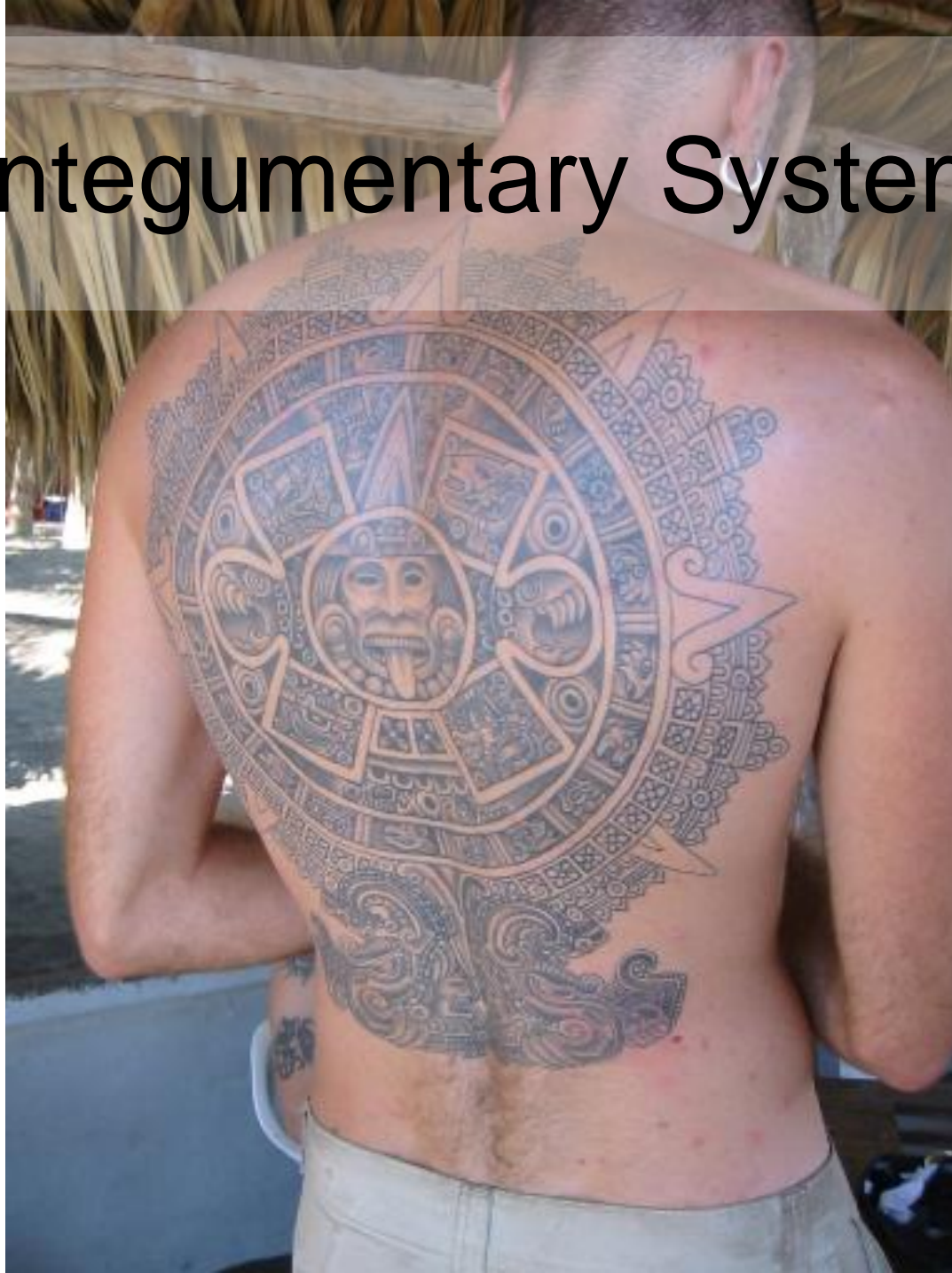


Integumentary System



Functions of the integumentary system

- Protection from the environment-the skin is the superficial surface of the body
- Thermoregulation-secretions from sweat glands in the skin cool the body down
- Storage of lipids-adipose tissue (fat)
- Vitamin D synthesis
- Provides sensory info-sensory receptors located in the skin

