Plasma membrane worksheet 6 answers

LEARNING GOALS Describe a model of liquid cell membrane mosaic The fluid mosaic model was first proposed by S.J. Singer and Garth L. Nicolson in 1972 to explain the structure of the plasma membrane. The model has evolved a bit over time, but it is still best responsible for the structure and functions of the plasma membrane, as we now understand them. The liquid mosaic model describes the structure of the plasma membrane as a mosaic of ingredients , including phospholipids, cholesterol, proteins and carbohydrates , which gives the membrane a liquid character. Plasma membranes are 5 to 10 nm thick. By comparison, human red blood cells, visible through light microscopy, are about 8 μm wide, which is about 1,000 times wider than the plasma membrane. The proportions of proteins, lipids and carbohydrates in the plasma membrane vary depending on the type of cell. For example, myeal contains 18% protein and 76% lipids. The mitochondrial inner membrane contains 76% protein and 24% lipids. Figure \(\PageIndex{1}\): Components and functions of the plasma membrane: The main components of the plasma membrane are lipids (phospholipids and cholesterol), proteins and carbohydrates attached to certain lipids and certain proteins. Figure \(\PageIndex{1}\): Plasma membrane fluid mosaic model: The plasma membrane fluid mosaic model describes the plasma membrane as a liquid combination of phospholipids, cholesterol and proteins. Carbohydrates attached to lipids (glilicolipids) and proteins (glycoproteins) extend from the outer surface of the membrane. The main membrane fabric consists of amphiphilic or two-sensitive phospholipid molecules. Hydrophilic or water-loving areas of these molecules are in contact with the aqueous fluid both inside and outside the cell. Hydrophobic, or water-hating molecules, tend to be non-polar. The phospholipid molecule consists of a three-carbon spine of glycerol with two fatty acid molecules attached to carbon 1 and 2 and a group containing phosphates attached to a third carbon. This system gives the entire molecule an area described as its head (a group containing phosphates), which is polar in nature or a negative charge, and an area called the tail (fatty acids), which has no charge. They interact with other blue-gun molecules in chemical reactions, but generally do not interact with polar molecules. When placed in water, hydrophobic molecules tend to form a sphere or cluster. Hydrophilic phospholipid regions tend to form hydrogen bonds with water and other polar molecules both outside and inside the cell. Thus, the membrane surfaces that go outside the cells are hydrophilic. However, the agent of the cell membrane is hydrophobic and will not interact with water. Therefore, phospholipids form an excellent the two-layer cell membrane that separates the fluid in the cell from the fluid outside the cell. Figure \(\PageIndex{1}\): Phospholipid aggregation: In the aqueous solution, phospholipids tend to stack with polar heads facing outwards and hydrophobic tails facing inwards. Figure \(\PageIndex{1}\): Phospholipid molecule structure: This phospholipid molecule consists of a hydrophilic head and two hydrophobic tails. The hydrophilic head group consists of a group containing phosphates attached to a glycerol molecule. Hydrophobic tails, each containing saturated or unsaturated fatty acid, are long chains of hydrocarbons. Proteins are the second main component of plasma membranes. Integral proteins (some specialized types are called integrins) are, as the name suggests, completely integrated into the membrane structure, and their hydrophobic membrane regions interact with the hydrophobic area of the phospholipid bi layer. Single-pass integral membrane proteins usually have a hydrophobic transmersible segment, which consists of 20-25 amino acids. Some cover only part of the membrane — associating with a single layer — while others extend from one side of the membrane to the other and are exposed on both sides. Some complex proteins consist of up to 12 segments of a single protein, which are widely complex and embedded in the membrane. This type of protein has a hydrophilic region or regions, and one or more mildly hydrophobic regions. This system of protein regions tends to orient the protein alongside phospholipids, with a hydrophobic protein area adjacent to the tails of phospholipids and hydrophilic region or regions of protein protruding from the membrane and in contact with cytosol or extracellular fluid. Figure \(\PageIndex{1}\): Structure of integral membrane proteins: Integral membrane proteins can have one or more alpha-heliums that extend to the membrane (examples 1 and 2) or may have beta sheets covering the membrane (example 3). Carbohydrates are the third main component of plasma membranes. They are always found on the outer surface of cells and are bound to either proteins (forming glycoproteins) or lipids (forming glycolipids). These carbohydrate chains can consist of 2-60 units of monosaccharide and can be simple or branched. Together with peripheral proteins, carbohydrates form specialized places on the surface of the cell that allow cells to recognize each other. This recognition function is very important for cells because it allows the immune system to distinguish between body cells (called myself) and foreign cells or tissues (called non-self). Similar types of glycoproteins and glycicolipids occur on virus surfaces and can change frequently, preventing immune cells from recognizing and Them. These carbohydrates on the outer surface of the cell - carbohydrate components of both glycoproteins and glycicolipids - are collectively referred to as glycococaloxe (which means sugar coating). Glycocrine is highly hydrophilic and attracts large amounts of water to the surface of the cell. This helps the cell interact with its watery environment and the cell's ability to obtain substances dissolved in water. Key points The main fabric of the membrane consists of amphiphilic or two-felt phospholipid molecules. Integral proteins, the second main component of plasma membranes, are completely integrated into the membrane structure with their hydrophobic membrane-covering regions interacting with the hydrophobic area of the phospholipid bi-layer. Carbohydrates, the third main component of plasma membranes, are always found on the outer surface of cells where they are