Parts of skin diagram

The skin is the largest organ, and it's one of the most complicated. It's ever-changing, and it contains many specialized cells and structures. The skin's primary function is to serve as a protective barrier that interacts with a sometimes-hostile environment. It also helps regulate body temperature, gathers sensory information from the surrounding environment, and plays an active role in the immune system to protect the body from disease. Learning how the skin functions begins with an understanding of the structure of the three layers of skin: the epidermis, the dermis, and subcutaneous tissue. Its thickness depends on where it is located on the body. For example, it's thinnest on the eyelids half a millimeter. It's thickest on the palms of the hands and soles of the feet 1. The epidermis contains three specialized cells:. The dermis is the middle layer of the three layers of skin. It's located between the epidermis and the subcutaneous tissue. It contains connective tissue, blood capillaries, oil and sweat glands, nerve endings, and hair follicles. The dermis is split into two partsâ€"the papillary dermis, which is the thin, upper layer, and the reticular dermis, which is the thick, lower layer. The thickness of the dermis varies depending on its location on the body. On the eyelids, it's 0. The dermis is home to three different types of tissues that are present throughout:. The dermis contains several specialized cells and structures, including:. It's mostly made up of fat, connective tissue, and larger blood vessels and nerves. The thickness of this layer varies depending on where it's located on the bodyâ€"for example, it's thickest on the buttocks, the soles of the feet, and the palms of the hands. Subcutaneous tissue is a vital component of body temperature regulation. It also acts as a cushion, so if you ever fall or hit something with your body, it protects your insides and makes the injury hurt less. Sign up for our Health Tip of the Day newsletter, and receive daily tips that will help you live your healthiest life. The applied anatomy of human skin: A model for regeneration. Wound Medicine. National Center For Biotechnology Information. Anatomy, skin integument ,epidermis. Updated June Ono S, Kabashima K. Novel insights into the role of immune cells in skin and inducible skin-associated lymphoid tissue iSALT. Allergo J Int. Merkel cells are long-lived cells whose production is stimulated by skin injury. Dev Biol. Brown, T Krishnamurthy K. Histology, dermis. December Regeneration of dermis: scarring and cells involved. Merkel cells and Meissner's corpuscles in human digital skin display Piezo2 immunoreactivity. J Anat. Skin tissue regeneration for burn injury. Stem Cell Res Ther. What Is the Function of the Epidermis? Understanding the Subcutaneous Tissue. Was this page helpful? Thanks for your feedback! Sign Up. What are your concerns? Article Sources. Verywell Health uses only high-quality sources, including peer-reviewed studies, to support the facts within our articles. Read our editorial process to learn more about how we fact-check and keep our content accurate, reliable, and trustworthy. Robbins and Cotran Pathologic Basis of Disease. Philadelphia: Elsevier Saunders; Related Articles. The Anatomy of the Femoral Vein. The Anatomy of the Superior Vena Cava. What the Hypodermis Layer of the Skin Does. The Anatomy of the Subclavian Vein. What to Know About the Endocardium. Types of Skin Cancer. This barrier protects you from bacteria, changing temperatures, and chemical exposure. Your skin also feels sensation, communicating with your brain what is going on around you. Your skin, in cooperation with your nervous system, is the primary organ for your sense of touch. Skin has two main layers, both of which serve a purpose. Beneath the two layers is a layer of subcutaneous fat, which also protects your body and helps you adjust to outside temperatures. Some health conditions start or exist only in certain layers of your skin. Keep reading to understand more about the layers of the skin and their role in different diagnoses. The epidermis is the top layer of your skin. The epidermis is thicker than you might expect and has five sublayers. Your epidermis is constantly shedding dead skin cells from the top layer and replacing them with new healthy cells that grow in lower layers. It is also home to your pores, which allow oil and sweat to escape. There are conditions that start in the epidermis layer of your skin. These conditions can be caused by allergies, irritations, genetics, bacteria, or autoimmune reactions. Some of them are:. The dermis is thicker than the epidermis and contains all sweat and oil glands, hair follicles, connective tissues, nerve endings, and lymph vessels. While the epidermis covers your body in a visible layer, the dermis is the layer of skin that really enables the function