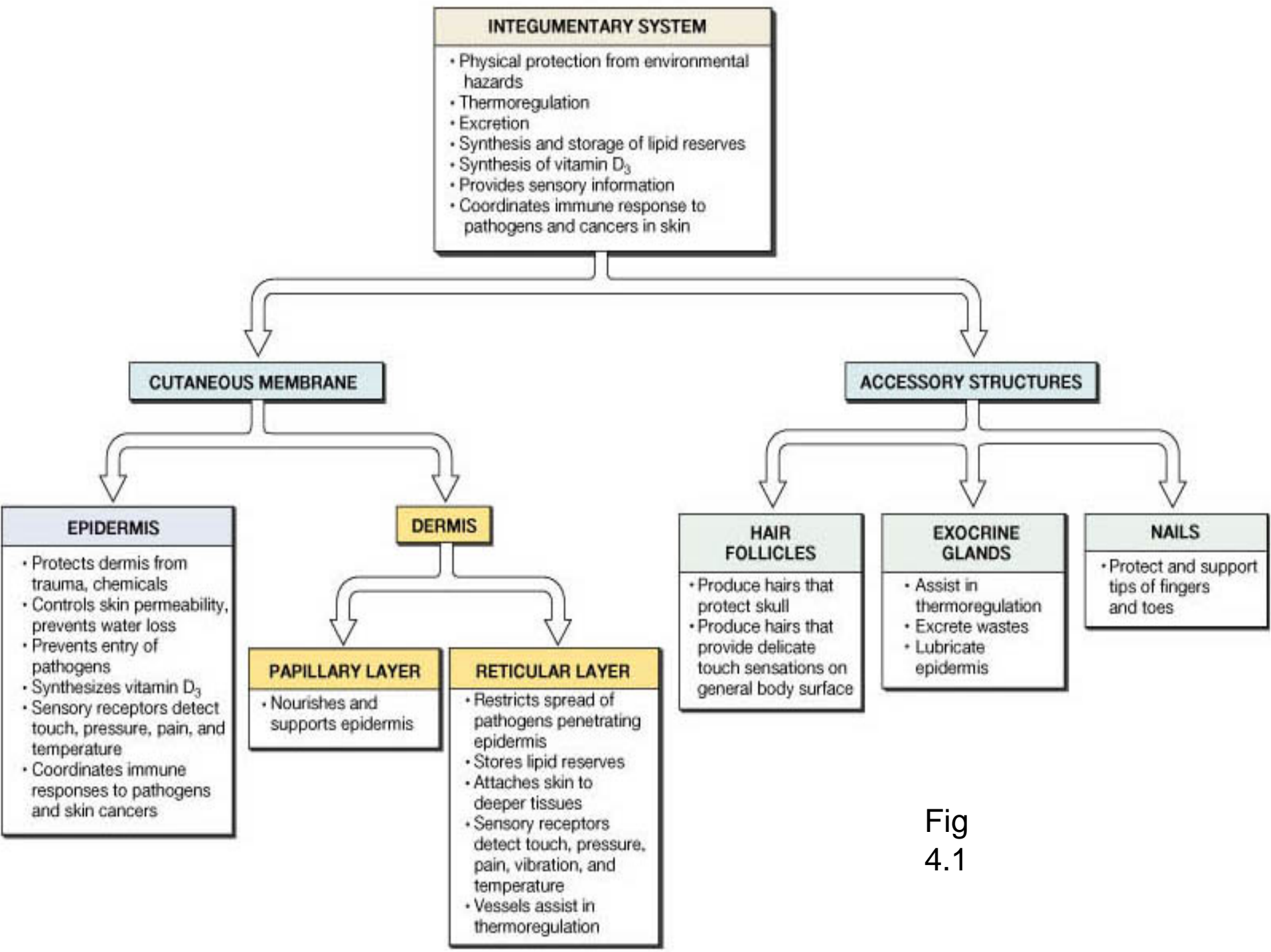


Fig 4.1

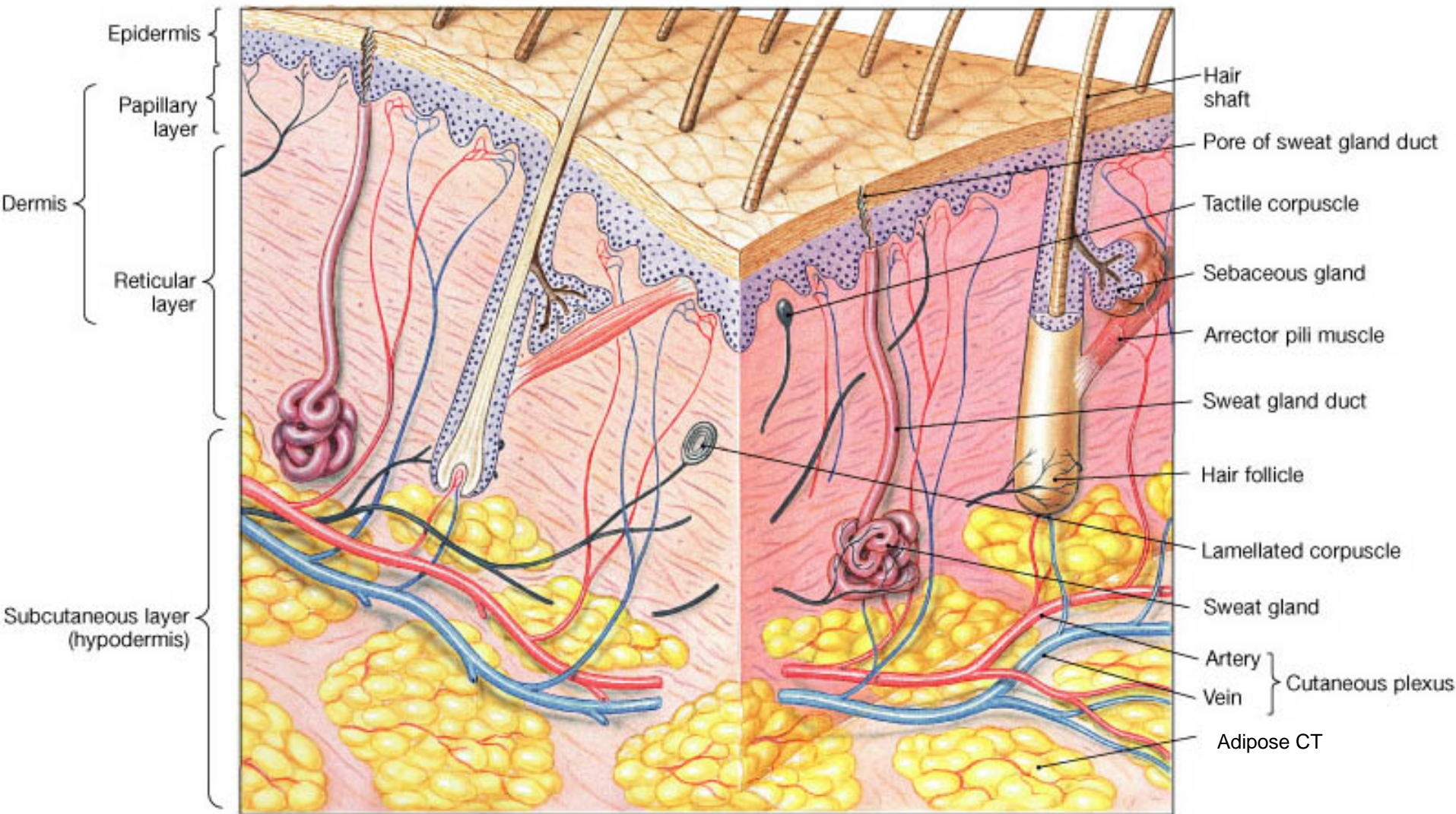


Fig
4.2

Layers of the epidermis

Stratum basal (germinativum)-attached to basement membrane, contains stem cells & melanocytes

