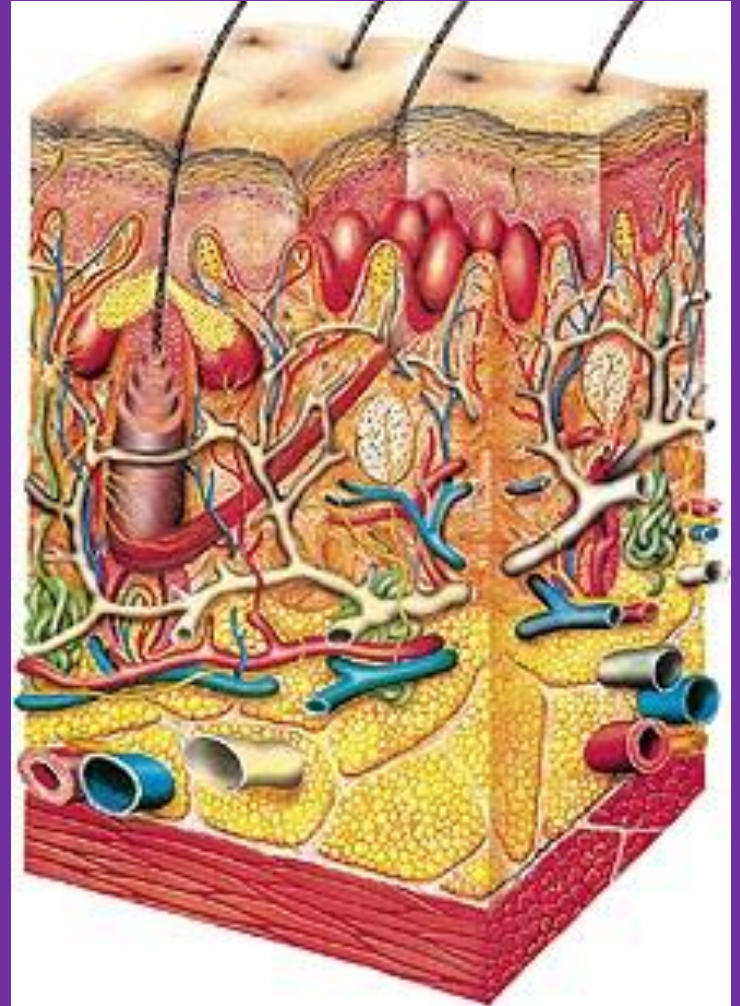


# Chapter 5: The Integumentary System



# The Integument

- Means
  - Covering
- Composed:
  - Skin
  - Hair
  - Nails
  - Sweat glands
  - Oil glands

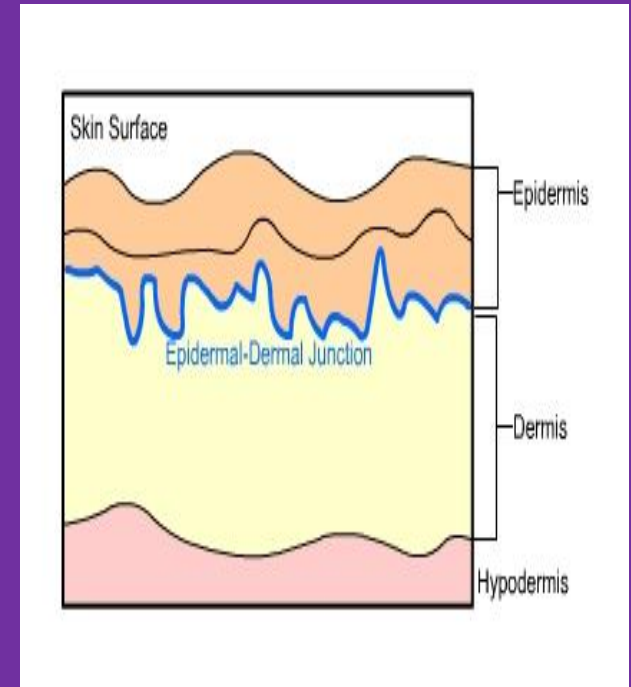


# The Integument

- Thickness
  - 1.5 – 4 mm (or more)
- Weight
  - 9 – 11 pounds
  - 7% of our total body weight
- Surface Area
  - 1.5 – 2 m<sup>2</sup>