bound to either proteins (forming glycoproteins) or lipids (forming glilikolipids). Key amphiphilic terms: With one surface consisting of hydrophilic amino acids and an opposite surface consisting of hydrophobic (or lipophilic) ones. hydrophilic: O affinity for water; absorb or be moistened by water, loving water. hydrophobic: No affinity for water; it must not absorb or be moistened by water, water fearing. A cell plasma membrane is a network of lipids and proteins that forms the boundary between the cell contents and the outer part of the cell. It is also simply called a cell membrane. The main function of the plasma membrane is to protect the cell from the surrounding environment. It is semi-permeable and regulates the materials that enter and exit the cell. The cells of all living beings have plasma membranes. The plasma membrane surrounds all cells and physically separates the cytoplasm, which is the material that forms the cell, from the extracellular fluid of the extracellular. This protects all cell components from the external environment and allows separate actions inside and outside the cell. Plasma membrane provides structural support for the cell. A cytoskeleton entlayer, which is a network of protein fibers inside a cell that hold all parts of a cell in place. This gives the cell its shape. Some organisms, such as plants and fungi, have a cell wall in addition to the membrane. The cell wall consists of molecules such as cellulose. It provides additional support for the cell, and therefore plant cells do not break like animal cells if too much water is scattered into them. Plasma membranes are selectively permeable (or semi-permeable), which means that only certain molecules can pass through them. Water, oxygen and carbon dioxide can easily travel through the membrane. In general, ions (e.g. sodium, potassium) and polar molecules must not be membrane; they must pass through specific channels or pores in the membrane instead of dispersing freely. In this way, the membrane can control the rate at which some molecules can enter and exit the cell. Endocytosis is when a cell consumes a relatively higher content than single ions or molecules that pass through channels. Through endocytosis, the cell can take in large amounts of molecules or even whole bacteria from extracellular fluid. Exocytosis is when a cell releases these materials. The cell membrane plays an important role in both of these processes. The shape of the membrane itself changes to allow molecules to enter or exit the cell. It also creates vacancies, small membrane bubbles that can transport multiple molecules at once, in order to transport materials to different places in the cell. Another important function of the membrane is to facilitate communication and signaling between cells. It does this by applying various proteins and carbohydrates in the membrane. Proteins on a cell select this cell so that other cells can identify it. The membrane also has receptors that allow it to perform certain tasks when molecules such as hormones bind to those receptors. The cell membrane detailed membrane scheme consists partly of molecules called phospholipids, which spontaneously form a double layer with hydrophilic (water-loving) heads outside and hydrophobic (hate water) tails inside. These interactions with water are what allow plasma membranes to form. Proteins are wedged between the lipids that make up the membrane, and these transmedial proteins allow molecules that could not enter the cell in any other way to pass through forming channels, pores or gates. In this way, the cell controls the flow of these molecules as they enter and exit. Proteins in the cell membrane play a role in many other functions, such as cellular signaling, cell recognition and enzyme activity. Carbohydrates are also found in the plasma membrane; In particular, most carbohydrates in the membrane are part of glycoproteins, which are formed when carbohydrates attach to a protein. Glycoproteins play a role in cell interactions, including cell adhesion, the process by which cells join each other. Technically, the cell membrane is a liquid. At room temperature, it has about the same consistency as vegetable oil. Lipids, proteins, and carbohydrates in the plasma membrane can freely disperse throughout the cell membrane; essentially float on its surface. It is known as a liquid mosaic model that was invented by S.J. Singer and G.L. Nicolson in 1972. Cell wall – the structure that surrounds the plasma membrane of plant cells and fungi and provides additional support for these cells. Phospholipid – a molecule that forms a characteristic double plasma membrane. Semi-permeable – allowing only certain molecules to pass due to the chemical properties of the membrane. Fluid Mosaic Model – a model that describes the composition of the plasma membrane and how phospholipids, proteins and carbohydrates move freely in it. 1. What kind of molecule forms a double layer of plasma film? A. Phospholipids B. Ion channels C. Ribosomes D. Deoxyrybonucleic acid A is correct. Phospholipids form a double layer of plasma membrane, spontaneously laying out in this way when they are in an aqueous solution (aqueous). Ion channels are also found in the membrane, but are not responsible for forming the double layer. Ribosomes and deoxyrybonucleic acid are located inside the cell; ribosomes form proteins, and deoxypribonucleic acid is DNA, a genetic material. 2. Which sentence best describes the fluid mosaic model? A. The plasma membrane allows fluid to flow between extracellular fluid and cytoplasm. B. Too much fluid will cause animal cells to crack. C. The membrane elements are located in place, as are the tiles in the mosaics. D. Lipids, proteins and carbohydrates of the plasma membrane move freely on its surface. D is correct. The fluid mosaic model describes the smooth movement of lipids, proteins and carbohydrates that make up the plasma membrane. These components move freely across its entire surface. 3. Which function is not a plasma membrane function? A. To generate energy to power the activity of cells B. To protect the cell from the surrounding environment C. To facilitate the communication of cell cells D. To control the speed of certain molecules entering and leaving cell A is correct. Choices B, C and D are all plasma membrane functions. Mitochonddrion is the part of the cell that produces energy. Energy.