THE STRUCTURE OF ANIMAL LIFE pdf

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General Concepts Protozoa Protozoa are one-celled animals found worldwide in most habitats. Most species are free living, but all higher animals are infected with one or more species of protozoa. Infections range from asymptomatic to life threatening, depending on the species and strain of the parasite and the resistance of the host. Structure Protozoa are microscopic unicellular eukaryotes that have a relatively complex internal structure and carry out complex metabolic activities. Some protozoa have structures for propulsion or other types of movement. Classification On the basis of light and electron microscopic morphology, the protozoa are currently classified into six phyla. Most species causing human disease are members of the phyla Sacromastigophora and Apicomplexa. Life Cycle Stages The stages of parasitic protozoa that actively feed and multiply are frequently called trophozoites; in some protozoa, other terms are used for these stages. Cysts are stages with a protective membrane or thickened wall. Protozoan cysts that must survive outside the host usually have more resistant walls than cysts that form in tissues. Reproduction Binary fission, the most common form of reproduction, is asexual; multiple asexual division occurs in some forms. Both sexual and asexual reproduction occur in the Apicomplexa. Nutrition All parasitic protozoa require preformed organic substancesâ€"that is, nutrition is holozoic as in higher animals. Introduction The Protozoa are considered to be a subkingdom of the kingdom Protista, although in the classical system they were placed in the kingdom Animalia. More than 50, species have been described, most of which are free-living organisms; protozoa are found in almost every possible habitat. The fossil record in the form of shells in sedimentary rocks shows that protozoa were present in the Pre-cambrian era. Anton van Leeuwenhoek was the first person to see protozoa, using microscopes he constructed with simple lenses. Between and , he described, in addition to free-living protozoa, several parasitic species from animals, and Giardia lamblia from his own stools. Virtually all humans have protozoa living in or on their body at some time, and many persons are infected with one or more species throughout their life. Some species are considered commensals, i. Protozoan diseases range from very mild to life-threatening. Individuals whose defenses are able to control but not eliminate a parasitic infection become carriers and constitute a source of infection for others. Many protozoan infections that are inapparent or mild in normal individuals can be life-threatening in immunosuppressed patients, particularly patients with acquired immune deficiency syndrome AIDS. Evidence suggests that many healthy persons harbor low numbers of Pneumocystis carinii in their lungs. However, this parasite produces a frequently fatal pneumonia in immunosuppressed patients such as those with AIDS. Toxoplasma gondii, a very common protozoan parasite, usually causes a rather mild initial illness followed by a long-lasting latent infection. AIDS patients, however, can develop fatal toxoplasmic encephalitis. Cryptosporidium was described in the 19th century, but widespread human infection has only recently been recognized. Cryptosporidium is another protozoan that can produce serious complications in patients with AIDS. Microsporidiosis in humans was reported in only a few instances prior to the appearance of AIDS. It has now become a more common infection in AIDS patients. As more thorough studies of patients with AIDS are made, it is likely that other rare or unusual protozoan infections will be diagnosed. Acanthamoeba species are free-living amebas that inhabit soil and water. Cyst stages can be airborne. Serious eye-threatening corneal ulcers due to Acanthamoeba species are being reported in individuals who use contact lenses. The parasites presumably are transmitted in contaminated lens-cleaning solution. Amebas of the genus Naegleria, which inhabit bodies of fresh water, are responsible for almost all cases of the usually fatal disease primary amebic meningoencephalitis. The amebas are thought to enter the body from water that is splashed onto the upper nasal tract during swimming or diving. Human infections of this type were predicted before they were recognized and reported, based on laboratory studies of Acanthamoeba infections in cell cultures and in animals. The lack of effective vaccines, the paucity of reliable drugs, and other problems, including difficulties of vector control, prompted the World Health Organization to target six diseases for increased research and training. Three of these were protozoan infectionsâ€"malaria, trypanosomiasis, and leishmaniasis. Although new information on these diseases has been gained, most of the problems with control persist. Protozoa are unicellular eukaryotes. As in all eukaryotes, the nucleus is enclosed in a membrane. In protozoa other than ciliates, the nucleus is vesicular, with scattered chromatin giving a diffuse appearance to the nucleus, all nuclei in the individual organism appear alike. One type of vesicular nucleus contains a more or less central body, called an endosome or karyosome. The endosome lacks DNA in the parasitic amebas and trypanosomes. In the phylum Apicomplexa, on the other hand, the vesicular nucleus has one or more nucleoli that contain DNA. The ciliates have both a micronucleus and macronucleus, which appear quite homogeneous in composition. The organelles of protozoa have functions similar to the organs of higher animals. The plasma membrane enclosing the cytoplasm also covers the projecting locomotory structures such as pseudopodia, cilia, and flagella. The outer surface layer of some protozoa, termed a pellicle, is sufficiently rigid to maintain a distinctive shape, as in the trypanosomes and Giardia. However, these organisms can readily twist and bend when moving through their environment. In most protozoa the cytoplasm is differentiated into ectoplasm the outer, transparent layer and