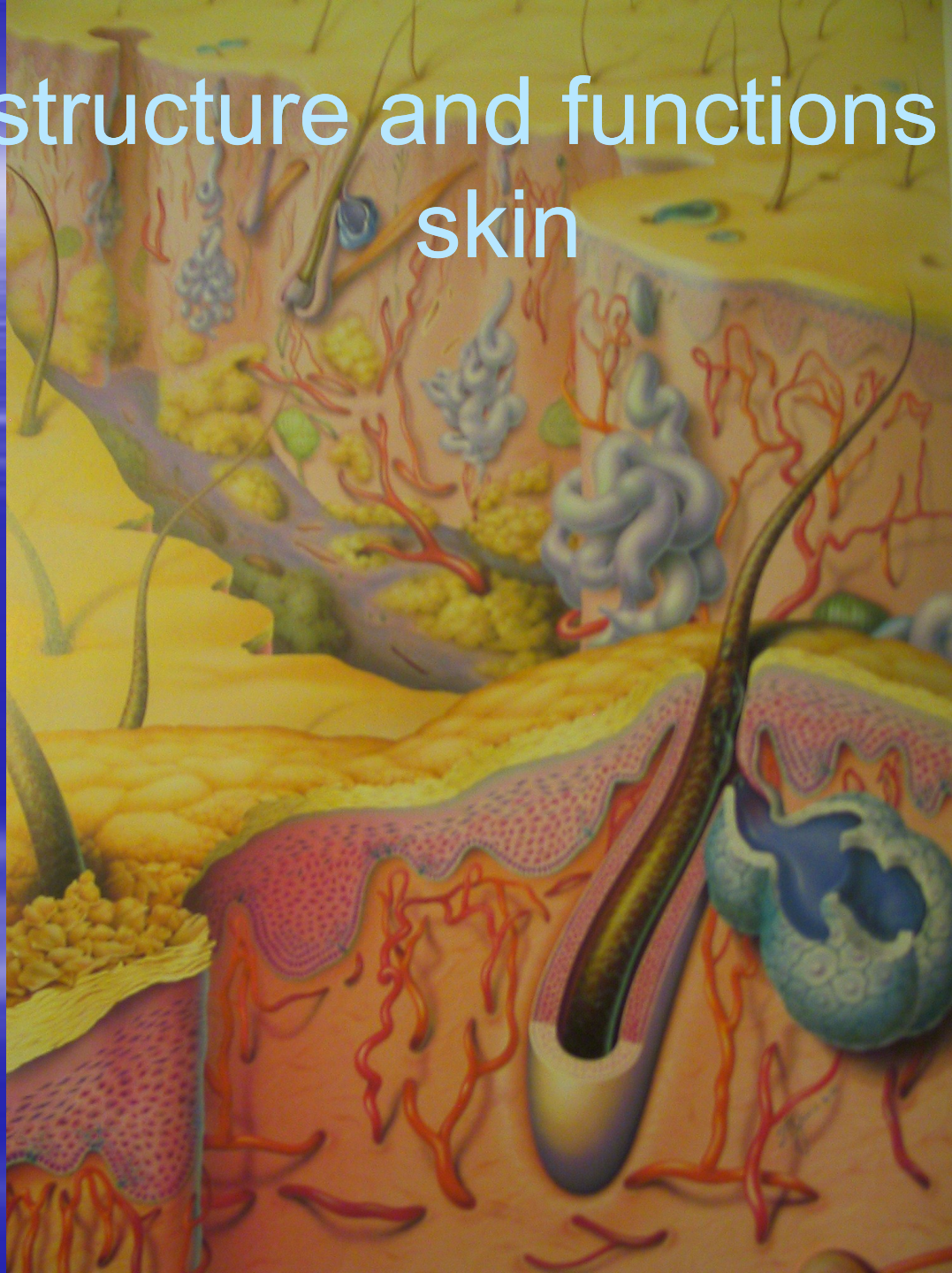


The structure and functions of the skin



Skin of an adult

- Surface 1,5 – 2m²
- Weight 18 – 20 kg
15-19% of total weight

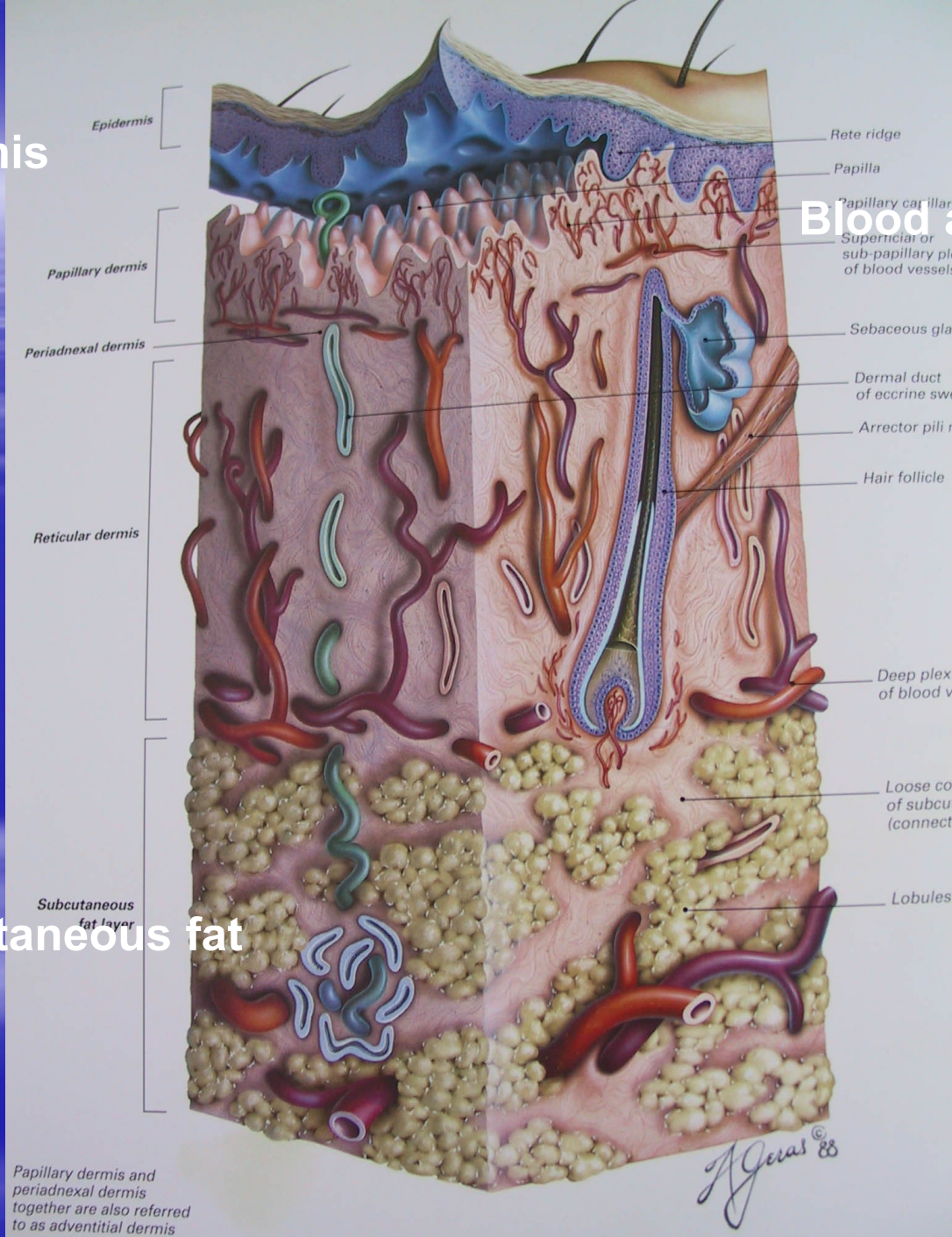
Epidermis and dermis mean thickness 2mm
(0,5 kg and 3,5 kg)