of pathogen protection that your body needs. Since the dermis contains collagen and elastin, it also helps support the structure of skin that we see. Here are some of the conditions that occur in or start in the dermis. Some of these conditions can eventually impact your epidermis:. The layer of skin beneath the dermis is sometimes called the subcutaneous fat, subcutis, or hypodermis layer. This layer provides insulation for your body, keeping you warm. It also provides a cushion that works like a shock absorber surrounding your vital organs. There are plenty of blood vessels contained in the hypodermis. This is the layer that attaches your skin to the muscles and tissue below it. This layer can be thicker in some parts of your body than others and tends to be determined by genetics. One condition that occurs in this layer is called panniculitis. This

condition is characterized by inflammation in the layer of fatty tissue under your dermis. Sarcoidosis , a condition that causes lumps to form in your skin tissue, can also impact the hypodermis. It serves a critical health function, protecting you from disease and exposure. You can take good care of your skin by applying sunscreen all year round, staying hydrated, and making sure your diet includes plenty of vitamins A, C, E, and K. If you notice excessive bruising, wounds that have trouble healing, bleeding moles, painful cysts, or skin that tears easily, you should make an appointment with a health care professional. Stretch marks commonly appear during or after pregnancy, after a sudden change in your weight, or during adolescence. Read on to learn how to care forâ€¦. Whether your pockmarks were caused by acne, chickenpox, or another skin condition, the resulting scar can be difficult to fade. Here's what works. Dermarolling, aka microneedling, is the art of erasing unwanted acne scars, wrinkles, and stretch marks. See how to do it right, to avoid bad sideâ€¦. It's not just the ingredients. American sunscreen may also be less great at sun and skin protection than brands from other countries. Learn theâ€¦. Healthline's mission is to make people healthier through the power of information. As your ally, our communities connect you to others who may shareâ€¦. Lisa Saia Dickerson. Break it Down: Cholesterol. The Layers of Your Skin. Share on Pinterest. The three layers of skin. The takeaway. Read this next. How to Get Rid of Pockmarks. Would you like your scores to be saved so that you can track your progress? Get a Seterra membership on Patreon. Learn all the chemical elements in our science game! Log in Log out. Print Options. The Skin - Science Quiz. The Skin. Nickname Score Time. The skin is an organ. The skin is an amazing part of the human body, and this science quiz game will help you identify its components. The middle section of the skin is called the dermis; it contains blood cells, sweat glands, and hair follicles. Basic Human Anatomy. Bones of the Skeleton. Respiratory System. The Brain. The Ear. The Eye. The Heart. The Mouth and Throat. Miscellaneous Science Quizzes. Animal Cell. Cloud Types. Earth: Atmosphere. Microscope Components. Parts of a Flower. Plant Cell. Periodic Table of the Elements, With Symbols. Periodic Table of the Elements. Periodic Table of the Elements, Periods Periodic Table of the Elements, Other Nonmetals. Periodic Table of the Elements, Alkali Metals. Periodic Table of the Elements, Transition Metals. Periodic Table of the Elements, Metalloids. Periodic Table of the Elements, Halogens. Periodic Table of the Elements, Noble Gases. Periodic Table of the Elements, Lanthanides. Periodic Table of the Elements, Actinides. Blank Images. Computer Cables 1. Computer Cables 2. Computer Parts. The Carbon Cycle. The Energy Pyramid. The Food Chain. The Food Chain 2. The Nitrogen Cycle. The Water Cycle. This game in English was played times yesterday. The game The Skin is available in the following languages:. Keywords: Science games, anatomy games, anatomy study tool, healthcare, memorize anatomy, chemistry, elements, quiz, tool, biology. Remove ads. Seterra on Speedrun. Its most obvious job is to protect our insides from the outside, but there is much more to the skin than that. Alongside its role as a protective barrier, the skin helps us maintain the right internal temperature and allows us to sense the world through nerve endings. Skin is a complex organ; an average square inch of skin contains sweat glands , 20 blood vessels , and more than 1, nerve endings. Despite being just a few millimeters thick, skin makes up around one-seventh of our body weight. In this article, we will cover the basics of skin, how it is constructed, what it does, and how it does it. We shed around million skin cells each day. In fact, the outermost parts of the epidermis consist of 25â€"30 layers of dead cells. New cells are made in the lower layers of the epidermis. Over the