endoplasm the inner layer containing organelles ; the structure of the cytoplasm is most easily seen in species with projecting pseudopodia, such as the amebas. Contractile vacuoles for osmoregulation occur in some, such as Naegleria and Balantidium. Many protozoa have subpellicular microtubules; in the Apicomplexa, which have no external organelles for locomotion, these provide a means for slow movement. The trichomonads and trypanosomes have a distinctive undulating membrane between the body wall and a flagellum. Many other structures occur in parasitic protozoa, including the Golgi apparatus, mitochondria, lysosomes, food vacuoles, conoids in the Apicomplexa, and other specialized structures. Electron microscopy is essential to visualize the details of protozoal structure. From the point of view of functional and physiologic complexity, a protozoan is more like an animal than like a single cell. Figure shows the structure of the bloodstream form of a trypanosome, as determined by electron microscopy. Fine structure of a protozoan parasite, Typanosoma evansi, as revealed by transmission electron microcopy of thin sections. Adapted from Vickerman K: Classification In the Society of Protozoologists published a taxonomic scheme that distributed the Protozoa into six phyla. Two of these phylaâ€"the Sarcomastigophora and the Apicomplexa--contain the most important species causing human disease. This scheme is based on morphology as revealed by light, electron, and scanning microscopy. Dientamoeba fragilis, for example, had been thought to be an ameba and placed in the family Entamoebidae. However, internal structures seen by electron microscopy showed that it is properly placed in the order Trichomonadida of flagellate protozoa. In some instances, organisms that appear identical under the microscope have been assigned different species names on the basis of such criteria as geographic distribution and clinical manifestations; a good example is the genus Leishmania, for which subspecies names are often used. Biochemical methods have been employed on strains and species to determine isoenzyme patterns or to identify relevant nucleotide sequences in RNA, DNA, or both. Extensive studies have been made on the kinetoplast, a unique mitochondrion found in the hemoflagellates and other members of the order Kinetoplastida. The DNA associated with this organelle is of great interest. Cloning is widely used in taxonomic studies, for example to study differences in virulence or disease manifestations in isolates of a single species obtained from different hosts or geographic regions. Antibodies particularly monoclonal antibodies to known species or to specific antigens from a species are being employed to identify unknown isolates. Eventually, molecular taxonomy may prove to be a more reliable basis than morphology for protozoan taxonomy, but the microscope is still the most practical tool for identifying a protozoan parasite. Table lists the medically important protozoa. Classification of Parasitic Protozoa and Associated Diseases. Life Cycle Stages During its life cycle, a protozoan generally passes through several stages that differ in structure and activity. In parasitic species this is the stage usually associated with pathogenesis. In the hemoflagellates the terms amastigote, promastigote, epimastigote, and trypomastigote designate trophozoite stages that differ in the absence or presence of a flagellum and in the position of the kinetoplast associated with the flagellum. A variety of terms are employed for stages in the Apicomplexa, such as tachyzoite and bradyzoite for Toxoplasma gondii. Other stages in the complex asexual and sexual life cycles seen in this phylum are the merozoite the form resulting from fission of a multinucleate schizont and sexual stages such as gametocytes and gametes. Some protozoa form cysts that contain one or more infective forms. Multiplication occurs in the cysts of some species so that excystation releases more than one organism. For example, when the trophozoite of Entamoeba histolytica first forms a cyst, it has a single nucleus. As the cyst matures nuclear division produces four nuclei and during excystation four uninucleate metacystic amebas appear. Similarly, a freshly encysted Giardia lamblia has the same number of internal structures organelles as the trophozoite. However, as the cyst matures the organelles double and two trophozoites are formed. Cysts passed in stools have a protective wall, enabling the parasite to survive in the outside environment for a period ranging from days to a year, depending on the species and environmental conditions. Cysts formed in tissues do not usually have a heavy protective wall and rely upon carnivorism for transmission. Oocysts are stages resulting from sexual reproduction in the Apicomplexa. Some apicomplexan oocysts are passed in the feces of the host, but the oocysts of Plasmodium, the agent of malaria, develop in the body cavity of the mosquito vector. Reproduction Reproduction in the Protozoa may be asexual, as in the amebas and flagellates that infect humans, or both asexual and sexual, as in the Apicomplexa of medical importance. The most common type of asexual multiplication is binary fission, in which the organelles are duplicated and the protozoan then divides into two complete organisms. Division is longitudinal in the flagellates and transverse in the ciliates; amebas have no apparent anterior-posterior axis. Endodyogeny is a form of asexual division seen in Toxoplasma and some related organisms. Two daughter cells form within the parent cell, which then ruptures, releasing the smaller progeny which grow to full size before repeating the process. In schizogony, a common form of asexual division in the Apicomplexa, the nucleus divides a number of times, and then the cytoplasm divides into smaller uninucleate merozoites. In Plasmodium, Toxoplasma, and other apicomplexans, the sexual cycle involves the production of gametes gamogony , fertilization to form the zygote, encystation of the zygote to form an oocyst, and the formation of infective sporozoites sporogony within the oocyst.

