Dermatology 101 for the Optometric Physician

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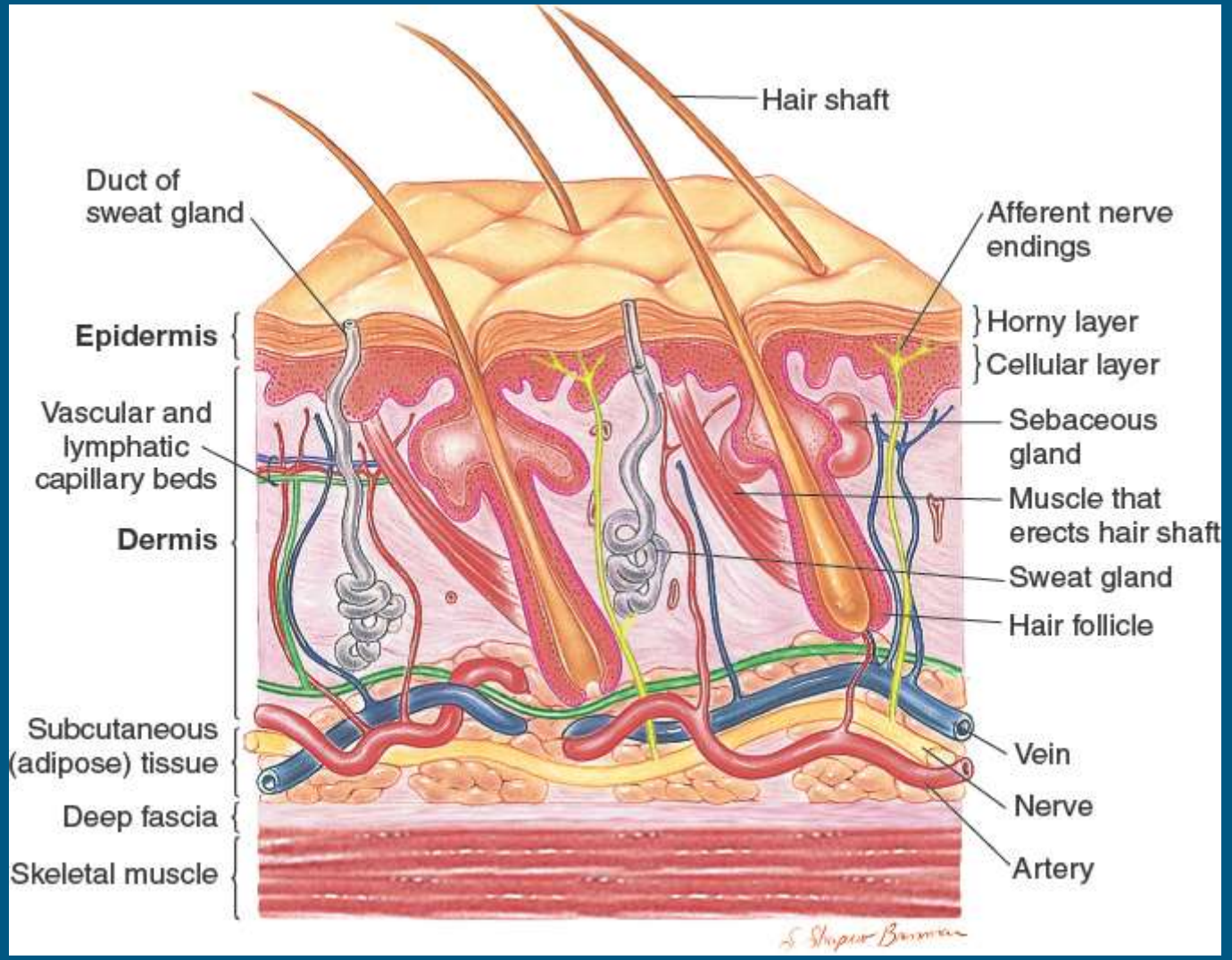
Anatomy and Physiology

- The skin keeps the body in homeostasis despite daily assaults from the environment
- It retains body fluids while protecting underlying tissues from microorganisms, harmful substances, and radiation
- It modulates body temperature and synthesizes vitamin D
- Hair, nails, and sebaceous and sweat glands are considered appendages of the skin

Skin

- The skin is the heaviest single organ of the body, accounting for approximately 16% of body weight
- It contains three layers: the epidermis, the dermis, and the subcutaneous tissues

Skin


Hair shaft
Duct of sweat gland
Afferent nerve endings
Epidermis
Horny layer
Cellular layer
Vascular and lymphatic capillary beds
Sebaceous gland
Dermis
Muscle that erects hair shaft
Sweat gland
Hair follicle
Subcutaneous (adipose) tissue
Vein
Deep fascia
Nerve
Skeletal muscle
Artery

Lesions

- A lesion is any single area of altered skin
- Look for lesions suggesting melanoma, basal cell carcinoma (BCC), or squamous cell carcinoma (SCC) throughout the skin examination regardless of the patient's skin color
- Detecting skin cancer at an early stage can increase the likelihood of successful treatment

Describing Skin Lesions

- It is important to use specific terminology to describe skin lesions and rashes
- Good descriptions include each of the following elements: number, size, color, shape, texture, primary lesion, location, and configuration

Terms to Describe Lesions*

- Number—solitary or multiple; estimate of total number
- Size—measured in millimeters or centimeters
- Color—including erythematous if blanching; if nonblanching, vascular-like cherry angiomas and vascular malformations, petechiae, or purpura
- Shape—circular, oval, annular, nummular, or polygonal

Terms to Describe Lesions

- Texture—smooth, fleshy, verrucous or warty, keratotic; greasy if scaling
- Primary lesion—flat, a macule or patch; raised, a papule or plaque; or fluid filled, a vesicle or bulla (may also be erosions, ulcers, nodules, ecchymoses, petechiae, and palpable purpura)
- Distribution/Location—including measured distance from other landmarks
- Configuration—grouped, annular, linear

Describing Skin Lesions

- For example, for seborrheic keratosis, examine this record: “Multiple 5-mm to 2-cm tan to brown, oval, stuck-on, flat-topped verrucous plaques on the back and abdomen, following skin tension lines.”