Subcutaneous tissue 8-25mm

Epidermis

Dermis

Subcutaneous fat



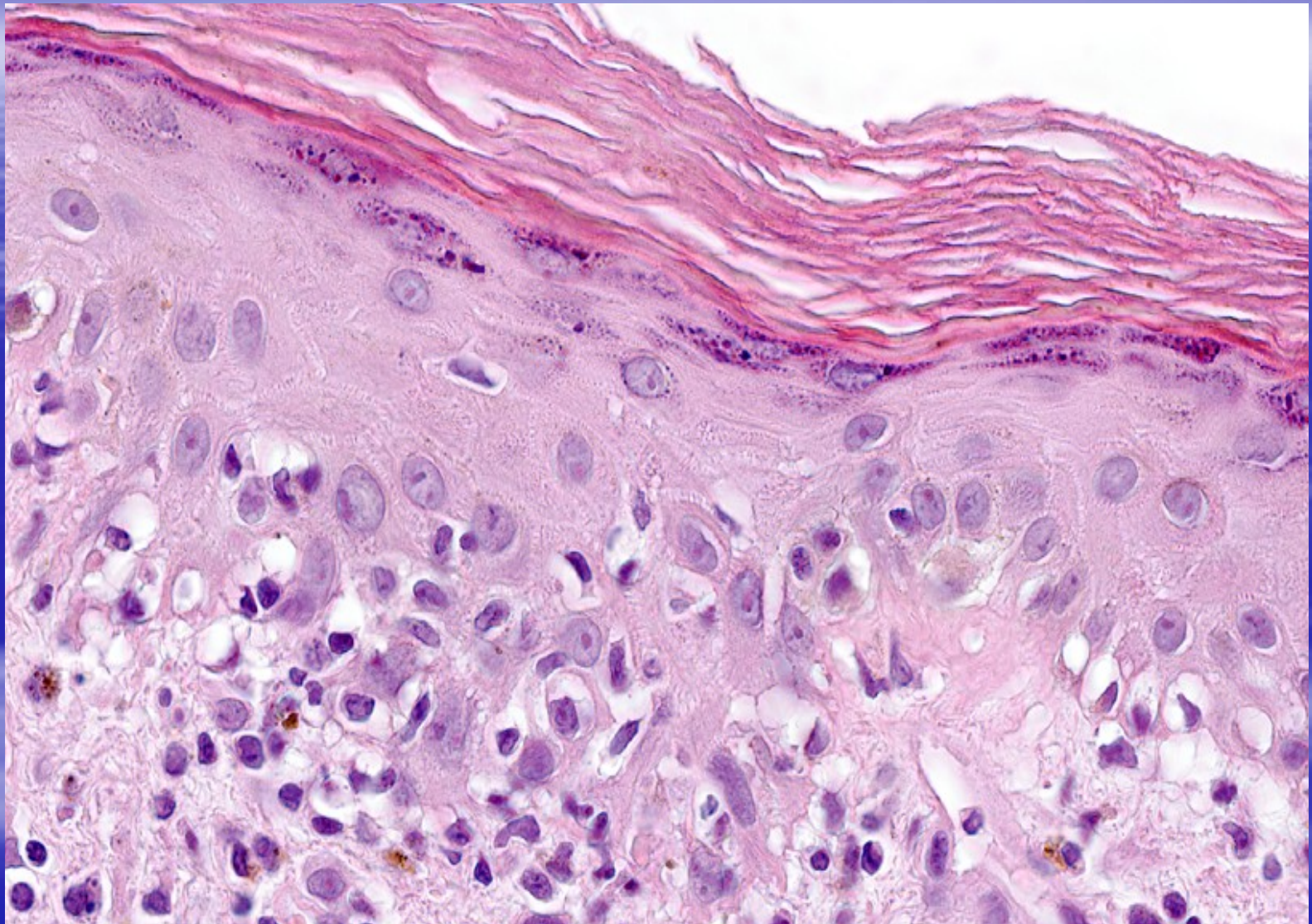
Blood and lymphatic vessels

Hair follicle unit

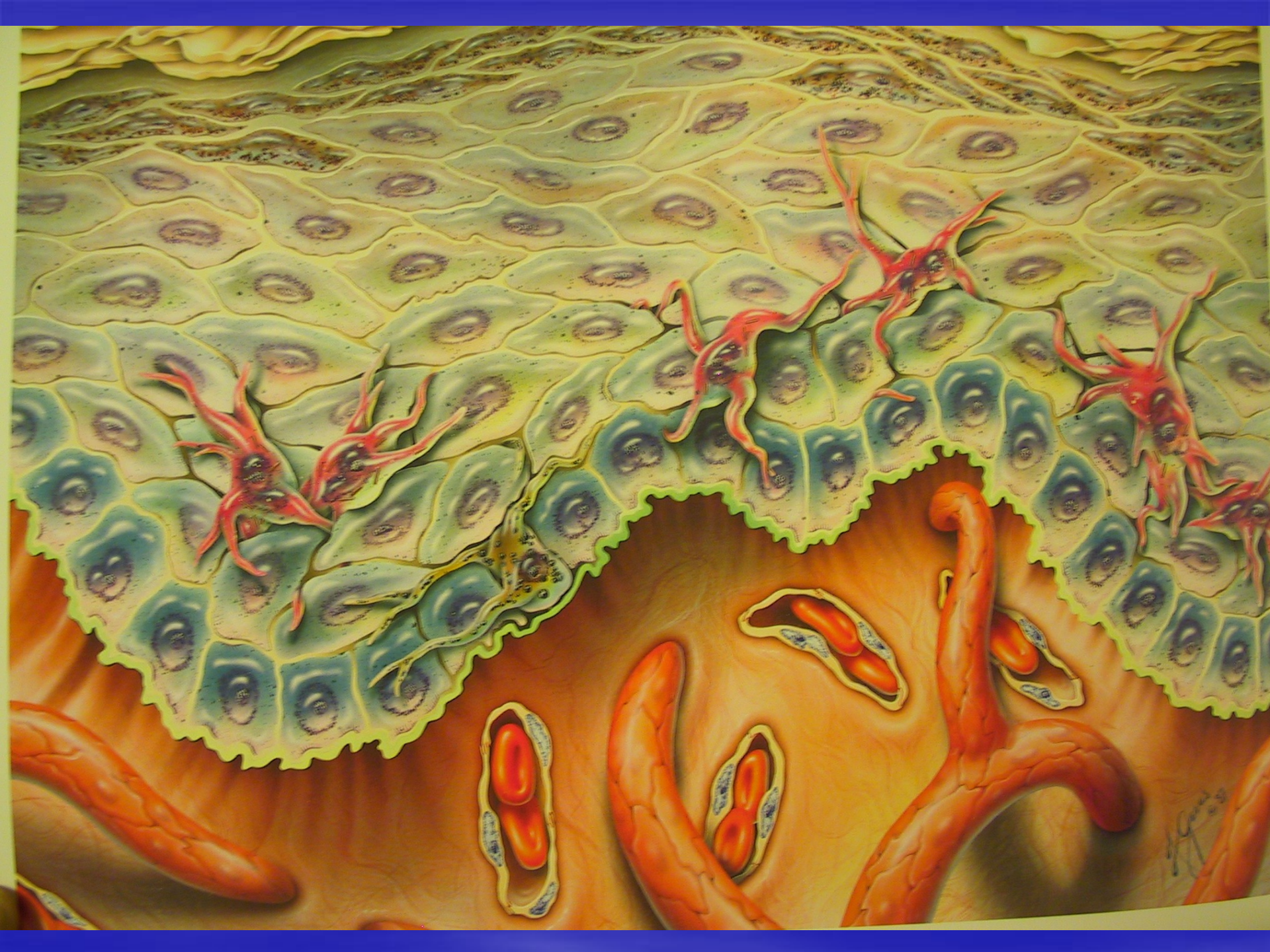
Sweat glands

Nerves

Connective tissue



www.muni.cz/atlas