course of around 4 weeks, they make their way to the surface, become hard, and replace the dead cells as they are shed. Keratinocytes are the most common cell type within the epidermis; their job is to act as a barrier against bacteria, parasites, fungi, viruses, heat, ultraviolet UV rays from the sun, and water loss. The color of our skin is produced by a pigment called melanin, which is produced by melanocytes; these are found in the epidermis and protect the skin from UV rays. Main roles: makes sweat and oil, provides sensations and blood to the skin, grows hair. The dermis is mostly connective tissue, and it protects the body from stress and strain; it gives the skin strength and elasticity. If the dermis is stretched a lot, for instance, during pregnancy, the dermis can be torn, and this shows up as so-called stretch marks. Receptors that detect pressure mechanoreceptors , pain nociceptors , and heat thermoreceptors are based in the dermis. The dermis houses hair follicles, blood vessels, and lymphatic vessels. It is also home to a number of glands, including sweat glands and sebaceous glands, which produce sebum, an oil that lubricates and waterproofs hair. Papillary region: made of loose connective tissue, it has finger-like projections that push into the epidermis. These projections give the dermis a bumpy surface and are responsible for the patterns we have on our fingertips. Reticular region: made of dense, irregularly organized connective tissue. Protein fibers in the reticular region give skin its strength and elasticity. The deepest layer is called subcutaneous tissue; the hypodermis, or subcutis. It is not technically

part of the skin but helps attach the skin to underlying bone and muscle. Subcutaneous tissue also provides skin with nerves and blood supply. The hypodermis is mostly made of fat, connective tissue, and elastin an elastic protein that helps tissues return to their normal shape after stretching. The high levels of fat help insulate the body and prevent us from losing too much heat. The fat layer also acts as protection, padding our bones and muscles. Some hormones are made by fat cells in the hypodermis, vitamin D , for instance. Human skin color can vary from almost black through to almost white. Most of this variation is due to a pigment called melanin. It is worth noting that the coloration of light skin is mostly determined by the whitish-blue color of connective tissue below the dermis and hemoglobin in the veins of the dermis. When skin is exposed to UV light, melanocytes start producing melanin, creating a suntan. Populations that live in parts of the world that receive higher levels of UV light, for instance, nearer the equator, tend to have higher levels of melanin and, therefore, darker skin. Conversely, populations that receive less sunlight toward the poles tend to have lighter skin with less melanin. In general, females have lighter skin than males. This may be because women need more calcium during pregnancy and while breast-feeding; vitamin D, which is produced when skin is exposed to the sun, is important for absorbing calcium. Atopic dermatitis: also known as eczema , this is an inflammatory skin disease characterized by dry, red, itchy patches of skin. Acne: this is perhaps the most common skin disorder. It occurs when hair follicles become clogged with dead skin cells and oil. Rosacea: a common rash found in middle-aged people. They have a tendency to flush and have small red bumps on the center of the face. Psoriasis: this is another inflammatory skin disease. It causes red, flaky patches to appear on the skin. Scabies: an itchy skin condition caused by the human scabies mite. Shingles: also called herpes zoster, it is a painful blistering rash caused by a virus. As we get older, our skin changes; it becomes thinner and more easily damaged. Also, the process of healing slows. Overall, we have less skin, and it is less elastic. There are a number of reasons why the skin goes through these changes. One important factor is exposure to UV rays, which also increases the risk of skin cancer. The skin is a large, complex organ with a wide range of vital roles. What do genital warts on Black men look like? Discover more about symptoms, prevalence, treatment, and prevention of genital warts in males with blackâ€¦. Keloids are raised scars that can develop after a skin injury, and they are more common on black skin. Learn about the causes, prevention, andâ€¦. People often associate small bumps on the forehead with acne, but there are other reasons. Learn the causes, treatments, and more. What are third degree burns and what do they look like? Read on to learn about potential causes, symptoms, treatment, and recovery for third degreeâ€¦. A few studies suggest that omega-3s may improve hair growth and thickness. However, the overall evidence of benefits for hair health is limited. Skin: How it