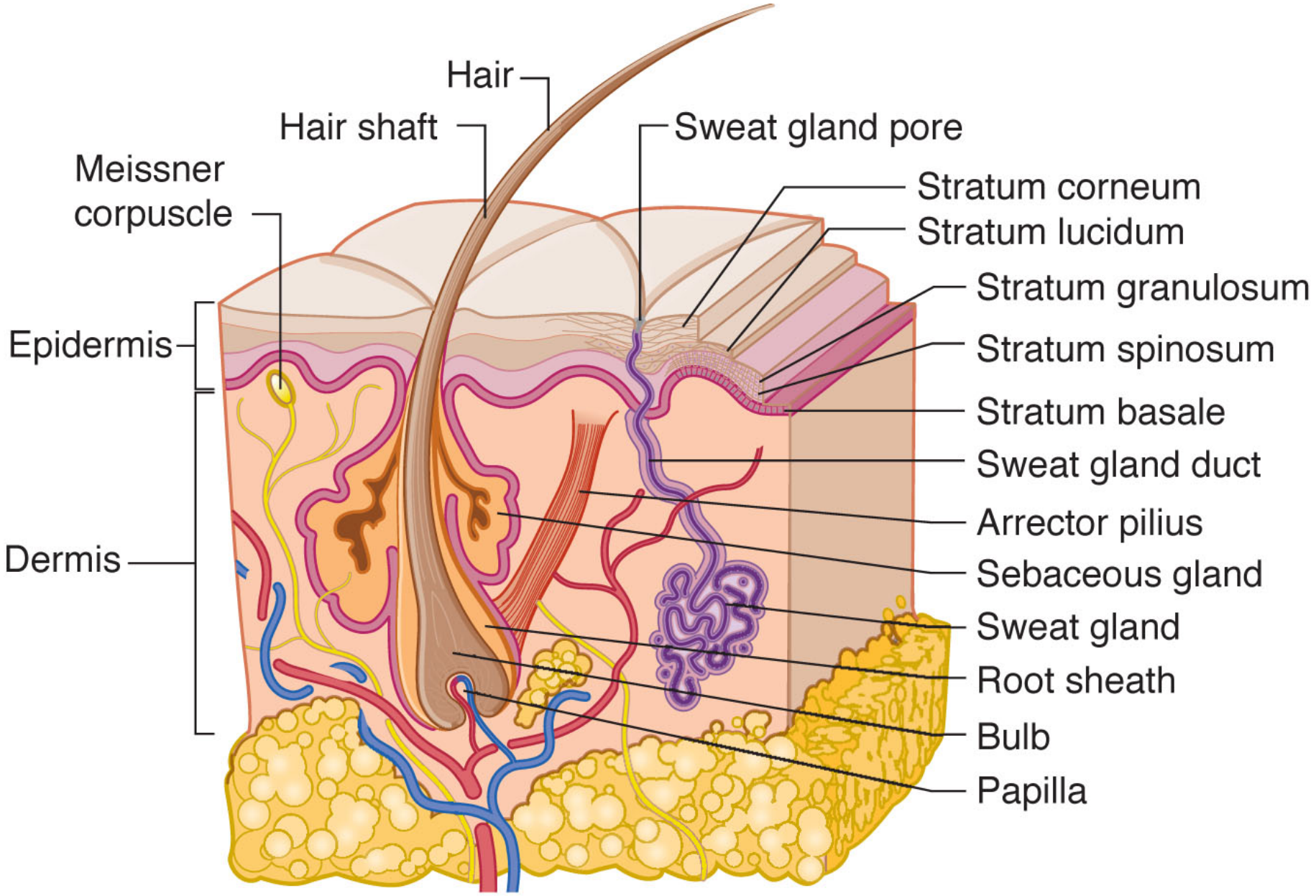
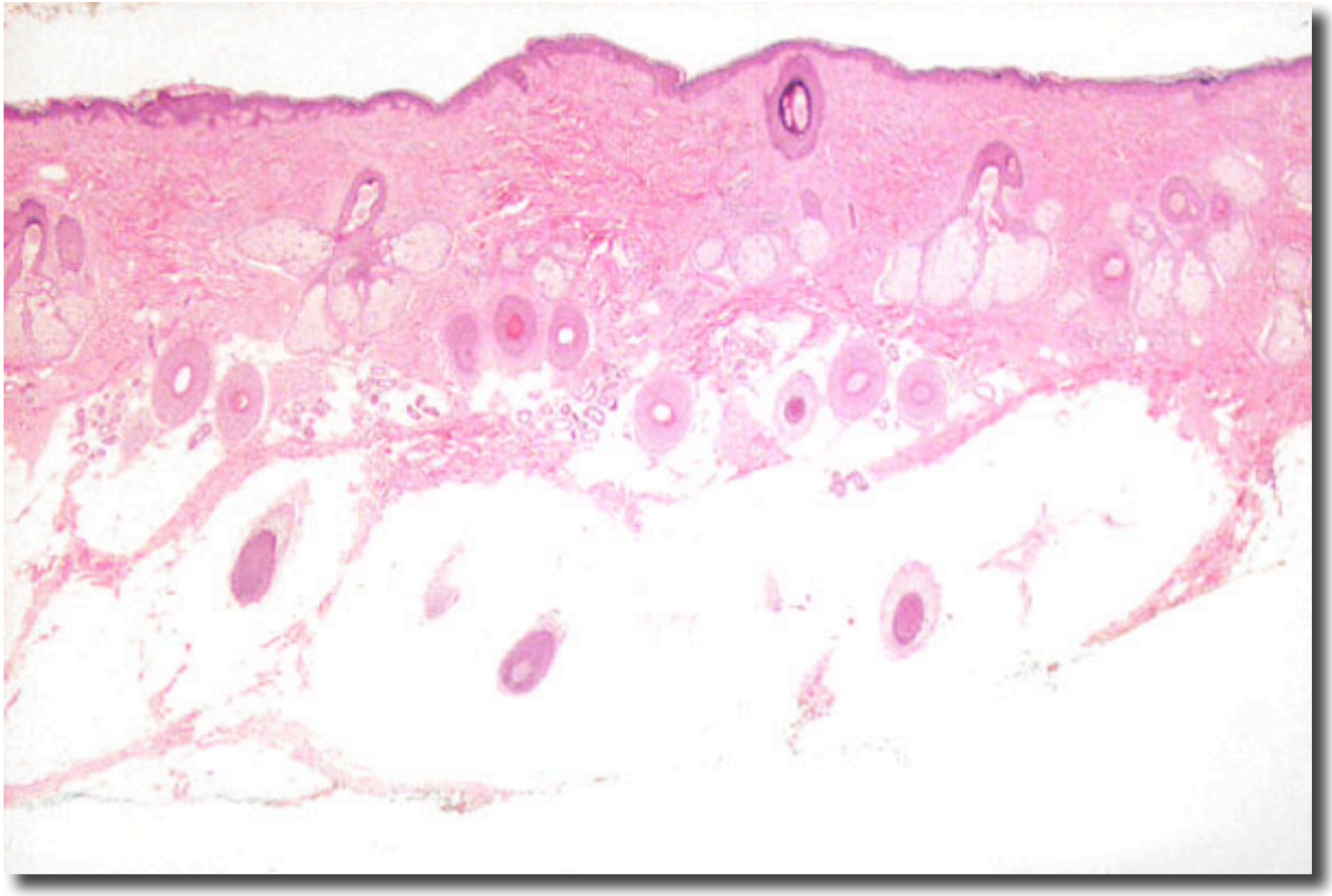
Skin Pathology: The Basics

Henry Sánchez, M.D.

