

McEachin \_\_\_\_\_

## Module 4: Class Notes (Krc )

MODULE 4: INTEGUMENTARY SYSTEM

**Instructions:** Complete the notes from power point slides. Type in the answers/ fill in the blanks. Print in your name. Save the document in pdf format.

MODULE 4: INTEGUMENTARY SYSTEM

1. What does integument mean? covering
2. Components: Skin, Hair, nails, & Glands
3. Functions: 1. Protection: water loss, microbes, UV light; 2. Sensation: hot, cold, pain, pressure; 3. Temperature regulation: helps maintain homeostasis 4. Excretion: removes waste; 5. Vitamin D **production**: UV light stimulates production
4. Skin Facts: Weighs 9lbs. Used to determine body fat; 2 main regions: epidermis & dermis
5. **Epidermis**: 1<sup>st</sup> major skin region (outside). Composed of stratified squamous epithelium.
6. **Keratinization**: process in which cells (with keratin) push old cells to surface. produces cells filled with keratin. produces an outer layer of epidermal cells that resist abrasion.
7. **Strata of Epidermis**: A. Stratum corneum: outermost layer of epidermis. 20-30 layers of dead squamous cells filled with keratin; accounts for 75% of epidermal thickness. dandruff is this layer flaking off Scalp. callus forms when stratum corneum has frequent friction. B. Stratum basale: deepest layer of epidermis. single layer of cells. Firmly attached to dermis.
8. **Dermis**: 2<sup>nd</sup> major skin region. Dense connective tissue. Contains collagen and elastic fibers. Contains fibroblasts, fat cells, macrophages, nerve endings, smooth muscle, glands, blood vessels, and hair follicles. It is responsible for most of the structural Strength of the skin.
9. Cleavage lines: area where skin is most resistant to stretching due to stretching of collagen fibers;
10. **Layers of Dermis**: A. papillary layer: Blood connective tissue layer that contains blood vessels. B. Dermal papillae: projections that extend up into epidermis. Remove waste and help regulate body temp. pattern is genetically determined. finger prints and footprints are produced by dermal projections into the epidermis called papillae. C. Reticular layer: deepest layer of dermis; accounts for 80% of dermis.
11. **Hypodermis**: Below dermis; foundation of skin; muscle skin to underlying \_\_\_\_\_ and \_\_\_\_\_. Contains \_\_\_\_\_ tissue. Contains 1/2 of body's fat. Body fat for females 20-23%, males 13-25%