Stratum spinosum-keratinization begins

Stratum granulosum-process of adding keratin continues

Stratum lucidum-only in thick skin

Stratum corneum-at surface of skin

Layers of dead interlocking keratinocytes

Contains large amount of keratin

Makes a dry water resistant layer

Epidermis

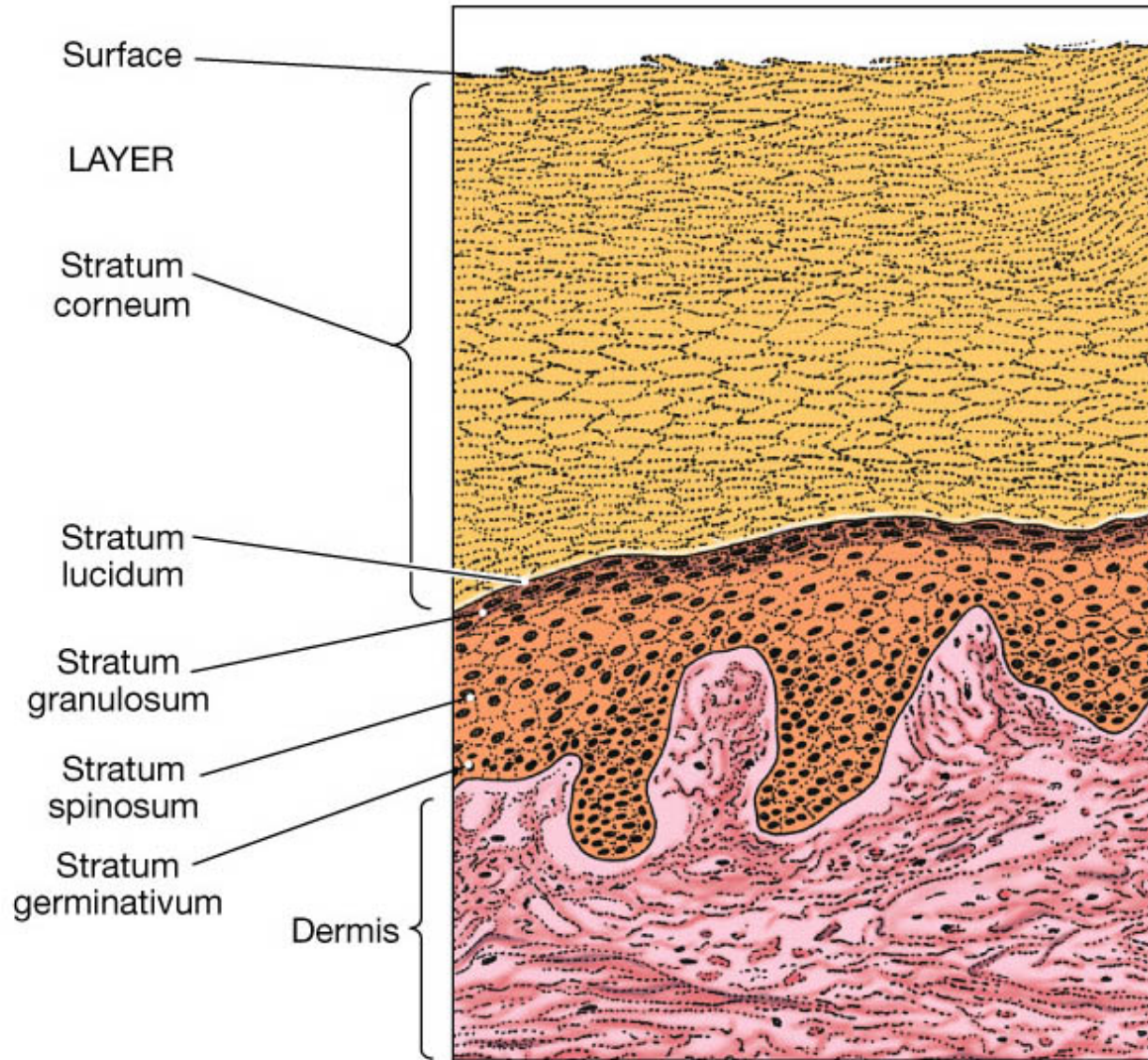
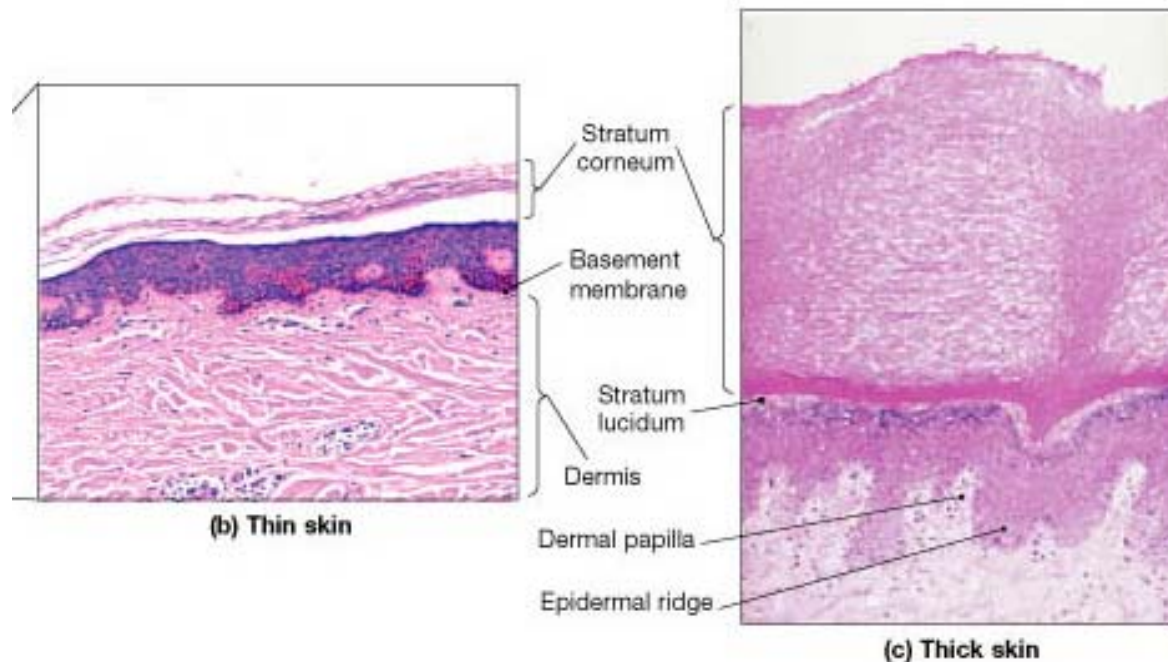


Fig 4.3

Thick & thin skin

- Thick skin has 5 layers in the epidermis- includes the stratum lucidum, plantar/palmar
- Thick skin has a thicker stratum corneum

Fig
4.4



Fingerprints-thick skin

- Epidermis-epidermal ridges
- Dermis-dermal papillae

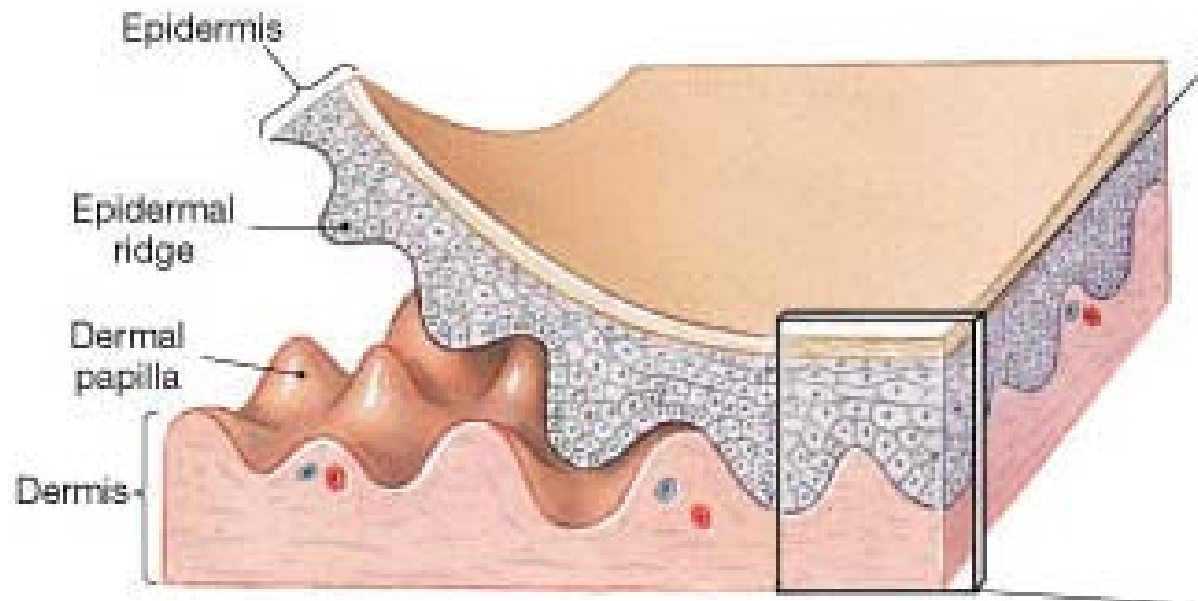


Fig
4.4

(a)