Keratinocyte and keratinization

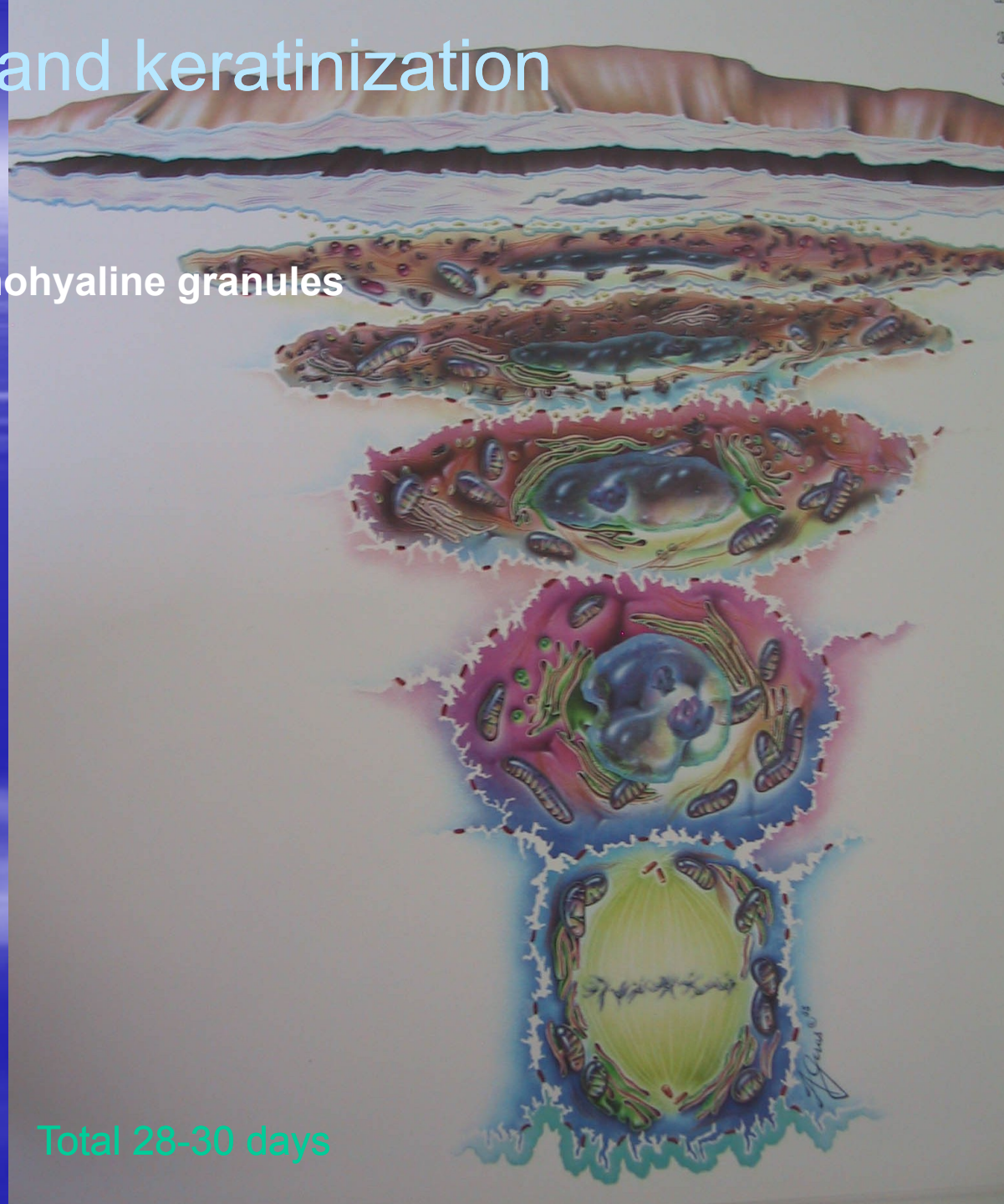
Horny layer 12 days

Granular layer- keratohyaline granules
2 days

Stratum spinosum
- 6 days

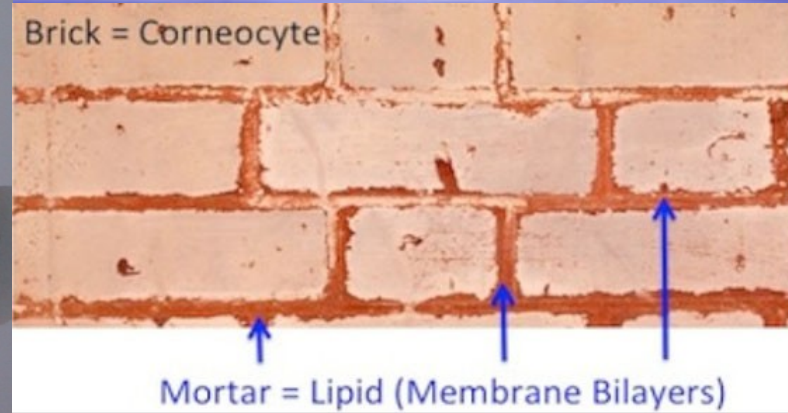
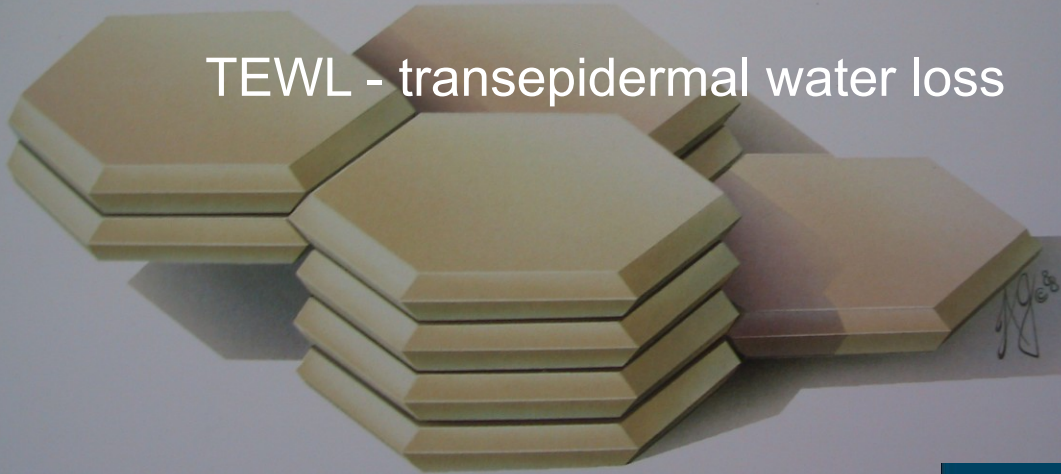
Basal cell layer
- 8-10 days

