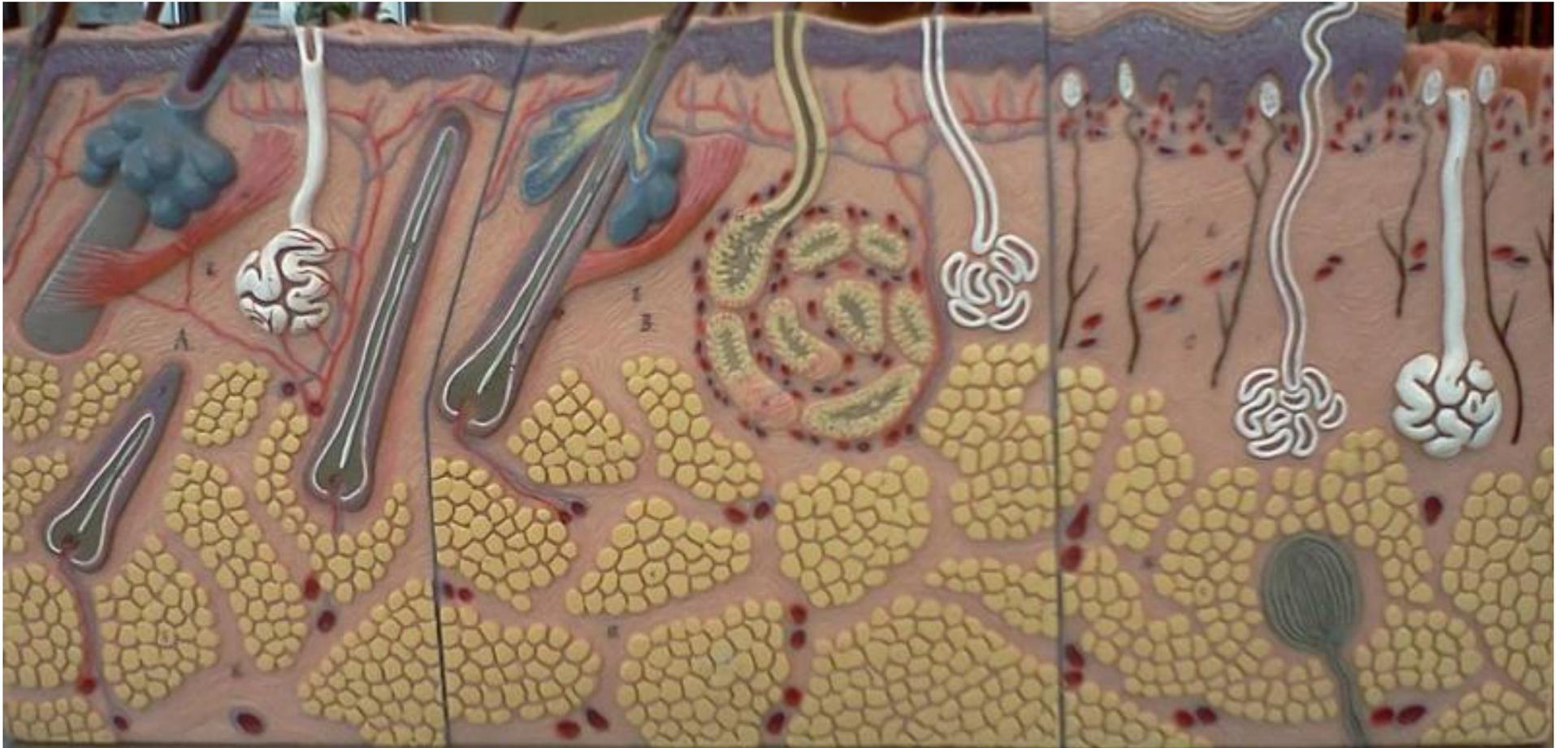


The Cutaneous Membrane

Lab Skin Model



An overview of human skin anatomy including the types of skin cells in each layer. Complete with an anatomy quiz so you can test your understanding.

Skin is actually the body's largest organ! Skin includes all four types of tissue - epithelial tissue, connective tissue, nervous tissue and muscle tissue.