- Note the description of each element: number, multiple; size, 5 mm to 2 cm; color, tan to brown; shape, oval; texture, flat-topped verrucous; primary lesion, plaques; location, on the back and abdomen; and configuration, following skin tension lines

Size

- Measure lesions with a ruler in millimeters
- For oval lesions, measure in the long axis, then perpendicular to the axis

Color

- Blanchable lesions are erythematous and suggest inflammation
- Nonblanching lesions such as petechiae, purpura, and vascular structures (cherry angiomas, vascular malformations) are not erythematous, but rather bright red, purple, or violaceous
- They are nonblanching because blood has extravasated out from the capillaries into the surrounding tissues

Color

- Use “skin-colored” to describe a lesion that is the same shade as the patient’s skin
- Other common colors are black, orange, yellow, and purple and shades of blue, silver, and gray
- For red lesions or rashes (erythema), blanch the lesion by pressing it firmly with your finger or a glass slide to see if the redness temporarily lightens then refills

Texture

- Palpate the lesion to see if it is smooth, fleshy, verrucous or warty, or scaly (fine, keratotic, or greasy scale).
- Scaling can be:
  - greasy, like seborrheic dermatitis or seborrheic keratoses
  - dry and fine like tinea pedis (athlete's foot)
  - hard and keratotic like actinic keratoses or SCC

Primary Lesions

- Primary skin lesions are those that develop as a direct result of, and therefore are most characteristic of, the disease process
- Review the descriptions of these primary lesions so you can identify these in your patients
- Primary lesions are flat, raised, or fluid filled

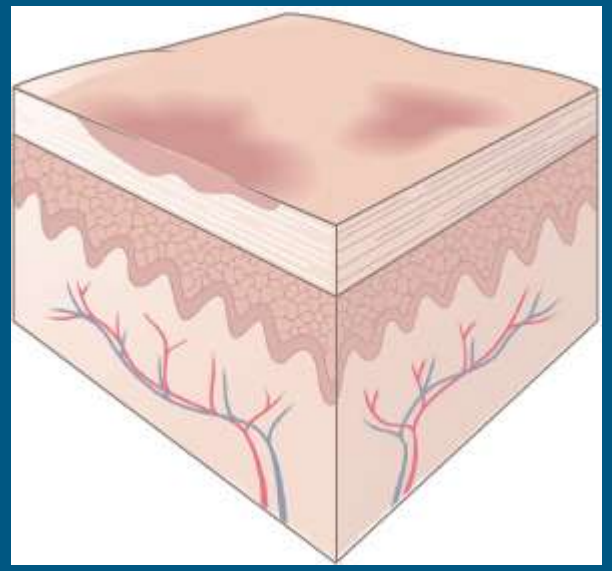
Primary Lesions

- Flat
  - Macule
  - Patch
- Elevated
  - Papule
  - Plaque
  - Nodule
- Fluid Filled
  - Pustule
  - Vesicle
  - Bulla
- Wheal

Primary Lesions

- A macule is a circumscribed flat area of change in color of the skin <1 cm in diameter

- Examples include freckles, flat moles, and port-wine stains and the rashes of rickettsial infections, rubella, and measles



Primary Lesions

- Multiple 3–8-mm erythematous confluent round macules on chest, back, and arms; morbilliform drug eruption

Primary Lesions

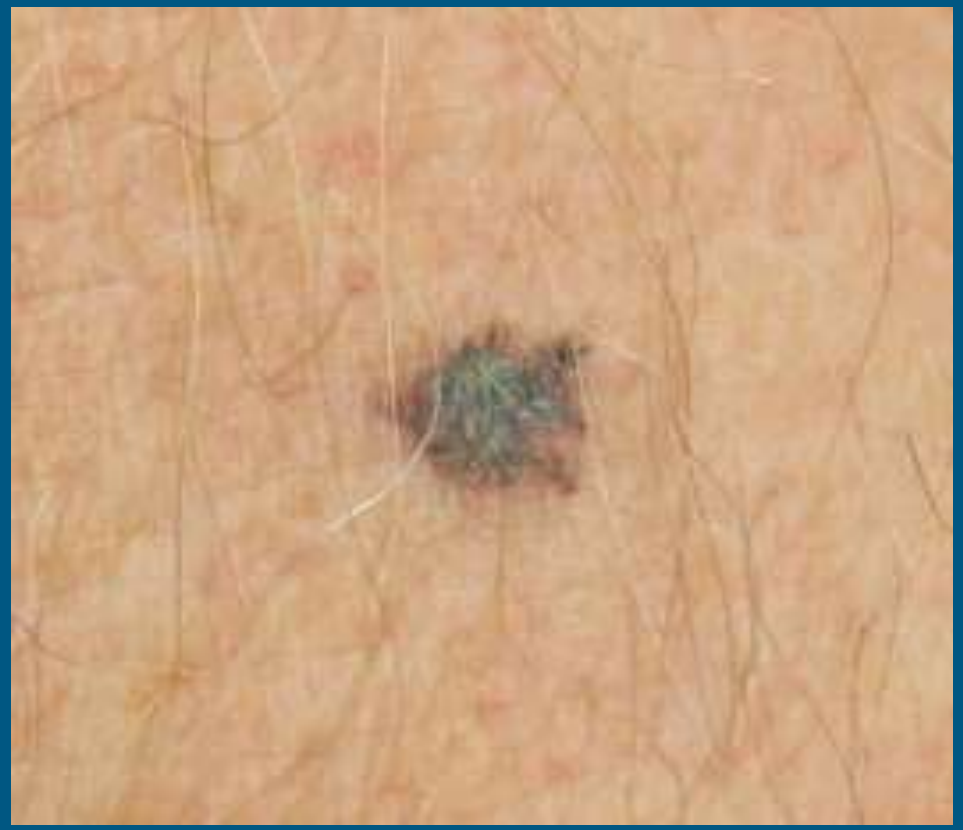
- Multiple scattered 2–4-mm round and oval brown macules, symmetrically pigmented, on back and chest with reticular pattern on dermoscopy; benign melanocytic nevi