Total 28-30 days



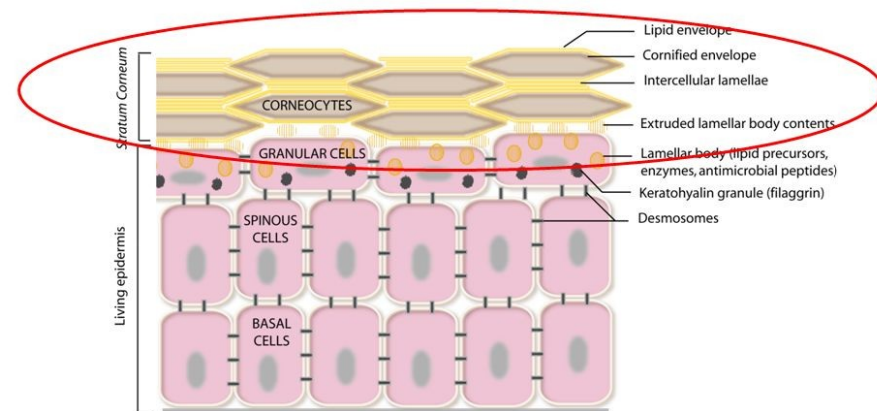
Horny layer - epidermal barrier

TEWL - transepidermal water loss



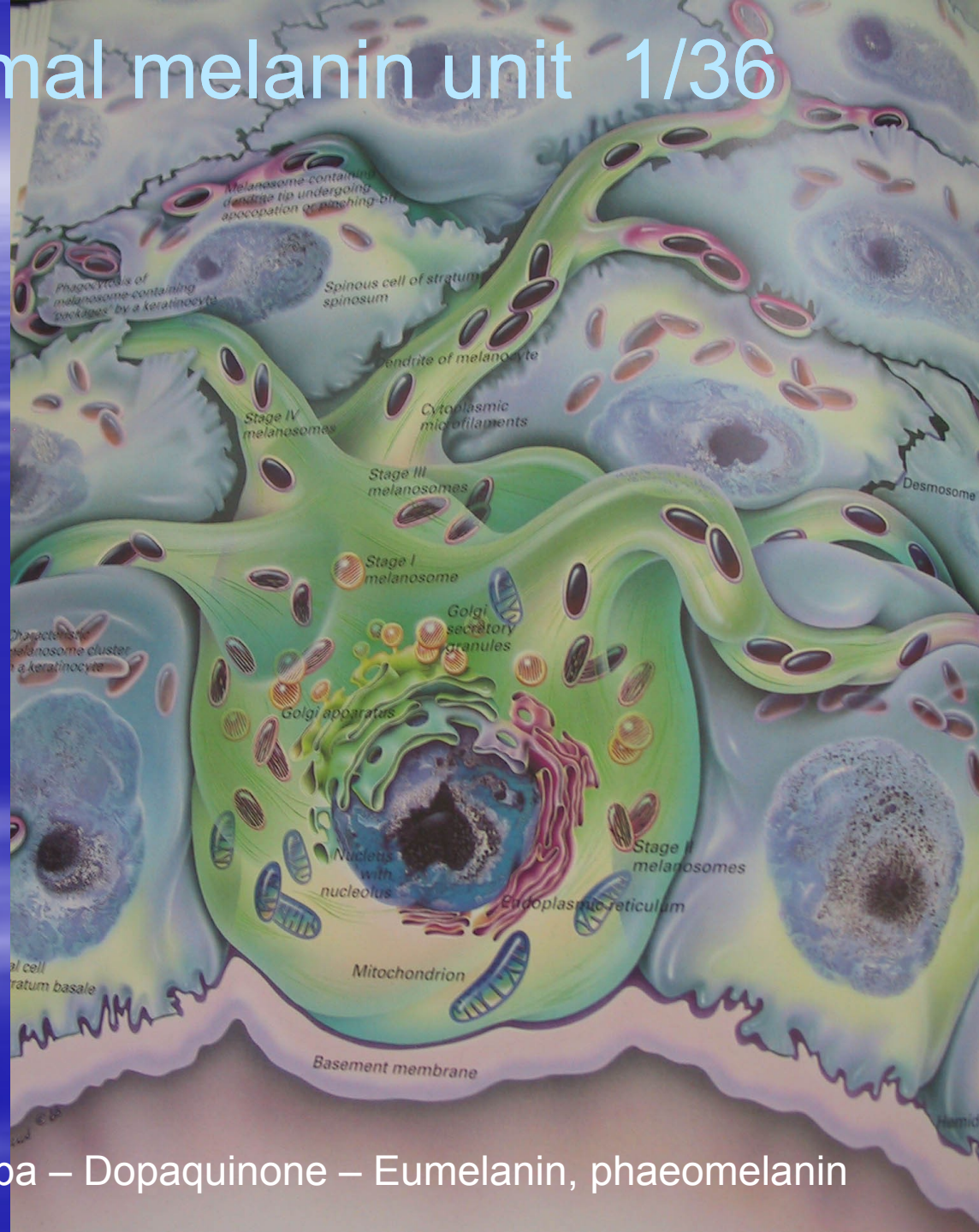
The Epidermal Barrier

Disorders - hyperkeratosis proliferation x retention
- parakeratosis
- dyskeratosis



