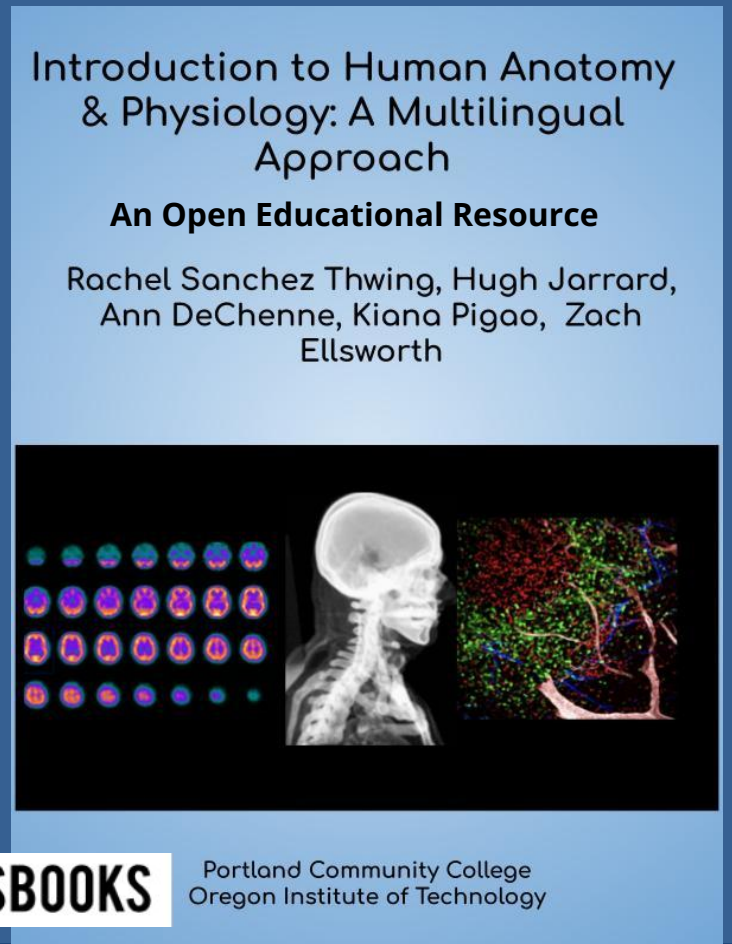
Integumentary System:
Growth, Repair, and Disorders of the Integumentary System



"Stratum corneum peeling off due to a sunburn" by tei athinas, CC BY-SA 4.0

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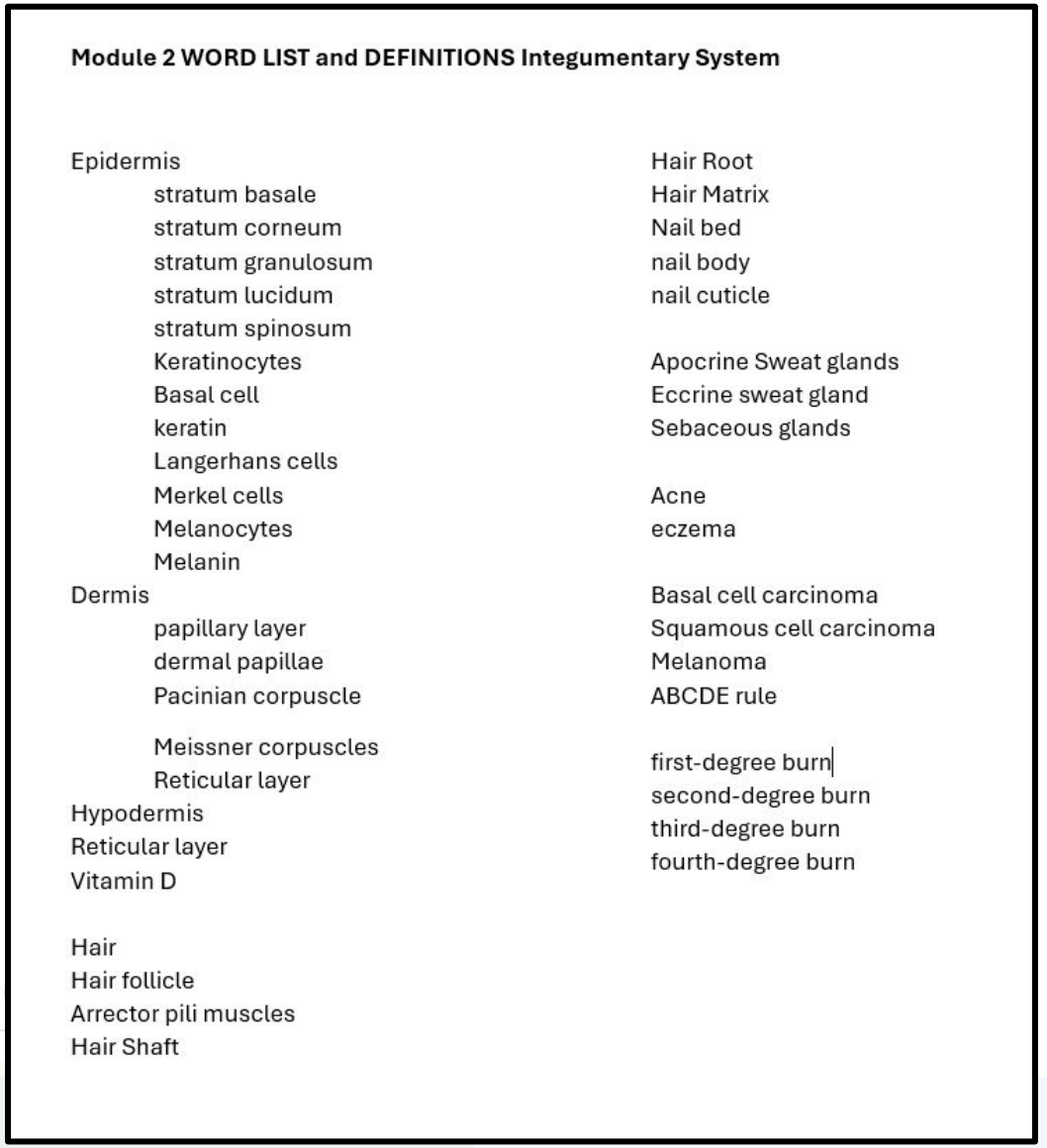
Lesson 2: Growth, Repair, and Disorders of the Integumentary System