# The Integument - Layers

- Epidermis
  - “epi” - upon
  - Tissue – Stratified Squamous
- Dermis
  - Makes up the bulk of the skin
  - Vascularized
  - Tissue → Dense Irregular
- Hypodermis (superficial fascia)
  - Not “really” a part of skin, but shares some protective properties
  - Tissue → Adipose



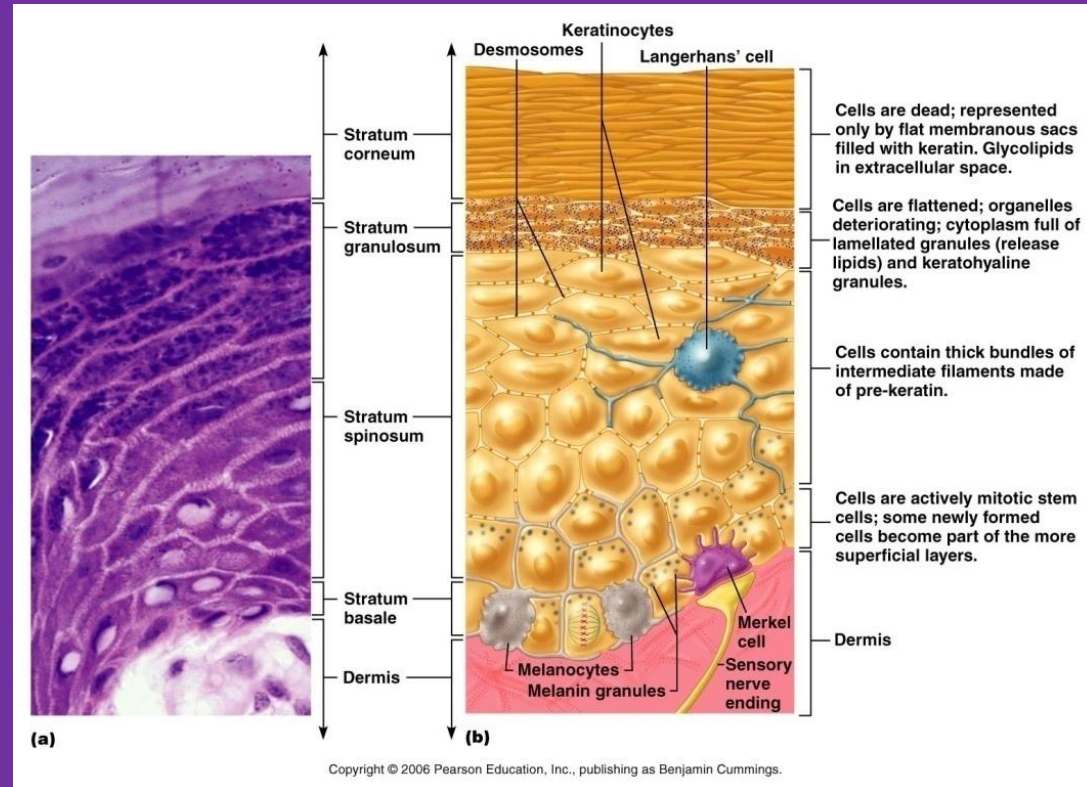
# Cells of the Epidermis

- Keratinocytes
  - Makes up bulk of epidermis
  - Connected by desmosomes
  - Produces keratin → protective properties
  - Cells are produced in the basal layer, as they are pushed up towards the surface they are filled with keratin. By the time the cells reach the surface they are dead and filled with keratin
  - Millions rub off every day → you get a new “skin” every 25 – 45 days