Primary Lesions

- Solitary 6-mm dark brown round symmetric macule on upper back; benign melanocytic nevus

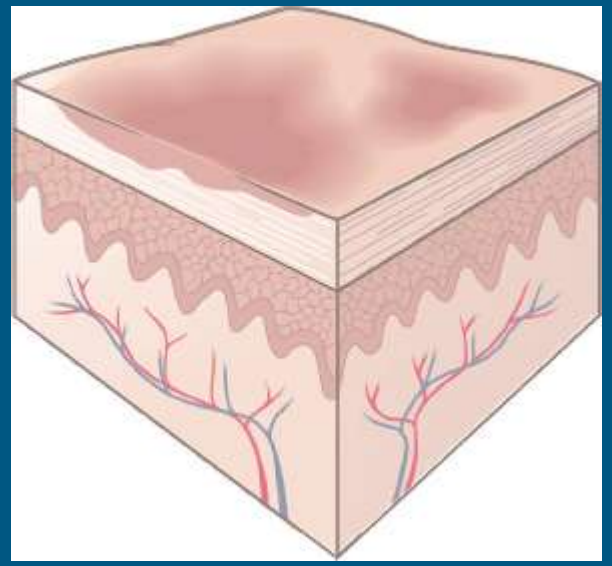
Primary Lesions

- Solitary dark brown, blue-gray, and red 7-mm macule with irregular borders and fingerlike projections of pigment, on right forearm; malignant melanoma



Primary Lesions

- A patch is a circumscribed flat area of change in color of the skin >1 cm in diameter



Primary Lesions

- Bilaterally symmetric erythematous patches on central cheeks and eyebrows, some with overlying greasy scale; seborrheic dermatitis

Primary Lesions

- Large confluent completely depigmented patches on dorsal hands and distal forearms; vitiligo

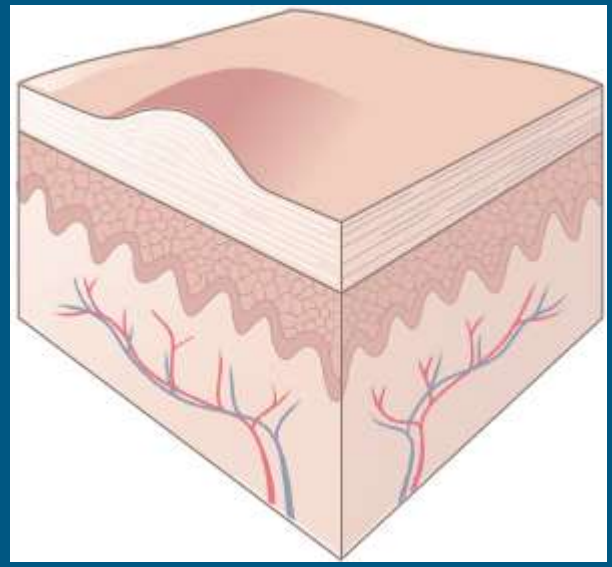
Primary Lesions

- Flat
  - Macule
  - Patch
- Elevated
  - Papule
  - Plaque
  - Nodule
- Fluid Filled
  - Pustule
  - Vesicle
  - Bulla
- Wheal

Primary Lesions

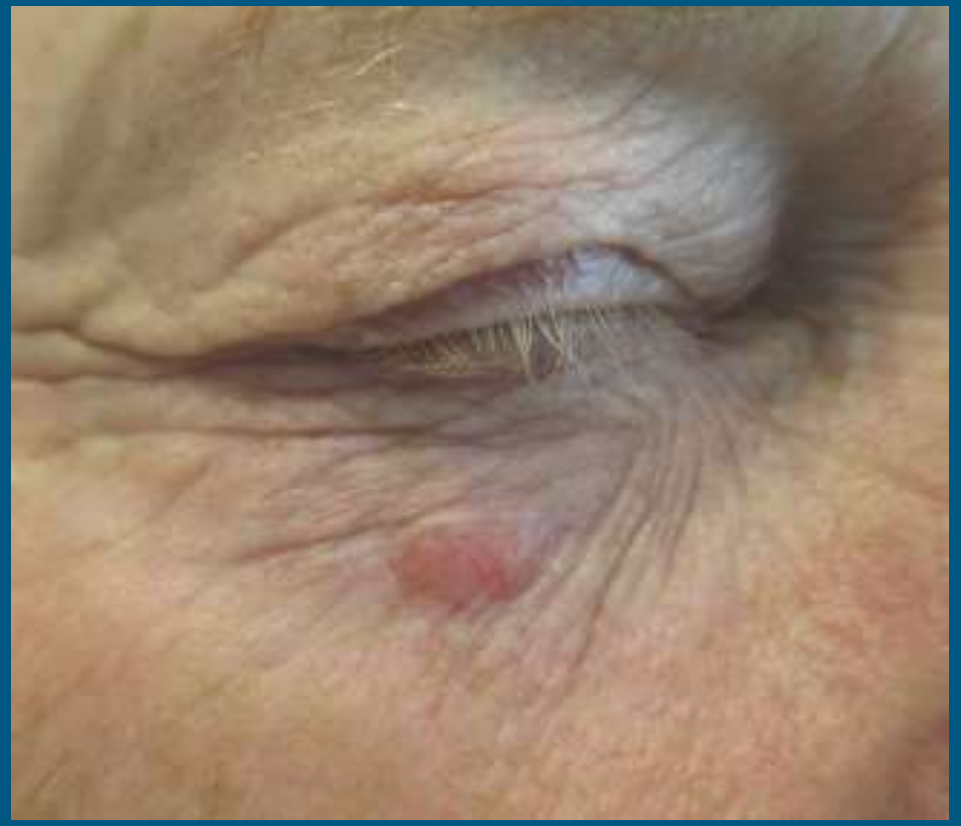
- A papule is a small solid elevation of the skin < 1 cm in diameter