Learning Objectives:

- Describe the process of skin repair and the phases of wound healing.
- Relate breakdowns in homeostasis to pathological presentations of the integumentary system.

See the Integumentary System Wordlist!

- Can be found in accompanying materials to this lecture
- Materials are available in English, Spanish, Russian, Vietnamese, Filipino, East African French, Kiswahili (Swahili) and Chinese.



Module 2 WORD LIST and DEFINITIONS Integumentary System

Epidermis
- stratum basale
- stratum corneum
- stratum granulosum
- stratum lucidum
- stratum spinosum
- Keratinocytes
- Basal cell
- keratin
- Langerhans cells
- Merkel cells
- Melanocytes
- Melanin

Dermis
- papillary layer
- dermal papillae
- Pacinian corpuscle
- Meissner corpuscles
- Reticular layer

Hypodermis
Reticular layer
Vitamin D

Hair
Hair follicle
Arrector pili muscles
Hair Shaft
Hair Root
Hair Matrix
Nail bed
nail body
nail cuticle

Apocrine Sweat glands
Eccrine sweat gland
Sebaceous glands

Acne
eczema

Basal cell carcinoma
Squamous cell carcinoma
Melanoma
ABCDE rule

first-degree burn
second-degree burn
third-degree burn
fourth-degree burn

When does the Integumentary System Grow and Repair?

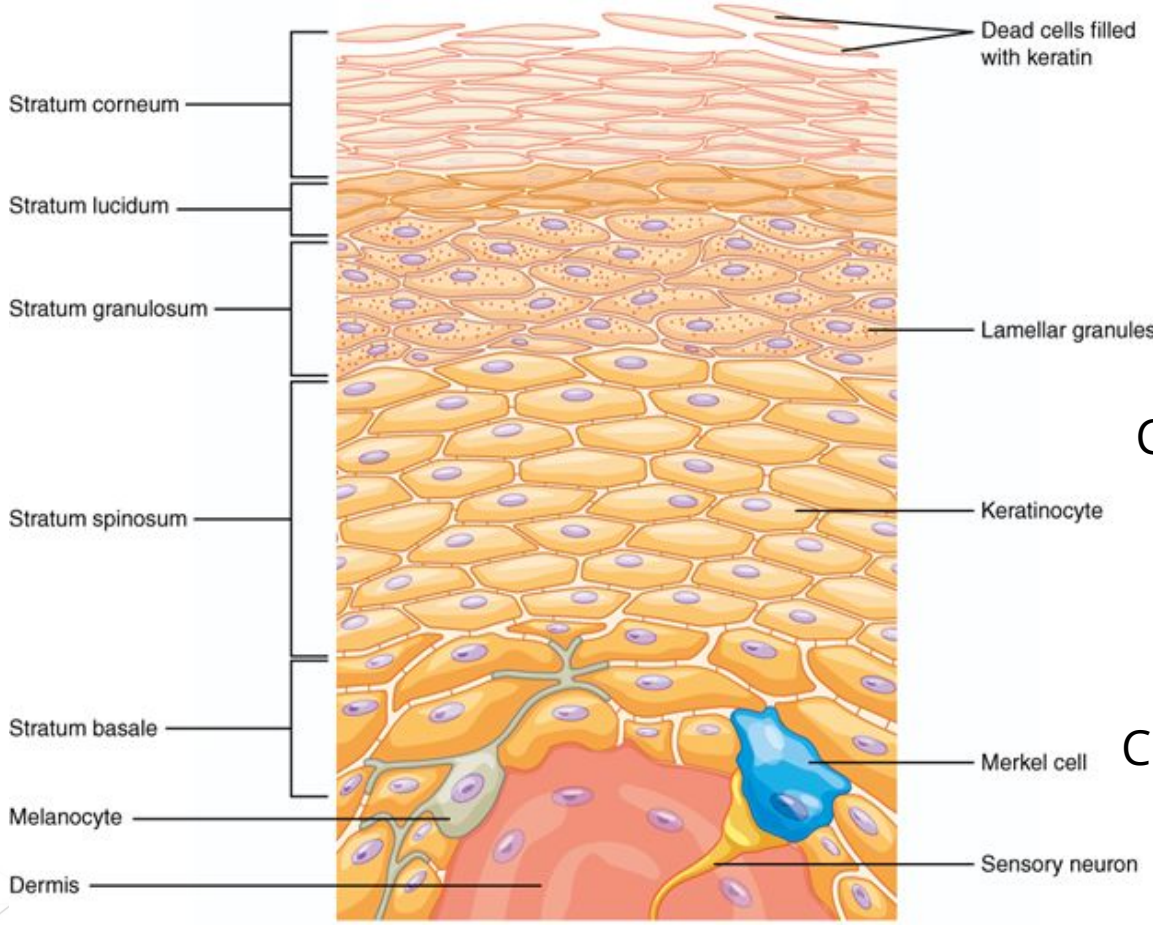
Growth:

Development

In Use and Aging

Repair:

After Damage

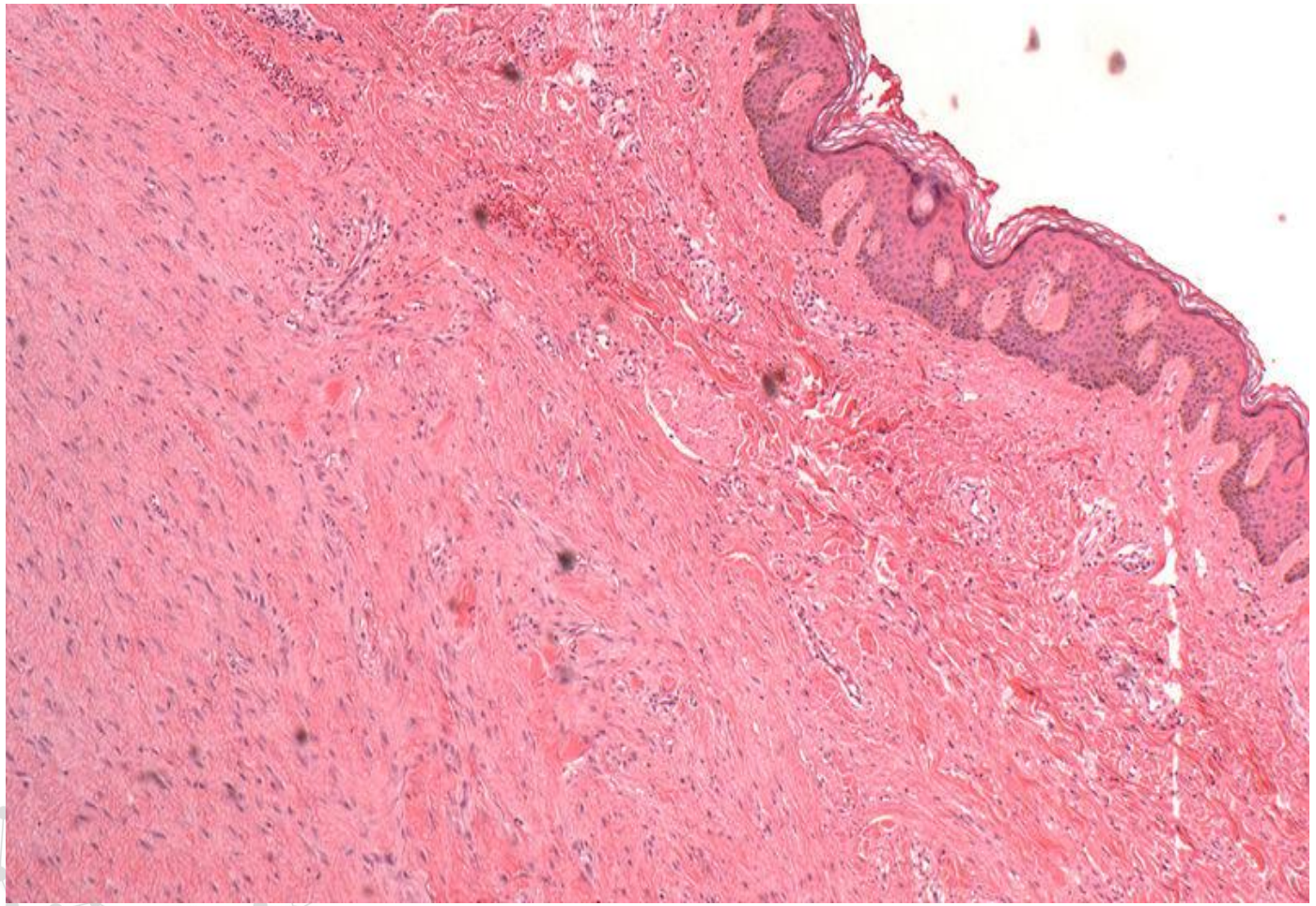


Layers of Epidermis, Figure 5.5, OpenStax A&P 2e

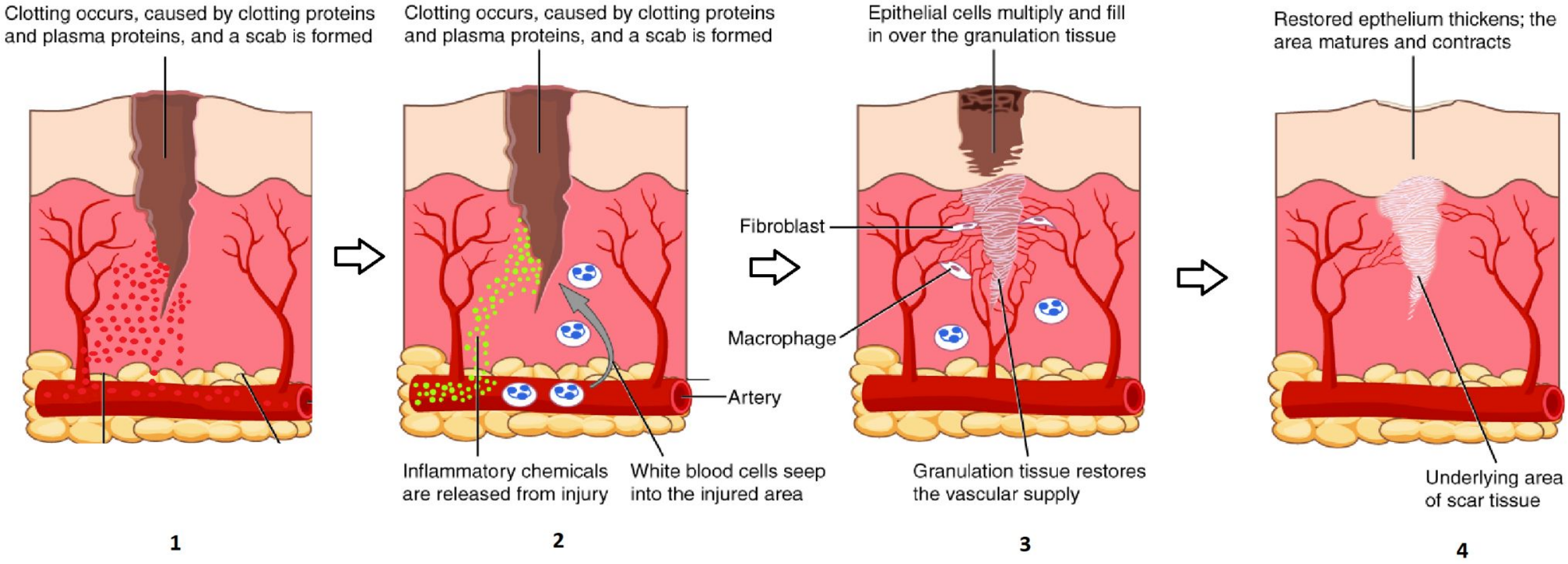
Methods of Tissue Repair after Damage

Regeneration
replacement of dead or damaged cells with the same type of cell as before

Restores normal function