Dermis

- Composed of connective tissue
- Highly vascular
- Contain nerves and sensory receptors
- Located deep to the epidermis
- Has two layers:
 - Papillary layer provides nutrients, O₂ etc to the epidermis
 - Reticular layer-interwoven network of collagen fibers surrounding dermal organs

Papillary & Reticular layers

Papillary layer

Consists of areolar CT

provides nutrients, O₂ etc to the epidermis

Tattoo ink is injected into the papillary layer

Reticular layer

- Reticular layer-interwoven network of collagen fibers surrounding dermal organs
- Wrinkles and stretch marks arise from degradation of the reticular layer

Lines of cleavage-clinical aspect

- Collagen & elastic fibers are arranged in parallel bundles in the skin
- Incisions parallel to the lines of cleavage heal faster than incisions at a right angle to the line of cleavage



Hypodermis

- Loose Ct with adipose cells
- Regional distributions of adipose in males and females

- Stabilizes position of organs
- Reduces heat loss
- Energy reserve
- Cushion

?’s about the integument

- Text chapter 4

Accessory structures

- Hair, nails, & glands in the skin (dermis)
- Hair grows everywhere except areas with thick skin and portions of the external genitalia
- Hair is formed in organs called hair follicles
- Hair give added sensory info and protects orifices of the body (nostrils, ears)

Hair

- Types of hairs on the body:
- Vellus hairs-“peach fuzz” over most of the body
- Intermediate hairs-hairs stimulated by hormones-pubic hair, beard, distal appendages
- Terminal hairs-hairs on head, eyebrows, eyelashes