# Cells of the Epidermis

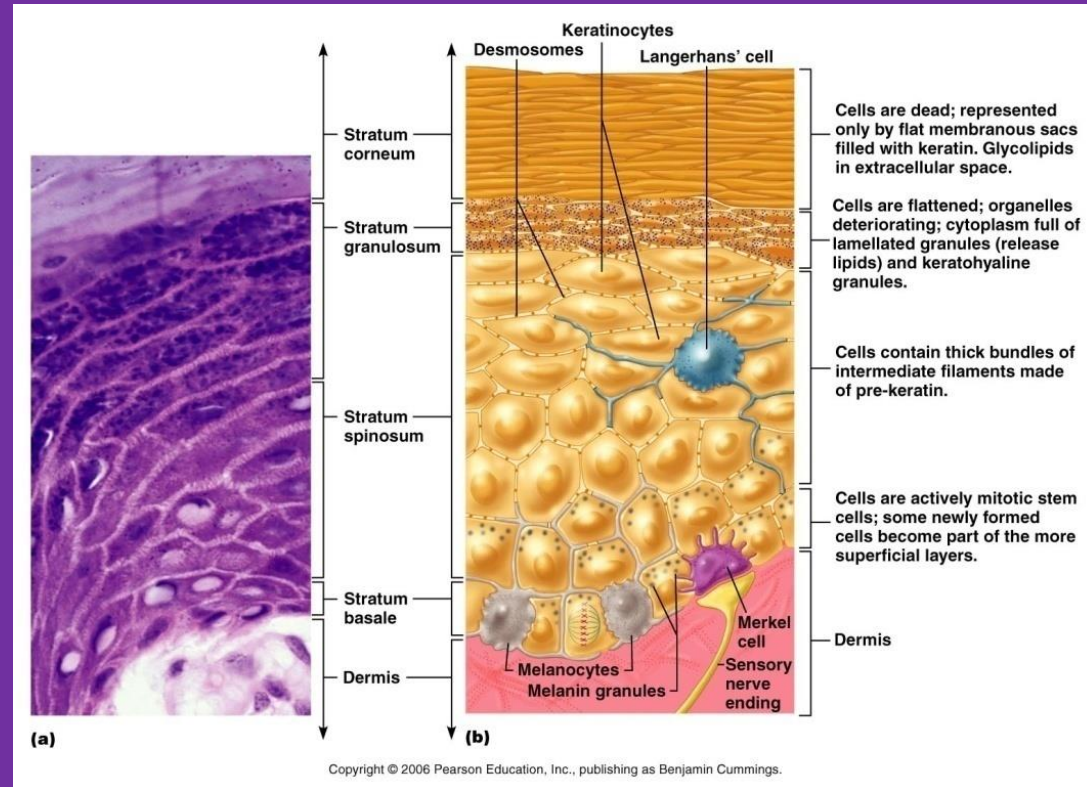
- Melanocytes

- Spider shaped cells that produce melanin
- Melan = black
- Found in the deepest layer of the epidermis
- Melanin is taken in by the keratinocytes and accumulates on the superficial “sunny” side to form a shield that protects the nucleus from UV radiation in the sun



# Cells of the Epidermis

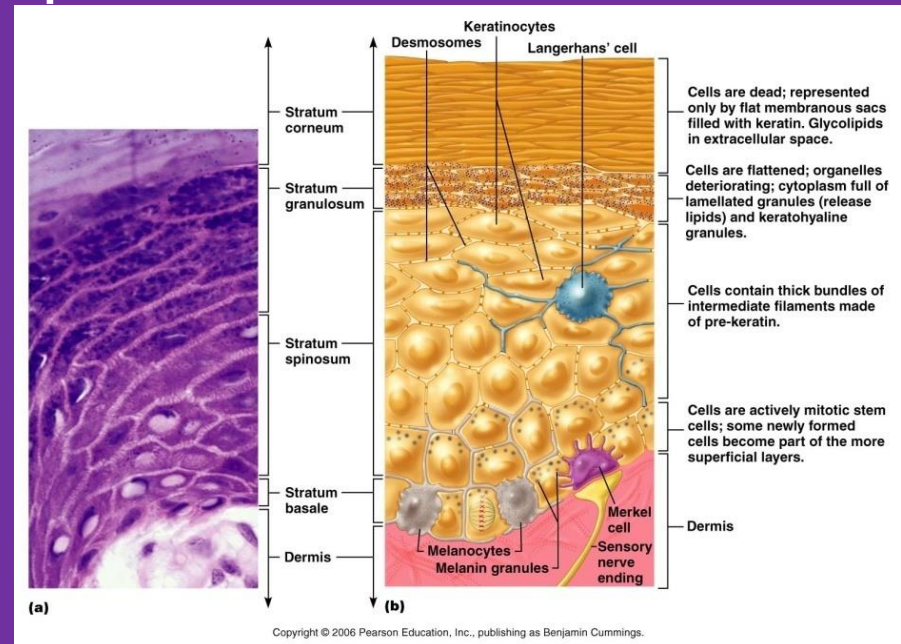
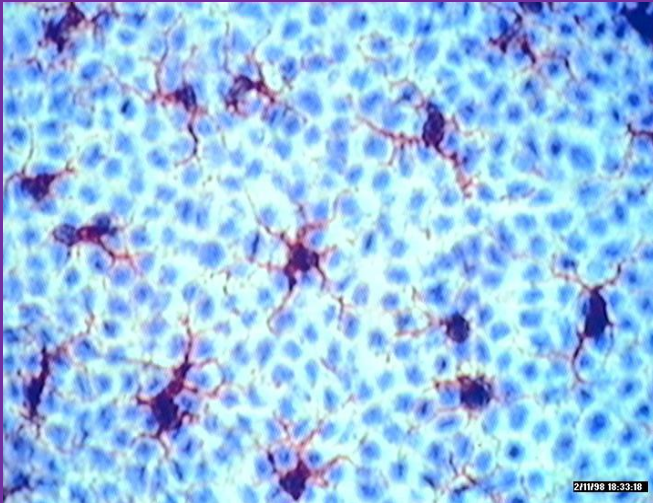
- Merkel Cells
  - Found at the epidermal-dermal junction
  - Associated with a sensory nerve ending for touch
  - Shaped like a spiky half ball