Occurs in repair of most skin and liver injuries



Example of Skin Repair: Deep Wound Healing

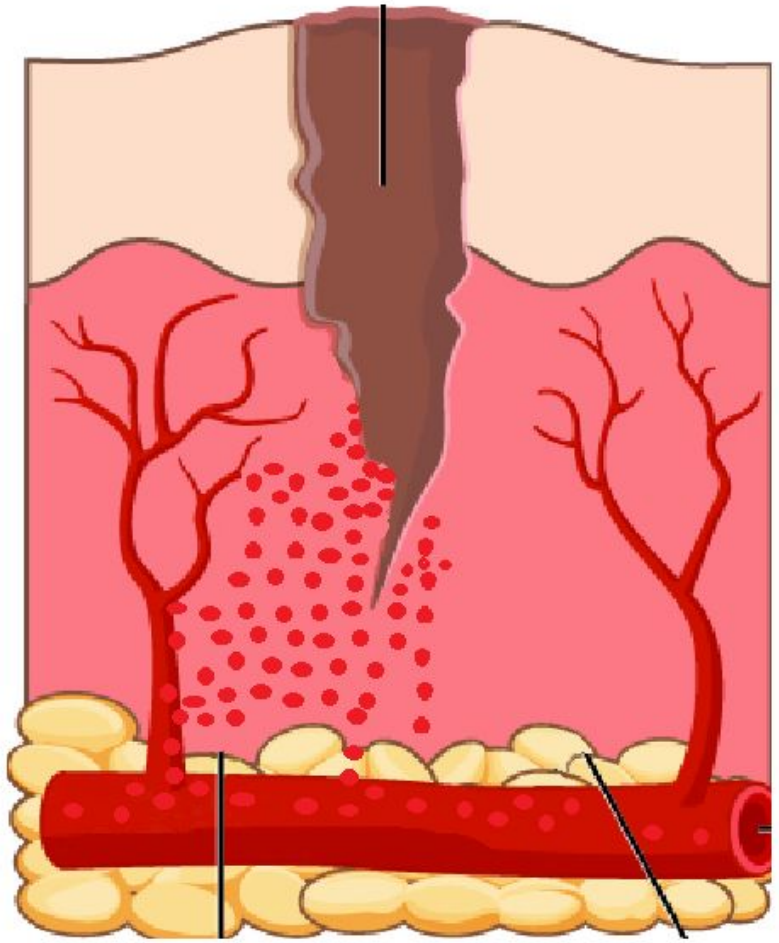


Step 1: Inflammation Sets The Stage

Severed blood vessels
bleed into cut

Injured tissues & mast cells
release **histamine,** increases capillary permeability

Fluid rich in white blood cells, clotting proteins, and antibodies seep into the area