12. **Skin Color and Variations:** Determined by: PIGMENTS \_\_\_\_\_, genetics, \_\_\_\_\_ blood \_\_\_\_\_ circulation, \_\_\_\_\_ thickness \_\_\_\_\_ of stratum corneum. All \_\_\_\_\_ races \_\_\_\_\_ have same \_\_\_\_\_ Number \_\_\_\_\_ of \_\_\_\_\_ melanocytes \_\_\_\_\_. \_\_\_\_\_ Melanocytes \_\_\_\_\_ of \_\_\_\_\_ darker \_\_\_\_\_ skinned people produce \_\_\_\_\_ more \_\_\_\_\_ and \_\_\_\_\_ darker \_\_\_\_\_ melanin than fairer skinned people. \_\_\_\_\_ Dark-skinned \_\_\_\_\_ children are more susceptible to \_\_\_\_\_ rickets \_\_\_\_\_ (weak bones, bowed legs) than fair-skinned children because dark skin has more melanin and \_\_\_\_\_ melanin \_\_\_\_\_ absorbs \_\_\_\_\_ more ultraviolet light allowing less UV radiation to \_\_\_\_\_ penetrate \_\_\_\_\_ into the skin and therefore less \_\_\_\_\_ VitaminD \_\_\_\_\_ production.
13. **Skin Pigments: A. Melanin:** produced by melanocytes \_\_\_\_\_; ranges from \_\_\_\_\_ yellow \_\_\_\_\_ to \_\_\_\_\_ reddish-brown \_\_\_\_\_ to \_\_\_\_\_ Black \_\_\_\_\_. \_\_\_\_\_ responsible for \_\_\_\_\_ hair \_\_\_\_\_ and \_\_\_\_\_ eye \_\_\_\_\_ color; provides \_\_\_\_\_ protection \_\_\_\_\_ against UV light. Amount produced is determined by genetics, UV light \_\_\_\_\_, hormones. \_\_\_\_\_ freckles \_\_\_\_\_ are accumulation of \_\_\_\_\_ Melanin \_\_\_\_\_. \_\_\_\_\_ albinism \_\_\_\_\_ is \_\_\_\_\_ absence \_\_\_\_\_ of melanin. **B. Carotene:** \_\_\_\_\_ yellow-orange \_\_\_\_\_ pigment found in \_\_\_\_\_ Plants \_\_\_\_\_. Accumulates in \_\_\_\_\_ stratum \_\_\_\_\_ corneum \_\_\_\_\_. **C. Hemoglobin:** gives \_\_\_\_\_ Pinkish-red \_\_\_\_\_ color. Found in \_\_\_\_\_ red blood cells \_\_\_\_\_. A \_\_\_\_\_ decrease \_\_\_\_\_ in the blood \_\_\_\_\_ Oxygen \_\_\_\_\_ content produces a bluish \_\_\_\_\_ color \_\_\_\_\_ of the skin, called \_\_\_\_\_ cyanosis \_\_\_\_\_.
14. **Tanning and Sunburns:** Exposure to UV light \_\_\_\_\_ stimulates melanocytes \_\_\_\_\_ to increase production of \_\_\_\_\_ melanin \_\_\_\_\_. Melanin builds up to help \_\_\_\_\_ protect \_\_\_\_\_ skin against UV \_\_\_\_\_ radiation \_\_\_\_\_ (tan). A \_\_\_\_\_ sunburn \_\_\_\_\_ is the skin \_\_\_\_\_ reacting \_\_\_\_\_ to UV exposure. UV light can \_\_\_\_\_ alter \_\_\_\_\_ DNA \_\_\_\_\_ in cells causing them to \_\_\_\_\_ Mutate \_\_\_\_\_ (cancer). A safe and effective, \_\_\_\_\_ sunscreen \_\_\_\_\_ preparations should \_\_\_\_\_ block \_\_\_\_\_ both \_\_\_\_\_ UVA \_\_\_\_\_ and \_\_\_\_\_ UVB \_\_\_\_\_.
15. **Skin Color and Disease: Redness:** fever, \_\_\_\_\_ Hypertension \_\_\_\_\_, inflammation, \_\_\_\_\_ allergies \_\_\_\_\_
- Pallor:** \_\_\_\_\_ anemia \_\_\_\_\_ or low blood pressure. **Jaundice:** liver disorder (\_\_\_\_\_ yellow \_\_\_\_\_) caused by collection of abnormal \_\_\_\_\_ bile \_\_\_\_\_ pigment in the skin. **Bronzing:** Addison's disease (\_\_\_\_\_ Kidney \_\_\_\_\_ disease \_\_\_\_\_) Bruising: \_\_\_\_\_ broken \_\_\_\_\_ blood vessels
16. **Hair Components: A. Hair/ bulb** \_\_\_\_\_: flexible \_\_\_\_\_ strands \_\_\_\_\_ of keratinized cells. **B. Root:** below \_\_\_\_\_ skin \_\_\_\_\_ (\_\_\_\_\_ scalp \_\_\_\_\_) **C. Hair Bulb** \_\_\_\_\_: \_\_\_\_\_ base \_\_\_\_\_ of root; where hair is produced. **D. Hair follicle** \_\_\_\_\_: group of cells that \_\_\_\_\_ surround \_\_\_\_\_ root and bulb; gives hair different \_\_\_\_\_ shapes \_\_\_\_\_.
17. **How is Hair Produced?** Hair is produced in \_\_\_\_\_ hair \_\_\_\_\_ bulb \_\_\_\_\_. Hair bulb rests on \_\_\_\_\_ blood \_\_\_\_\_ vessels to supply it with \_\_\_\_\_ nutrients \_\_\_\_\_. Hair grows longer as cells are added to \_\_\_\_\_ base \_\_\_\_\_ of hair \_\_\_\_\_ bulb \_\_\_\_\_.
18. **Hair Facts:** \_\_\_\_\_ Testosterone \_\_\_\_\_ and good nutrition \_\_\_\_\_ promote \_\_\_\_\_ hair growth. Growth occurs in \_\_\_\_\_ cycles \_\_\_\_\_: active and resting. \_\_\_\_\_ scalp \_\_\_\_\_ hair grows for \_\_\_\_\_ 3 \_\_\_\_\_ years \_\_\_\_\_ and rests for \_\_\_\_\_ 1 year \_\_\_\_\_. \_\_\_\_\_ eyelashes \_\_\_\_\_ grow for \_\_\_\_\_ 30 \_\_\_\_\_ years \_\_\_\_\_ and rest for 105 days \_\_\_\_\_. We lose about \_\_\_\_\_ 90scalp \_\_\_\_\_ hairs/day. \_\_\_\_\_ grey \_\_\_\_\_ hair is the loss or \_\_\_\_\_ fading \_\_\_\_\_ of \_\_\_\_\_ melanin \_\_\_\_\_. Male pattern baldness is from the loss \_\_\_\_\_ of the \_\_\_\_\_ hair \_\_\_\_\_ follicle \_\_\_\_\_.
19. **Hair Muscles: Arrector Pili: Smooth** \_\_\_\_\_ **Muscle** \_\_\_\_\_ that surrounds each hair follicle; contracts and hair \_\_\_\_\_ stands \_\_\_\_\_ on \_\_\_\_\_ end \_\_\_\_\_ (goose bumps)
20. **Glands: A. Sebaceous glands:** \_\_\_\_\_ connected \_\_\_\_\_ to hair follicle; \_\_\_\_\_: oily substance that lubricates hair and skin to \_\_\_\_\_ prevent \_\_\_\_\_ drying; lubricate skin and hair and \_\_\_\_\_ protect \_\_\_\_\_ against some \_\_\_\_\_ bacteria \_\_\_\_\_. **B. Eccrine sweat glands:** Present