works. Skin layers. Functions of the skin. Share on Pinterest Goosebumps help us to retain heat when we are in a cold environment. Skin color. Skin disease. Share on Pinterest Acne is one of the most common skin complaints. Aging skin. Latest news Neuroscience of overeating: Animal study provides insight. People are more likely to believe quick answers than slow ones. Navigating the world with aphantasia. Related Coverage. How common are keloids on black skin, and what causes them? How to get rid of small bumps on the forehead. Medically reviewed by Debra Sullivan, Ph. What to know about third degree burns. Medically reviewed by Alana Biggers, M. Is omega-3 good for hair growth? The skin consists of three layers of tissue: the epidermis , an outermost layer that contains the primary protective structure, the stratum corneum; the dermis , a fibrous layer that supports and strengthens the epidermis; and the subcutis, a subcutaneous layer of fat beneath the dermis that supplies nutrients to the other two layers and that cushions and insulates the body. The apparent lack of body hair immediately distinguishes human beings from all other large land mammals. Regardless of individual or racial differences, the human body seems to be more or less hairless, in the sense that the hair is so vestigial as to seem absent; yet in certain areas hair grows profusely. These relatively hairy places may be referred to as epigamic areas, and they are concerned with social and sexual communication, either visually or by scent from glands associated with the hair follicles. The characteristic features of skin change from the time of birth to old age. In infants and children it is velvety, dry, soft, and largely free of wrinkles and blemishes. Children younger than two years sweat poorly and irregularly; their sebaceous glands function minimally. At adolescence hair becomes longer, thicker, and more pigmented, particularly in the scalp, axillae, pubic eminence, and the male face. General skin pigmentation increases, localized pigmented foci appear mysteriously, and acne lesions often develop. Hair growth, sweating, and sebaceous secretion begin to blossom. As a person ages , anatomical and physiological alterations, as well as exposure to sunlight and wind, leave skin, particularly that not protected by clothing, dry, wrinkled, and flaccid. Human skin, more than that of any other mammal , exhibits striking topographic differences. An example is the dissimilarity between the palms and

the backs of the hands and fingers. The skin of the eyebrows is thick, coarse, and hairy; that on the eyelids is thin, smooth, and covered with almost invisible hairs. The face is seldom visibly haired on the forehead and cheekbones. It is completely hairless in the vermilion border of the lips, yet coarsely hairy over the chin and jaws of males. The surfaces of the forehead, cheeks, and nose are normally oily, in contrast with the relatively greaseless lower surface of the chin and jaws. The skin of the chest, pubic region, scalp, axillae, abdomen, soles of the feet, and ends of the fingers varies as much structurally and functionally as it would if the skin in these different areas belonged to different animals. The skin achieves strength and pliability by being composed of numbers of layers oriented so that each complements the others structurally and functionally. To allow communication with the environment, countless nervesâ€"some modified as specialized receptor end organs and others more or less structurelessâ€"come as close as possible to the surface layer, and nearly every skin organ is enwrapped by skeins of fine sensory nerves. The dermis makes up the bulk of the skin and provides physical protection. It is composed of an association of fibres, mainly collagen , with materials known as glycosaminoglycans , which are capable of holding a large amount of water, thus maintaining the turgidity of the skin. A network of extendable elastic fibres keeps the skin taut and restores it after it has been stretched. The hair follicles and skin glands are derived from the epidermis but are deeply embedded in the dermis. The dermis is richly supplied with blood vessels, although none penetrates the living epidermis. The epidermis receives materials only by diffusion from below. The dermis also contains nerves and sense organs at various levels. Human skin is enormously well supplied with blood vessels ; it is pervaded with a tangled, though apparently orderly, mass of arteries, veins, and capillaries. Such a supply of blood, far in excess of the maximum biologic needs of the skin itself, is evidence that the skin is at the service of the blood vascular system , functioning as a cooling device. To aid in this function, sweat glands pour water upon its surface, the evaporation of which absorbs heat from the skin. If the environment is cold and body heat must be conserved, cutaneous