2: Animal - Wikipedia

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Animal Cell Structure Animal cells are typical of the eukaryotic cell, enclosed by a plasma membrane and containing a membrane-bound nucleus and organelles. Unlike the eukaryotic cells of plants and fungi, animal cells do not have a cell wall. This feature was lost in the distant past by the single-celled organisms that gave rise to the kingdom Animalia. Most cells, both animal and plant, range in size between 1 and micrometers and are thus visible only with the aid of a microscope. The lack of a rigid cell wall allowed animals to develop a greater diversity of cell types, tissues, and organs. The ability to move about by the use of specialized muscle tissues is a hallmark of the animal world, though a few animals, primarily sponges, do not possess differentiated tissues. Notably, protozoans locomote, but it is only via nonmuscular means, in effect, using cilia, flagella, and pseudopodia. The animal kingdom is unique among eukaryotic organisms because most animal tissues are bound together in an extracellular matrix by a triple helix of protein known as collagen. Plant and fungal cells are bound together in tissues or aggregations by other molecules, such as pectin. The fact that no other organisms utilize collagen in this manner is one of the indications that all animals arose from a common unicellular ancestor. Bones, shells, spicules, and other hardened structures are formed when the collagen-containing extracellular matrix between animal cells becomes calcified. Animals are a large and incredibly diverse group of organisms. Making up about three-quarters of the species on Earth, they run the gamut from corals and jellyfish to ants, whales, elephants, and, of course, humans. Being mobile has given animals, which are capable of sensing and responding to their environment, the flexibility to adopt many different modes of feeding, defense, and reproduction. Unlike plants, however, animals are unable to manufacture their own food, and therefore, are always directly or indirectly dependent on plant life. Most animal cells are diploid, meaning that their chromosomes exist in homologous pairs. Different chromosomal ploidies are also, however, known to occasionally occur. The proliferation of animal cells occurs in a variety of ways. In instances of sexual reproduction, the cellular process of meiosis is first necessary so that haploid daughter cells, or gametes, can be produced. Two haploid cells then fuse to form a diploid zygote, which develops into a new organism as its cells divide and multiply. The earliest fossil evidence of animals dates from the Vendian Period to million years ago , with coelenterate-type creatures that left traces of their soft bodies in shallow-water sediments. The first mass extinction ended that period, but during the Cambrian Period which followed, an explosion of new forms began the evolutionary radiation that produced most of the major groups, or phyla, known today. Vertebrates animals with backbones are not known to have occurred until the early Ordovician Period to million years ago. Illustrated in Figure 2 are a pair of fibroblast deer skin cells that have been labeled with fluorescent probes and photographed in the microscope to reveal their internal structure. The nuclei are stained with a red probe, while the Golgi apparatus and microfilament actin network are stained green and blue, respectively. The microscope has been a fundamental tool in the field of cell biology and is often used to observe living cells in culture. Use the links below to obtain more detailed information about the various components that are found in animal cells. Centrioles - Centrioles are self-replicating organelles made up of nine bundles of microtubules and are found only in animal cells. Cilia and Flagella - For single-celled eukaryotes, cilia and flagella are essential for the locomotion of individual organisms. In multicellular organisms, cilia function to move fluid or materials past an immobile cell as well as moving a cell or group of cells. Endoplasmic Reticulum - The endoplasmic reticulum is a network of sacs that manufactures, processes, and transports chemical compounds for use inside and outside of the cell. It is connected to the double-layered nuclear envelope, providing a pipeline between the nucleus and the cytoplasm. Endosomes and Endocytosis - Endosomes are membrane-bound vesicles, formed via a complex family of processes collectively known as endocytosis, and found in the cytoplasm of virtually every animal cell. The basic mechanism of endocytosis is the reverse of what occurs during exocytosis or cellular secretion. It modifies proteins and fats built in the endoplasmic reticulum and prepares them for export to the outside of the cell. Intermediate Filaments - Intermediate filaments are a very broad class of fibrous proteins that play an important role as both structural and functional elements of the cytoskeleton. Ranging in size from 8 to 12 nanometers, intermediate filaments function as tension-bearing elements to help maintain cell shape and rigidity. Lysosomes - The main function of these microbodies is digestion. Lysosomes break down cellular waste products and debris from outside the cell into simple compounds, which are transferred to the cytoplasm as new cell-building materials. Microfilaments - Microfilaments are solid rods made of globular proteins called actin. These filaments are primarily structural in function and are an important component of the cytoskeleton. Mitochondria - Mitochondria are oblong shaped organelles that are found in the cytoplasm of every eukaryotic cell. In the animal cell, they are the main power generators, converting oxygen and nutrients into energy. Nucleus - The nucleus is a highly specialized organelle that serves as the information processing and administrative center of the cell. This organelle has two major functions: Peroxisomes - Microbodies are a diverse group of organelles that are found in the cytoplasm, roughly spherical and bound by a single membrane. There are several types of microbodies but peroxisomes are the most common. Plasma Membrane - All living cells have a plasma membrane that encloses their contents. In prokaryotes, the membrane is the inner layer of protection surrounded by a rigid cell wall. Eukaryotic animal cells have only the membrane to contain and protect their contents. These membranes also regulate the passage of molecules in and out of the cells. Ribosomes - All living cells contain ribosomes, tiny organelles composed of approximately 60 percent RNA and 40 percent protein. In eukaryotes, ribosomes are made of four strands of RNA. In prokaryotes, they consist of three strands of RNA. In addition the optical and electron microscope, scientists are able to use a number of other techniques to probe the mysteries of the animal cell. Cells can be disassembled by chemical methods and their individual organelles and macromolecules isolated for study. The process of cell fractionation enables the scientist to prepare specific components, the mitochondria for example, in large quantities for investigations of their composition and functions. Using this approach, cell biologists have been able to assign various functions to specific locations within the cell. Send us an email. Davidson and The Florida State University.

3: Molecular Expressions Cell Biology: Animal Cell Structure

The Structure of Animal Life Six Lectures Delivered at the Brooklyn Academy of Music in January and February, by Louis Agassiz Six Lectures Delivered at the Brooklyn Academy of Music in January and February,

Bring fact-checked results to the top of your browser search. Animal life The profusion of vegetation types and a variety of relief have allowed a great diversity of animal life to develop and have permitted animals to survive there that elsewhere are extinct. Notable among such survivals are the great paddlefish of the Yangtze, the species of small alligator in eastern and central China, and the giant salamander related to the Japanese giant salamander and the American hellbender in western China. The diversity of animal life is perhaps greatest in the ranges and valleys of Tibet and Sichuan , the latter province being renowned as the home of the giant panda. The takin a type of goat antelope , numerous species of pheasant s, and a variety of laughing thrushes are found in all Chinese mountain ranges. China seems to be one of the chief centres of dispersal of the carp family and also of old-world catfishes. Resemblances in the Northeast are to the fauna of the Siberian forests. Animals from Central Asia inhabit suitable steppe areas in northern China. The life of the great mountain ranges is Palearctic relating to a biogeographic region that includes Europe, Asia north of the Himalayas , northern Arabia, and Africa north of the Sahara but with distinctively Chinese species or genera. To the southeast the lowlands and mountains alike permit direct access to the eastern region. This part of China presents a complete transition from temperate-zone Palearctic life to the wealth of tropical forms distinctive of southeastern Asia. Tropical types of reptiles, amphibians, birds, and mammals predominate in the southernmost Chinese provinces. People Ethnic groups China is a multinational country, with a population composed of a large number of ethnic and linguistic groups. The Han Chinese , the largest group, outnumber the minority groups or minority nationalities in every province or autonomous region except Tibet and Xinjiang. The Han, therefore, form the great homogeneous mass of the Chinese people, sharing the same culture , the same traditions, and the same written language. Where these minority groups are found in large numbers, they have been given some semblance of autonomy and self-government; autonomous regions of several types have been established on the basis of the geographic distribution of nationalities. Ethnic composition General ethnic composition of China. The government takes great credit for its treatment of these minorities; it has advanced their economic well-being, raised their living standards , provided educational facilities, promoted their national languages and cultures , and raised their literacy levels, as well as introduced a written language where none existed previously. It must be noted, however, that some minorities e. Still, of the odd minority languages, only 20 had written forms before the coming of the communist regime in ; and only relatively few written languagesâ€”e. Other written languages were used chiefly for religious purposes and by a limited number of people. Educational institutions for national minorities are a feature of many large cities, notably Beijing , Wuhan , Chengdu , and Lanzhou.

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4: SparkNotes: SAT Subject Test: Biology: Structure and Function of Animals

IN bequeathing to the Brooklyn Institute a fund the interest of which was to be applied to the purchase Of pictures by the best American artists, Mr. Graham, no doubt, proposed to him self gradually to build up a gallery in Brooklyn which Should Show to future generations the state of the arts in.

