Biology assignment

Biology – Assignment One Cells. Question One Explain the roles of the main components and features of a cell to the cell function. A typical animal cell is rounded in shape, surrounded by a cell membrane. This holds in the cytoplasm, which contains other structures such as the nucleus, ribosome, and mitochondria. Each cell has tiny structures inside called organelles; each type of organelle performs a particular function.

For example there are mitochondria (power stations), ribosome (protein packaging factories) and lissome (waste disposal stations) The largest structure in the cell in the nucleus; it contains the nucleolus gather with chromatin which condenses into chromosomes when the cell undergoes division. It usually lies towards the middle of the cell and is the most important part of the cell. It is the control centre and sends out messages to other parts of the cell, controlling the production of molecules such as proteins. The ability to control production comes from the chromosomes, which lie within the nucleus.

For example a sperm cell. The mitochondria are the power stations of the cells. They are the sites of aerobic respiration and produce nearly all of the energy the cells require to function. Mitochondria have two membranes, an inner and an outer membrane. The inner membrane is highly folded and this increases the surface area. Cells whose function requires them to expend particularly large amounts of energy contain unusually high amounts of mitochondria. This is seen in spermatozoa where the mitochondria are packed tightly at the base of the motile tail. The endoplasmic reticulum (ERE) is the transport network for the cell.

It is made up of a network of tubes that crisis-cross the cell. It allows substances such as protein to be moved from one part of the cell to another. This is found in the mucus secreting cell, when recessing and transporting bacteria to remove them from the cell. Some of the ERE has tiny particles called ribosome attached to it; these are known as rough endoplasmic reticulum. Ribosome are the protein factories where the manufacturing of proteins takes place. This is called protein synthesis. Proteins are made up of lots of smaller molecules called amino acids.

Amino acids are carried to the ribosome and Joined together to form proteins. Found in a mucus secreting cell when processing bacteria. In some parts of the sell the ERE is not encrusted with ribosome and is known as smooth endoplasmic reticulum. This is not continuous with the rough ERE and its cavities are tubular rather than flattened sacs. It is seen particularly in the cells of the liver, gut and certain glands and is concerned with the synthesis and transport of lipids and steroids. The Googol Apparatus looks a bit like a stack of tubes. It is responsible for making new products.

It makes globetrotting and proteins from carbohydrates. It packages the new products into small membrane bound sacks called vesicles which are moved around the cell or sent out of the cell. This can be seen in a mucus secreting cell when processing bacteria. The lissome are responsible for breaking down waste materials and old organelles within the cell. A lissome is a bundle tot enzymes contained within a membrane. I t tutees Witt unwanted materials and pours its enzymes over them in order to break them down. The materials from this breakdown are either recycled within the cell or sent outside.

Sometimes lissome may destroy the entire cell. This can be seen in a phagocyte cell. The nervous system is made up of cells called neurons, or nerve cells. Neurons are specialized to carry messages in the form of electrical impulses all around the nervous system. Neurons have a number of parts in common with all animal cells, including a cell membrane, cytoplasm and a nucleus; their appearance is quite different from other cells. The main part of the neuron is the cell body, which contains the nucleus and most of the cytoplasm. The rest of the neuron is made up of nerve fibers.

These are thin threads of cytoplasm that extend out from the cell body. An animal cell has two rod like controller situated at right angles to each other. Controller are responsible for the formation of cilia and flagella. The controller is the organizing cell for all of the misconstrues in animal cells. These can be found in a sperm cell to develop the long tail required for movement. The surface of certain cells is drawn out to form fine hair like processes called cilia or flagella, according to their length. They provide cells with a means of movement by swaying back and forth. This can be seen as a long tail on a sperm cell.

A cell is surrounded by a thin layer, this is called the plasma membrane and it stops the contents of the cell escaping. The cell membrane controls the passage of materials in and out of the cell. Water passes through the cell membrane by osmosis. Water lobule substances cross the membrane by diffusion or active transport. The cytoplasm fills the cell. It is mostly made up of water, often about 70%, the rest being molecules of salts, sugars, fats, amino acids and proteins. Some of the proteins are enzymes that the cell has

made. Enzymes control the rate of chemical reactions in the cell. This can be seen in most cells.

Red blood cells are the most numerous cells in the body. Their role is to pick up oxygen in the lungs and carry it to the other cells in the body. In order to do this they contain a protein called hemoglobin which can pick up oxygen. Each hemoglobin can pick up four molecules of oxygen. The red blood cell has a round shape, but unlike other ells it lacks a nucleus. The cell does not need a nucleus since it only has a short life span. The lack of a nucleus gives the cell a sunken appearance. The absence of a nucleus provides more space for hemoglobin while the sunken shape provides a larger surface area for picking up oxygen.