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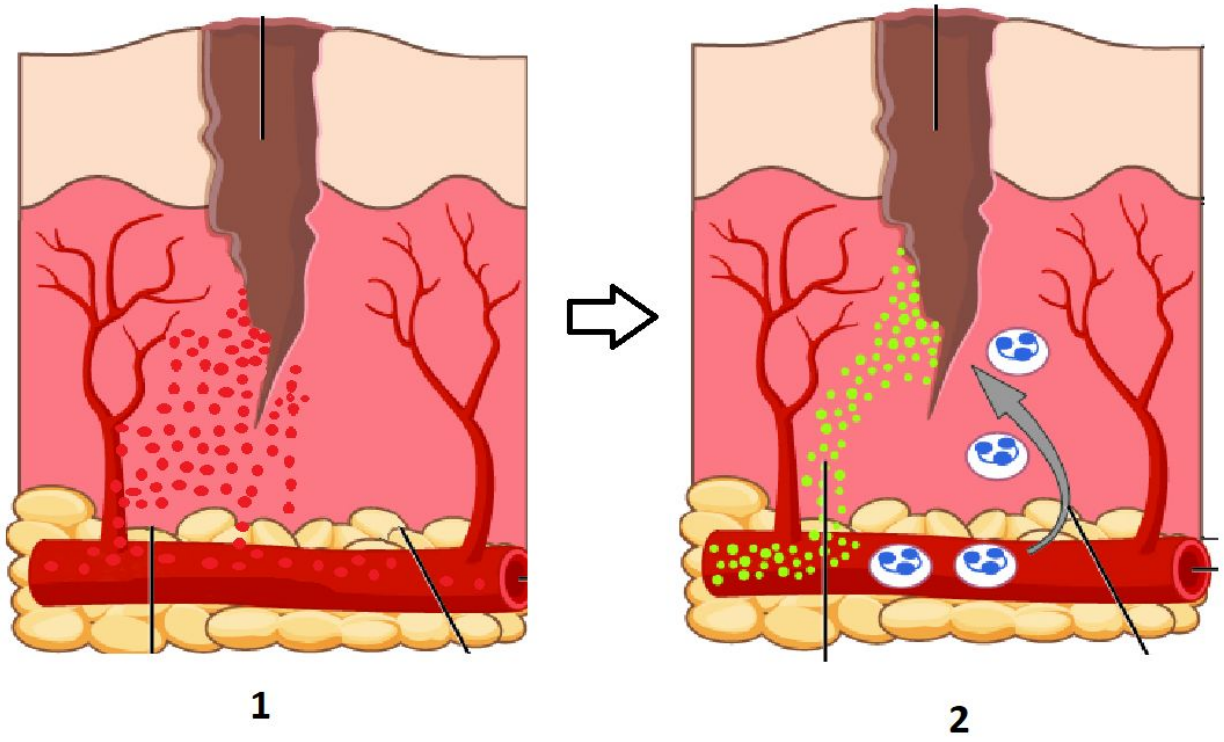
Step 2: Formation of Clot

Leaked clotting proteins
construct a clot, walling off area to prevent spread of pathogens