Transepidermal water loss

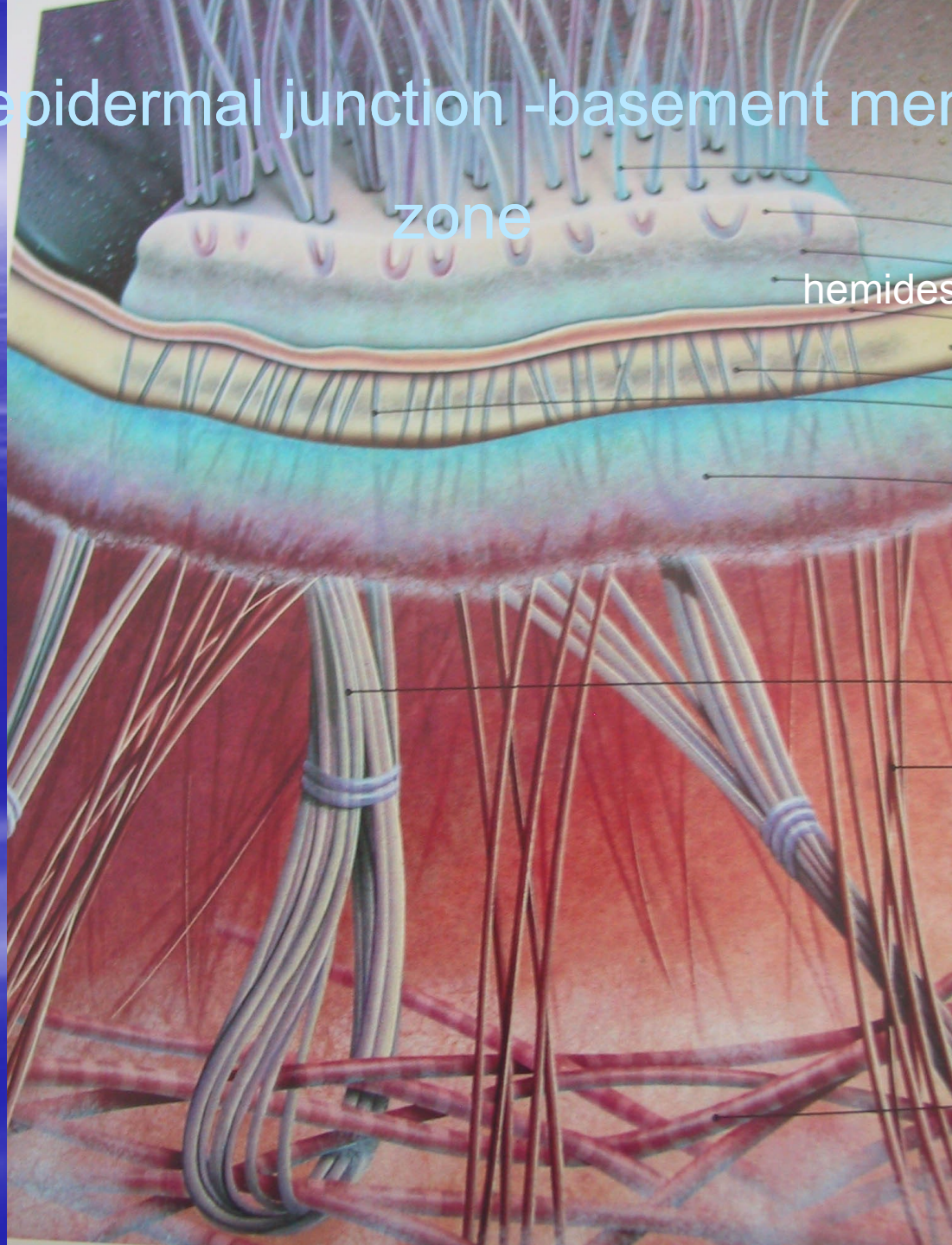
Epidermal melanin unit 1/36



Tyrosinase

Tyrosine – Dopa – Dopaquinone – Eumelanin, pheomelanin

Dermo epidermal junction -basement membrane



zone

hemidesmosome

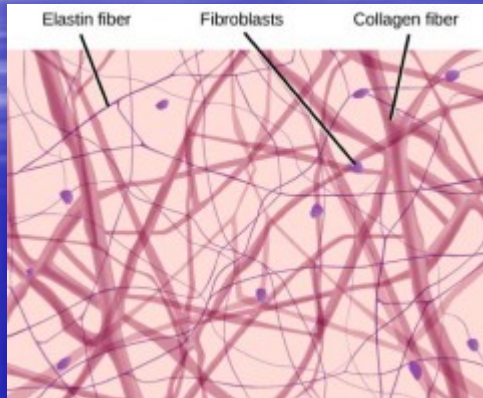
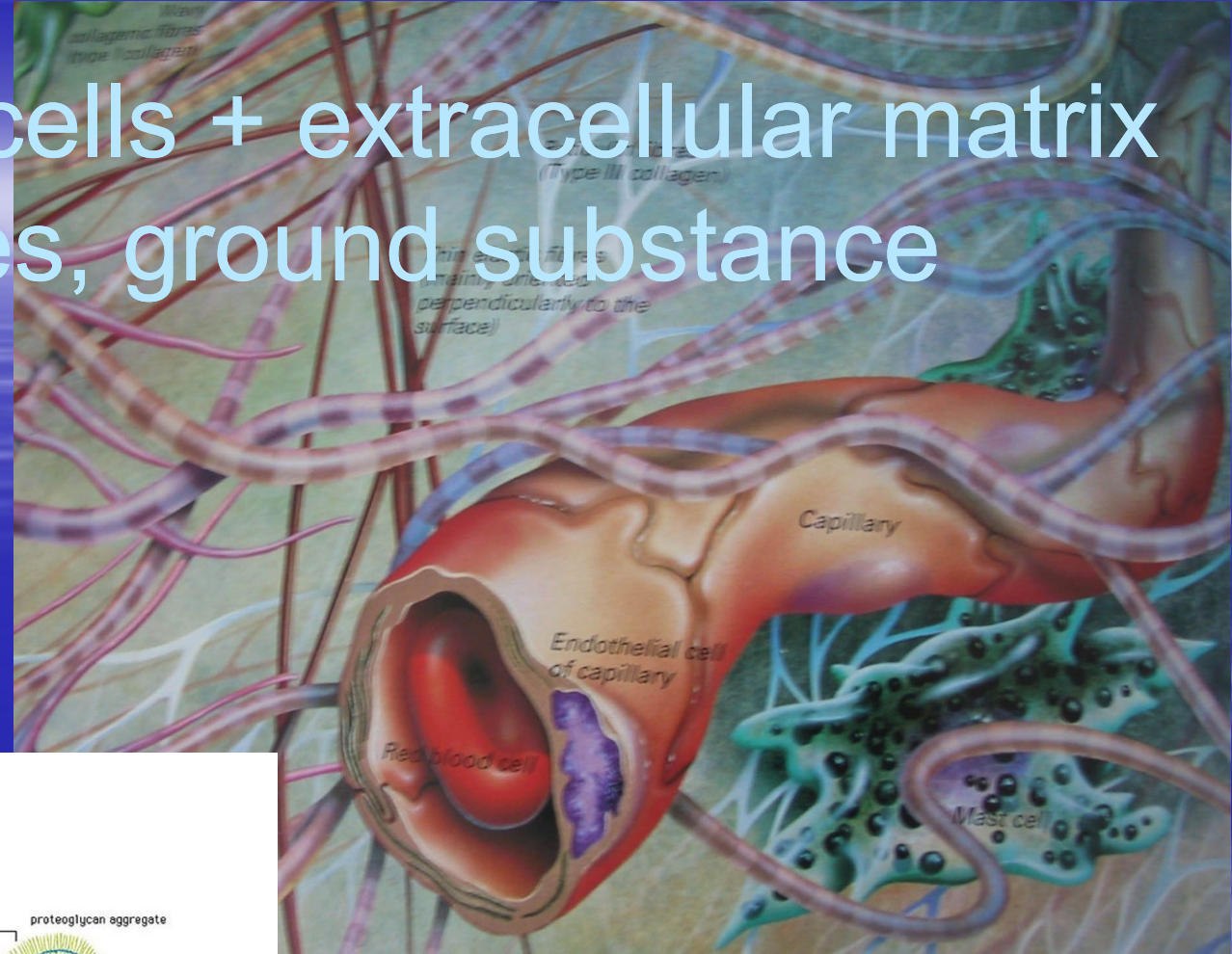
lamina lucida

lamina densa
collagen IV

collagen VII

Dermis – cells + extracellular matrix

- fibres, ground substance



Ground substance

is found in all cavities and clefts between the fibres and cells of connective tissues

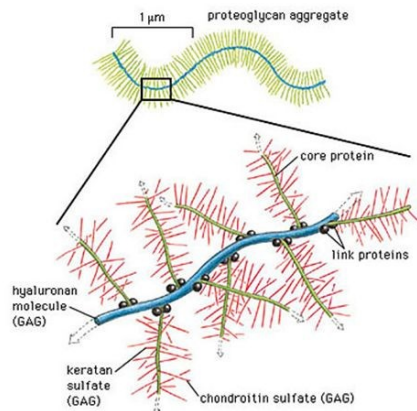
glycosaminoglycans /GAGs/

- hyaluronic acid
- chondroitin 4-sulfate / chondroitin 6-sulfate/
- dermatan sulfate
- heparan sulfate

proteoglycans /protein core to which GAGs are covalently bound/ - aggrecan, syndecan, fibroglycan