White blood cells protect the body from disease, when germs like bacteria or viruses invade the body; the white cells have a number of ways they can attack. Some white blood cells produce antibodies, which attach to the germ and destroy them, there called interruptions, surround the germ and destroy it. If the germs persist and increase in number, the white blood cells multiply too. Question Two. Outline the structure of the main tissues of the human body and explain the role they play in two named organs of the body. A tissue is defined as a group of cells of common origin with some specialized structure and common function.

Animal Tissues can be divided into epithelial, connective, skeletal, blood, nerve, muscular and reproductive Epithelial tissue forms the lining of structures, cavities and tubes. There are several iterant types whose tensions collectively are protection, absorption and movement (by means of

cilia) and secretion. Exogamous (pavement) epithelial tissue has flattened cells which look like paving slabs. The resulting sheet of cells is thin and delicate. It is found in places where the protective covering needs to be readily permeable to molecules in solution, e. G. The linings of capillaries and alveoli in the lungs.

Cuboids epithelial tissue consists of cells that are cube shaped when seen in section. This kind of tissue is found in the thyroid gland where it forms he lining of vesicles. Many other glands and ducts are lined with cuboids epithelial tissue, including tubules in the kidney. Columnar epithelial tissue consists of cells elongated at right angles to the basement membrane (they appear to be tall and column like when viewed in section). It is found in lining the intestine where it plays an important part in supporting other types of cell absorbing soluble food material.

Ciliated epithelial tissue is a specialized form of lining tissue. It is usually columnar in shape and the free surface of each cell has numerous cilia capable of beating hydraulically. It lines tubes and cavities where materials have to be moved. E. G. The respiratory tract removes small particles of dust and other foreign materials. Stratified epithelial tissue is made up of a series of layers and is much thicker than other types of epithelial tissue. Tough and impervious, it comprises the epidermis of the skin where its function is protective. The cells at its base, maintain the capacity to divide along a plane parallel.

As multiplication continues the cells get pushed gradually outwards as new cells are produced beneath them. As the cells moved outwards they become

flattened and eventually flake off, to be replaced by new ones. In the skin the cells towards the surface are transformed into a tough non living layer of keratin, this enhances the protective nature of the skin. Transitional epithelial tissue is a form of modified stratified epithelial tissue and is found lining cavities and tubes that are subject to stretching e. G. The bladder. When the bladder is full the epithelium stretches and becomes a single layer of cells.

After the urine has been passed; the bladder wall relaxes, and the epithelial lining is then of several layers. Muscle tissue consists of sheets of densely packed, elongated fibers, running parallel to each other and bound together by connective tissue. Skeletal muscle may be controlled consciously to move the bones of the skeleton. Skeletal muscle is controlled by the voluntary part of the nervous system. Skeletal muscle consists of fibers arranged in large groups; each group is surrounded by a fibrous membrane called the presidium. Tendons attach the tapered end of muscles to the bones.

Smooth muscle tissue is found in the walls of many tubular structures of the body such as blood vessels, the gut and orientating system. It is involuntary. Visceral muscles are not arranged into fibers. The cells are nucleate and usually tapered with fine longitudinal striations in the cytoplasm. Visceral muscle contracts and fatigues relatively slowly. Cardiac muscle tissue is also an involuntary muscle and is found only in the heart, it never tires. The tissues and organs in a body must be supported and held in place. This function is carried out by connective tissue which binds organs and tissues together.

It is strong and consists of a matrix in which a variety of structures may be embedded. Areola tissue is found all over the body: beneath the kin, connecting organs together, and filling in the spaces between adjacent tissues. Areola tissue consists of a gelatinous globetrotting matrix containing four main types tot cell and two types tot protein fiber. Fibroblasts which produces collagen and elastic fibers, amoeboid mast cells which secrete an anticoagulant, a variable number of fat filled cells and macrophages (ingests foreign particles, important for defending against disease).

Adipose tissue or fatty tissue is a matrix which contains nothing but closely packed fat filled cells, it is important for storage. In the dermis of the skin dipsos tissue insulates the body from heat loss. Bone tissue is a type of dense connective tissue. Bones come in a variety of shapes and have a complex structure, are lightweight yet strong and hard. Bone is much harder than cartilage; it consists of an organic matrix impregnated with calcium salts. The salts give bone its extreme hardness. They are secreted by Stella cells called speedboats which arrange themselves in concentric rings round nerves and blood vessels.