Macrophages
phagocytize bacteria and clean up debris underneath scab



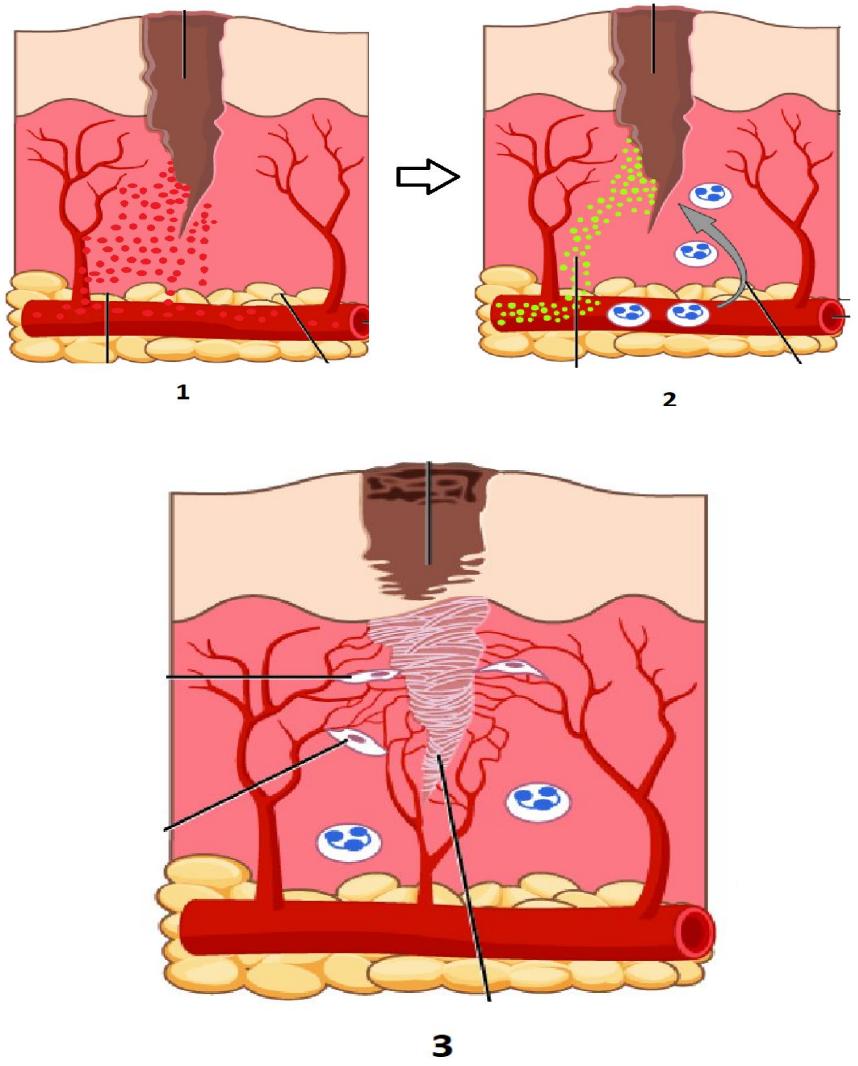
Step 3: Formation of Granulation Tissue

New capillaries
grow into damaged area

Fibroblasts
lay down collagen fibers to knit wound together

Collagen fibers
form soft mass called granulation tissue

Macrophages
remove blood clot, while fibroblasts replace it

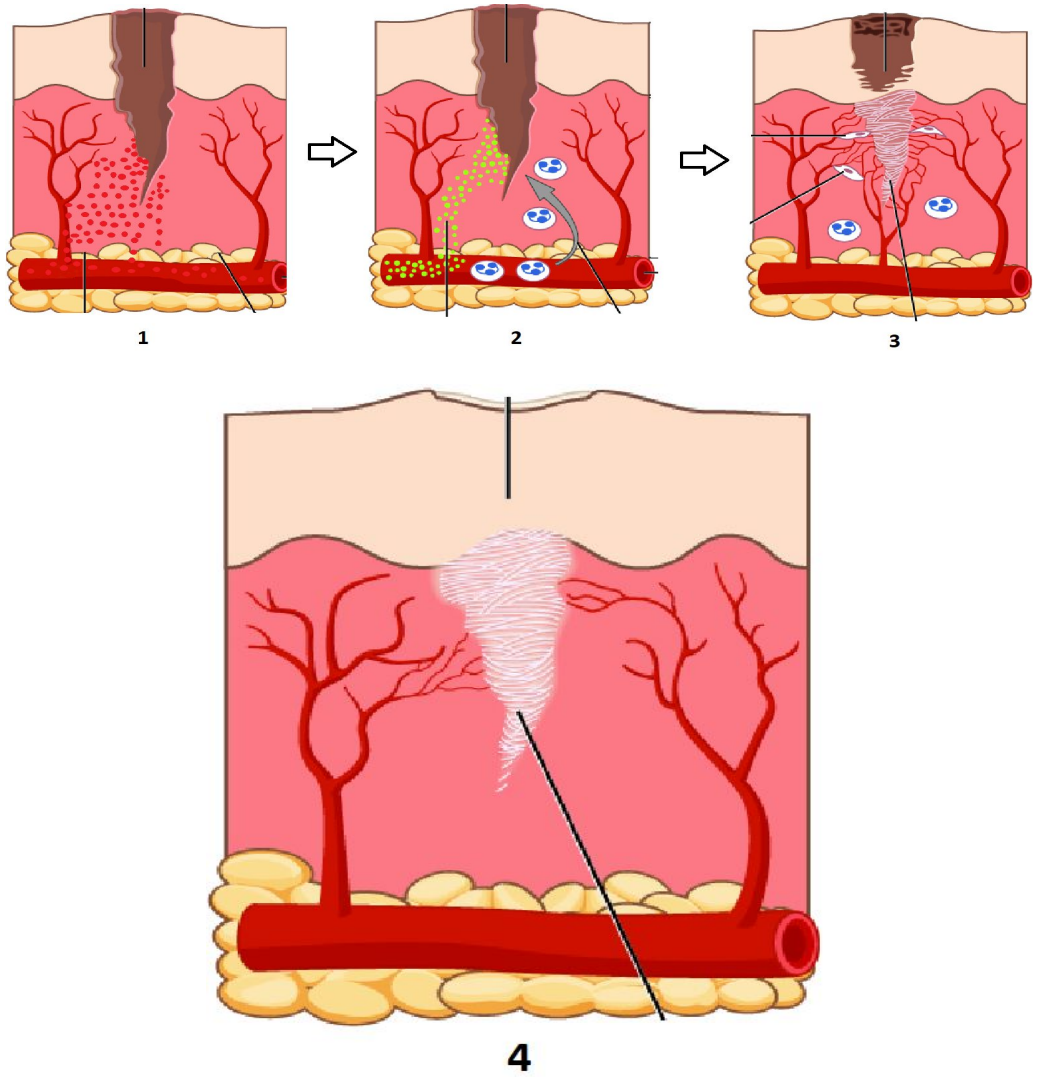


Step 4: Epithelial Regeneration

Epithelium
regenerates with mitosis & scab falls off

Underlying connective tissue
undergoes scarring

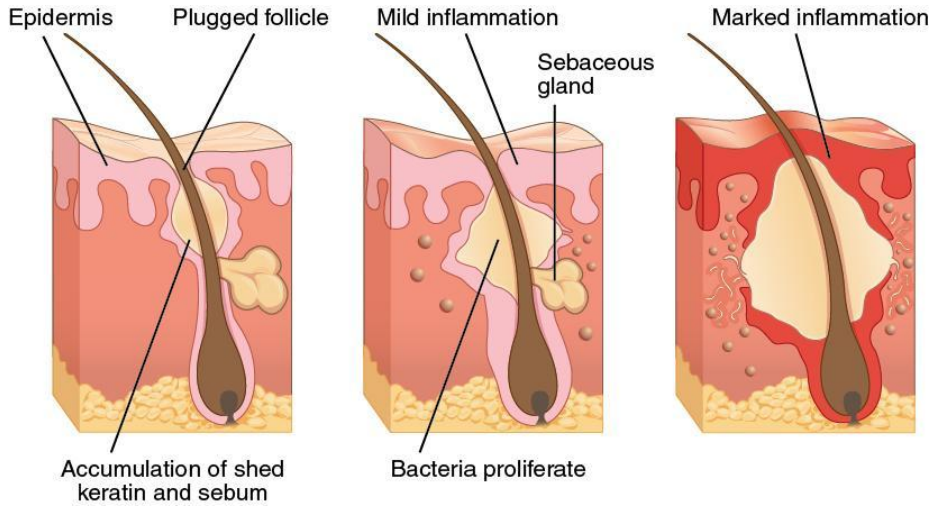
Remodeling of scars
may last 2 years



