Chapter 7 cell structure and function test pdf

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Inside the cellCell divisionTypesSummaryHumans have trillions of cells, the basic units of life on earth. In this article, we explain some of the structures in cells and describe a few of the many types of cells in our bodies.People can think of cells as tiny packages that contain minute factories, warehouses, transport systems, and power plants. They function on their own, creating their own energy and self-replicating — the cell is the smallest unit of life that can replicate. Cells are the basic units of life.The body contains around 50—100 trillion cells, and they vary widely in size, number, structure, and use. Cells also communicate with each other. Whether in plants, humans, or animals, they connect to create a solid, well formed organism. In humans, cells build tissues, tissues form organs, and organs work together to keep the body alive.Robert Hooke first discovered cells in the 1600s. He gave them their name because they resembled the “cella,” the Latin term for “small rooms” where monks lived in monasteries.Share on PinterestAlexander Spatari/Getty ImagesExperts estimate that there are around 200 cell types in the human body.Cell types can look different, and carry out distinct roles within the body.For instance, a sperm cell resembles a tadpole, a female egg cell is spherical, and nerve cells are essentially thin tubes.Despite their differences, cells often share certain structures. These are known as organelles or mini-organs. Below are some of the most important:NucleusThe nucleus represents the cell’s headquarters. There is typically one nucleus per cell. However, this is not always the case. Skeletal muscle cells, for instance, have two. The nucleus contains the majority of the cell’s DNA, and the mitochondria house a small amount. The nucleus sends out messages to tell the cell to grow, divide, or die.A membrane called the nuclear envelope separates the nucleus from the rest of the cell. Nuclear pores within the membrane allow small molecules and ions to cross back and forth, while larger molecules need to transport proteins to help them through.Plasma membraneTo ensure each cell remains separate from its neighbor, a special membrane, known as the plasma membrane, envelops the cell. Phospholipids make most of this membrane and prevent water-based substances from entering the cell. The plasma membrane contains a range of receptors, which carry out a number of tasks, including being:Gatekeepers: Some receptors allow certain molecules through and stop others.Markers: These receptors act as name badges, informing the immune system that they are part of the organism and not foreign invaders.Communicators: Some receptors help the cell communicate with other cells and the environment.Fasteners: Some receptors help bind the cell to its neighbors.CytoplasmThe cytoplasm is the interior of the cell that surrounds the nucleus. It includes the organelles and a jelly-like fluid called the cytosol. Many of the important reactions that take place in the cell occur in the cytoplasm.CytoskeletonThe cytoskeleton forms the scaffolding within the cytoplasm of the human cell. It helps the cell maintain the correct shape. However, unlike regular scaffolding, the cytoskeleton is flexible. It plays a role in cell division and cell motility — the ability of some cells to move, such as sperm cells, for instance.The cytoskeleton also helps with cell signaling through the uptake of material from the endocytosis, or the area outside the cell, and moving materials within the cell.Endoplasmic reticulumThe endoplasmic reticulum (ER) processes molecules within the cell and helps transport them to their final destinations. In particular, it synthesizes, folds, modifies, and transports proteins.Cisternae are long sacs that make the ER. The cytoskeleton holds them together. There are two ER types: rough ER and smooth ER.Golgi apparatusOnce the ER processes the molecules, they travel to the Golgi apparatus. People tend to consider the Golgi apparatus the post office of the cell, where items go through packaging and labeling. Once materials leave, they may be useful inside or outside the cell.MitochondriaPeople may often refer to mitochondria as the powerhouses of cells. They help turn energy from food into energy that the cell can use — adenosine triphosphate. However, mitochondria have a number of other jobs, including calcium storage and a role in cell death.RibosomesThe nucleus transcribes segments of DNA into ribonucleic acid (RNA), a molecule similar to DNA, which directs the translation of RNA into proteins. Ribosomes read the RNA and translate it into proteins by sticking together amino acids in the order the RNA defines.Some ribosomes float freely in the cytoplasm while others attach to the ER.The human body constantly replaces cells. Cells need to divide for a number of reasons, including the growth of an organism and to fill gaps that dead and destroyed cells leave after an injury, for instance.There are two types of cell division: mitosis and meiosis.MitosisMitosis is how most of the cells in the body divide. The “parent” cell splits into two “daughter” cells.Both daughter cells have the same chromosomes as each other and the parent. People refer to them as diploid because they have two complete copies of the chromosomes.MeiosisIn meiosis, the body produces sperm cells and egg cells. In males, meiosis occurs after puberty. Diploid cells within the testes undergo meiosis to produce haploid sperm cells with 23 chromosomes. A single diploid cell yields four haploidsperm cells. They contain one complete set of 23 chromosomes.In females, meiosis begins during the fetal stage, before the individual is born. It happens in stages.A series of diploid future egg cells enter meiosis. At the end of the first stage of meiosis the process stops, and the cells gather in the ovaries. At puberty, one female egg cell resumes meiosis each month. As meiosis completes, it yields a single haploid egg cell each monthly cycle. During human reproduction, the haploid sperm and haploid egg combine. This temporarily doubles the number of chromosomes. A small portion of each chromosome breaks off and reattaches to its partner chromosome before fertilization finishes.More than 200 different types of cells are present in the human body. Below is a small selection of human cell types:Stem cellsStem cells are cells that must choose what they are going to become. Some differentiate to become a certain cell type, and others divide to produce more stem cells. The embryo and some adult tissues, such as bone marrow, house them.Bone cellsThere are at least three main types of bone cells:osteoclasts, which dissolve boneosteoblasts, which form new boneosteocytes, which help communicate with other bone cellsBlood cellsThere are many types of blood cells, including:red blood cells, which carry oxygen around the bodywhite blood cells, which are part of the immune systemplatelets, which help blood clot to prevent blood loss after injuryneutrophils and basophils, and other types of white blood cellsMuscle cellsAlso called myocytes, muscle cells are long, tubular cells. Muscle cells are important for a range of functions, including movement, support, and internal functions, such as peristalsis — the movement of food along the gut.Sperm cellsThese tadpole-shaped cells are the smallest in the human body.They are motile, meaning that they can move. They achieve this movement by using their tail, which contains energy-giving mitochondria.Sperm cells cannot divide. They only carry one haploid, unlike the majority of cells, which carry diploids.Female egg cellCompared with the sperm cell, the female egg cell is a giant. It is the largest human cell. The egg cell is also haploid so that the chromosomes from the sperm and egg can combine to create a diploid cell during the process of fertilization.Fat cellsFat cells are also called adipocytes, the main adipose tissue constituents. They contain stored fats called triglycerides that the body can use as energy. Once the body uses the triglycerides, the fat cells shrink. Adipocytes also produce some hormones.Nerve cellsNerves cells form the communication system of the body. Also called neurons, they consist of two major parts — the cell body and nerve processes, known as axons and dendrites. The central body contains the nucleus and other organelles, and the nerve processes run like long fingers, carrying messages far and wide. Some of the axons are around 1 meter long.There are various and fascinating cells. In one sense, cells are autonomous cities that function alone, producing their own energy and proteins. In another sense, they are part of the huge network of cells that creates tissues, organs, and us. Last medically reviewed on August 23, 2022Medical News Today has strict sourcing guidelines and draws only from peer-reviewed studies, academic research institutions, and medical journals and associations. We avoid using tertiary references. We link primary sources — including studies, scientific references, and statistics — within each article and also list them in the resources section at the bottom of our articles. You can learn more about how we ensure our content is accurate and current by reading our editorial policy.

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