The Grade 5 Life Science Unit focuses on transport systems in animals respiratory, circulatory, digestive and excretory and plants roots, stems-xylem and phloem, leaves and addresses the California Science Standards for 5th grade Life Science. By the end of the unit students will know the main idea that structure and function are related in living organisms. Specifically students will know that: The Grade 5 Life Science Unit is presented to students through a series of investigations, experiments, active learning experiences, questions, and assessments. Transport Systems in Animals and Plants builds on the concepts presented on conceptual flow graphic by describing the concept s addressed in each lesson and the links that connect each lesson to the next. Lessons are linked to the previous lesson and the lesson that follows via a conceptual storyline to enable the development of student understanding as they progress from one concept to the next. In this lesson students learn that living things demonstrate a hierarchy of structure from cells to tissues to organs to organ systems to organism. In the previous lesson students learned levels of organization. Students use sport balls e. Formative Assessment 1 is aligned to the concepts in Lessons As a formative assessment, student answers provide feedback to the teacher and student for any adjustments in the learning. In Formative Assessment 1 students demonstrate their understanding of the organizational levels of living things and share their understanding of structure and function by answering five open-ended prompts. The next set of lessons addresses the structure and function of four different transport systems respiration, circulation, digestion, excretion found in animals. With each new system, students are first asked to draw what they know about the system, and then in the course of the lessons about the system, they compare their new learning with their original thoughts. They learn the structure and function of the lungs and how changes in air pressure allow air to enter and leave the lungs. Using diagrams and discussion, students learn about the structure of the heart including the parts and the related functions. They are able to compare their drawings from Lesson 5 with a real heart in Lesson 6. Formative Assessment 2 is aligned to the concepts in Lessons 5 and 6. In Formative Assessment 2 students participate in a performance assessment to determine the effect of various activities on their heart rate. Students take their pulse after sitting, walking, jogging and doing jumping jacks. They record their data in a chart, graph the data, and create summary statements about the data. Students play a simulation game moving blood from the heart, around the body and back to the heart. Using diagrams and discussion, students trace the conversion of oxygen-rich blood into blood that carries carbon dioxide, which is then expelled through the lungs. In the previous lesson, students learned about how digestions begin in the mouth. Be prepared for a memorable event! Formative Assessment 3 is given after Lessons 9 and 10 as a creative writing prompt for students to show their understanding of the digestive system. In this lesson, students build a model of the excretory system and explain its structure and function. Formative Assessment 4 is given after Lesson 11 as an indicator of student understanding from Lessons that the body has four major systems respiration, circulation, digestion and excretory for transporting nutrients and waste. Each system is made of specific organs that perform specific functions. The functions of the systems are inter-related. In this assessment, students demonstrate their knowledge by placing organs on their body outline to show the location of each system and its organs and then explain how each system works in relationship to another system. Lessons address transport in plants. In this lesson, students focus on root types. In the previous lessons, the students studied roots and stems as structures for transport. Students make leaf rubbings to identify stalk and veins. Through discussion with powerpoint slides, students also indentify microscopic components of the leaf that are necessary for photosynthesis: Formative Assessment 5 is given after Lesson 14 as an indicator of student understanding from Lessons about the structure and function of plant transport. The unit concludes with two lessons that introduce the concept of photosynthesis and cellular respiration and the relationship between the two. Plants use photosynthesis to make food and release oxygen and plants and animals use cellular respiration to break down food sugars and release carbon dioxide. Using an experiment with their breath, an indicator, and elodea a plant , students observe as carbon dioxide is converted to oxygen. Through discussion, students understand that photosynthesis occurs in plants, while cellular respiration occurs in animals and plants. Therefore, plants need oxygen too! This is the last lesson in this unit. Students label each reaction and write about their relationship. Upon completion of the 16 lessons, students take a Post-Assessment to determine their overall understanding of the concepts presented in the unit.