# Cells of the Epidermis

- Langerhans' Cells

- Arise from the bone marrow and migrate to the epidermis
- Phagocytes that ingest foreign substances → activate immune response



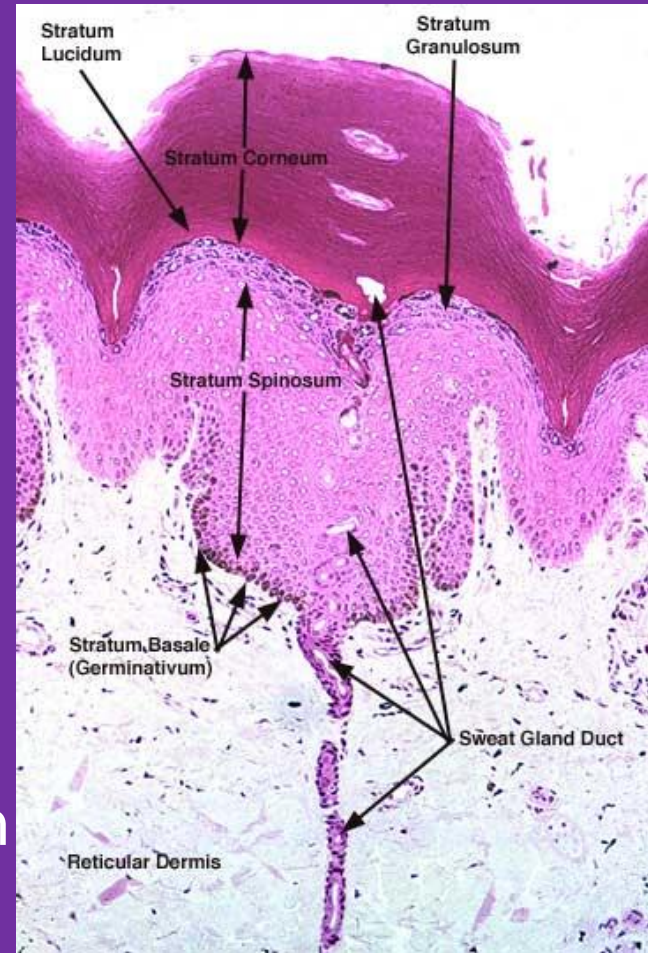
# Epidermis

- 5 layers
  - Stratum Germinativum (Basal layer)
  - Stratum Spinosum (Prickly layer)
  - Stratum Granulosum (Granular layer)
  - Stratum Lucidum (Clear layer)
  - Stratum Corneum (Horny layer)



# Epidermis - Stratum Basale

- Basal Layer (Ah Hem!!)
- Aka stratum germinativum
- Deepest layer – single row of cells
- Cell farm – always making new cells (keratinocytes)
- Forms epidermal ridges (looks like corrugated cardboard) → extend into the dermis to increase area of contact between the two layers



# Epidermis - Stratum Basale



# Skin Grafts!

- New skin can't heal itself if an injury destroys the s. basale.
- Need skin graft to heal
- Involves covering the wound with a patch of healthy skin from a donor site → usually taken from another part of the body to avoid rejection.



