Skin – human skin

- multiple layers of **ectodermal tissue**
- **hairy and glabrous skin**, glabrous skin is **hairless**.
  It is found on fingers, palmar surfaces of hands, soles of feet, lips, labia minora and penis

Functions:

**Protection:** an anatomical barrier from pathogens and damage

**Sensation:** contains a variety of nerve endings that react to heat and cold, touch, pressure, vibration, and tissue injury
**Heat regulation:** dilated blood vessels reduce perfusion and increase heat loss, while constricted vessels greatly increase cutaneous blood flow and conserve heat.

**Control of evaporation:** the skin provides a relatively dry and semi-impermeable barrier to fluid loss.

**Storage and synthesis:** acts as a storage center for lipids and water, as well as a means of synthesis of vitamin D by action of UV on certain parts of the skin.

**Absorption:** In addition, medicine can be administered through the skin.
SWEAT

Sweat contains mainly water.
It also contains minerals, lactate, and urea.

sodium (0.9 gram/liter), potassium (0.2 g/l), calcium (0.015 g/l),
magnesium (0.0013 g/l).
zinc (0.4 milligrams/liter), copper (0.3–0.8 mg/l), iron (1 mg/l),
chromium (0.1 mg/l), nickel (0.05 mg/l), lead (0.05 mg/l).

In humans, sweat is hypoosmotic relative to plasma.
Bacteria

- number roughly 1000 species from 19 phyla
- Microorganisms like *Staphylococcus epidermidis* colonize the skin surface.

The disinfected skin surface gets recolonized from bacteria residing in the deeper areas of the hair follicle, gut and urogenital openings.
Skin layers

- **Epidermis**, which provides waterproofing and serves as a barrier to infection.

- **Dermis**, which serves as a location for the appendages of skin.

- **Hypodermis** (*subcutaneous adipose layer*).
Epidermis

- stratified squamous epithelium with keratin

- Cells in the deepest layers are nourished by diffusion from blood capillaries extending to the upper layers of the dermis.

- The main type of cells which make up the epidermis are keratinocytes (90-95%), melanocytes, Merkel cells and Langerhans cells also present. The process is called keratinization and takes place within about 27 days.
Dermis consists of connective tissue. It contains the hair follicles, sweat glands, sebaceous glands, apocrine glands, lymphatic vessels and blood vessels. The blood vessels in the dermis provide nourishment and waste removal. It also harbors many mechanoreceptor/nerve endings.
Merkel cells or Merkel-Ranvier cells are oval receptor cells found in the skin of vertebrates that have synaptic contacts with somatosensory afferents.

In combination with sensory neuron ending forms a mechanoreceptor called Merkel’s corpuscle.
Mechanoreceptor/nerve endings

1. **free nerve ending** - nerve terminal loses myelin sheath, at the epidermal/dermal junction

2. **Meissner‘s corpuscle** - encapsulated (Schwann cells) nerve; touch receptors

3. **Krause‘s end bulb** - axon loses myelin, found in the papillary layer of the dermis and in the epidermis of oral mucosa and tongue; mechanoreceptor
4. **Ruffini endings** axon loses myelin, found in the deep dermis and in the hypodermis; mechanoreceptor sensitive to sustain or continuous stress.

5. **Pacinian corpuscle** - axon loses myelin found deep in the dermis and in the hypodermis; sense vibration and pressure.
Hypodermis

The hypodermis is not part of the skin. It attaches the skin supplying it with blood vessels and nerves.

It consists of loose connective tissue and elastin. The main cell types are fibroblasts, macrophages and adipocytes (50% of body fat).

Fat serves as padding and insulation for the body.
Skin tone

provided by melanin from melanocytes, ectodermal cells.

Pigment absorb ultraviolet radiation (UV).

<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Always burns, never tans</td>
<td>Pale, Fair, Freckles</td>
</tr>
<tr>
<td>II</td>
<td>Usually burns, sometimes tans</td>
<td>Fair</td>
</tr>
<tr>
<td>III</td>
<td>May burn, usually tans</td>
<td>Light Brown</td>
</tr>
<tr>
<td>IV</td>
<td>Rarely burns, always tans</td>
<td>Olive brown</td>
</tr>
<tr>
<td>V</td>
<td>Moderate constitutional pigmentation</td>
<td>Brown</td>
</tr>
<tr>
<td>VI</td>
<td>Marked constitutional pigmentation</td>
<td>Black</td>
</tr>
</tbody>
</table>
African skin tone
European Skin tone

European Derived Skin Tones

Intimate Skin Tones
Albinism

- lack of product, pigment of skin and hair,
- achromatosis
- lack or non-functional tyrosinase
Thank you form your attention