- Hair is dead keratinized epithelial cells

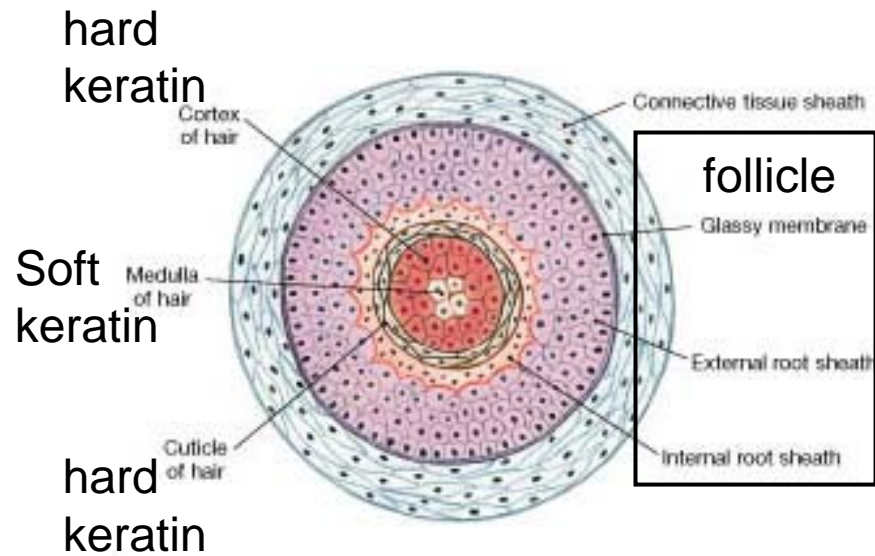


Fig
4.10

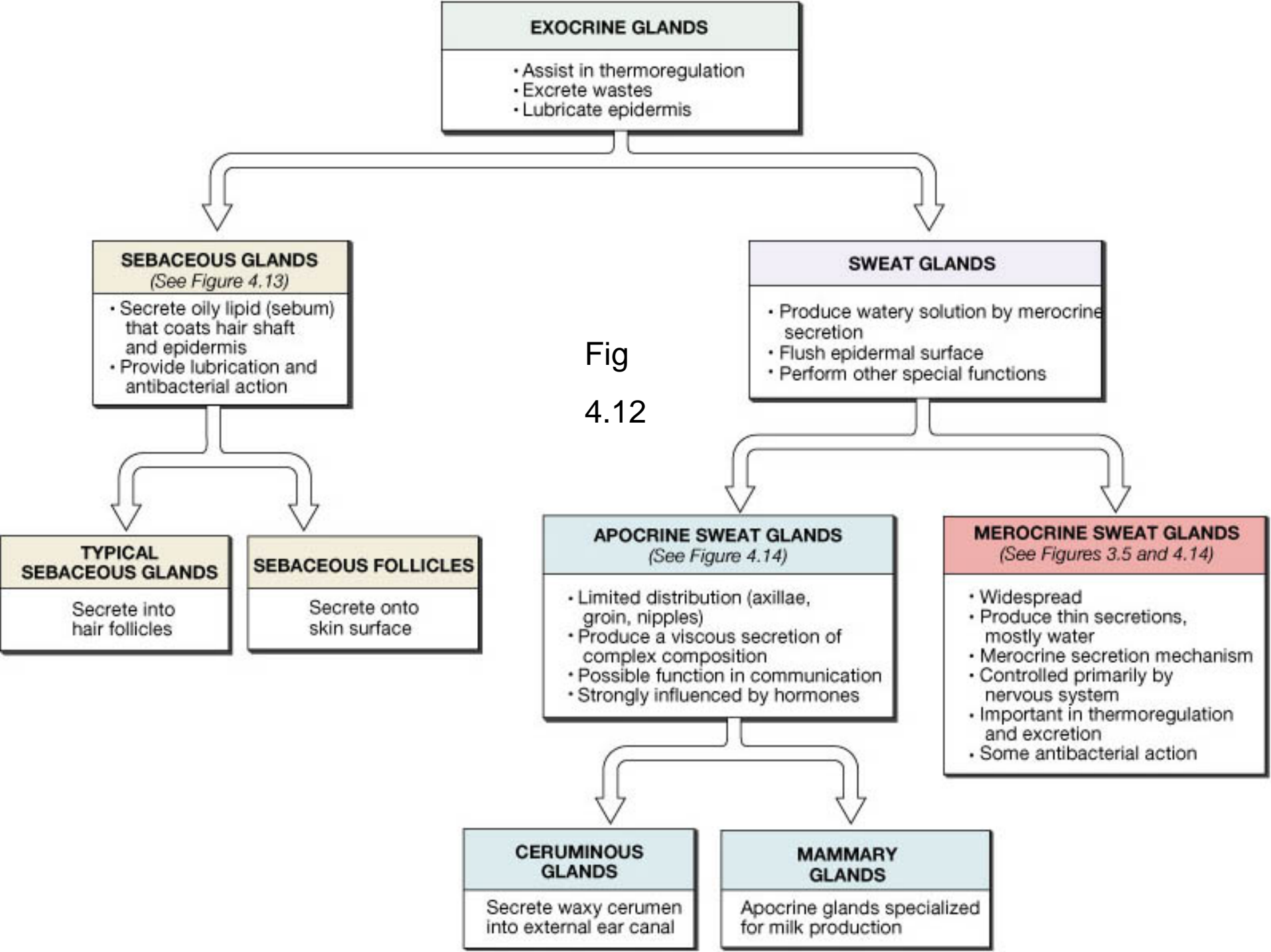


Fig 4.12

Sebaceous glands

- Branch off of hair follicles
- Release oily secretion on to hair

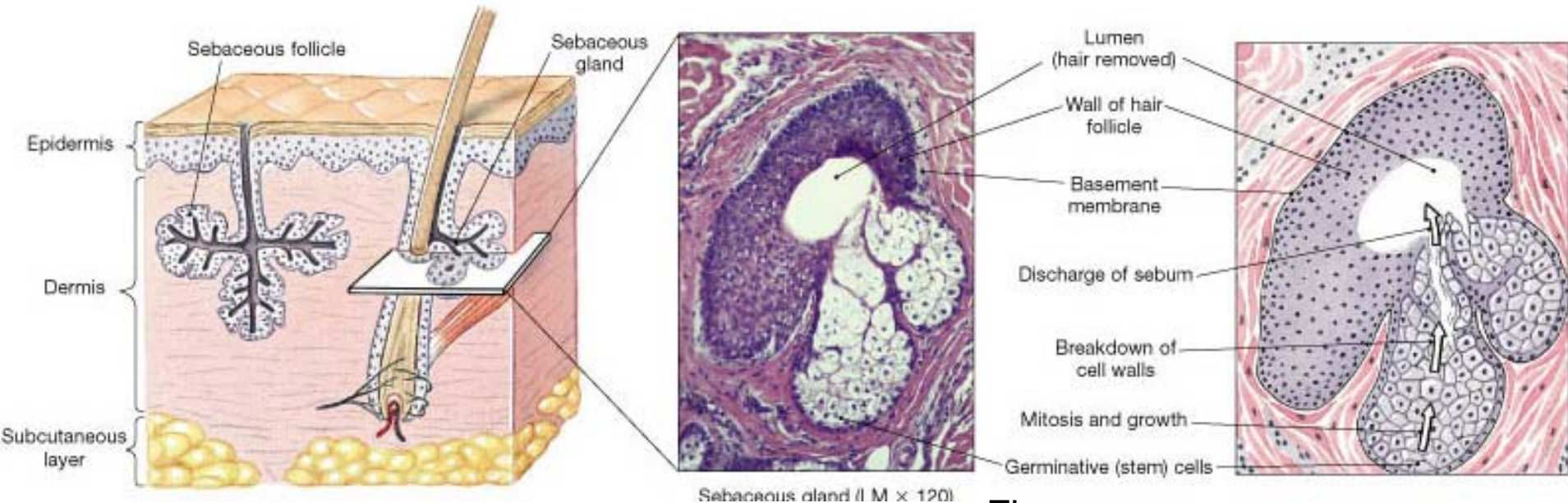
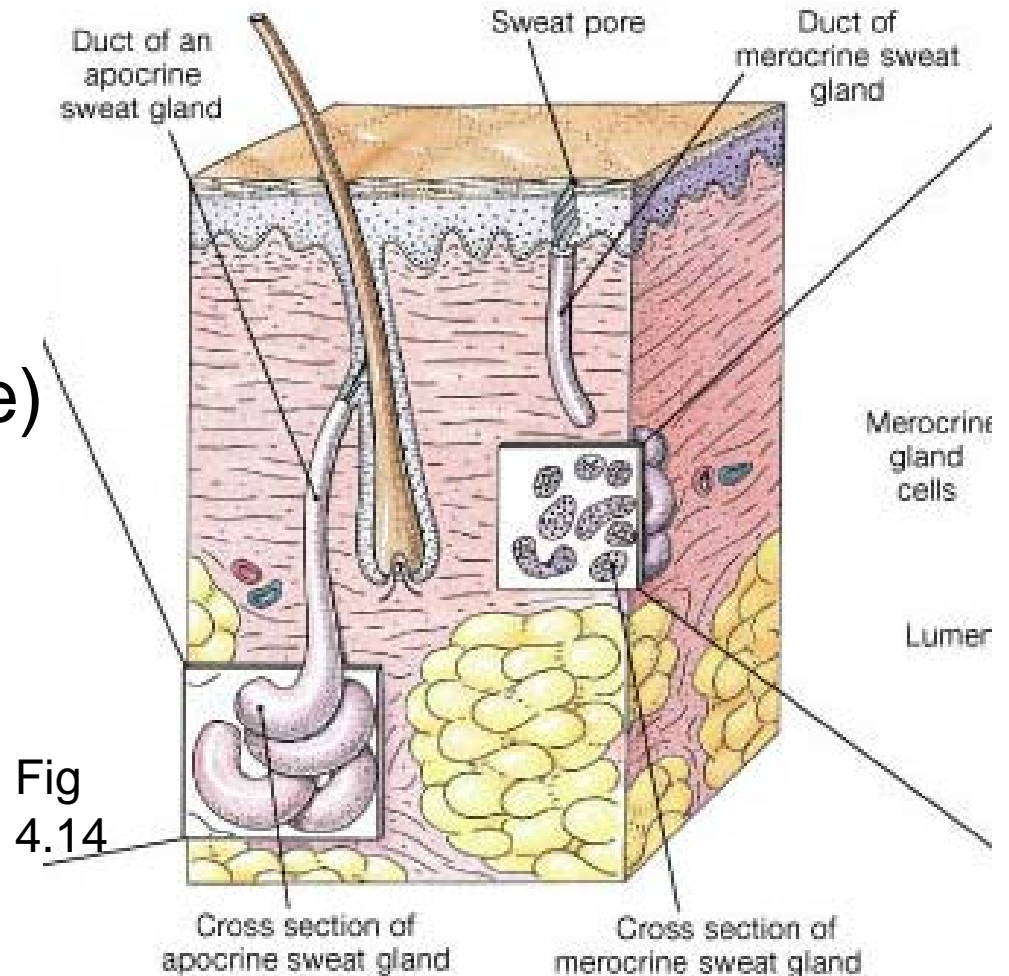


Fig
4.9

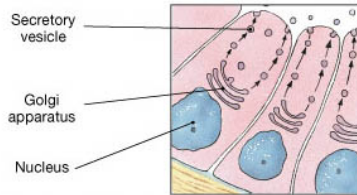
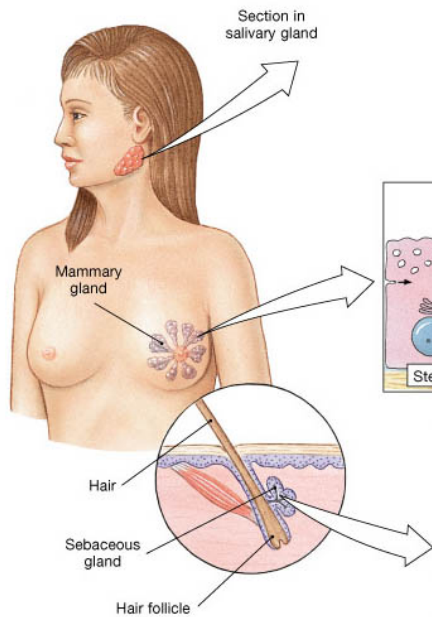
Sweat glands