5: Cell (biology) - Wikipedia

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Cell membrane and membrane-bound organelles Subcellular components All cells, whether prokaryotic or eukaryotic , have a membrane that envelops the cell, regulates what moves in and out selectively permeable , and maintains the electric potential of the cell. There are also other kinds of biomolecules in cells. This article lists these primary cellular components , then briefly describes their function. Cell membrane Detailed diagram of lipid bilayer cell membrane The cell membrane , or plasma membrane, is a biological membrane that surrounds the cytoplasm of a cell. In animals, the plasma membrane is the outer boundary of the cell, while in plants and prokaryotes it is usually covered by a cell wall. This membrane serves to separate and protect a cell from its surrounding environment and is made mostly from a double layer of phospholipids , which are amphiphilic partly hydrophobic and partly hydrophilic. Hence, the layer is called a phospholipid bilayer , or sometimes a fluid mosaic membrane. Embedded within this membrane is a variety of protein molecules that act as channels and pumps that move different molecules into and out of the cell. Cell surface membranes also contain receptor proteins that allow cells to detect external signaling molecules such as hormones. Cytoskeleton A fluorescent image of an endothelial cell. Nuclei are stained blue, mitochondria are stained red, and microfilaments are stained green. The eukaryotic cytoskeleton is composed of microfilaments , intermediate filaments and microtubules. The subunit of microtubules is a dimeric molecule called tubulin. Intermediate filaments are heteropolymers whose subunits vary among the cell types in different tissues. But some of the subunit protein of intermediate filaments include vimentin , desmin , lamin lamins A, B and C , keratin multiple acidic and basic keratins , neurofilament proteins NFâ€”L, NFâ€”M. Genetic material Two different kinds of genetic material exist: Cells use DNA for their long-term information storage. The biological information contained in an organism is encoded in its DNA sequence. Prokaryotic genetic material is organized in a simple circular bacterial chromosome in the nucleoid region of the cytoplasm. Eukaryotic genetic material is divided into different, [3] linear molecules called chromosomes inside a discrete nucleus, usually with additional genetic material in some organelles like mitochondria and chloroplasts see endosymbiotic theory. A human cell has genetic material contained in the cell nucleus the nuclear genome and in the mitochondria the mitochondrial genome. In humans the nuclear genome is divided into 46 linear DNA molecules called chromosomes , including 22 homologous chromosome pairs and a pair of sex chromosomes. Although the mitochondrial DNA is very small compared to nuclear chromosomes, [3] it codes for 13 proteins involved in mitochondrial energy production and specific tRNAs. Foreign genetic material most commonly DNA can also be artificially introduced into the cell by a process called transfection. Certain viruses also insert their genetic material into the genome. There are several types of organelles in a cell. Some such as the nucleus and golgi apparatus are typically solitary, while others such as mitochondria , chloroplasts , peroxisomes and lysosomes can be numerous hundreds to thousands. The cytosol is the gelatinous fluid that fills the cell and surrounds the organelles. The central and rightmost cell are in interphase , so their DNA is diffuse and the entire nuclei are labelled. The cell on the left is going through mitosis and its chromosomes have condensed. The nucleus is spherical and separated from the cytoplasm by a double membrane called the nuclear envelope. This mRNA is then transported out of the nucleus, where it is translated into a specific protein molecule. The nucleolus is a specialized region within the nucleus where ribosome subunits are assembled. In prokaryotes, DNA processing takes place in the cytoplasm. Mitochondria are self-replicating organelles that occur in various numbers, shapes, and sizes in the cytoplasm of all eukaryotic cells. Mitochondria multiply by binary fission , like prokaryotes. Diagram of the endomembrane system Endoplasmic reticulum: The endoplasmic reticulum ER is a transport network for molecules targeted for certain modifications and specific destinations, as compared to molecules that float freely in the cytoplasm. The ER has two forms: The primary function of the Golgi apparatus is to process and package the macromolecules such as proteins and lipids that are synthesized by the cell. Lysosomes contain digestive enzymes acid hydrolases. They digest excess or worn-out organelles , food particles, and engulfed viruses or bacteria. Peroxisomes have enzymes that rid the cell of toxic peroxides. The cell could not house these destructive enzymes if they were not contained in a membrane-bound system. The centrosome produces the microtubules of a cell â€” a key component of the cytoskeleton. It directs the transport through the ER and the Golgi apparatus. Centrosomes are composed of two centrioles , which separate during cell division and help in the formation of the mitotic spindle. A single centrosome is present in the animal cells. They are also found in some fungi and algae cells. Vacuoles sequester waste products and in plant cells store water. They are often described as liquid filled space and are surrounded by a membrane. Some cells, most notably Amoeba , have contractile vacuoles, which can pump water out of the cell if there is too much water. The vacuoles of plant cells and fungal cells are usually larger than those of animal cells. Eukaryotic and prokaryotic Ribosomes: The ribosome is a large complex of RNA and protein molecules. Ribosomes can be found either floating freely or bound to a membrane the rough endoplasmatic reticulum in eukaryotes, or the cell membrane in prokaryotes. These structures are notable because they are not protected from the external environment by the semipermeable cell membrane. In order to assemble these structures, their components must be carried across the cell membrane by export processes. Cell wall Further information: Cell wall Many types of prokaryotic and eukaryotic cells have a cell wall. The cell wall acts to protect the cell mechanically and chemically from its environment, and is an additional layer of protection to the cell membrane. Different types of cell have cell walls made up of different materials; plant cell walls are primarily made up of cellulose , fungi cell walls are made up of chitin and bacteria cell walls are made up of peptidoglycan. Prokaryotic Capsule A gelatinous capsule is present in some bacteria outside the cell membrane and cell wall. The capsule may be polysaccharide as in pneumococci , meningococci or polypeptide as Bacillus anthracis or hyaluronic acid as in streptococci. Capsules are not marked by normal staining protocols and can be detected by India ink or methyl blue ; which allows for higher contrast between the cells for observation. The bacterial flagellum stretches from cytoplasm through the cell membrane s and extrudes through the cell wall. They are long and thick thread-like appendages, protein in nature. A different type of flagellum is found in archaea and a different type is found in eukaryotes. Fimbria A fimbria also known as a pilus is a short, thin, hair-like filament found on the surface of bacteria. Fimbriae, or pili are formed of a protein called pilin antigenic and are responsible for attachment of bacteria to specific receptors of human cell cell adhesion. There are special types of specific pili involved in bacterial conjugation. Cellular processes Prokaryotes divide by binary fission , while eukaryotes divide by mitosis or meiosis. Cell division Cell division involves a single cell called a mother cell dividing into two daughter cells. This leads to growth in multicellular organisms the growth of tissue and to procreation vegetative reproduction in unicellular organisms. Prokaryotic cells divide by binary fission , while eukaryotic cells usually undergo a process of nuclear division, called mitosis , followed by division of the cell, called cytokinesis. A diploid cell may also undergo meiosis to produce haploid cells, usually four. Haploid cells serve as gametes in multicellular organisms, fusing to form new diploid cells. This occurs during the S phase of the cell cycle. In meiosis, the DNA is replicated only once, while the cell divides twice. DNA replication only occurs before meiosis I. DNA replication does not occur when the cells divide the second time, in meiosis II. This RNA is then subject to post-transcriptional modification and control, resulting in a mature mRNA red that is then transported out of the nucleus and into the cytoplasm peach , where it undergoes translation into a protein. Newly synthesized proteins black are often further modified, such as by binding to an effector molecule orange , to become fully active. Cell growth and Metabolism Between successive cell divisions, cells grow through the functioning of cellular metabolism. Cell metabolism is the process by which individual cells process nutrient molecules. Metabolism has two distinct divisions: Complex sugars consumed by the organism can be broken down into simpler sugar molecules called monosaccharides such as glucose. Once inside the cell, glucose is broken down to make adenosine triphosphate ATP , [3] a molecule that possesses readily available energy, through two different pathways. Protein synthesis Main article: Protein biosynthesis Cells are capable of synthesizing new proteins, which are essential for the modulation and maintenance of cellular activities. Protein synthesis generally consists of two major steps: The ribosome mediates the formation of a polypeptide sequence based on the mRNA sequence. The new polypeptide then folds into a functional three-dimensional protein molecule. Motility Unicellular organisms can move in order to find food or escape predators. Common mechanisms of motion include flagella and cilia. In multicellular organisms, cells can move during processes such as wound healing, the immune response and cancer metastasis. For example, in wound healing in animals, white blood cells move to the wound site to kill the microorganisms that cause infection. Cell motility involves many receptors, crosslinking, bundling, binding, adhesion, motor and other proteins. Each step is driven by physical forces generated by unique segments of the cytoskeleton.