- Examples include nevi, warts, lichen planus, insect bites, seborrheic keratoses, actinic keratoses, some lesions of acne, and skin cancers



Primary Lesions

- Solitary 7-mm oval pink pearly papule with overlying telangiectasias on right nasojugal fold; basal cell carcinoma



Primary Lesions

- Multiple 2–4-mm soft, fleshy skin-colored to light brown papules on lateral neck and axillae in skin folds; skin tags

Primary Lesions

- Multiple 3–5-mm pink firm smooth-domed papules with central umbilications; molluscum contagiosum

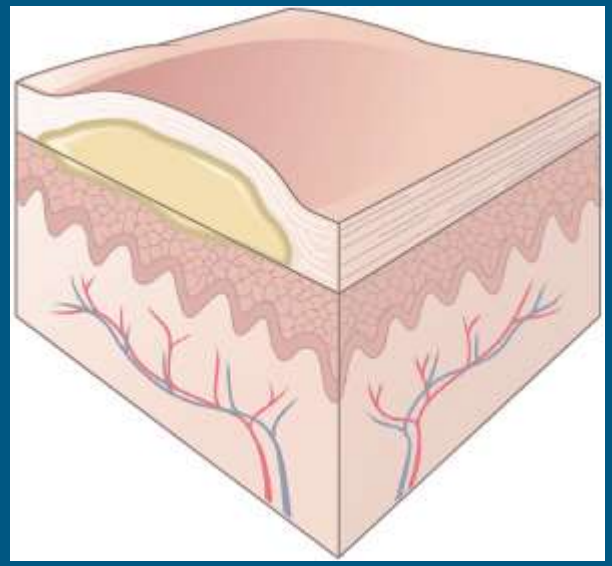
Primary Lesions

- Scattered erythematous round drop-like, flat-topped well-circumscribed scaling papules and plaques on trunk; guttate psoriasis

Primary Lesions

- A plaque is a large flatter elevation of the skin, sometimes formed by papules coalescing

- Lesions of psoriasis and granuloma annulare commonly form plaques



Primary Lesions

- Scattered erythematous to bright pink well-circumscribed flat-topped plaques on extensor knees and elbows, with overlying silvery scale; plaque psoriasis

Primary Lesions

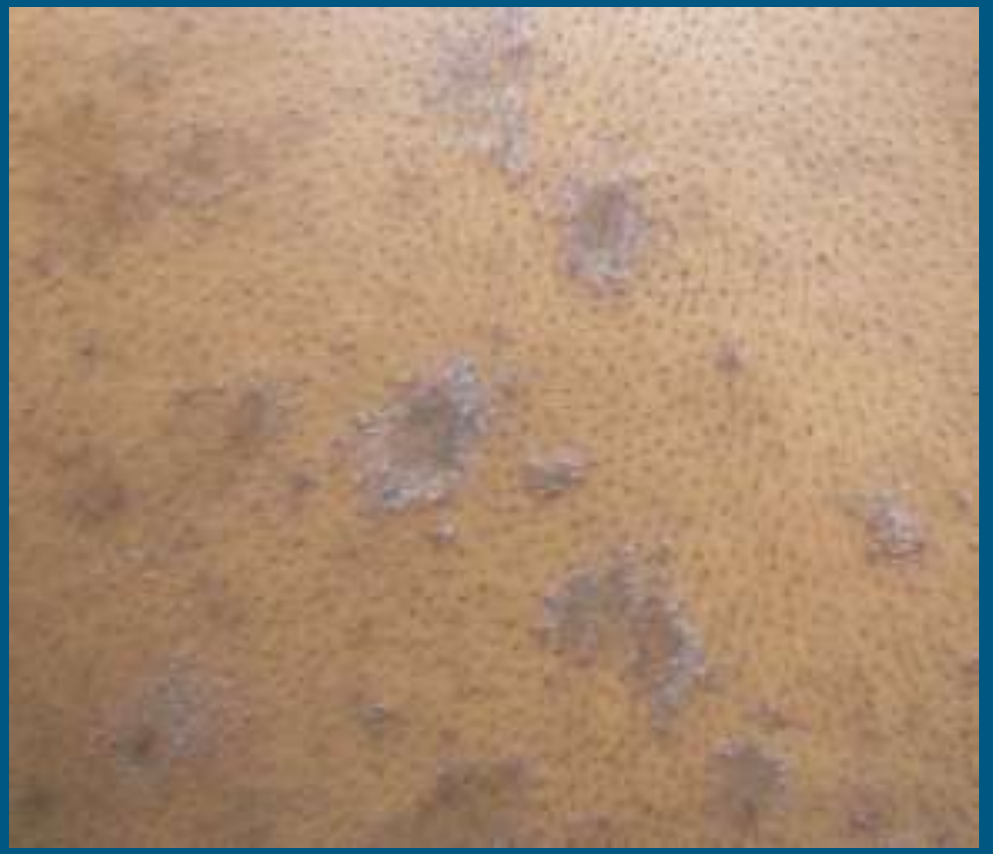
- Bilateral erythematous, lichenified (thickened from rubbing) poorly circumscribed plaques on flexor wrists, antecubital fossae, and popliteal fossae; atopic dermatitis