- Apocrine-in the axillary, areolae & inguinal regions
- -secrete into hair
- Merocrine (eccrine) all over the body
 - Secrete onto skin
 - Smaller and more superficial than apocrine glands

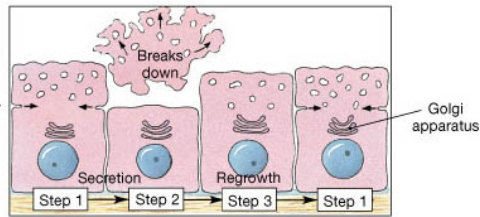


- Mammary glands-modified apocrine glands that release breast milk
- Ceruminous glands-modified merocrine glands that release cerumen (ear wax)

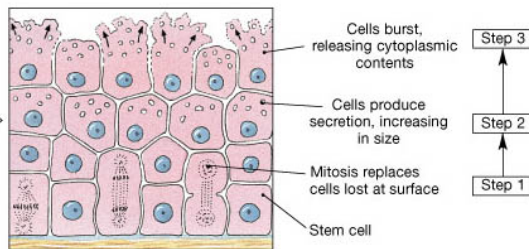
mechanism of secretion	holocrine	merocrine	apocrine
Type of gland	Sebaceous glands	merocrine (eccrine) & Apocrine glands	Mammary glands



(a) Merocrine secretion



(b) Apocrine secretion



(c) Holocrine secretion

Fig 3.9

Nails



- Protect distal ends of finger & toes
- Stratum corneum forms the hyponychium and eponychium
- Blood vessels give the pink color

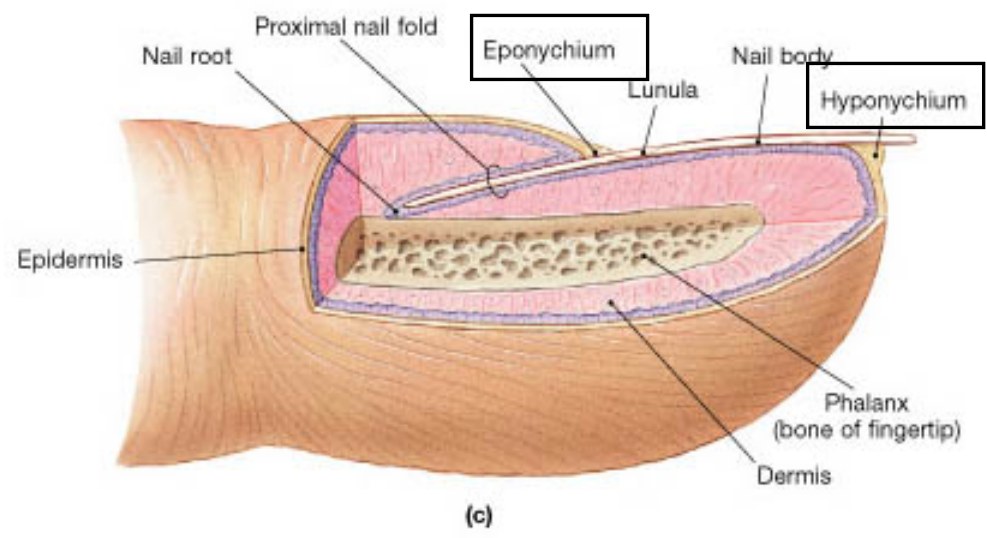
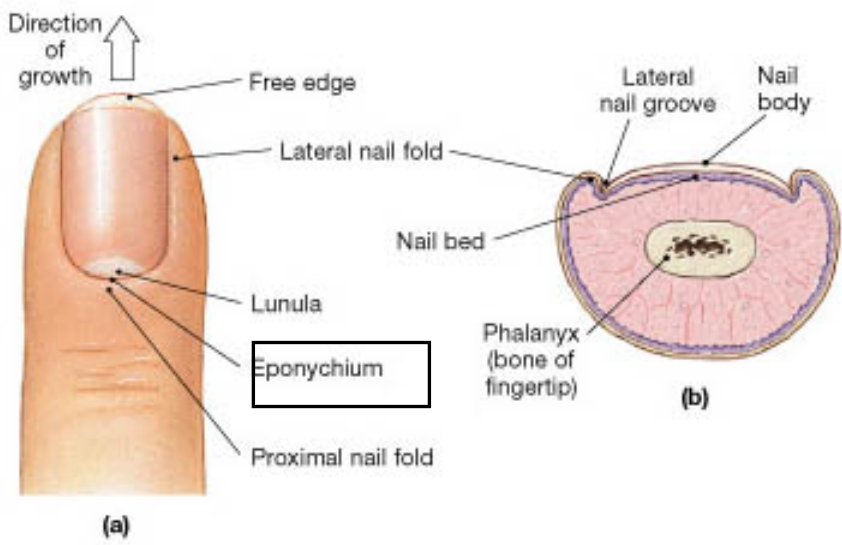


Fig
4.15

Layers of the integument-review

superficial

- Epidermis-stratified squamous epithelial tissue
 - Stratum corneum-thicker in thick skin-palmar/plantar
 - Stratum lucidum-only in thick skin
 - Stratum granulosum-contains keratin & (melanin in people of African decent)
 - Stratum spinosum-contains melanin & keratinocytes
 - Stratum basal (germinativum)-contain melanocytes-melanin
- Dermis
 - Papillary layer-areolar CT