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6: The Structure of Animal Life

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Bring fact-checked results to the top of your browser search. Life cycles of animals Invertebrate animals have a rich variety of life cycles, especially among those forms that undergo metamorphosis , a radical physical change. Butterflies , for instance, have a caterpillar stage larva , a dormant chrysalis stage pupa , and an adult stage imago. One remarkable aspect of this development is that, during the transition from caterpillar to adult, most of the caterpillar tissue disintegrates and is used as food, thereby providing energy for the next stage of development, which begins when certain small structures imaginal disks in the larva start growing into the adult form. Thus, the butterfly undergoes essentially two periods of growth and development larva and pupaâ€"adult and two periods of small size fertilized egg and imaginal disks. A somewhat similar phenomenon is found in sea urchins ; the larva, which is called a pluteus , has a small, wartlike bud that grows into the adult while the pluteus tissue disintegrates. In both examples it is as if the organism has two life histories, one built on the ruins of another. Another life-cycle pattern found among certain invertebrates illustrates the principle that major differences between organisms are not always found in the physical appearance of the adult but in differences of the whole life history. In the coelenterate Obelia , for example, the egg develops into a colonial hydroid consisting of a series of branching Hydra-like organisms called polyps. Certain of these polyps become specialized reproductive polyps and bud off from the colony as free-swimming jellyfish medusae that bear eggs and sperm. As with caterpillars and sea urchins, two distinct phases occur in the life cycle of Obelia: In some related coelenterates the medusa form has been totally lost, leaving only the polyp stage to bear eggs and sperm directly. In still other coelenterates the polyp stage has been lost, and the medusae produce other medusae directly, without the sessile stage. There are, furthermore, intermediate forms between the extremes. Natural selection and reproduction The significance of biological reproduction can be explained entirely by natural selection see evolution: The concept of natural selection. In formulating his theory of natural selection, Charles Darwin realized that, in order for evolution to occur, not only must living organisms be able to reproduce themselves but the copies must not all be identical; that is, they must show some variation. In this way the more successful variants would make a greater contribution to subsequent generations in the number of offspring. For such selection to act continuously in successive generations, Darwin also recognized that the variations had to be inherited, although he failed to fathom the mechanism of heredity. Moreover, the amount of variation is particularly important. According to what has been called the principle of compromise, which itself has been shaped by natural selection, there must not be too little or too much variation: Of the numerous mechanisms for controlling variation, all of which involve a combination of checks and balances that work together, the most successful is that found in the large majority of all plants and animalsâ€"i. During the evolution of reproduction and variation, which are the two basic properties of organisms that not only are required for natural selection but are also subject to it, sexual reproduction has become ideally adapted to produce the right amount of variation and to allow new combinations of traits to be rapidly incorporated into an individual. The evolution of reproduction An examination of the way in which organisms have changed since their initial unicellular condition in primeval times shows an increase in multicellularity and therefore an increase in the size of both plants and animals. After cell reproduction evolved into multicellular growth, the multicellular organism evolved a means of reproducing itself that is best described as life-cycle reproduction. Size increase has been accompanied by many mechanical requirements that have necessitated a selection for increased efficiency; the result has been a great increase in the complexity of organisms. In terms of reproduction this means a great increase in the permutations of cell reproduction during the process of evolutionary development. Size increase also means a longer life cycle, and with it a great diversity of patterns at different stages of the cycle. This is because each part of the life cycle is adaptive in that, through natural selection, certain characteristics have evolved for each stage that enable the organism to survive. The most extreme examples are those forms with two or more separate phases of their life cycle separated by a metamorphosis , as in caterpillars and butterflies; these phases may be shortened or extended by natural selection, as has occurred in different species of coelenterates. To reproduce efficiently in order to contribute effectively to subsequent generations is another factor that has evolved through natural selection. For instance, an organism can produce vast quantities of eggs of which, possibly by neglect, only a small percent will survive. On the other hand, an organism can produce very few or perhaps one egg , which, as it develops, will be cared for, thereby greatly increasing its chances for survival. These are two strategies of reproduction; each has its advantages and disadvantages. Many other considerations of the natural history and structure of the organism determine, through natural selection, the strategy that is best for a particular species; one of these is that any species must not produce too few offspring for it will become extinct or too many for it may also become extinct by overpopulation and disease. The numbers of some organisms fluctuate cyclically but always remain between upper and lower limits. The question of how, through natural selection, numbers of individuals are controlled is a matter of great interest; clearly, it involves factors that influence the rate of reproduction. The evolution of variation control Because inherited variation is largely handled by genes in the chromosomes, organisms that reproduce sexually require a single-cell stage in their life cycle, during which the haploid gamete of each parent can combine to form the diploid zygote. This is also often true in organisms that reproduce asexually, but in this case the asexual reproductive bodies e. The amount of variation is controlled in a large number of ways, all of which involve a carefully balanced set of factors. These factors include whether the organism reproduces asexually or sexually; the mutation gene change rate; the number of chromosomes; the amount of exchange of parts of chromosomes crossing over ; the size of the individual which correlates with complexity and generation time ; the size of the population; the degree of inbreeding versus outbreeding; and the relative amounts and position of haploidy and diploidy in the life cycle. It is clear, therefore, that the mode of reproduction influences the amount of variation and vice versa; the two together permit natural selection to operate, and selection in turn modifies the mechanisms of reproduction and variation.