Primary Lesions

- Single, oval, flat-topped superficial erythematous to skin-colored plaque on right abdomen; herald patch of pityriasis rosea

Primary Lesions

- Multiple round to oval scaling violaceous plaques on abdomen and back; pityriasis rosea

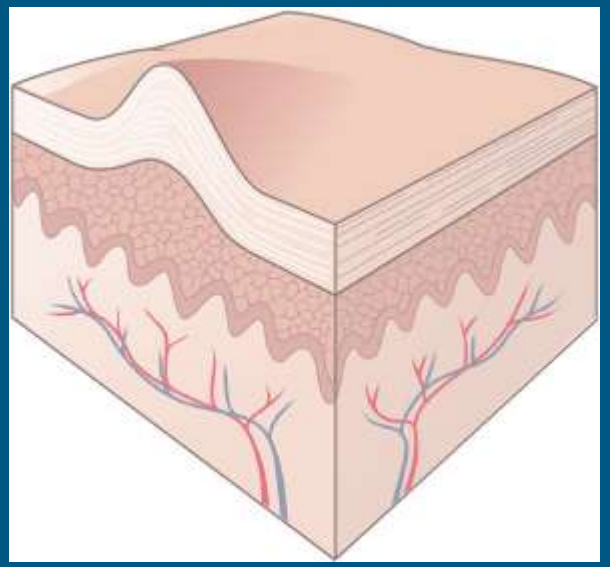


Primary Lesions

- Multiple round coin-like eczematous plaques on arms, legs, and abdomen, with overlying dried transudate crust; nummular dermatitis

Primary Lesions

- A nodule is a solid elevation of the skin >1 cm in diameter that usually extends into the deeper skin layers
- Examples include cysts, lipomas, and fibromas



Primary Lesions

- Solitary blue-brown 1.2-cm firm nodule with positive dimple sign and hyperpigmented rim on left lateral thigh; dermatofibroma

Primary Lesions

- Solitary 4-cm pink and brown scar-like nodule on central chest at site of previous trauma; keloid

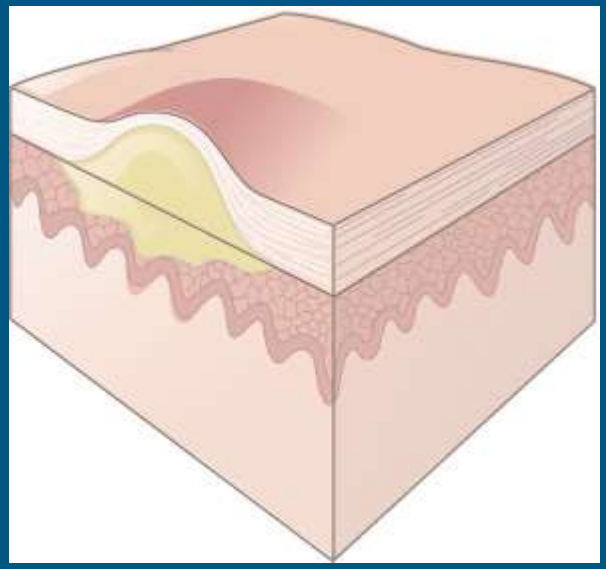
Primary Lesions

- Flat
  - Macule
  - Patch
- Elevated
  - Papule
  - Plaque
  - Nodule
- Fluid Filled
  - Pustule
  - Vesicle
  - Bulla
- Wheal

Primary Lesions

- A pustule is a small circumscribed elevation of the epidermis filled with purulent fluid (neutrophils or keratin) that appears white

- Pustules are common in bacterial infections and folliculitis



Primary Lesions

- ~15–20 pustules and acneiform papules on buccal

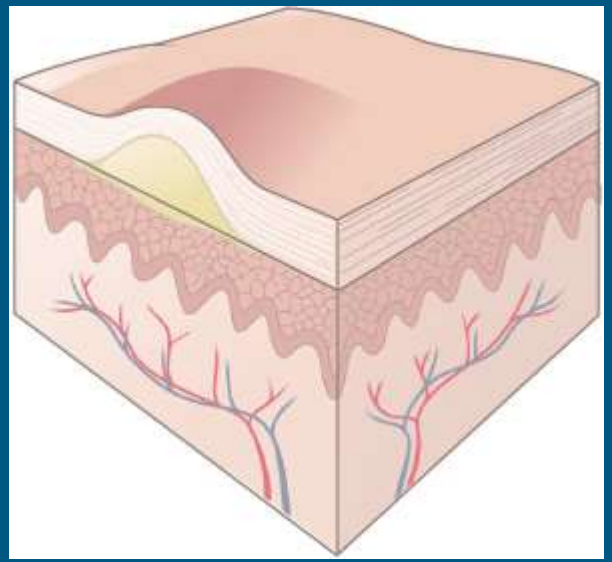
Primary Lesions

- ~30 2–5-mm erythematous papules and and parotid cheeks bilaterally; acne vulgaris pustules on frontal, temporal, and parietal scalp; bacterial folliculitis