deep



superficial

- Dermis

- Papillary layer- areolar CT

- Eccrine sweat glands-watery secretions

- Sebaceous glands- oily secretions

- Meissners corpuscle-sensory receptors for soft touch

- Reticular layer- dense irregular CT

- Apocrine sweat glands- smelly secretions

- Hypodermis

- Adipose CT

- Pacinian corpuscles-sensory receptors for deep
pressure

deep



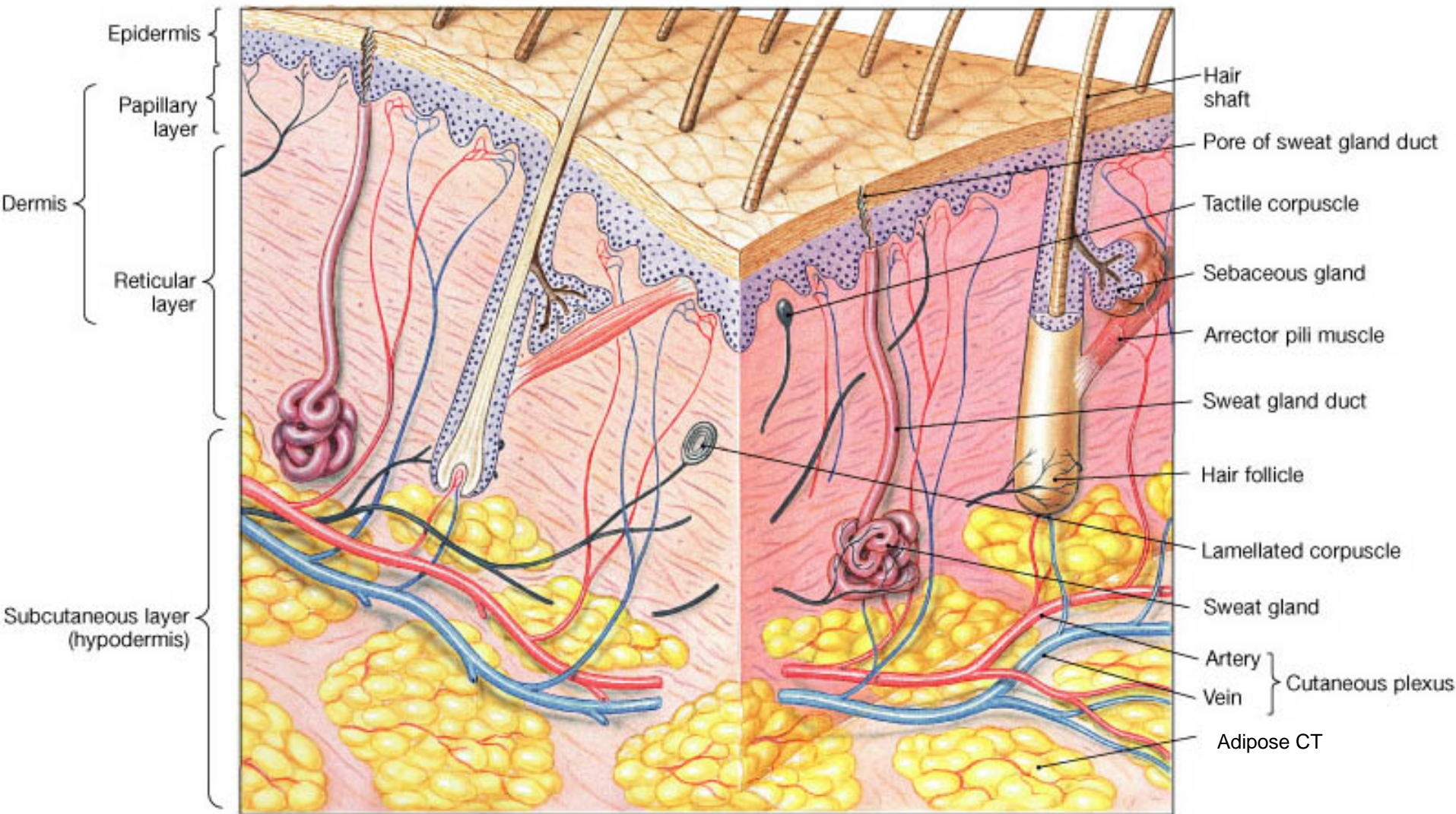


Fig
4.2

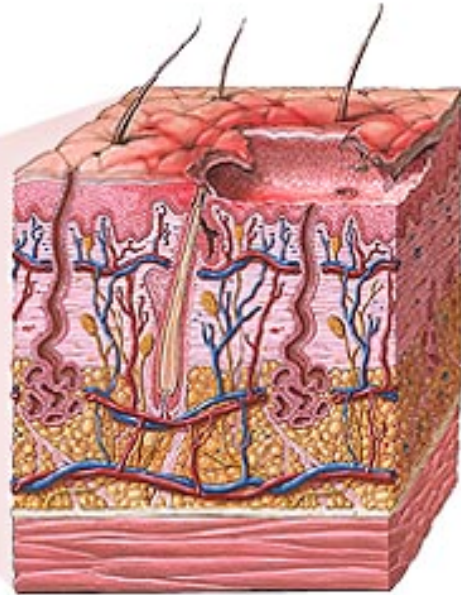
Burns to the skin

classification	damage	Affected organs	Appearance and sensation
1 st degree burn	Superficial cells of the epidermis are killed. Dermis cells are injured-papillary layer	Hair follicles & glands unaffected	Inflamed, tender
2 nd degree burn	Injury to dermis-reticular layer	Hair follicles & glands may be affected	Blister, pain
3 rd degree burn	All dermal cells are killed. Injury to the hypodermis	Sensory nerves, accessory structure, blood vessels destroyed	Charred, less pain than 1 st and 2 nd

Redness



First-degree burn

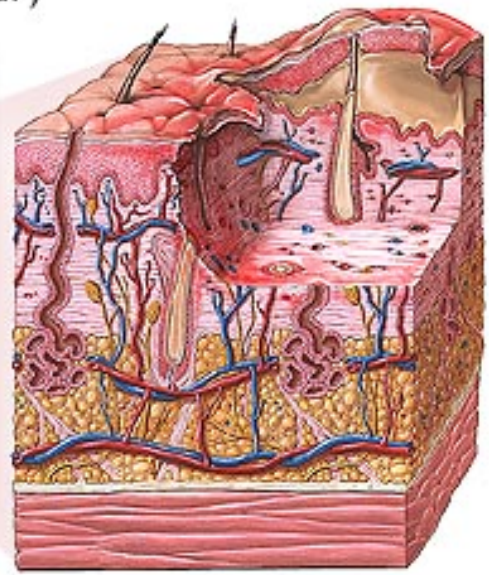


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Blistering (erosions and ulcerations can also occur)

Second-degree burn



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Charred tissues



Third-degree burn



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FYI Aging & the Integumentary system

<u>Changes that occur</u>	<u>Result</u>
Epidermis thins-less germinative cell activity	More prone to injury/infection
Decreased # of Langerhans cells	Reduced immune function
Decreased melanocyte activity	More sensitivity to sun/sunburn
Reduced Vitamin. D synthesis	Muscle/bone weakness
Decreased dermal blood supply & sweat/oil gland activity	Reduced ability to regulate temperature, dryer skin
Hair follicles function decreases	Thinner hairs, grey/white hairs, balding
Dermis thins, elastic fiber network shrinks	Weaker sagging wrinkled skin
Skin repairs slowly	Recurring infections