glycoproteins

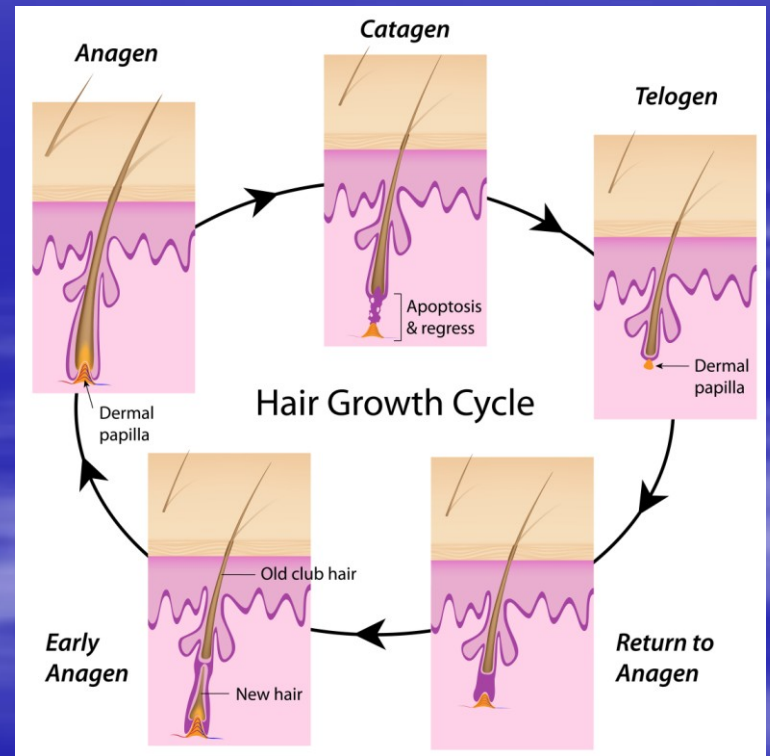
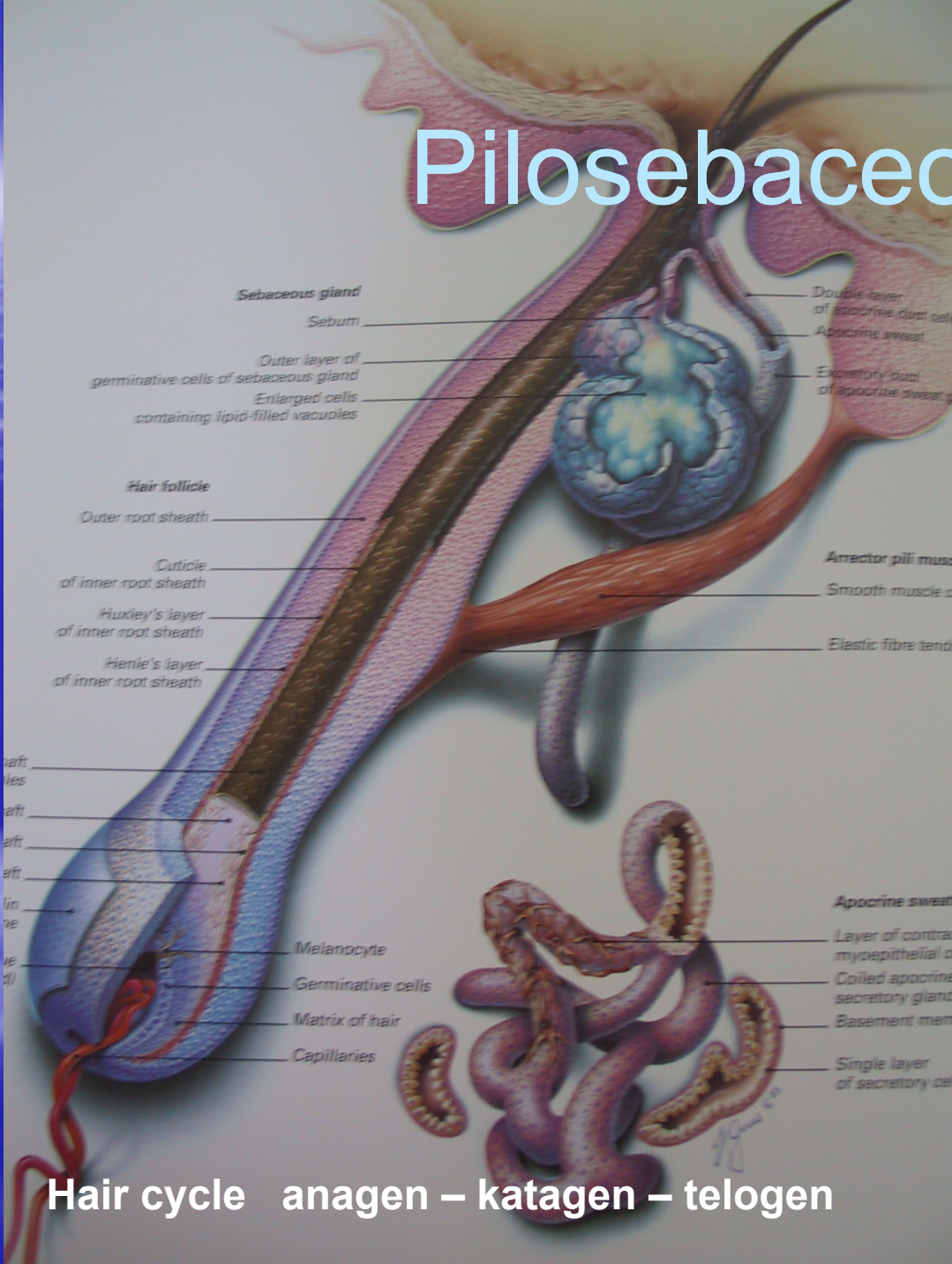
- fibronectin, laminin, osteonectin, osteopontin, chondronectin..



Some functions of dermal resident cells

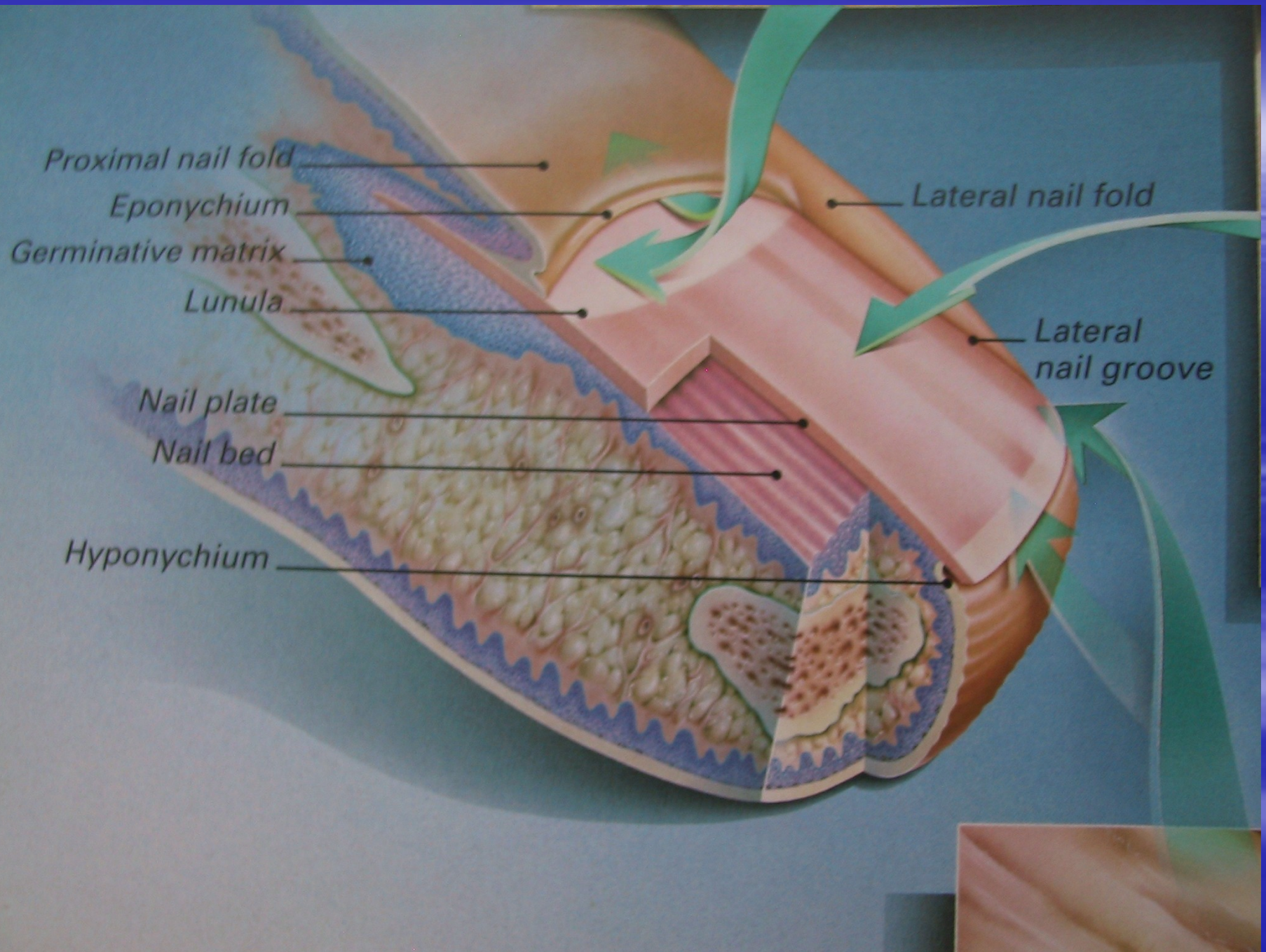
- **Fibroblast** synthesis of collagen, reticulin, elastin, fibronectin, glycosaminoglycans
- **Mononuclear phagocyte** phagocytose (bacteria), cytokine secretion
- **Lymphocyte** – immunosurveillance
- **Mast cell** – release of mediators (histamine, heparin, prostaglandins, leukotriens, tryptase etc)