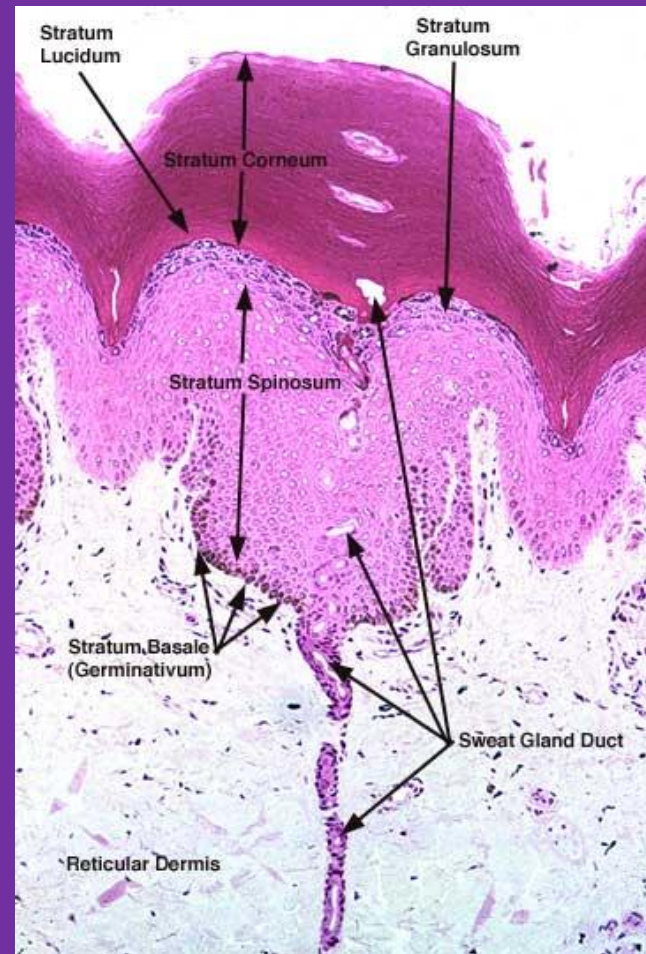
# Skin Grafts

- Healthy epidermis is removed from another area and treated to produce the graft.
  - Keratinocytes may also be harvested and cultured to produce more cells.
- New skin is transplanted back to the patient so that it covers the wound and generates a permanent skin.

