

McCance: Pathophysiology, 6th Edition

Chapter 44: Structure, Function, and Disorders of the Integument

Key Points – Print

SUMMARY REVIEW

Structure and Function of the Skin

1. Skin is the largest organ of the body and equals about 20% of body weight.
2. The skin has three layers: the dermis, epidermis, and subcutaneous layer.
3. Keratinocytes produce keratin to form the superficial layer of the epidermis. The underlying epidermis contains a basal and a spinous layer with melanocytes, Langerhans cells, and Merkel cells.
4. The dermis is composed of connective tissue elements, hair follicles, sweat glands, sebaceous glands, blood vessels, nerves, and lymphatic vessels.
5. The subcutaneous layer contains fat cells and connective tissue.
6. The papillary capillaries provide the major blood supply to the skin, arising from deeper arterial plexuses. The sympathetic nervous system regulates skin blood flow.
7. Heat loss and heat conservation are regulated by arteriovenous anastomoses that lead to the papillary capillaries.

Aging and Skin Integrity

1. Older skin is thinner and drier with less collagen; has fewer capillary loops and changes in pigmentation.
2. Loss of melanocytes and hair follicles leads to gray and thinner hair.
3. The skin of older adults is more permeable; there is decreased sweating and loss of thermal regulation and decreased protective functions.
4. Pressure ulcers develop from continuous pressure and shearing forces that occlude capillary blood flow with resulting ischemia and necrosis. Areas at greatest risk are pressure points over bony prominences, such as the greater trochanter, sacrum, ischia, and heels. Immobilized individuals with fractures and neurologic deficits are most likely to develop pressure ulcers.
5. Keloids are scars that extend beyond the border of injury and result from abnormal fibroblast activity and excess collagen formation.
6. Pruritus (itching) and is associated with many skin disorders. Itch mediators, peripheral polymodal C-nerve fibers, and central processes contribute to itching. Scratching can cause skin trauma, infection, and scarring.

Disorders of the Skin

1. Allergic contact dermatitis is a form of delayed hypersensitivity that develops with sensitization to allergens, such as metals, chemicals, or poison ivy.
2. Atopic or allergic dermatitis is associated with a family history of allergies, hay fever, elevated IgE levels, and increased histamine sensitivity. Pruritus and scratching predispose the skin to infection, scaling, and thickening.
3. Stasis dermatitis occurs on the legs and results from venous stasis and edema.
4. Irritant contact dermatitis develops as an inflammatory response to prolonged exposure to chemicals, such as acids or soaps.
5. Seborrheic dermatitis involves scaly, yellowish, inflammatory plaques of the scalp, eyebrows, eyelids, ear canals, chest, axillae, and back. The cause is unknown.
6. Papulosquamous disorders are characterized by papules, scales, plaques, and erythema.
7. Psoriasis is a chronic autoimmune T-cell-mediated inflammatory skin disease with thickening of the epidermis and dermis characterized by scaly, erythematous pruritic plaques. The forms of psoriasis are plaque, guttate, pustular, and erythrodermic. Systemic complications can accompany the disease including arthritis and cardiovascular disease.
8. Pityriasis rosea is a self-limiting disease characterized by oval lesions with scales around the edges located along skin lines of the trunk.
9. Lichen planus is a papular violet-colored autoimmune inflammatory lesion involving T cells and inflammatory cytokines manifest by severe pruritus.
10. Acne vulgaris is a facial inflammation of the pilosebaceous follicles with hypertrophy of sebaceous glands and telangiectasia, particularly of the nose.
11. Acne rosacea develops on the middle third of the face with hypertrophy and inflammation of the sebaceous glands that may be the result of infection or immune-mediated inflammation.
12. Lupus erythematosus is an inflammatory autoimmune disease that can affect only the skin (discoid) or have a systemic presentation. The inflammatory lesions usually occur in sun-exposed areas with a butterfly distribution over the nose and cheeks.
13. Pemphigus is a chronic, autoimmune, blistering disease that begins in the mouth or on the scalp and spreads to other parts of the body, often with a fatal outcome. There are two major forms: pemphigus vulgaris and pemphigus foliaceus. Bullous pemphigoid is a blistering disease that resolves rapidly.
14. Erythema multiforme is an acute inflammation of the skin and mucous membranes with lesions that appear target-like with alternating rings of edema and inflammation; it is often associated with allergic reactions to drugs. Stevens-Johnson syndrome and toxic epidermal necrolysis are severe forms that also involve the mucous membranes.
15. Folliculitis is a bacterial infection of the hair follicle.
16. A furuncle is an infection of the hair follicle that extends to the surrounding tissue.
17. A carbuncle is a collection of infected hair follicles that forms a draining abscess.
18. Cellulitis is a diffuse infection of the dermis and subcutaneous tissue.