Pathologies of the Integumentary System

Common Skin Disorders:

Acne: inflammation and infection of hair follicles and sebaceous glands

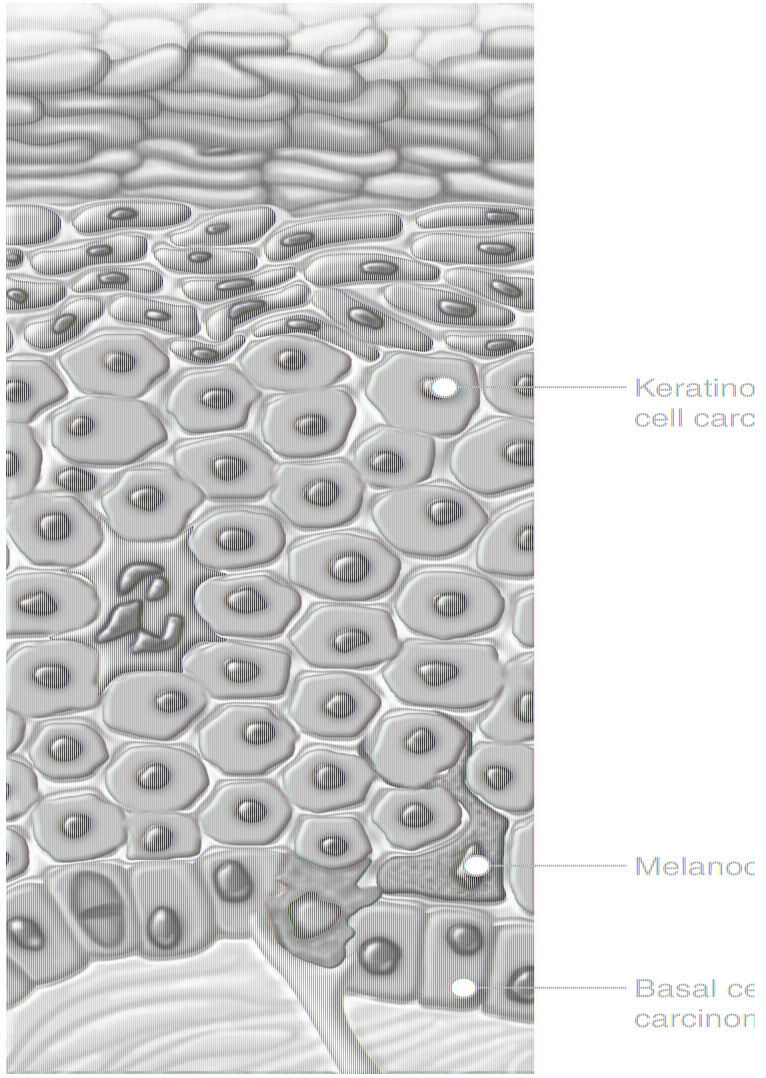


Eczema: chronic inflammation causing itchy, red patches

Eczema, and Acne, OpenStax A&P 2e

Other Pathologies: Skin Cancer

- Most common type of cancer
- Primary risk factor overexposure to UV radiation
- Benign vs. malignant tumors
- Types:
  - Basal cell carcinoma
  - Squamous cell carcinoma
  - Malignant melanoma



Cells of the epidermis (from superficial to deep) and their associated type of skin cancer. Via Pressbooks: Anatomy and Physiology, CCCOnline, CC - Sharealike