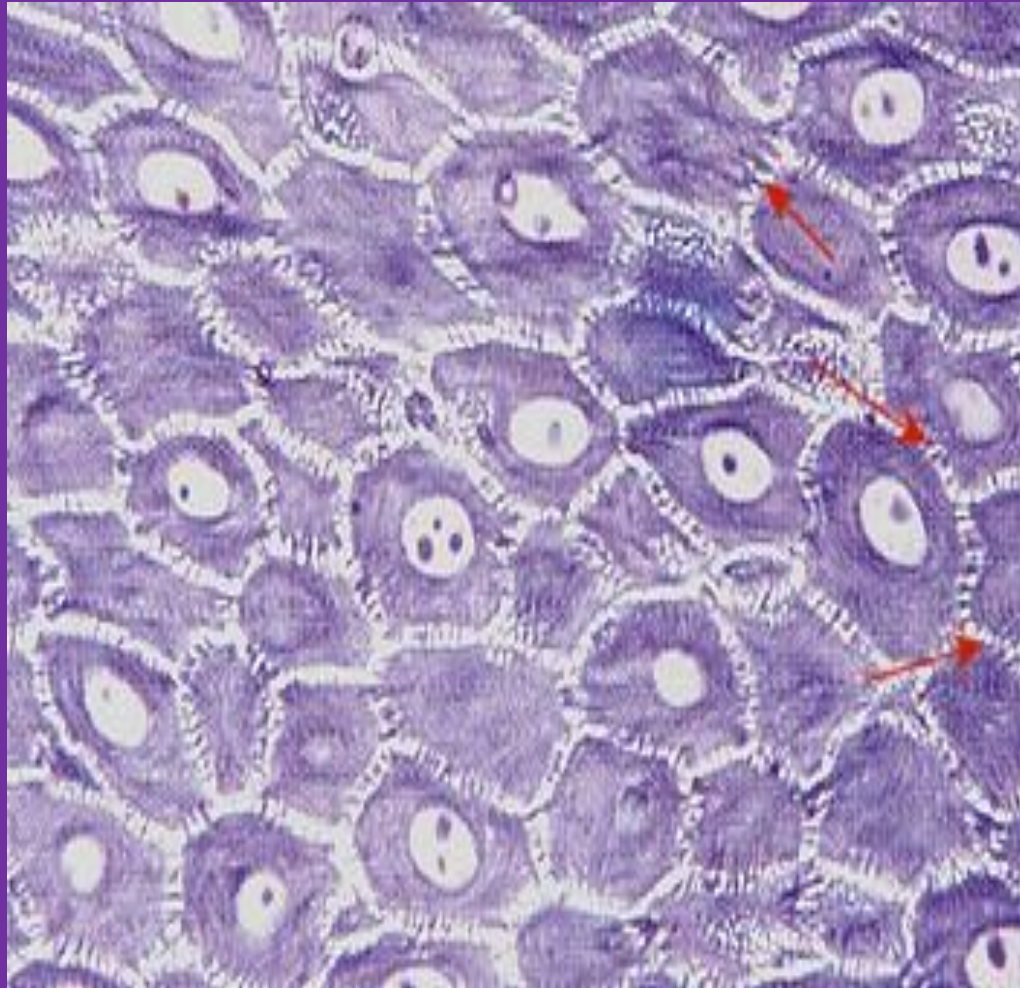


# Epidermis - Stratum Spinosum

- Prickly layer
- 8 – 10 layers thick
- Cells connected by desmosomes
- When on slides, appears to have many small spiny projections (prickle cells)
- The projections don't exist in living tissue → during tissue preparation the cells shrink and the desmosomes hold tight.