- \_\_\_\_\_ all over \_\_\_\_\_ body and open into \_\_\_\_\_ sweat \_\_\_\_\_ pores. Helps in \_\_\_\_\_ water \_\_\_\_\_ and \_\_\_\_\_ salt \_\_\_\_\_ secretions. C. **Apocrine sweat glands:** \_\_\_\_\_ open \_\_\_\_\_ into hair follicle; present only in \_\_\_\_\_ armpits \_\_\_\_\_ and \_\_\_\_\_ genitalia \_\_\_\_\_; \_\_\_\_\_ thick \_\_\_\_\_ rich secretions; become active \_\_\_\_\_ during \_\_\_\_\_ puberty \_\_\_\_\_ and cause \_\_\_\_\_ body \_\_\_\_\_ odor \_\_\_\_\_.
21. **Nails. What are they?** thin \_\_\_\_\_ plate \_\_\_\_\_ with layers of \_\_\_\_\_ dead \_\_\_\_\_ stratum corneum cells with hard \_\_\_\_\_ keratin \_\_\_\_\_. **Nail Structure:** A. **Nail body:** \_\_\_\_\_ visual \_\_\_\_\_ part. B. **Nail root:** \_\_\_\_\_ covered \_\_\_\_\_ by skin. C. **Cuticle:** stratum corneum that \_\_\_\_\_ extends \_\_\_\_\_ into \_\_\_\_\_ nail \_\_\_\_\_ body \_\_\_\_\_. D. **Nail \_\_\_\_\_**: continuation of nail root; gives rise to most of nail. E. **Nail bed:** \_\_\_\_\_ to nail and is \_\_\_\_\_ distal \_\_\_\_\_ to nail matrix. F. **Lunula:** part of nail matrix; \_\_\_\_\_ continuation \_\_\_\_\_ crescent \_\_\_\_\_ shaped area; base \_\_\_\_\_ of nail
22. **Vitamin D Production:** 1. \_\_\_\_\_ UV light \_\_\_\_\_ causes skin to produce a \_\_\_\_\_ precursor \_\_\_\_\_ molecule of \_\_\_\_\_ vitamin D \_\_\_\_\_. 2. Precursor is \_\_\_\_\_ CARRIED \_\_\_\_\_ by blood to \_\_\_\_\_ LIVER \_\_\_\_\_ where it is \_\_\_\_\_ Modified \_\_\_\_\_. 3. Next to \_\_\_\_\_ where it is modified again to form \_\_\_\_\_ vitamin D. Vitamin D can also be \_\_\_\_\_ Kidneys \_\_\_\_\_ through fish oils, fortified milk, eggs, and butter.
23. Vitamin D \_\_\_\_\_ stimulates \_\_\_\_\_ intestine to \_\_\_\_\_ absorb \_\_\_\_\_ calcium \_\_\_\_\_ and \_\_\_\_\_ phosphate \_\_\_\_\_ (\_\_\_\_\_ bone \_\_\_\_\_ growth and \_\_\_\_\_ muscle function \_\_\_\_\_ function)
24. **Temperature Regulation:** Body temp. should be \_\_\_\_\_ 98.6f \_\_\_\_\_. Rate of chemical reactions (\_\_\_\_\_ metabolism \_\_\_\_\_) is altered by changes in temperature. **To cool body:** \_\_\_\_\_ blood vessels \_\_\_\_\_ dilate \_\_\_\_\_ in dermis \_\_\_\_\_ and heat is \_\_\_\_\_ transferred \_\_\_\_\_ from deep in tissues to \_\_\_\_\_ skin \_\_\_\_\_ and \_\_\_\_\_ heat \_\_\_\_\_ is produced. \_\_\_\_\_ Evaporation \_\_\_\_\_ of sweat from the \_\_\_\_\_ surface \_\_\_\_\_ of the skin \_\_\_\_\_ reduce \_\_\_\_\_ body temperature. **To heat body:** blood vessels constrict \_\_\_\_\_ to reduce blood flow to skin and heat is \_\_\_\_\_ retained \_\_\_\_\_.
