

Tissues are groups of cells that lie together to accomplish a common function. There are four main types of tissues: epithelial, connective, muscular, and nervous. All of these tissues are found in our bodies, but epithelial tissue has a special function-- it must cover all the surfaces of the body, therefore it is found in our skin, and it is also found covering all the surfaces of the openings (each one is called a lumen) within our bodies

Epithelial tissue is one of the four major tissue types in the body, acting as an interface between the body and the rest of the world

It is made up of cells closely packed and ranged in one or more layers. Epithelial cells are packed tightly together, with almost no intercellular spaces and only a small amount of intercellular substance. Epithelial tissue, regardless of the type, is usually separated from the underlying tissue by a thin sheet of connective tissue; basement membrane. The basement membrane provides structural support for the epithelium and also binds it to neighboring structures.

Basal laminae and basement membrane

All epithelium rests on a sheetlike extracellular structure called basal lamina that is not visible under the light microscope. This layer contains type IV collagen, laminin, entactin and proteoglycan. Under the electron microscope, the basal lamina appears as a denser layer, 20-100 nm thick, (consisting of a delicate network of fine fibrils (lamina densa)).

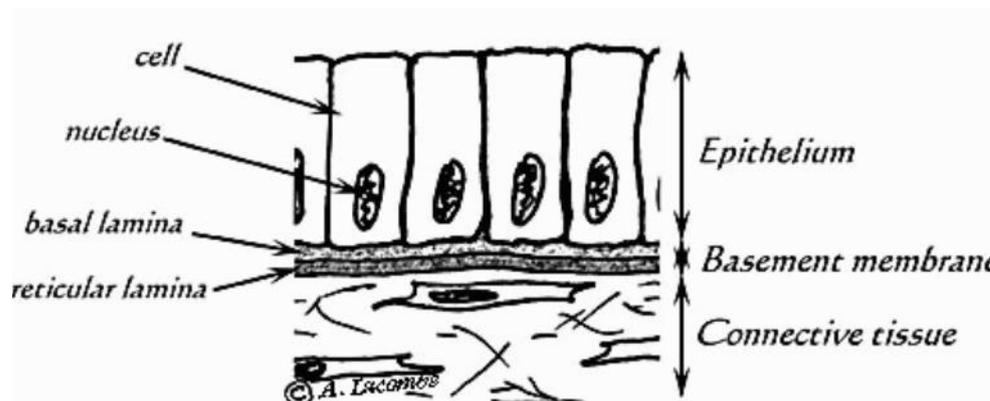
The epithelial cells produce the basal lamina .In some instances, reticular fibers (formed by connective tissue cells) are closely associated with the basal lamina, forming the reticular lamina.

The term **basement membrane** usually contains two fused basal laminae or a basal laminae and articular lamina.

The basal lamina forms a sieve-like barrier between the epithelium and connective tissue.

The functions of the basal lamina include: structural support, filtering, binding with growth factors (thus influencing cell proliferation and differentiation), organizing the proteins in adjacent plasma membrane, and serve as a guide for cell migration.

Defects and disruptions of the basal lamina lead to many pathological conditions, e.g. glomerulonephritis.



Diagrammatic illustration showing epithelial cells resting on basement membrane.

Main Characteristics of Epithelium .

An epithelium is a continuous sheet of connected cells that covers or lines a body surface (e.g. skin, intestine). Secretory glands (e.g. sweat, salivary, mammary) are derived from epithelium.

An epithelium contains very little extracellular matrix.

An epithelium sits on a basal lamina.

Epithelium does not contain blood vessels, therefore said to be avascular. Nutrients reach cells epithelium via diffusion from blood vessels outside the basal lamina, (it is instead supported by capillaries in connective tissues, which supply the epithelial tissue with nutrients through a process called diffusion). Although epithelial tissue contains no blood vessels, it does contain nerve endings.

These cells are often characterized by frequent cell division because they are exposed to wear and tear and injury, necessitating replacement.

Derived from all embryonic germ layers, including endoderm, mesoderm and ectoderm.

Function of epithelium

Protection

Epithelial cells from the skin protect underlying tissue from mechanical injury, harmful chemicals, invading bacteria and from excessive loss of water.

Sensation

Sensory stimuli penetrate specialized epithelial cells. Specialized epithelial tissue containing sensory nerve endings is found in the skin, eyes, ears, nose and on the tongue.

Secretion

In glands, epithelial tissue is specialized to secrete specific chemical substances such as enzymes, hormones and lubricating fluids.

Absorption

Certain epithelial cells lining the small intestine absorb nutrients from the digestion of food.

Excretion

Epithelial tissues in the kidney excrete waste products from the body and reabsorb needed materials from the urine. Sweat is also excreted from the body by epithelial cells in the sweat glands.

Diffusion

Simple epithelium promotes the diffusion of gases, liquids and nutrients. Because they form such a thin lining, they are ideal for the diffusion of (gases e.g. walls of capillaries and lungs).

Cleaning

Ciliated epithelium assists in removing dust particles and foreign bodies which have entered the air passages.

Reduces Friction

The smooth, tightly-interlocking, epithelial cells that line the entire circulatory system reduce friction between the blood and the walls of the blood vessels.

Renewal of cell epithelia

The cells of epithelial tissue are capable of rapid division, which is the process that creates new cells. Many epithelial cells, in different parts of the body, are lost due to friction or exposure to harmful substances. The skin, for instance, constantly produces new cells to replace the dead cells closest to the skin's outer surface. The cells of tissues lining the digestive tract, including those of the esophagus, stomach, and intestines, also undergo continuous division.