Skin Function

Functions of the skin include protection, body temperature regulation, excretion of wastes, production of vitamin D and reception of sensory information from the environment. Skin layers and skin structures have different adaptations to carry out skin functions. The main layers of the skin include the epidermis, dermis and hypodermis. Within the main layers are sublayers with specialized properties.

Epidermis

The epidermis is the top layer of the skin containing stratified squamous epithelial cells. Epidermal squamous cells are keratinized, which means that they contain the tough protective protein keratin. The epidermis contains cells that produce keratin as well as cells that produce pigmentation, pick up sensory information and remove potentially harmful substances.

Cells in the Epidermis

keratinocytes (produce keratin)

melanocytes (produce pigment)

tactile epithelial cells (pick up sensory information)

dendritic cells (transport foreign substances to the lymph nodes)

Layers Within the Epidermis

stratum corneum (tough outermost layer)

stratum lucidum (thin (light) band in thick skin only)

stratum granulosum (lamellated granules and keratohyalin granules)

stratum spinosum (contains dendritic cells which aid the immune response)

stratum basale (base of epidermis containing melanocytes and tactile epithelial cells)

The stratum corneum is found in the upper most layer of the skin and is much thicker in "thick skin," the type of skin on your heels and palms. Though these topmost skin cells are dead they are protective and contain waterproofing glycolipids. The stratum lucidum is a thin layer of dead keratinocytes only present in thick skin. Under a light microscope stratum lucidum appears as a thin translucent line separating the stratum corneum from the stratum granulosum.

The stratum granulosum, a layer of one to five keratinocytes, is named for having keratohyalin granules and lamellated granules. A granule is a small particle or microscopic structure. Keratohyalin granules facilitate keratin formation in upper skin layers, and lamellated granules hold waterproofing glycolipids. Cell membranes in the stratum granulosum toughen as they are pushed into upper skin layers.

The stratum spinosum contains several layers of cells which are still actively dividing. Stratum spinosum contains dendritic cells which pick up potentially toxic foreign substances and transport them to lymph nodes to be disposed of.

Stratum basale lies at the base of the epidermis, composed of one layer of rapidly dividing keratinocytes. Round looking touch receptors, or tactile epithelial cells, pick up sensory information in the stratum basale. The stratum basale also holds melanocytes, which produce the pigment melanin.

Dermis

The dermis, a layer composed of connective tissue, lies underneath the epidermis. Blood vessels in the dermis facilitate temperature regulation by constricting to channel blood to the core of the body, or widening to bring blood to the skin surface where it radiates heat away from the body. Small muscles in the dermis called arrector pili, cause the hairs in the skin to stand on end when you get cold or become frightened.

Cells in the Dermis

fibroblasts (produce collagen fibers)

macrophages (involved in immunity)

mast cells (involved in the histamine response)

white blood cells (involved in immunity)

Layers Within the Dermis

papillary layer

reticular layer

The papillary layer, the upper layer of the dermis, contains dermal papillae.

Dermal papillae are finger like projections which increase the surface area of the top layer of the dermis, facilitating the diffusion of nutrients, gasses and wastes from the dermis to the epidermis. Underneath the dermal papillae are dermal ridges which influence the shape of the epidermal layer, creating the varied skin patterns which make up finger prints.

The reticular layer makes up the majority of the dermis, containing thickly interlaced collagen and elastic fibers which give the skin its strength and ability to stretch.

Hypodermis

The hypodermis is a fatty layer of connective tissue underneath the dermis, also called the superficial fascia and the subcutaneous layer. The hypodermis connects the skin to the body, stores fat, provides temperature insulation and cushions the internal structures from outside bumps and blows.

Skin Anatomy Quiz

Read the article then try to answer the questions. Check back to the relevant parts of the article for the answers.

What are the five major functions of the skin?

What types of tissues are found in skin? Which skin layers have which tissues?

What role does keratin play in the skin and where can keratin be found?

Which sublayer gives skin its strength and ability to stretch?

See the image included in the article. Name the different layers of the skin on the image and try to identify structures within the skin.

Which layers of the skin are vascularized (Hint: vascularized means having blood vessels)