19. Erysipelas is a superficial streptococcal infection of the skin commonly affecting the face, ears, and lower legs.
20. Impetigo may have a bullous or an ulcerative form and is caused by *Staphylococcus* or *Streptococcus*.
21. HSV-1 causes cold sores but can infect the cornea, mouth, and labia. HSV-2 causes genital lesions and is usually spread by sexual contact.
22. Herpes zoster and varicella are both caused by the same herpesvirus, with herpes zoster manifesting years after the initial infection.
23. Warts (verrucae) are benign, rough, elevated lesions caused by papillomavirus. *Condylomata acuminata*. Venereal warts are spread by sexual contact.
24. Tinea skin infections (fungal infections) can occur anywhere on the body and are classified by location (i.e., tinea pedis, tinea corporis, tinea capitis).
25. Candidiasis is a yeastlike fungal infection caused by *C. albicans* occurring on skin, mucous membranes, and in the gastrointestinal tract.
26. Cutaneous vasculitis is an immune-mediated inflammation of skin blood vessels with purpura, ischemia, and necrosis resulting from vessel necrosis.
27. Urticarial lesions are associated with type I hypersensitivity responses and appear as wheals, welts, or hives.
28. Scleroderma is an immune-mediated sclerosis of the skin that also may affect systemic organs and cause renal failure, bowel obstruction, or cardiac dysrhythmias.
29. Ticks cause a local reaction on the skin of humans and can cause systemic disease when mouthparts pierce the skin and remain embedded in the tissue.
30. Lyme disease is a multisystem inflammatory disease caused by *B. burgdorferi* transmitted by tick bites. Complications may persist for years.
31. Mosquitoes can transmit infectious diseases, and the saliva from their bite produces the characteristic itching and wheal formation.
32. Blood-sucking flies are represented by many species, including Ceratopogonidae (“no-see-ums”), Tabanidae (horseflies), or Simuliidae (blackflies). Their bites are usually painful and produce bleeding; the itching and local reactions may last for days, and systemic symptoms of fever and malaise may develop.
33. Seborrheic keratosis is a proliferation of squamous cells that produce elevated, smooth, or warty lesions of varying size usually in sun-damaged skin. They are most common among older adults.
34. Keratoacanthoma arises from hair follicles on sun-exposed areas. There are three stages of development that result in a dome-shaped, crusty lesion filled with keratin that resolves in 3 to 4 months.
35. Actinic keratosis is a pigmented scaly lesion that develops in sun-exposed individuals with fair skin. The lesion may become malignant in the form of squamous cell carcinoma.

36. Nevi arise from melanocytes and may be pigmented or fleshy pink. They occur singly or in groups and may undergo transition to malignant melanoma.
37. Basal cell carcinoma is the most common skin cancer and occurs most often on sun-exposed areas.
38. Squamous cell carcinoma is a tumor of the epidermis associated with sun exposure and can be localized (in situ) or invasive.
39. Malignant melanoma arises from melanocytes; if it is not excised early, metastasis occurs through the lymph nodes.
40. KS is a vascular malignancy associated with immunodeficiency states and is associated with herpesvirus 8.
41. Frostbite usually occurs on cheeks and digits, causing direct injury to cells and impaired circulation.

Disorders of the Hair

1. Male-pattern alopecia is an inherited form of irreversible baldness with hair loss in the central scalp and recession of the temporofrontal hairline.
2. Female-pattern alopecia is a thinning of the central hair of the scalp beginning in women at 20 to 30 years of age.
3. Alopecia areata is patchy loss of hair associated with an autoimmune process and triggered by stress or metabolic diseases; it is usually reversible.
4. Hirsutism is a male pattern of hair growth in women that may be normal or the result of excessive secretion of androgenic hormones.

Disorders of the Nail

1. Paronychia is an inflammation of the cuticle that can be acute or chronic and is usually caused by staphylococci or streptococci.
2. Onychomycosis is a fungal infection of the nail plate.