Skin Cancer Types

(a) Basal cell carcinoma

Most common, least dangerous

(b) Squamous cell carcinoma

Easily cured, but can be lethal if not caught early

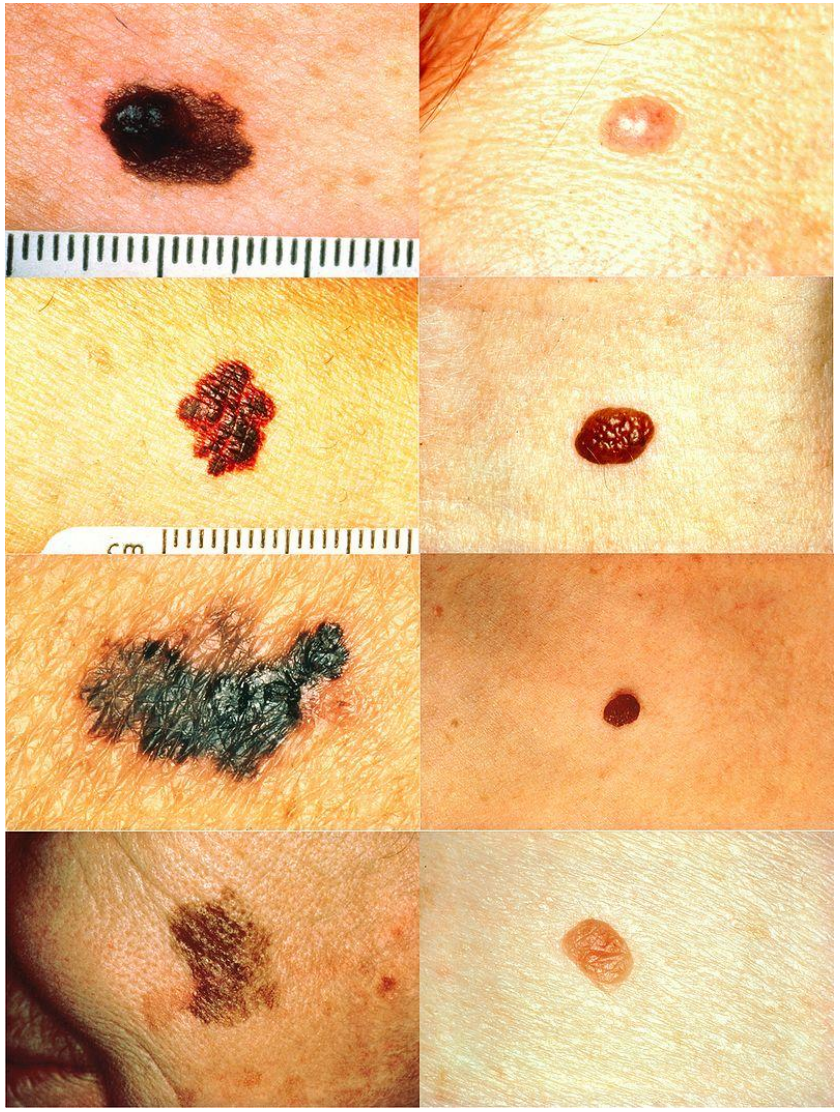
(c) Malignant melanoma

- Rarest but the most deadly
- ***Detection uses ABCDE rule for recognizing melanoma***

Figure 5.18, 5.19, 5.20, OpenStax A&P 2e

Detecting Malignant Melanoma: ABCDE Rule

- **A**symmetry – the two sides are not symmetrical
- **B**orders – the edges are irregular in shape
- **C**olor – the color is varied shades of brown or black
- **D**iameter – it is larger than 6 mm (0.24 in)
- **E**volving – its shape has changed



Burns

Tissue damage and cell death caused by fires, hot water, electricity, chemicals, and the sun

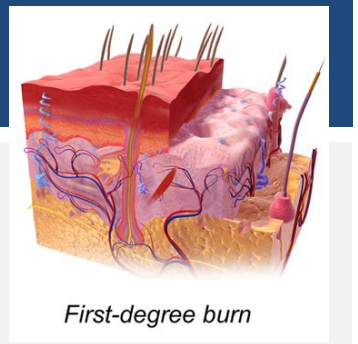
- **Primary Dangers:**
  - Protein denaturation and cell death
  - Dehydration and electrolyte imbalance
  - Circulatory shock
  - Infection from the invasion of bacteria

DEGREES OF BURNS

First-degree burn
(most sunburns!)

Only epidermis damaged

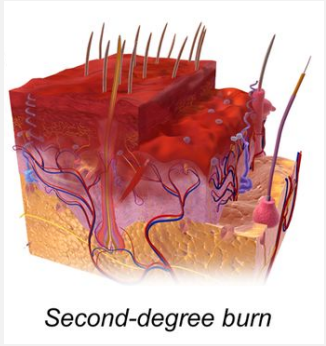
Redness, swelling, pain


First-degree burn

Second-degree burn

Epidermis + superficial dermis damaged

Red, painful, and blistering

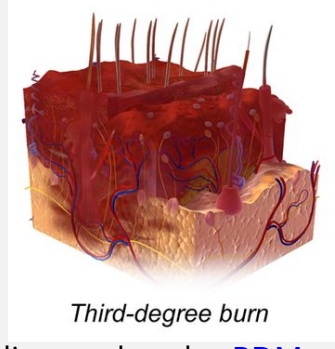

Second-degree burn

Third-degree burn

Epidermis and all of dermis destroyed

Burned area is painless; Fluid loss, infections

Requires skin grafts, regeneration NOT possible


Third-degree burn

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Lesson 2: Growth, Repair, and Disorders of the Integumentary System Summary

Summary:

- Describe the process of skin repair and the phases of wound healing.
- Relate breakdowns in homeostasis to pathological presentations of the integumentary system.