blood vessels contract in quick, successive rhythms, allowing only a small amount of blood to flow through them. When the environment is warm, they contract at long intervals, providing a free flow of blood. During muscular exertion, when great quantities of generated heat must be dissipated, blood flow through the skin is maximal. In addition to its control of body temperature , skin also plays a role in the regulation of blood pressure. Much of the flow of blood can be controlled by the opening and closing of certain sphincterlike vessels in the skin. These vessels allow the blood to circulate through the peripheral capillary beds or to bypass them by being shunted directly from small arteries to veins. Human skin is permeated with an intricate mesh of lymph vessels. In the more superficial parts of the dermis, minute lymph vessels that appear to terminate in blind sacs function as affluents of a superficial lymphatic net that in turn opens into vessels that become progressively larger in the deeper portions of the dermis. The deeper, larger vessels are embedded in the loose connective tissue that surrounds the veins. The walls of lymph vessels are so flabby and collapsed that they often escape notice in specimens prepared for microscopic studies. Their abundance, however, has been demonstrated by injecting vital dyes inside the dermis and observing the clearance of the dye. Because lymph vessels have minimal or no musculature in their walls, the circulation of lymph is sluggish and largely controlled by such extrinsic forces as pressure, skeletal muscle action, massaging, and heat. Any external pressure exerted, even from a fixed dressing, for example, interferes with its flow. Since skin plays a major role in immunologic responses of the body, its lymphatic drainage is as significant as its blood vascular system. The intact surface of the skin is pitted by the orifices of sweat glands and hair folliclesâ€"the so-called poresâ€"and is furrowed by intersecting lines that delineate characteristic patterns. All individuals have roughly similar markings on any one part of the body, but the details are unique. The lines are oriented in the general direction of elastic tension. Countless numbers of them, deep and shallow, together with the pores, give every region of the body a characteristic topography. Like the deeper furrows and ridges on the palms and soles, the skin lines are mostly established before birth. The fine details of each area of body surface are peculiar to each individual. Fingerprints are used as a means of personal identification because they have a high relief, more evident patternings, and can be easily obtained. Some of the lines on the surface of the skin are acquired after birth as a result of use or damage. For example, furrows on the forehead are an accentuation of preexisting congenital lines that become strongly emphasized in old age. As the skin becomes less firm with aging, it also forms wrinkles. Certain occupations leave skin marks that, depending upon duration and severity, may be transient or permanent. The palms of the hands and the soles of the feet are etched by distinct alternating ridges and grooves that together constitute dermatoglyphics. The ridges follow variable courses, but their arrangement in specific areas has a consistent structural plan. Though apparently continuous, the ridges

have many interruptions and irregularities, branching and varying in length. Every small area of surface has ridge details not matched anywhere in the same individual or in any other individual, even in an identical twin. This infallible signature makes dermatoglyphics the best-known physical characteristic for personal identification. Human skin Article Media Additional Info. Article Contents. Print print Print. Table Of Contents. While every effort has been made to follow citation style rules, there may be some discrepancies. Please refer to the appropriate style manual or other sources if you have any questions. Facebook Twitter. Give Feedback External Websites. Let us know if you have suggestions to improve this article requires login. External Websites. Articles from Britannica Encyclopedias for elementary and high school students. John G. Coeditor of and contributor to Textbook of Dermatology. See Article History. Animation and microphotography showing the skin's three layers: the epidermis, dermis, and subcutis. Britannica Quiz. Human Organs: Fact or Fiction? Is it true that we only use ten percent of our brain? Is the retina the lens at the front of the eye? Dissect these questions and learn more about human organs. Human skin, whose cells are generated continuously by the body, serves as a protective barrier between the inside of the human body and the environment. A cross section of mammalian skin and its underlying structures. Get a Britannica Premium subscription and gain access to exclusive