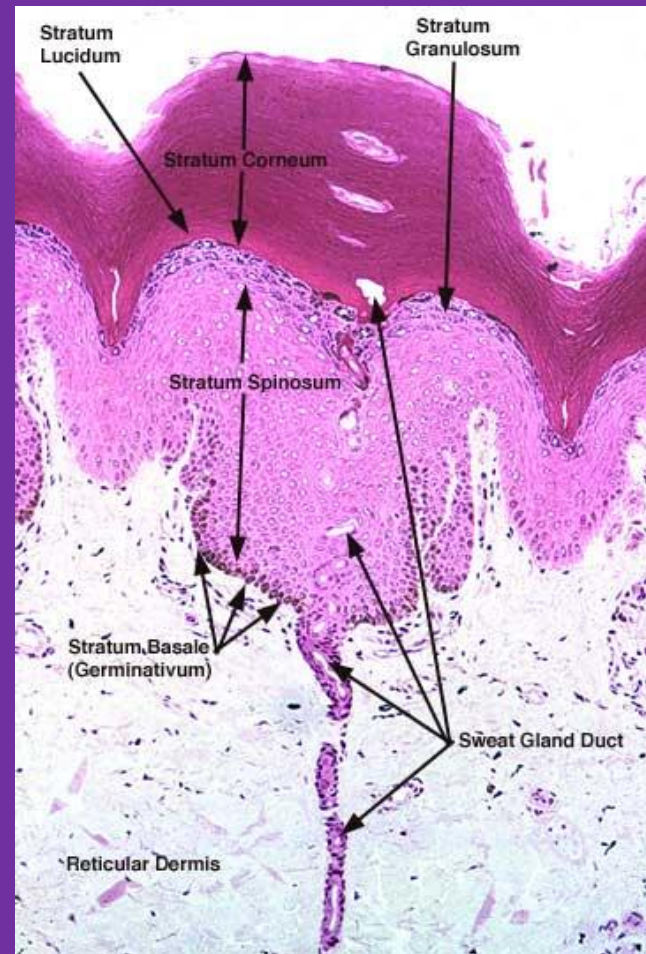


# Epidermis - Stratum Spinosum

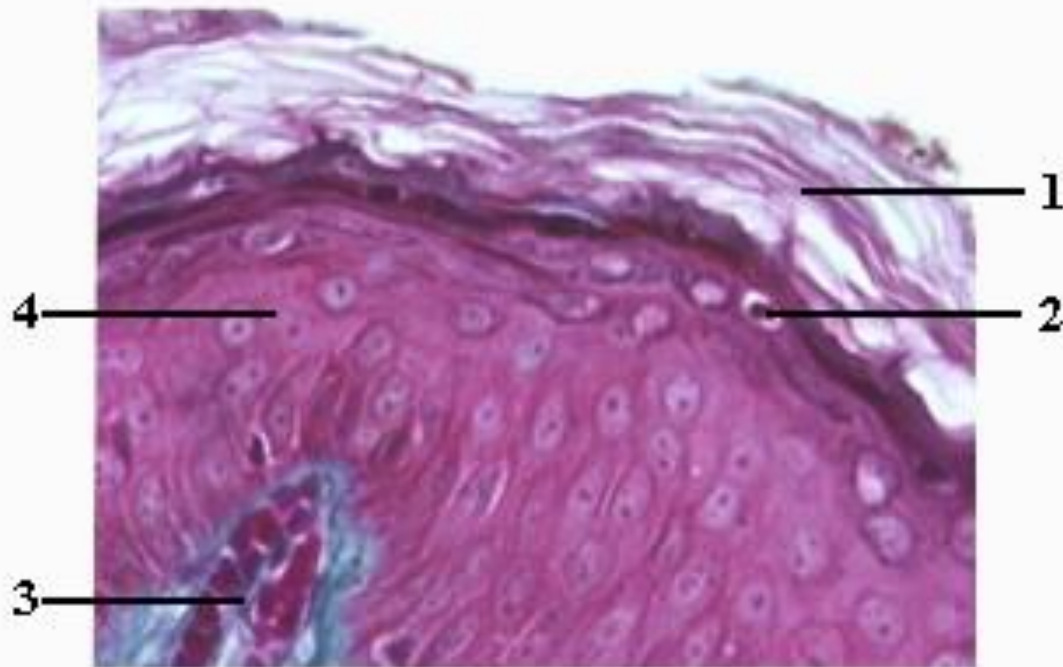


# Epidermis - Stratum Granulosum

- Granular layer
- 3 – 5 cell layers thick
- Contains granules important in keratin formation
- **Drastic Changes** → Cells flatten, nuclei and organelles begin to disintegrate
- Plasma membrane starts to thicken → more resistant to destruction → keratinocytes “toughening up”.