Primary Lesions

- A vesicle is a small circumscribed elevation of the epidermis containing clear fluid <1 cm in diameter

- Vesicles are characteristic of herpes infections, acute allergic contact dermatitis, and some autoimmune blistering disorders such as dermatitis herpetiformis



Primary Lesions

- Multiple 2–4-mm vesicles and pustules on erythematous base, grouped together on left neck; herpes simplex virus

Primary Lesions

- Grouped 2–5-mm vesicles on erythematous base on left upper abdomen and trunk in a dermatomal distribution that does not cross the midline; herpes zoster, or shingles

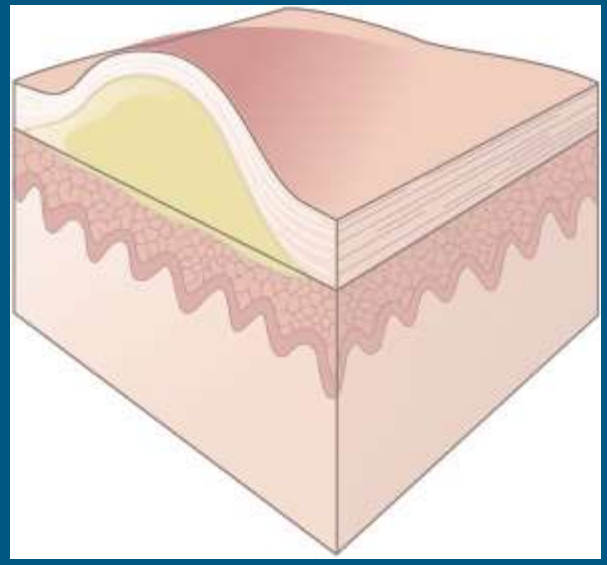
Primary Lesions

- Scattered 2–5-mm erythematous papules and vesicles with transudate crust, some with linear arrays, on forearms, neck, and abdomen; rhus dermatitis or allergic contact dermatitis from poison ivy

Primary Lesions

- A bulla is a circumscribed elevation of the epidermis containing clear fluid >1 cm in diameter

- Classic autoimmune bullous diseases include pemphigus vulgaris and bullous pemphigoid



Primary Lesions

- Solitary 8-cm dusky oval patch with smaller inner violaceous patch and central 3.5-cm tense bulla, on right posterior lower back; bullous fixed drug eruption

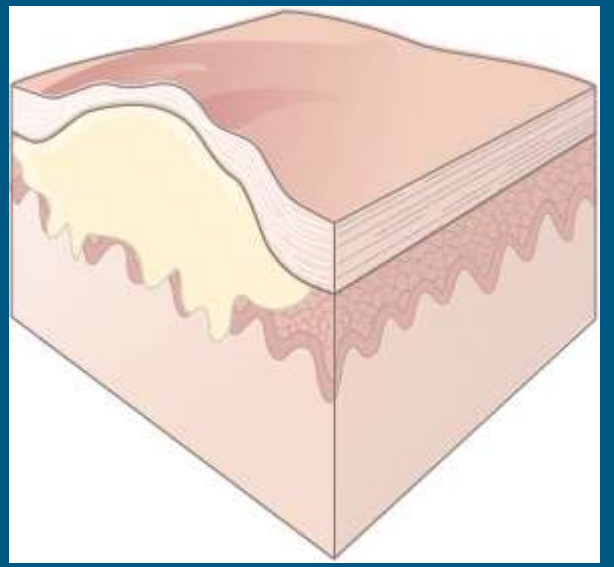
Primary Lesions

- Several tense bullae on lower legs; insect bites

Primary Lesions

- A wheal is a circumscribed, raised lesion consisting of dermal edema and is also known as hives or urticaria. Wheals typically last <24 hours

- Wheals are a common manifestation of hypersensitivity to drugs; stings or bites; autoimmunity; and, less commonly, physical stimuli including temperature, pressure, and sunlight