Pilosebaceous unit



Hair cycle anagen – katagen – telogen

1000 – 10 – 100 days



Nerves

Nerve endings

Merkel cells

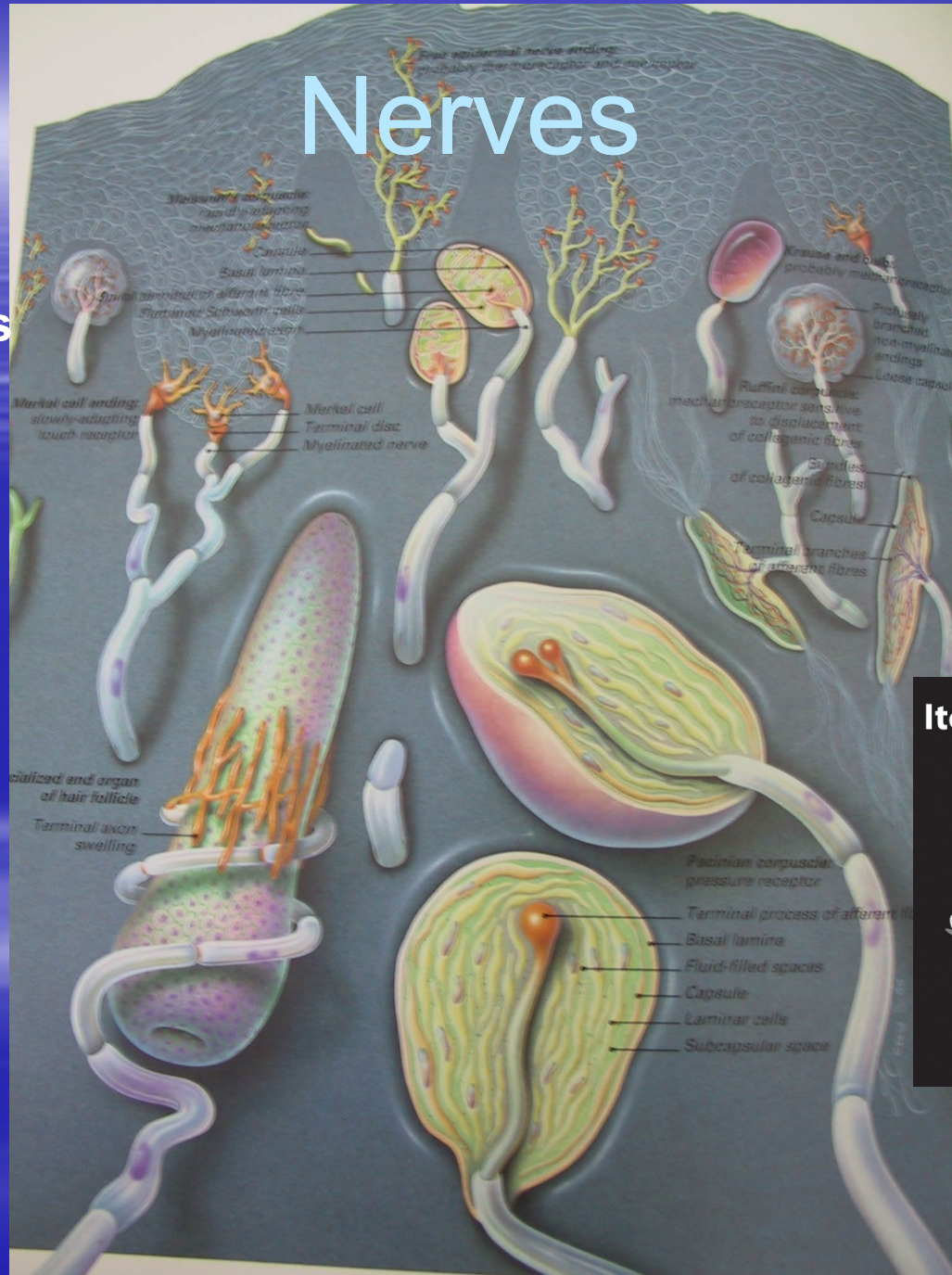
Corpuscles

Temperature

Pressure

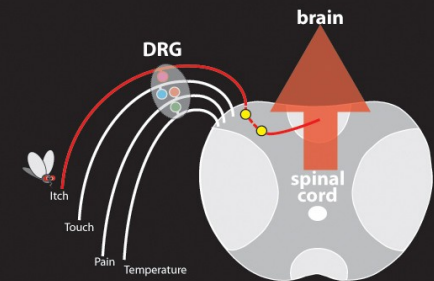
Vibration

Touch



Itch
Pain

Itch: detection and circuit

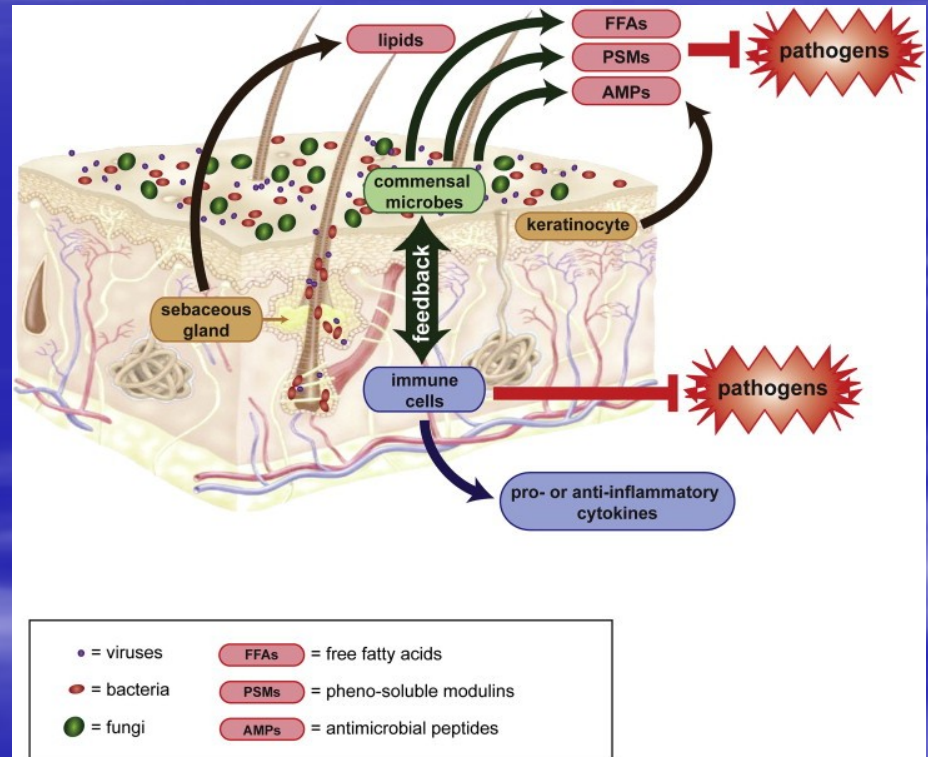
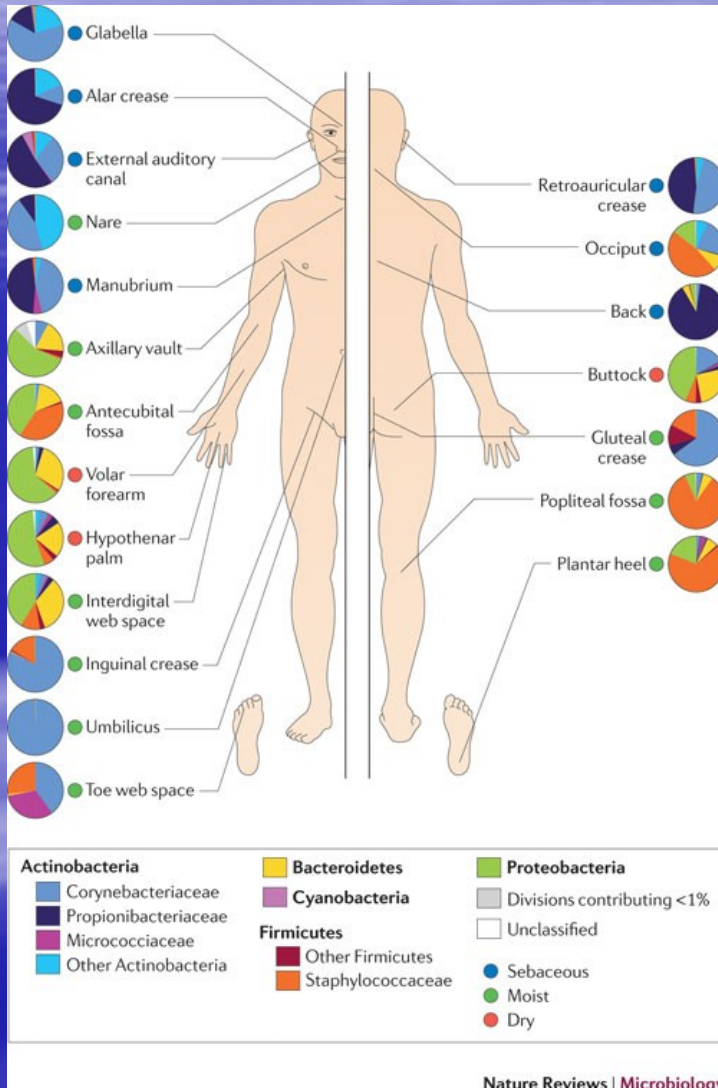