Another type of bone tissue, called spongy bone, is less compact and hard than havening bone and forms a network of interconnected traceable. Compact bone is found in the shafts of limb bones, while spongy bone is found at the ends of such bones. Cartilage tissue is a flexible connective tissue found in many areas of the body. It is not as rigid as bone but is stiffer and less flexible than muscle. Cartilage consists of an organic matrix, condign in which cells called counterblasts are embedded. Counterblasts secrete the matrix.

In its simplest form it consists of nothing but condign and counterblasts. Other more complex forms are strengthened by the presence of connective tissue fibers such as collagen or elastic fibers. Blood tissue is a circulating tissue consisting of three types of cell suspended in a fluid (plasma). The most numerous cells are red blood cells, whose function is to transport oxygen. Less numerous are white blood cells, of which there are several different types. Collectively they combat disease by destroying pathogenic micro-organisms.

Finally blood contains cell fragments called platelets which play an important part in blood clotting. Bloods main function is transport and defended. Nervous tissue cells are elaborately interconnected. Their function is to transmit electrical messages from en part of the body to another and to sometimes store information. The tissue is composed of neurons which send impulses and neuralgia cells, which help the conduction of the nerve impulses as well, provide nutrients to the neurons. Reticular fibers are composed of a protein called reticulum.

It is delicately branched and supports tissues containing many cells in organs such as the liver, lymph nodes and endocrine glands. Fibrous tissue, which makes up tendons and ligaments, contains collagen fibers which are tightly packed together. It has limited elasticity and provides structural support to the tissue. Tissues of the Heart. Layer one: Simple exogamous epithelial tissue A thin protective layer Layer two: Areola tissue (loose connective tissue) Connects organs together and fills the spaces between adjacent tissues Layer three: Cardiac Muscle Tissue To make the heart contract and beat. The muscle will never tire.

Layer four: Areola tissue and adipose tissue to hold the parts of the heart in place and to create insulation with the adipose tissue. Layer Five: Simple Exogamous epithelial tissue a lining tissue to prevent friction or damage to the heart. Tissues of the skin Layer One: Epithelial Tissue Creates a protective and waterproof layer for the body. Layer Two: Connective Tissue Is a strong layer that binds organs and tissues together and provides structure and strength to the skin Layer Three: Connective and Adipose Tissue Binds organs and tissues together as well as providing a fatty layer to help insulate the body.

Question Three a) Identify and explain the function of all the main organs found within the body a) The main organs found within the body are: Brain, heart, lungs, stomach, small intestine, large intestine, kidneys, diaphragm, bone, muscle, spleen, bladder, uterus and pancreas. Brain: the general function of the brain is to coordinate the bodies activities. It contains numerous centers for coordinating specific functions such as locomotion, breathing and so on. These centers are made up of nerve cells and synapses, and are connected with the spinal cord and the peripheral nerves.

Collectively they perform three functions; they receive impulses from receptors, they integrate (by interpreting and correlating incoming information) these impulses and they send out impulses to the appropriate effectors. Heart: The function of the heart is to pump oxygenated blood around the body and turn blood to the lungs to gain re-oxygenation. It does this by pumping blood from the heart to the lungs, then back to the heart where it is re-pumped to the body. To prevent mixing oxygenated and re-oxygenated blood the heart is divided into right and left sides.

The right side dealing with degenerated blood and the left side with oxygenated blood. Lungs. The function of the lungs is gas exchange. Each lung is made up of sections. The lungs are soft and are protected by the ribcage. They bring oxygen into the body and remove carbon dioxide. Diaphragm. The function of the diaphragm is to help to facilitate breathing. The diaphragm contracts upon inhalation, and enlarges the space available in the thoracic cavity. This creates a negative pressure which creates a negative pressure which leads to a suction force drawing air into the lungs.

After inhalation, when the diaphragm relaxes, air is exhaled due to the elastic recoil tot the lungs an d the tissues of the thoracic cavity. Stomach. The stomach is a hollow organ composed of several strong muscular layers. It is located under the ribcage and connected at each opening to the esophagi and the small intestine. The stomach stores, mixes and digests the food that we eat and acts to protect us from infectious organisms we may have ingested. After food is chewed and moistened in the mouth it passes through the esophagi into the stomach.

Food is mixed with stomach acid and enzymes to break the food down into smaller particles (this combination of food and enzymes is called chem.). The stomach also stores food temporarily, releasing chem. in small amounts into the small intestine. Small Intestine. The small intestine is responsible for the chemical digestion of food and the absorption of nutrients into the blood. The first section of the small intestine is the duodenum. The pancreas releases digestive fluid through a duct in the duodenum, the fluid is rich in enzymes that break down fats, proteins and carbohydrates.