content. Subscribe Now. Load Next Page. Although you may not typically think of the skin as an organ, it is in fact made of tissues that work together as a single structure to perform unique and critical functions. The skin is made of multiple layers of cells and tissues, which are held to underlying structures by connective tissue Figure 1. The deeper layer of skin is well vascularized has numerous blood vessels. It also has numerous sensory, and autonomic and sympathetic nerve fibers ensuring communication to and from the brain. Figure 1. Layers of Skin. The skin is composed of two main layers: the epidermis, made of closely packed epithelial cells, and the dermis, made of dense, irregular connective tissue that houses blood vessels, hair follicles, sweat glands, and other structures. Beneath the dermis lies the hypodermis, which is composed mainly of loose connective and fatty tissues. It is made of four or five layers of epithelial cells, depending on its location in the body. It does not have any blood vessels within it i. Most of the skin can be classified as thin skin. It has a fifth layer, called the stratum lucidum, located between the stratum corneum and the stratum granulosum Figure 2. Thin Skin versus Thick Skin. These slides show cross-sections of the epidermis and dermis of a thin and b thick skin. Note the significant difference in the thickness of the epithelial layer of the thick skin. The cells in all of the layers except the stratum basale are called keratinocytes. The keratinocytes in the stratum corneum are dead and regularly slough away, being replaced by cells from the deeper layers Figure 3. Figure 3. The epidermis is epithelium composed of multiple layers of cells. The basal layer consists of cuboidal cells, whereas the outer layers are squamous, keratinized cells, so the whole epithelium is often described as being keratinized stratified squamous epithelium. The cells in the stratum basale bond to the dermis via intertwining collagen fibers, referred to as the basement membrane. Dermal papillae increase the strength of the connection between the epidermis and dermis; the greater the folding, the stronger the connections made Figure 4. Layers of the Epidermis. The epidermis of thick skin has five layers: stratum basale, stratum spinosum, stratum granulosum, stratum lucidum, and stratum corneum. The stratum basale is a single layer of cells primarily made of basal cells. All of the keratinocytes are produced from this single layer of cells, which are constantly going through mitosis to produce new cells. As new cells are formed, the existing cells are pushed superficially away from the stratum basale. Two other cell types are found dispersed among the basal cells in the stratum basale. These cells are especially abundant on the surfaces of the hands and feet. The second is a melanocyte , a cell that produces the pigment melanin. In a growing fetus, fingerprints form where the cells of the stratum basale meet the papillae of the underlying dermal layer papillary layer , resulting in the formation of the ridges on your fingers that you recognize as fingerprints. Fingerprints are unique to each individual and are used for forensic analyses because the patterns do not change with the growth and aging processes. The desmosomes interlock with each other and strengthen the bond between the cells. Unstained epidermis samples do not exhibit this characteristic appearance. Cells of the Epidermis. The cells in the different layers of the epidermis originate from basal cells located in the stratum basale, yet the cells of each layer are distinctively different. The keratinocytes in the stratum spinosum begin the synthesis of keratin and release a water-repelling glycolipid that helps prevent water loss from the body, making the skin relatively waterproof. As new keratinocytes are produced atop the stratum basale, the keratinocytes of the stratum spinosum are pushed into the stratum granulosum. These two proteins make up the bulk of the keratinocyte mass in the stratum granulosum and give the layer its grainy appearance. The nuclei and other cell organelles disintegrate as the cells die, leaving behind the keratin, keratohyalin, and cell membranes that will form the stratum lucidum,