7: Thunderbolt Kids

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Structure and Function of Animals In order to survive, animals must be able to coordinate the functions of their many specialized cells, take in and digest food, pull oxygen from the air, circulate nutrients and oxygen to their cells, eliminate wastes, move, maintain body temperature, and reproduce. Animals have also developed various behaviors that help them to survive. Control Systems Humans and other highly evolved animals have developed two main systems for coordinating and synchronizing the functions of their millions of individual cells. The nervous system works rapidly by transmitting electrochemical impulses. The endocrine system is a slower system of control; it works by releasing chemical signals into the circulation. In addition to coordinating essential bodily functions, these two control systems allow the animal to react to both its external and internal environments. The Nervous System The nervous system functions by the almost instantaneous transmission of electrochemical signals. The means of transmission are highly specialized cells known as neurons, which are the functional unit of the nervous system. The neuron is an elongated cell that usually consists of three main parts: The typical neuron contains many dendrites, which have the appearance of thin branches extending from the cell body. The cell body of the neuron contains the nucleus and organelles of the cell. The axon, which can sometimes be thousands of times longer than the rest of the neuron, is a single, long projection extending from the cell body. The axon usually ends in several small branches known as the axon terminals. Neurons are often connected in chains and networks, yet they never actually come in contact with one another. The axon terminals of one neuron is separated from the dendrites of an adjacent neuron by a small gap known as a synapse. The electrical impulse moving through a neuron begins in the dendrites. From there, it passes through the cell body and then travels along the axon. The impulse always follows the same path from dendrite to cell body to axon. When the electrical impulse reaches the synapse at the end of the axon, it causes the release of specialized chemicals known as neurotransmitters. These neurotransmitters carry the signal across the synapse to the dendrites of the next neuron, starting the process again in the next cell. The Resting Potential To understand the nature of the electrical impulse that travels along the neuron, it is necessary to look at the changes that occur in a neuron between when it is at rest and when it is carrying an impulse. When there is no impulse traveling through a neuron, the cell is at its resting potential and the inside of the cell contains a negative charge in relation to the outside. Maintaining a negative charge inside the cell is an active process that requires energy. The sodium-potassium pump builds up a high concentration of sodium ions outside the cell and an excess of potassium ions inside the cell. These ions naturally want to diffuse across the membrane to regularize the distribution. However, one of the special properties of phospholipid cell membranes is that they bar passage to ions unless there is a special protein channel that allows a particular ion in or out. No such channel exists for the sodium that is built up outside the cell, though there are potassium leak channels that allow some of the potassium ions to flow out of the cell. The difference in ion concentrations creates a net potential difference across the cell membrane of approximately â€”70 mV millivolts , which is the value of the resting potential. The Action Potential While most cells have some sort of resting potential from the movement of ions across their membranes, neurons are among only a few types of cells that can also form an action potential. The action potential is the electrochemical impulse that can travel along the neuron. These proteins respond to changes in the membrane potential by opening to allow certain ions to cross that would not normally be able to do so. The neuron contains both voltage-gated sodium channels and voltage-gated potassium channels, which open under different circumstances. The action potential begins when chemical signals from another neuron manage to depolarize, or make less negative, the potential of the cell membrane in one localized area of the neuron cell membrane, usually in the dendrites. If the neuron is stimulated enough so that the cell membrane potential in that area manages to reach as high as â€”50 mV from the resting potential of â€”70 mV , the voltage-gated sodium channels in that region of the membrane open up. The voltage at which the voltage-gated channels open is called the threshold potential, so the threshold potential in this case is â€”50 mV. With the flood of positive ions, the cell continues to depolarize. The positive potassium ions concentrated in the cell now rush out of the neuron, repolarizing the cell membrane to its negative resting potential. The membrane potential continues to drop, even beyond â€”70 mV, until the voltage-gated potassium channels close once again at around â€”90 mV. The whole process takes approximately one millisecond to occur. The action potential does not occur in one localized area of the neuron and then stop: This cycle continues to occur along the entire length of the neuron in a chain reaction. This lag prevents the action potential from moving backward to regions of the cell membrane that have already experienced an action potential. Speeding Up the Action Potential Axons of many neurons are surrounded by a structure known as the myelin sheath, a structure that helps to speed up the movement of action potentials along the axon. The sheath is built of Schwann cells, which wrap themselves around the axon of the neuron, leaving small gaps in between known as the nodes of Ranvier. The sodium and potassium ions that cause the action potential are only able to cross the cell membrane at the nodes of Ranvier, so the action potential does not have to occur along the entire length of the axon. Instead, when the action potential is triggered at one node, the sodium ions that enter the neuron will trigger an action potential at the next node. This causes the action potential to jump from node to node, greatly increasing its speed. This jumping of the action potential is called saltatory conduction. Some diseases such as multiple sclerosis can damage the myelin sheaths, greatly impeding conduction of impulses along the neurons. Strength of the Signal There is no such thing as a stronger or weaker action potential. If a neuron reaches the threshold to trigger an action potential, then the entire sequence of events, from depolarization to repolarization, will occur, and the same threshold potentials will be reached. For example, if the feel of lukewarm water and the burn of a hot iron triggered the same response, our sense of touch would be rather useless. The body communicates a stronger message not by creating a larger action potential, but by firing action potentials more rapidly. The burn of an iron may cause the heat receptors in our skin to fire action potentials at a rate of up to one hundred action potentials per second, while lukewarm water might trigger action potentials at less than half that rate. Transmitting an Impulse Between Neurons Neurons cannot directly pass an action potential from one to the next because of the synapses between them. Instead, neurons communicate across the synaptic clefts by the means of chemical signals known as neurotransmitters. When an action potential reaches the synapse, it causes the release of vesicles of these neurotransmitters, which diffuse across the gap and bind to receptors in the dendrites of the adjacent neuron. The neurotransmitters can be excitatory, causing an action potential in the next neuron, or inhibitory, preventing one. Excitatory neurotransmitters cause the target neuron to allow positive ions to enter it, which may or may not be enough to cause the membrane to reach the threshold potential of â€”50 mV that is needed to open the -voltage-gated sodium channels and initiate an action potential. Inhibitory neurotransmitters cause the target neuron to allow entrance to negative ions, carrying the neuron further from threshold and preventing it from firing an action potential. To form the nervous system, neurons are organized in a dense network. Each neuron shares a synapse with many other neurons, exposing each neuron to excitatory and inhibitory neurotransmitters simultaneously. The effects of all of the neurotransmitters working on a neuron at a given time are added up to determine whether or not an action potential will be fired. After a neurotransmitter has its effect on the target neuron, it usually either diffuses away from the synapse, is deactivated by enzymes in the synapse, or is absorbed by surrounding cells. Nervous System Organization As animals became more complex, their nervous systems evolved from the simple, unorganized networks of nerves that are found in cnidarians, such as jellyfish, and became more complicated and coordinated by a central control. Annelids and mollusks have simple, organized clusters of neurons known as ganglia. Many ganglia fuse in the head region of these organisms to form a primitive brain. Arthropods exhibit a more complex nervous system that includes many sensory organs such as antennae and compound eyes. Vertebrates mark the culmination of nervous system evolution. The vertebrate system is highly centralized, with a large brain that can process complex information and numerous specialized sensory organs. The Vertebrate Nervous System The vertebrate nervous system contains billions of individual neurons but can be divided into two main parts: The central nervous system, as its name implies, acts as central command. It receives sensory input from all regions of the body, integrates this information, and creates a response. The central nervous system controls the most basic functions essential for survival, such as breathing and digestion, and it is responsible for complex behavior and, in humans, consciousness. The peripheral nervous system refers to the pathways through which the central nervous system communicates with the rest of the organism. In highly evolved systems, such as the human nervous system, there are actually three types of neural building blocks: Also called afferent neurons. In response to some stimulus or as a voluntary action, motor neurons carry information away from the central nervous system to an organ or muscle. Also called efferent neurons. Provide the connection between sensory neurons and motor neurons. The Central Nervous System The central nervous system consists of the brain and the spinal cord. The spinal cord is a long cylinder of nervous tissue that extends along the vertebral column from the head to the lower back. Composed of many distinct structures working together to coordinate the body, the brain is a highly complex and poorly understood organ. You just need to know its basic structures and their functions. The brain is made up almost entirely of interneurons. The cerebrum is the largest portion of the brain and the seat of consciousness. The cerebrum controls all voluntary movement, sensory perception, speech, memory, and creative thought. The cerebellum does not initiate voluntary movement, but it helps fine-tune it. The cerebellum makes sure that movements are coordinated and balanced. The brainstem, specifically a portion of it known as the medulla oblongata, is responsible for the control of involuntary functions such as breathing, cardiovascular regulation, and swallowing. The medulla oblongata is absolutely essential for life and processes a great deal of information. The medulla also helps maintain alertness. The hypothalamus is responsible for the maintenance of homeostasis. It regulates temperature, controls hunger and thirst, and manages water balance. It also helps generate emotion. The spinal cord contains all three types of neurons. Axons of motor neurons extend from the spinal column into the peripheral nervous system, while the fibers of sensory neurons merge into the column from the PNS. Interneurons link the motor and sensory neurons, and they make up the majority of the neurons in the spinal column. In addition to the neurons, cells called glial cells are present to provide physical and metabolic support for neurons.

