large variety of food digesting enzymes called hydrolases.</li> <li>3. They are very abundant in those animal cells which exhibit phagocytic activity i.e. neutrophils.</li> <li>4. Lysosomes were discovered by De Duve a Belgium cytologist in 1955, who called them suicide bags.</li> <li>5. They are involved in fertilization, autolysis, programmed cell death, etc.</li> </ol>	<p>cellular bodies approximately 0.5 <math>\mu\text{m}</math> in diameter surrounded by membranes and found in great variety of organisms.</p> <ol style="list-style-type: none"> <li>2. They are similar to lysosomes, but they have more dense and different enzyme system.</li> <li>3. In animals they are most common in liver and kidney cells.</li> <li>4. Peroxisomes were discovered De Duve in 1965 in liver cells.</li> <li>5. They are involved in many activities like degradation of hydrogen peroxide by catalase.</li> </ol>
--	---

<p style="text-align: center;"><b><u>PEPTIC ULCER</u></b></p> <ol style="list-style-type: none"> <li>1. Peptic ulcer is the inflammation in the lining of the digestive track, mostly in the stomach or duodenum caused by the digestive action of pepsin and stomach acid.</li> <li>2. Peptic ulcer is most common in females above 40 years of age.</li> <li>3. Causes of peptic ulcer are smoking, acidic drinks, medications, H. pylori infection, stress can worsen the symptom but not the cause.</li> <li>4. Signs of the peptic ulcer are dull pain in the stomach, bloating, heart burn, feeling easily full.</li> <li>5. Pain: epigastric can radiate to</li> </ol>	<p style="text-align: center;"><b><u>DUODENAL ULCER</u></b></p> <ol style="list-style-type: none"> <li>1. Duodenal ulcers occur in the upper area of small intestine which is called duodenum.</li> <li>2. Duodenal ulcer is most common in males.</li> <li>3. Causes of duodenal ulcer are helicobacter pylori, smoking, use of anti-inflammatory drugs, stress, drinking heavily increases the risk of duodenal ulcer.</li> <li>4. Signs of duodenal ulcer are abdominal distension, pain of nausea, loss of appetite, weight loss etc.</li> <li>5. Pain: epigastric discomfort</li> </ol>
---	--

**PEPSIN**

1. Pepsin is an endopeptidase that breakdown proteins into amino acids.
2. Pepsin is present in active form in the stomach that helps in the digestion of proteins. Pepsin is a proteolytic enzyme.
3. Pepsin can be activated by lowering the pH of the medium.
4. It is produced in the cells of the stomach lining.
5. Pepsin should be stored at very low temperature to prevent self-digestion.

**PEPSINOGEN**

1. Pepsinogen is present in inactive form in the stomach.
2. Pepsinogen is a pro enzyme and is activated by HCl.
3. Pepsinogen is secreted by the chief cells and pyloric glands.
4. Pepsinogen cannot be activated by lowering the pH of the medium.

**POSITIVE FEEDBACK**

1. When a process occurs in a body the positive feedback enhances the direction of the process.
2. In positive feedback input and output voltage increases.
3. Example: when a person is injured the wounded tissue release chemicals. These chemicals send signals to platelets to activate until the wound is clotted.

**NEGATIVE FEEDBACK**

1. Negative feedback occurs when the product of a reaction continues to decrease in that reaction.
2. In negative feedback input and output voltage decreases.
3. Example: blood pressure must be high enough to pump blood to all parts of the body, but not so high to cause damage. If the pressure is too high or too low a chemical signal is sent to the brain. The brain then sends a chemical signal to heart to adjust the rate of pumping.