25. **Aging and the Integument:** Blood \_\_\_\_\_ decreases and skin becomes \_\_\_\_\_ due to decreased amounts of \_\_\_\_\_. Decreased activity of \_\_\_\_\_ and \_\_\_\_\_ glands make temperature \_\_\_\_\_ more difficult. Loss of \_\_\_\_\_ fibers cause skin to \_\_\_\_\_ and \_\_\_\_\_.
26. **Classification of Burns:** **1<sup>st</sup> degree:** damages only epidermis \_\_\_\_\_. Causes \_\_\_\_\_ redness \_\_\_\_\_, slight swelling, \_\_\_\_\_ pain \_\_\_\_\_. Heals within 2-3 days (usually no scar); includes \_\_\_\_\_ sunburns \_\_\_\_\_ or exposure to cold  
**2<sup>nd</sup> degree:** damages \_\_\_\_\_ epidermis \_\_\_\_\_ and upper \_\_\_\_\_ dermis \_\_\_\_\_; causes redness, swelling, pain, \_\_\_\_\_ blisters \_\_\_\_\_; heals in \_\_\_\_\_ 2 weeks \_\_\_\_\_ with some \_\_\_\_\_ scarring \_\_\_\_\_  
**3<sup>rd</sup> degree :** \_\_\_\_\_ destroys \_\_\_\_\_ epidermis and dermis; burned areas are \_\_\_\_\_ cherry \_\_\_\_\_ red to \_\_\_\_\_ black \_\_\_\_\_; \_\_\_\_\_ nerve \_\_\_\_\_ endings are \_\_\_\_\_ destroyed \_\_\_\_\_; \_\_\_\_\_ skin \_\_\_\_\_ graft \_\_\_\_\_ might be necessary.
27. **Skin Cancer:** Most common cancer. Mainly caused by \_\_\_\_\_ UV light \_\_\_\_\_ exposure. Fair-skinned people more prone; Prevented by \_\_\_\_\_ limiting \_\_\_\_\_ sun exposure and using \_\_\_\_\_ sunscreens \_\_\_\_\_. UVA \_\_\_\_\_ rays cause \_\_\_\_\_ sunburns \_\_\_\_\_ and is associated with \_\_\_\_\_ malignant \_\_\_\_\_ melanomas \_\_\_\_\_. \_\_\_\_\_ UVB \_\_\_\_\_ rays cause \_\_\_\_\_ sunscreens \_\_\_\_\_. \_\_\_\_\_ sunscreens \_\_\_\_\_ should block \_\_\_\_\_ UVA \_\_\_\_\_ and \_\_\_\_\_ UVB \_\_\_\_\_ rays.
28. **Types of Skin Cancer:** A. **Basal cell carcinoma:** cells in \_\_\_\_\_ stratum \_\_\_\_\_ basale \_\_\_\_\_ affected; cancer removed by \_\_\_\_\_ surgery \_\_\_\_\_. B. **Squamous cell carcinoma:** cells \_\_\_\_\_ above \_\_\_\_\_ stratum basale affected; can cause \_\_\_\_\_ death \_\_\_\_\_. C. **Malignant**

**melanoma:** arises from melanocytes in a mole; rare type; can cause death.

29. INTEGUMENTARY SYSTEM AS A DIAGNOSTIC AID: The integumentary system is useful in diagnosis because it is observed easily and often reflects events occurring in other parts of the body. Cyanosis, a bluish color to the skin caused by decreased blood oxygen content, is an indication of impaired circulatory or respiratory function. A yellowish skin color, called jaundice (jawn'dis), can occur when the liver is damaged by a disease, such as viral hepatitis. Rashes and lesions in the skin can be symptoms of problems elsewhere in the body. The development of a rash can also indicate an allergic reaction to foods or to drugs, such as penicillin.