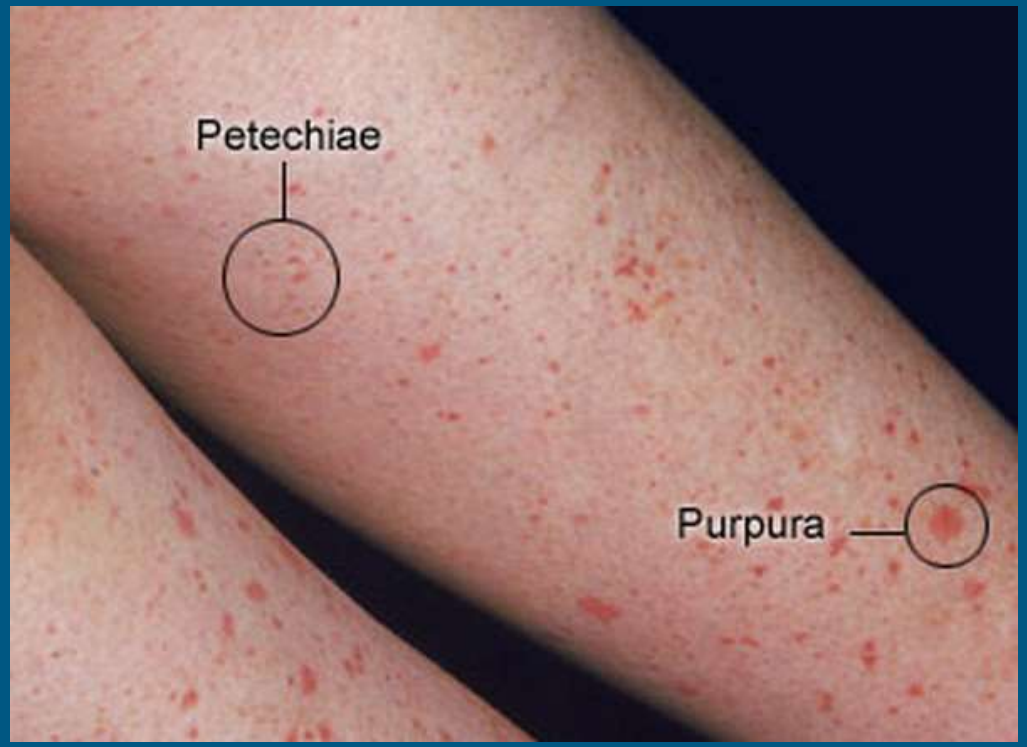
Primary Lesions

- Many variably sized (1–10-cm) wheals on lateral neck, shoulders, abdomen, arms, and legs; urticaria

Primary Lesions

- Other primary lesions include:
  - erosions (loss of epidermal or mucosal epithelium)
  - ulcers (deeper loss of the epidermis and at least the upper dermis)
  - petechiae (nonblanchable punctate foci of hemorrhage)
  - purpura (nonblanchable, raised and palpable)
  - ecchymoses (nonblanchable, larger areas or purpura)

Petechiae vs Purpura



Primary Lesions

- Multiple
- 2–4-mm
- skin-colored to light brown
- round to oval
- soft, fleshy
- papules
- on lateral neck and axillae
- in skin folds; skin tags

Primary Lesions

- solitary
- 6-mm
- dark brown
- round
- (generally no texture for flat lesions)
- macule
- on upper back
- (no configuration for solitary lesions); benign melanocytic nevus

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Sun-Exposed Areas

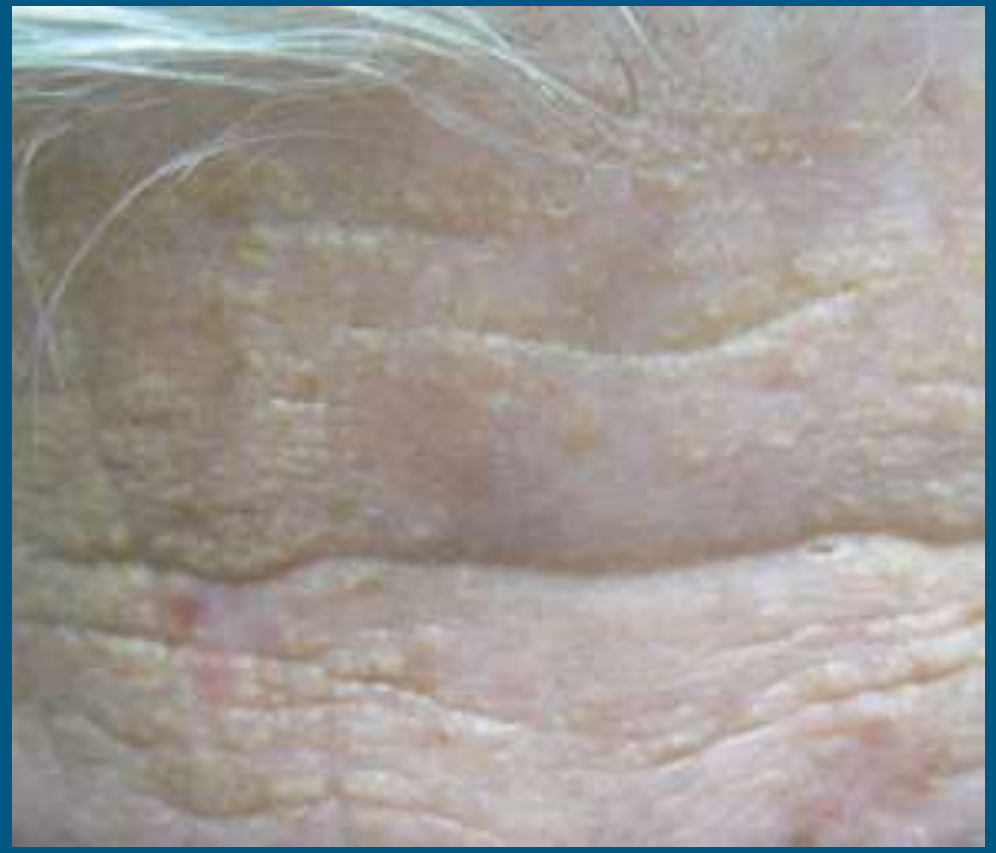
- When examining the sun-exposed areas that are readily accessible such as the arms and hands, look for sun damage, actinic keratoses, and SCCs as well as normal findings
- Educate the patient about such findings as solar lentigines and seborrheic keratoses

Signs of Sun Damage

- Solar Lentigo: Bilaterally symmetric brown macules located on sun-exposed skin, including the face, shoulders, and arms and hands

Signs of Sun Damage

- Solar Elastosis: Yellowish white macules or papules in sun-exposed skin, especially on the forehead



Signs of Sun Damage

- Actinic Purpura:
  Ecchymoses limited to the dorsal forearms and hands but not extending above the “shirt sleeve” line on the upper arm

Signs of Sun Damage

- Poikiloderma: Red patches in sun-damaged areas, especially the V of the neck, and lateral neck (usually sparing the shadow inferior to the chin) with fine telangiectasias, and both hyper- and hypopigmentations