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8: 5th - Life Science - Living Systems | Science Matters

Animal Cell Structure Animal cells are typical of the eukaryotic cell, enclosed by a plasma membrane and containing a membrane-bound nucleus and organelles. Unlike the eukaryotic cells of plants and fungi, animal cells do not have a cell wall.

Purchase Books Assessment This assessment accompanies Unit 6 and should be given on the suggested assessment day or after completing the unit. Structures of Plants and Animals Unit Prep? Why do plants and animals have different internal and external structures? Writing Focus Areas Specific skills to focus on when giving feedback on writing assignments Informational Writing Focus Areas Specific skills to focus on when giving feedback on informational writing assignments Selects the most relevant text-based details and examples from the text Elaborates on text details to show an accurate understanding of literal and inferential details in the text All paragraphs are relevant to the overall claim Orders paragraphs in a structure that is planned least to most important, chronological order, flow of the text, etc. At this point in the year, most literary analysis focus corrections areas have been taught. Therefore, using data from previous assessments and class work, pick 3â€"4 high-leverage focus correction areas to review as a whole class and in small groups. Vocabulary Literary terms, text-based vocabulary, idioms and word parts to be taught with the text Text-based? Vocabulary words occurring in the text internal, external, microscopic, cell, function, tissue, organ, body system, pathogens, antibodies, plasma, reflex, circulates, arteries, veins, nerves, valves, ventricles, platelets, pulse, exhale, oxygen, transports, absorb, lung, carbon dioxide, inhale, deflate, mucus, cartilage, trachea, bronchus, heart, lung, alveoli, capacity, lens, cornea, iris, pupil, prism, predator, prey, roots, parasites Content Knowledge and Connections Specific background knowledge and facts covered in the unit Describe internal structures that support animal survival, growth, and behavior. Cells, tissues, organs, body systems, brain, lungs, heart, eyes Describe external structures that support animal survival, growth, and behavior. Legs, wings, fins, feathers, trunks, claws, horns, etc. Describe internal structures that support plant survival, growth, and behavior. Roots, leaves Describe external structures that support plant survival, growth, and behavior. Leaves, flower, bark, branches, fruit Previous Connections? Research and learn about the different internal structures animals use for survival, growth, behavior, and reproduction. Specifically, research and learn about cells, tissues, body systems, eyes, brain, respiratory system, and circulatory system. Research and learn about the different external structures animals use for survival, growth, behavior, and reproduction. Specifically, research and learn about legs, wings, fins, feathers, trunks, claws, and horns. Research and learn about the different internal structures plants use for survival, growth, behavior, and reproduction. Specifically, research and learn about: Research and learn about the different external structures plants use for survival, growth, behavior, and reproduction. Specifically, research and learn about roots and leaves. Look at additional resources on www. Research and learn about different animal respiratory systems for lesson Read and annotate all unit texts, noticing evidence of priority standards and key ideas of the unit. Take unit assessment and notice evidence of unit priority standards. Plan a visual to track different internal and external features of plants and animals, and the similarities between the two. Plan hands-on projects and labs to help students deeply engage with the material. Also find videos and images to help students visualize the different concepts from the unit. The lab for lesson 18 on plants may need to be introduced prior to lesson 18 so that students can observe and analyze how plants use internal and external structures for survival.

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In the hierarchical structure of life, cells are the simplest living www.enganchecubano.com organisms can be composed of trillions of www.enganchecubano.com the human body, there are hundreds of different types of cells.

The Cell Learning Objectives Diagram the components of a cell. Describe the organization of the human body. One cell divides into two, which begins the creation of millions of more cells that ultimately become you. A living organism conducts self-sustaining biological processes. A cell is the smallest and most basic form of life. Robert Hooke, one of the first scientists to use a light microscope, discovered the cell in In all life forms, including bacteria, plants, animals, and humans, the cell Basic structural and functional unit of all life. Based on scientific observations over the next years, scientists formulated the cell theory Cells are the most basic building units of life, all living things are composed of cells, and new cells are made from preexisting cells, which divide into two. The cell theory incorporates three principles: Cells are the most basic building units of life. All living things are composed of cells. New cells are made from preexisting cells, which divide into two. The two cells containing all of your genetic information DNA united to begin making new life. As an adult, you are comprised of trillions of cells. Each of your individual cells is a compact and efficient form of lifeâ€”self-sufficient, yet interdependent upon the other cells within your body to supply its needs. Independent single-celled organisms must conduct all the basic processes of life: Even a one-celled organism must be organized to perform these essential processes. All cells are organized from the atomic level to all its larger forms. Oxygen and hydrogen atoms combine to make the molecule water H_2O. Molecules bond together to make bigger macromolecules. The carbon atom is often referred to as the backbone of life because it can readily bond with four other elements to form long chains and more complex macromolecules. Four macromoleculesâ€”carbohydrates, lipids, proteins, and nucleic acidsâ€”make up all of the structural and functional units of cells. A cell can be thought of as a mini-organism consisting of tiny organs called organelles. The organelles A structural or functional unit in a cell that is constructed from several macromolecules bonded together. A typical animal cell contains the following organelles: In addition, animal cells contain little digestive pouches, called lysosomes and peroxisomes, which break down macromolecules and destroy foreign invaders.

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