the stratum corneum, and the accessory structures of hair and nails. This thin layer of cells is found only in the thick skin of the palms, soles, and digits. The increased keratinization also called cornification of the cells in this layer gives it its name. There are usually 15 to 30 layers of cells in the stratum corneum. This dry, dead layer helps prevent the penetration of microbes and the dehydration of underlying tissues, and provides a mechanical protection against abrasion for the more delicate, underlying layers. Cells in this layer are shed periodically and are replaced by cells pushed up from the stratum granulosum or stratum lucidum in the case of the palms and soles of feet. The entire layer is replaced during a period of about 4 weeks. Figure 6. Layers of the Dermis. This stained slide shows the two components of the dermis—the papillary layer and the reticular layer. Both are made of connective tissue with fibers of collagen extending from one to the other, making the border between the two somewhat indistinct. The dermal papillae extending into the epidermis belong to the papillary layer, whereas the dense collagen fiber bundles below belong to the reticular layer. It contains blood and lymph vessels, nerves, and other structures, such as hair follicles and sweat glands. The dermis is made of two layers of connective tissue that compose an interconnected mesh of elastin and collagenous fibers, produced by fibroblasts Figure 6. Within the papillary layer are fibroblasts, a small number of fat cells adipocytes , and an abundance of small blood vessels. In addition, the papillary layer contains phagocytes, defensive cells that help fight bacteria or other infections that have breached the skin. This layer also contains lymphatic capillaries, nerve fibers, and touch receptors called the Meissner corpuscles. This layer is well vascularized and has a rich sensory and sympathetic nerve supply. The reticular layer appears reticulated net-like due to a tight meshwork of fibers. Collagen fibers provide structure and tensile strength, with strands of collagen extending into both the papillary layer and the hypodermis. In addition, collagen binds water to keep the skin hydrated. Collagen injections and Retin-A creams help restore skin turgor by either introducing collagen externally or stimulating blood flow and repair of the dermis, respectively. It is not strictly a part of the skin, although the border between the hypodermis and dermis can be difficult to distinguish. The hypodermis consists of well-vascularized, loose, areolar connective tissue and adipose tissue, which functions as a mode of fat storage and provides insulation and cushioning for the integument. The hypodermis is home to most of the fat that concerns people when they are trying to keep their weight under control. Adipose tissue present in the hypodermis consists of fat-storing cells called adipocytes. This stored fat can serve as an energy reserve, insulate the body to prevent heat loss, and act as a cushion to protect underlying structures from trauma. Where the fat is deposited and accumulates within the hypodermis depends on hormones testosterone, estrogen, insulin, glucagon, leptin, and others , as well as genetic factors. Fat distribution changes as our bodies mature and age. Men tend to accumulate fat in different areas neck, arms, lower back, and abdomen than do women breasts, hips, thighs, and buttocks. The body mass index BMI is often used as a measure of fat, although this measure is, in fact, derived from a mathematical formula that compares body weight mass to height. Therefore, its accuracy as a health indicator can be called into question in individuals who are extremely physically fit. In many animals, there is a pattern of storing excess calories as fat to be used in times when food is not readily available. In much of the developed world, insufficient exercise coupled with the ready availability and consumption of high-calorie foods have resulted in unwanted accumulations of adipose tissue in many people. Although periodic accumulation of excess fat may have provided an evolutionary advantage to our ancestors, who experienced unpredictable bouts of famine, it is now becoming chronic and considered a major health threat. Not only is this a problem for the individuals affected, but it also has a severe impact on our healthcare system. Changes in lifestyle, specifically in diet and exercise, are the best ways to control body fat accumulation, especially when it reaches levels that increase the risk of heart disease and diabetes. The color of skin is influenced by a number of pigments, including melanin, carotene, and hemoglobin. Recall that melanin is produced by cells called melanocytes, which are found scattered throughout the stratum basale of the epidermis. Figure 7. Skin Pigmentation. The relative coloration of the skin depends of the amount of melanin produced by melanocytes in the stratum basale and taken up by keratinocytes. Melanin occurs in two primary forms. Eumelanin exists as black and brown, whereas pheomelanin provides a red color. Dark-skinned individuals produce more melanin than those with pale skin. Exposure to the UV rays of the sun or a tanning salon causes melanin to be manufactured and built up in keratinocytes, as sun exposure stimulates keratinocytes to secrete chemicals that stimulate melanocytes. The accumulation of melanin in keratinocytes results in the darkening of the skin, or a tan. This increased melanin accumulation protects the DNA of epidermal cells from UV ray damage and the breakdown of folic acid, a nutrient necessary for our health and well-being. In contrast, too much melanin can interfere with the production of vitamin D, an important nutrient involved in