It also contains sodium bicarbonate to neutralist acid produced in the stomach. The digesting food is pushed through the small intestine by peristalsis (muscular movement in which alternating waves or muscle contraction and relaxation causes food to be squeezed along the digestive tract). Most of the nutrients in the food we eat pass through the lining of the small intestine into the blood stream. The lining of the small intestine is covered in microfossils which gives he lining a massive surface area for the occurrence of absorption of nutrients.

Each microfossils contains a blood capillary, and when nutrients are absorbed into the microfossils, they enter the blood capillary; this is how nutrients enter the blood. Indigestible food passes to the large intestine. Pancreas. The function of the pancreas is to secrete digestives enzymes and hormones that control blood sugar levels. The pancreas produces insulin and glaucoma that regulate sugar levels in the blood. They are secreted directly into the blood. Large Intestine. The function of the large intestine is to convert food waste products onto faces. It does this by reabsorbing water that is used in digestion.

This causes food waste products to harden and form faces, which is then excreted. Kidney. The function of the kidney is to make urine from waste products and excess water found in your blood. Kidneys play a vital role in keeping blood composition constant. When blood enters the kidneys it is distributed to filtration units (neoprene). The main substances neoprene filter are water, nitrogen containing compounds like urea, salts, acids and alkalis. Spleen. The function of the spleen is to clean blood, destroy old blood cells

and fight infection. The spleen acts as a filter for blood, cleansing it of bacteria, viruses and other debris.

When blood flows through your spleen white blood cells attack any tottering invaders. The spleen bread KS down old b transported elsewhere to be excreted or recycled. Cells and the remains are Bladder. The function of the bladder is to store urine. Urine is transported to the bladder via Reuters. As your bladder fills up it stretches. When the bladder stretches beyond a certain point, nerves in the bladder wall send a message to the brain telling it that the bladder is full and needs to be emptied. The bladder is opened by a sphincter, when you decide to urinate, the brain tells the sphincter to relax, opening the sphincter.

At this point the bladder contracts, forcing the urine down the urethra and out of the body. Bones. The function of bones is to provide the structure for the tissues and organs to form around. They enable the body to move in conjunction with muscles. Blood cells are created within the bone marrow in the centre of the bones. Bones provide mineral storage for calcium and phosphorus for the body. These minerals are used in chemical cellular reactions within the body. Muscle. The function of the muscle is to enable all or part of the body to move.

Muscles respond to stimulus from the nervous system to enable voluntary or involuntary muscle movement. Uterus. The function of the uterus is to nourish and house a fertilized egg until the offspring are ready to be delivered. B) Outline the gross structure and function of all the main body systems and explain how these systems interrelate Circulatory System,

includes the heart, blood and blood vessels, it transports substances around the body. Digestive System, includes the stomach, pancreas and intestines, it digests the food e eat and absorbs the nutrients into the blood.

Reproductive System, includes the testes and penis in males to make and deliver sperm and includes ovaries and uterus in females to make eggs and provide for a developing baby. Urinary System, includes the bladder and kidneys to remove urea, salt and water as urine. Respiratory System, includes the lungs, trachea and diaphragm to transfer oxygen from the air into the body and removes carbon dioxide. Nervous System, includes the brain and nerves, it controls the bodies activities and links the rest of the body to the brain and passes messages between them. Endocrine System, consists of the endocrine glands, they produce hormones.

Muscular System, consists tot the muscles, to enable the body to move. Intermediary System, includes the hair, skin and senses and help the body to thermo regulate. Lymphatic System, includes lymph vessels and nodes, they maintain the blood volume and help to fight infection. Interrelationships Between Systems All body systems work together in a delicate balance to maintain the body in optimal health. The skeletal system provides support and creates the bodies framework. Without this structure our bodies would collapse. The bones protect the internal organs of the respiratory and cardiovascular systems as well as the fragile body tissues.

The respiratory system benefits from bone marrow which produces red blood cells for the body. The skeletal system provides a bone structure for the muscles to attach to which allows the body to move. When muscles are

stimulated by the nervous system, they contract, moving the bones they are attached to. There are also involuntary muscles that keep our hearts pumping and our lungs breathing. The circulatory system delivers oxygen from the respiratory system as well as levering the nutrients from the digestive system and the hormones from the endocrine system around the body to where they are required.

The reproductive system works with the endocrine and circulatory systems in the release and delivery of hormones required to reproduce. The endocrine system releases the hormones which are carried around the body in the blood. The circulatory, urinary and digestive systems work together to eliminate waste that the body doesn’t need. The circulatory system pumps the blood around the body which picks up waste and toxins from the digestive system. The kidneys then filter the blood to remove the liquid toxins. The nervous, circulatory and intermediary system works together to thermo regulate the body.