Signs of Sun Damage

- Wrinkles: Increased sun damage and tanning leads to deeper wrinkles at an earlier age

Signs of Sun Damage

- Cutis Rhomboidalis Nuchae: Deep wrinkles on the posterior neck that “crisscross”

Epidemiology

- Skin cancers are the most commonly diagnosed cancers in Americans, with a lifetime risk estimated to be about one in five
- The most common skin cancer is BCC, followed by SCC, and then melanoma
- More than 3 million Americans are diagnosed each year with a nonmelanoma skin cancer, and an estimated 91,270 were diagnosed with melanoma in 2018

Describing Skin Lesions

- When screening moles for melanomas, clinicians often describe these lesions using the ABCDE method
- A lesion is described as it relates to its:
  - Asymmetry (of one side of mole compared to the other)
  - Border irregularity especially if ragged, notched, or blurred
  - Color variations (more than two colors, especially blue-black, white, or red)
  - Diameter >6 mm; Evolving or changing rapidly in size, symptoms, or morphology
  - Elevation; Firmness to palpation and progressive growing over several weeks

Describing Skin Lesions

Epidemiology

- Melanoma is the fifth most frequently diagnosed cancer in men and the sixth most frequently diagnosed cancer in women
- The estimated lifetime risk of being diagnosed with melanoma is 1 in 44 (2.3%), with the highest risk in whites, followed by Hispanics, and then African Americans
- Nonmelanoma skin cancers are rarely fatal, causing only about 2,000 deaths each year
- Although melanoma accounts for just 1% of skin cancers, it is the most lethal, causing an estimated 9,320 deaths in 2018

Epidemiology

- Sun and ultraviolet (UV) radiation exposure are the strongest risk factors for developing nonmelanoma skin cancer
- People who tan poorly or freckle or burn easily with sun exposure are most at risk; other risk factors include receiving immunosuppressive therapy for organ transplants and arsenic exposure

Epidemiology

- The Melanoma Risk Assessment Tool, developed by the National Cancer Institute, is available at http://www.cancer.gov/melanomarisktool
- This tool assesses an individual's 5-year risk of developing melanoma based on geographic location, gender, race, age, history of blistering sunburns, complexion, number and size of moles, freckling, and sun damage
- The tool is not intended for patients with a personal history of skin cancer or a family history of melanoma

Risk Factors for Melanoma

- Personal or family history of previous melanoma
- ≥50 common moles
- Atypical or large moles, especially if dysplastic
- Red or light hair
- *Solar lentigines* (acquired brown macules on sun-exposed areas)
- Freckles (inherited brown macules)
- Ultraviolet radiation from heavy sun exposure, sunlamps, or tanning booths
- Light eye or skin color, especially skin that freckles or burns easily
- Severe blistering sunburns in childhood
- Immunosuppression from human immunodeficiency virus (HIV) or from chemotherapy
- Personal history of nonmelanoma skin cancer

Skin Cancer Prevention

- Increasing lifetime sun exposure correlates directly with increasing risk of skin cancer
- Intermittent sun exposure appears to be more harmful than chronic exposure, particularly during childhood and adolescence
- The best defense against skin cancer is to avoid UV radiation exposure by limiting time in the sun, avoiding midday sun, using sunscreen, and wearing sun-protective clothing with long sleeves and hats with wide brims
- Advise patients to avoid indoor tanning, especially children, teens, and young adults

Skin Cancer Prevention

- Signs of chronic sun damage include:
  - numerous solar lentigines on the shoulders and upper back
  - many melanocytic nevi
  - solar elastosis (yellow, thickened skin with bumps, wrinkles, or furrowing)
  - cutis rhomboidalis nuchae (leathery thickened skin on the posterior neck)
  - actinic purpura

Skin Cancer Prevention

- The International Agency for Research on Cancer has classified UV-emitting tanning devices as “carcinogenic to humans.”
- Ever use of sunbeds is associated with an increased risk for all skin cancers, particularly among those using sunbeds before age 35, and the risk for melanoma increases with each additional tanning session
- The U.S. Preventive Services Task Force (USPSTF) has issued a grade B recommendation supporting behavioral counseling to minimize UV radiation exposure in fair-skinned persons aged 6 months to 24 years

Skin Cancer Prevention

- Use of indoor tanning beds, especially before age 35 years, increases risk of melanoma by as much as 75%
- Advise patients to use at least sun protective factor (SPF) 30 and broad-spectrum protection
- The AAD recommends using sunscreen to cover all exposed skin whenever going outside, even on cloudy days
- Sunscreen should be reapplied every 2 hours when outdoors and after being in the water

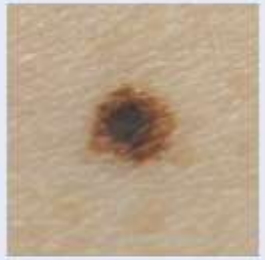
Screening for Melanomas

- Detecting melanoma requires knowledge of how benign nevi change over time, often going from flat to raised or acquiring additional brown pigment
- Clinicians should apply the ABCDE method when screening moles for melanoma
- The most sensitive is E, for evolution or change
- Pay close attention to nevi that have changed rapidly based on objective evidence

The ABCDE Rule

Asymmetry Of one side of mole compared to the other		

The ABCDE Rule

Border irregularity Especially if ragged, notched, or blurred		

The ABCDE Rule

Color variations More than two colors, especially blue-black, white (loss of pigment due to regression), or red (inflammatory reaction to abnormal cells)		

The ABCDE Rule

Diameter >6 mm Approximately the size of a pencil eraser		

The ABCDE Rule

Evolving Or changing rapidly in size, symptoms, or morphology		

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