calcium absorption. Thus, the amount of melanin present in our skin is dependent on a balance between available sunlight and folic acid destruction, and protection from UV radiation and vitamin D production. It requires about 10 days after initial sun exposure for melanin synthesis to peak, which is why pale-skinned individuals tend to suffer sunburns of the epidermis initially. Dark-skinned individuals can also get sunburns, but are more protected than are pale-skinned individuals. Melanosomes are temporary structures that are eventually destroyed by fusion with lysosomes; this fact, along with melanin-filled keratinocytes in the stratum corneum sloughing off, makes tanning impermanent. Too much sun exposure can eventually lead to wrinkling due to the destruction of the cellular structure of the skin, and in severe cases, can cause sufficient DNA damage to result in skin cancer. When there is an irregular accumulation of melanocytes in the skin, freckles appear. Moles are larger masses of melanocytes, and although most are benign, they should be monitored for changes that might indicate the presence of cancer Figure 8. Figure 8. Moles range from benign accumulations of melanocytes to melanomas. These structures populate the landscape of our skin. The first thing a clinician sees is the skin, and so the examination of the skin should be part of any thorough physical examination. Most skin disorders are relatively benign, but a few, including melanomas, can be fatal if untreated. A couple of the more noticeable disorders, albinism and vitiligo, affect the appearance of the skin and its accessory organs. Although neither is fatal, it would be hard to claim that they are benign, at least to the individuals so afflicted. Figure 9. Individuals with vitiligo experience depigmentation that results in lighter colored patches of skin. The condition is especially noticeable on darker skin. The defect is primarily due to the inability of melanocytes to produce melanin. Individuals with albinism tend to appear white or very pale due to the lack of melanin in their skin and hair. Recall that melanin helps protect the skin from the harmful effects of UV radiation. Individuals with albinism tend to need more protection from UV radiation, as they are more prone to sunburns and skin cancer. They also tend to be more sensitive to light and have vision problems due to the lack of pigmentation on the retinal wall. Treatment of this disorder usually involves addressing the symptoms, such as limiting UV light exposure to the skin and eyes. This leads to a loss of color in patches Figure 9. Neither albinism nor vitiligo directly affects the lifespan of an individual. Other changes in the appearance of skin coloration can be indicative of diseases associated with other body systems. Tumors of the pituitary gland can result in the secretion of large amounts of melanocyte-stimulating hormone MSH , which results in a darkening of the skin. A sudden drop in oxygenation can affect skin color, causing the skin to initially turn ashen white. This happens when the oxygen supply is restricted, as when someone is experiencing difficulty in breathing because of asthma or a heart attack. Skip to main content. Module 6: The Integumentary System. Search for:. Layers of the Skin Learning Objectives Identify the components of the integumentary system Describe the layers of the skin and the functions of each layer Identify and describe the hypodermis and deep fascia Describe the role of keratinocytes and their life cycle Describe the role of melanocytes in skin pigmentation.

92 honda accord wagon
2005 honda civic parts diagram
2004 lincoln navigator repair manual

The skin consists of two main layers and a closely associated layer. What are the basic functions of each of these layers? View the University of Michigan WebScope at to explore the tissue sample in greater detail. If you zoom on the cells at the outermost layer of this section of skin, what do you notice about the cells? View the University of Michigan WebScope to explore the tissue sample in greater detail. Everyday Connection: Lipid Storage The hypodermis is home to most of the fat that concerns people when they are trying to keep their weight under control. Key Takeaways Disorders of the Integumentary System The first thing a clinician sees is the skin, and so the examination of the skin should be part of any thorough physical examination. This ABC video follows the story of a pair of fraternal African-American twins, one of whom is albino. Which ethnicities do you think are exempt from the possibility of albinism? Licenses and Attributions. CC licensed content, Shared previously.