- Photos of models
- <http://www.rwc.uc.edu/ap/aphome.htm>

Lab 5

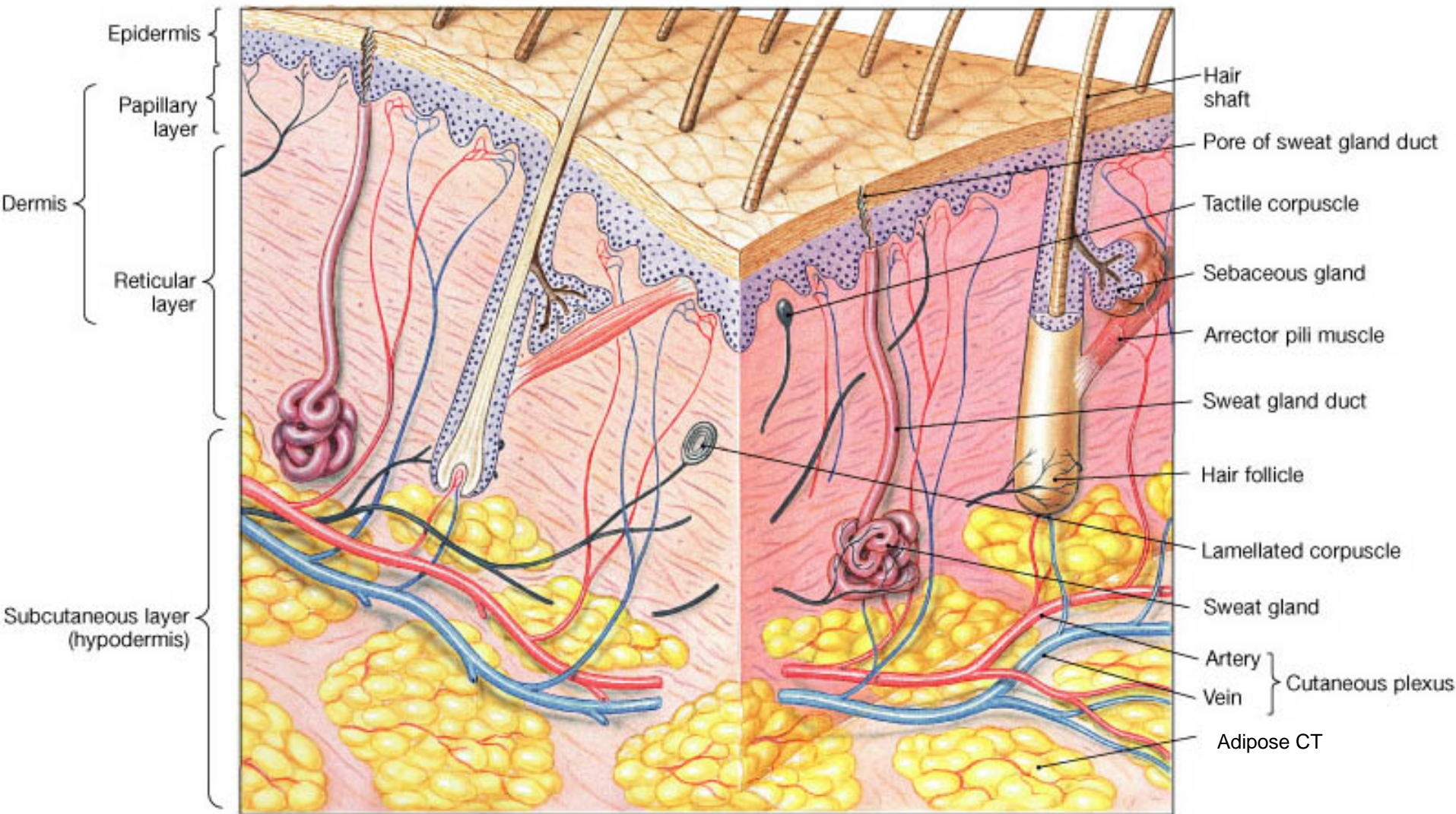
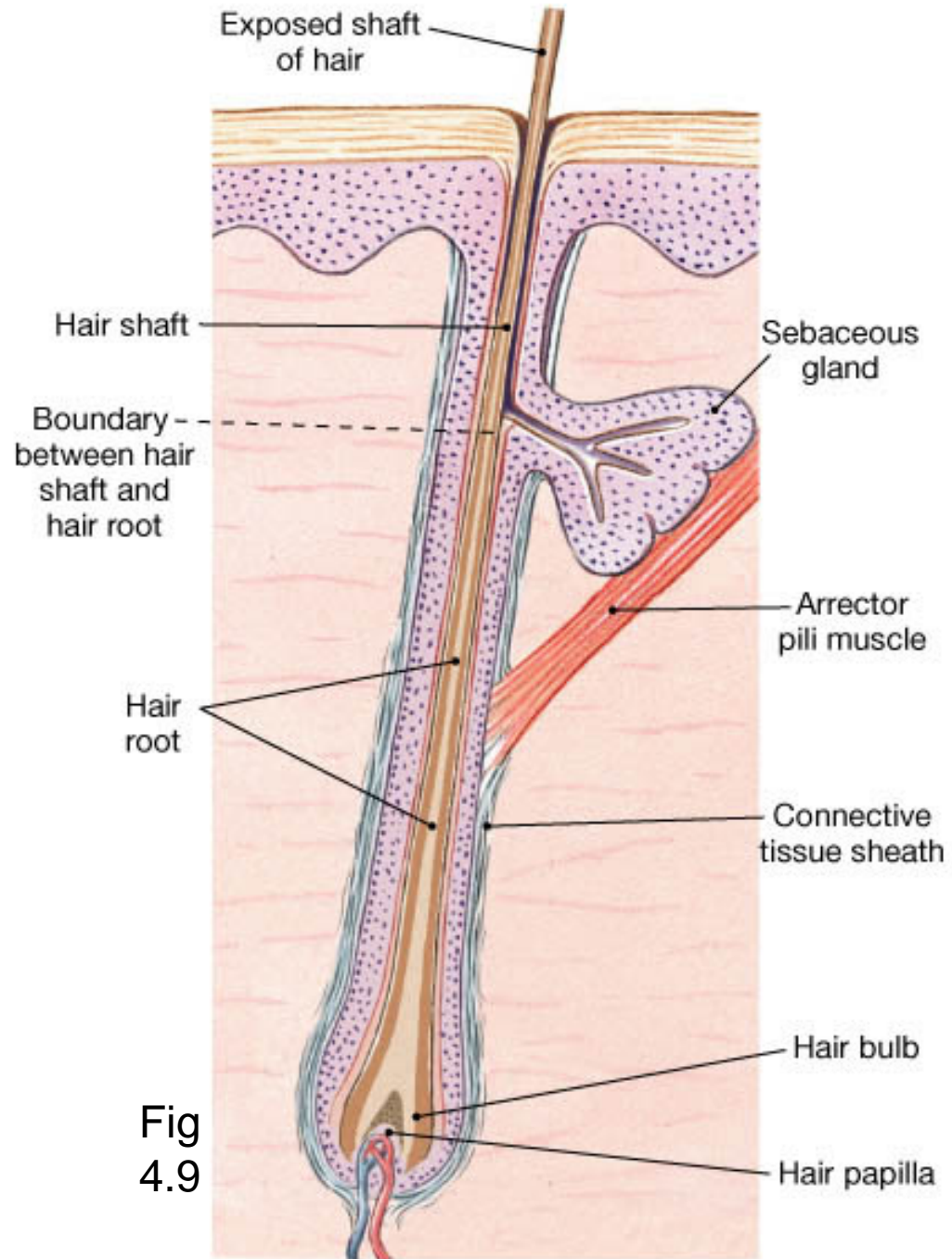


Fig
4.2



(a) Diagrammatic view of hair follicle