# Epidermis - Stratum Granulosum

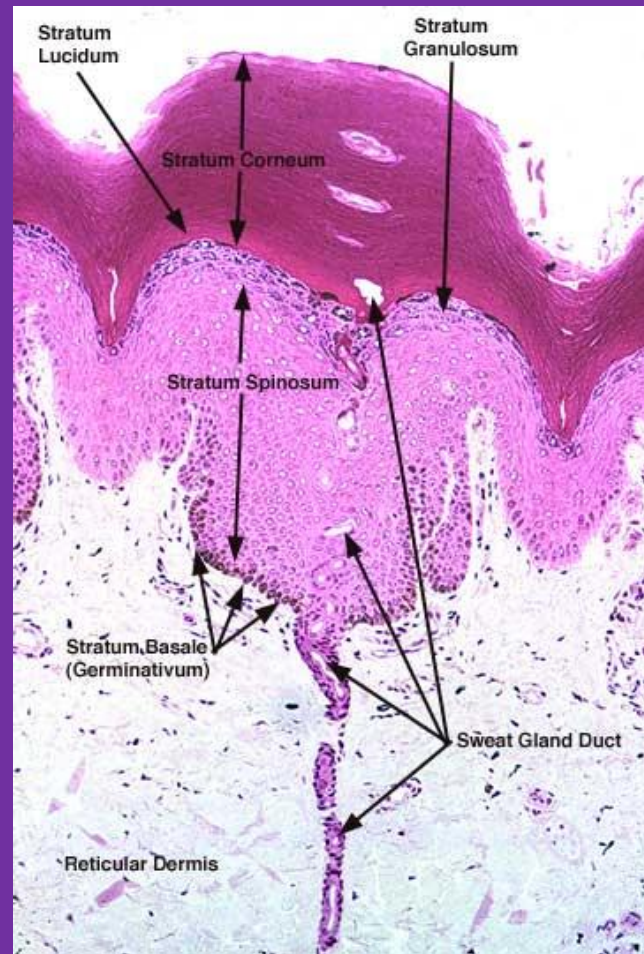


#2 is S. Granulosum

# Epidermis

## Stratum Lucidum

- Clear layer
- Present only in thick skin
  - Palms of hands
  - Soles of feet
- Appears as a thin translucent band just above the S. granulosum
- Consists of a few rows of clear, flat, dead keratinocytes



# Epidermis

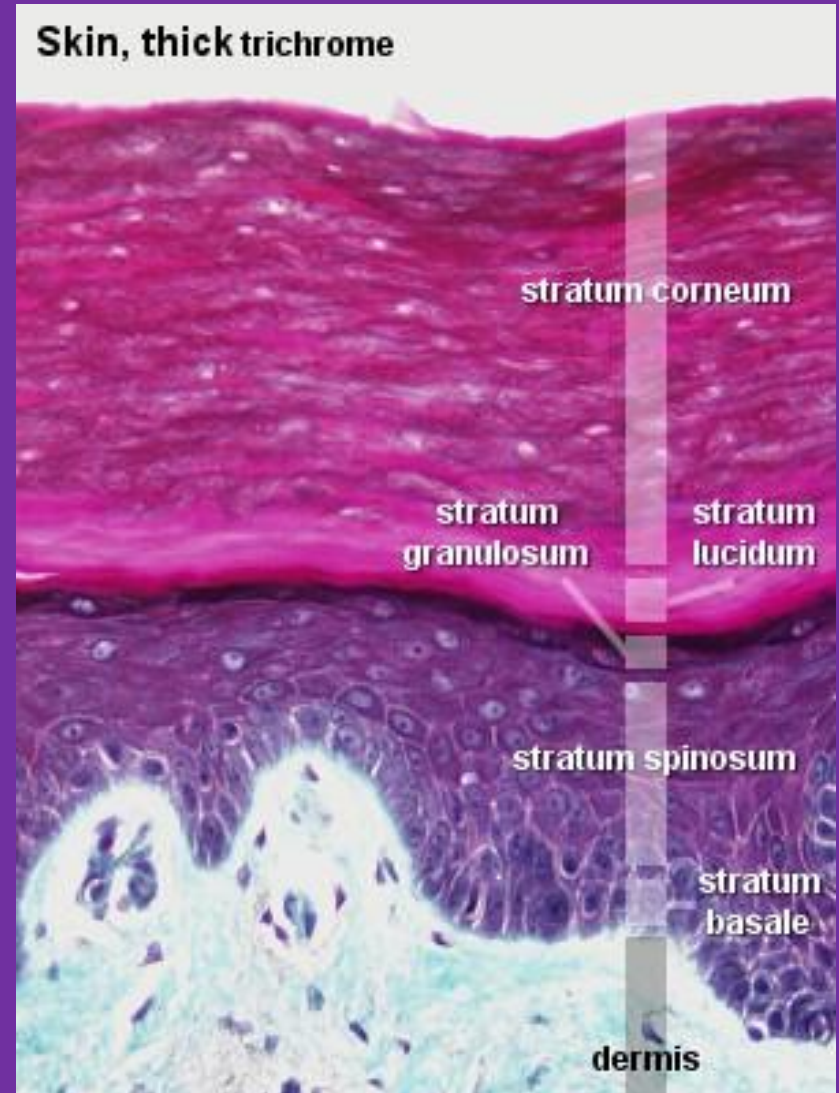
## Stratum Lucidum

Slide 43 Thick skin



# Epidermis - Stratum Corneum

- 20 – 30 cells thick (3/4 of epidermal thickness)
- Continuously shed → replaced from below (dandruff, skin flakes)
- Keratin and thickened plasma membranes of cells protect skin against abrasion and penetration. It is also waterproofed.
- Average person sheds 40lbs of skin flakes in their lifetime!



# Epidermis - Stratum Corneum