The function of the skin

1. Protection against

- Chemicals
- physical factors – UV, cold, heat, mechanical injury
- infections
- antigens
- Horny layer, (pH 5,5)
- Melanocytes, urocanic acid
- Antimicrobial peptides
- Langerhans cells

Skin microbioma



The function of the skin

2. Preservation of balanced internal environment

- Loss of water, electrolytes, macromolecules

3. Temperature regulation

4. Shock absorber

5. Sensation

6. Energy and water reserve

- Horny layer

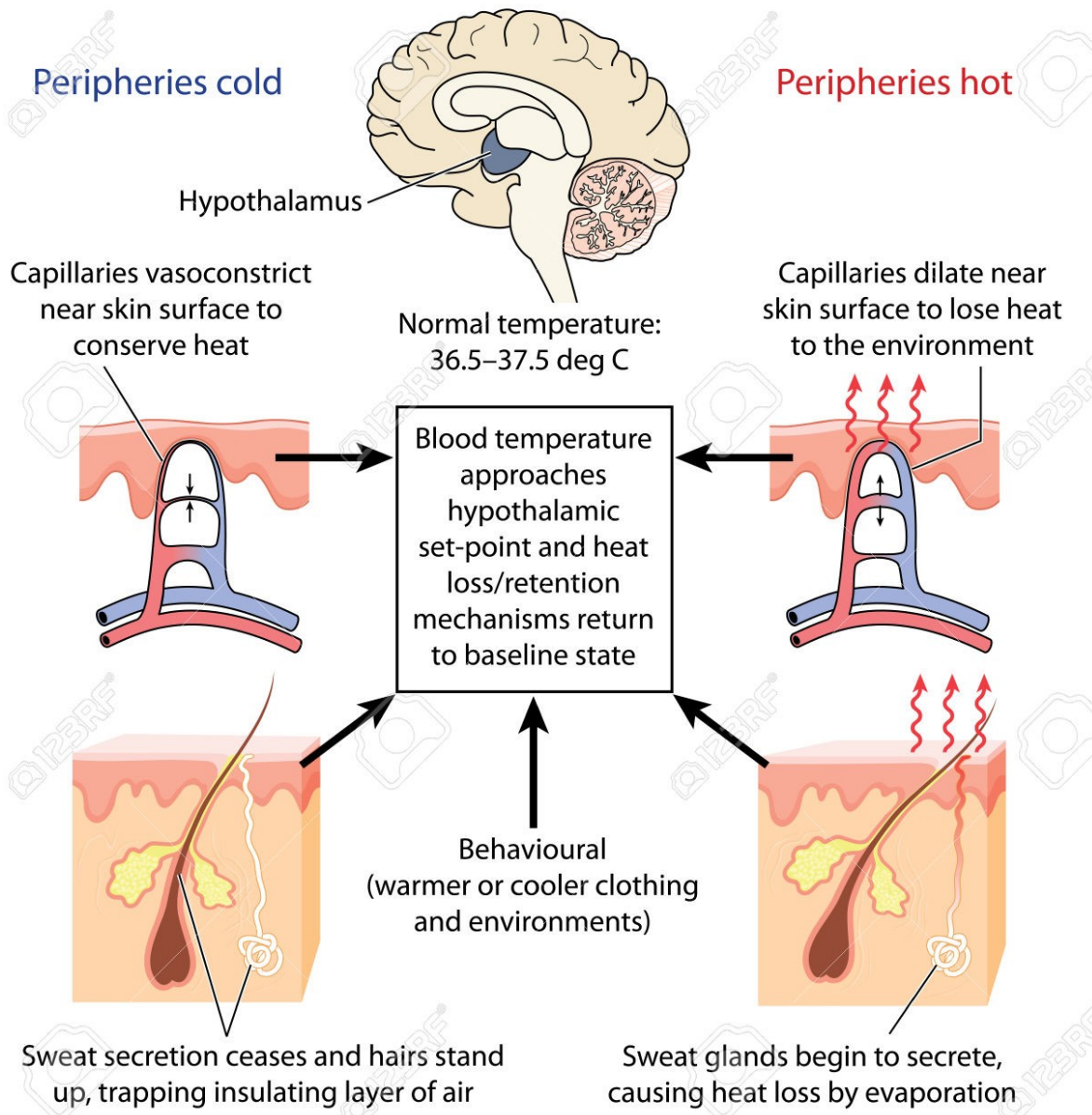
- Blood vessels, eccrine sweat glands

- Dermis, subcutaneous fat

- Nerves

- Subcutaneous fat, dermis

Thermoregulation



The function of the skin

7. Vitamin D synthesis

- Keratinocytes

8. Own metabolic function

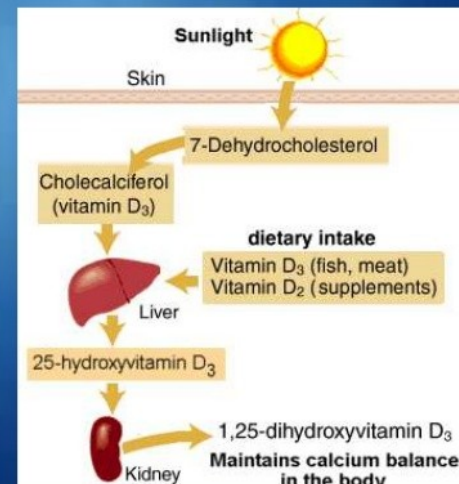
- Keratinocytes
- Fibroblasts

9. Immunological

10. Detoxicant

Vitamin D synthesis

- Synthesized in skin.
- Essential for bone metabolism.



The function of the skin

8. Protection and fight

- Nails, hair

9. Psychosocial function

- Cosmetic quality, lips, hair

10. Body odour

- Apocrine sweat glands