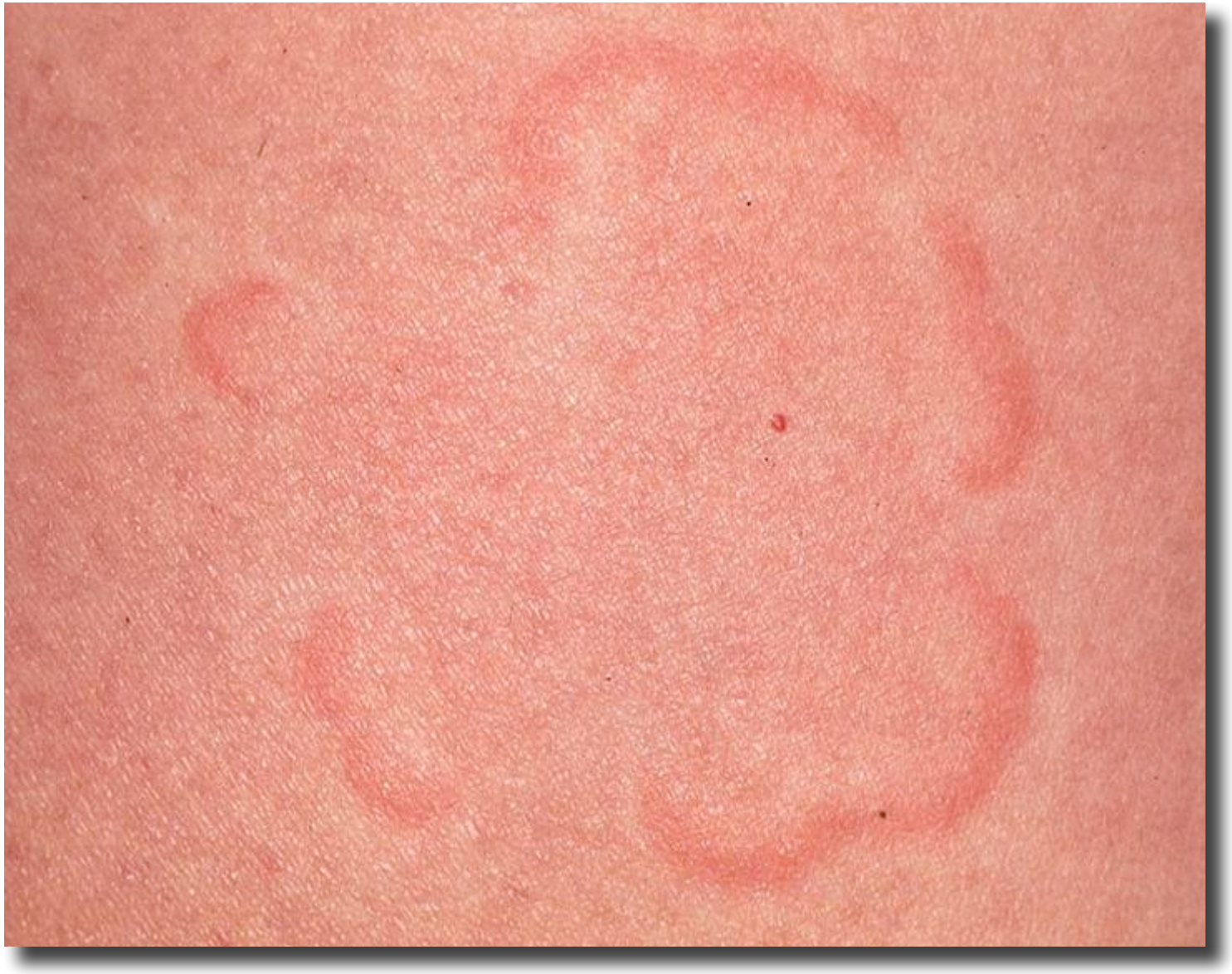

Hair
Hair shaft
Meissner corpuscle
Epidermis
Dermis
Sweat gland pore
Stratum corneum
Stratum lucidum
Stratum granulosum
Stratum spinosum
Stratum basale
Sweat gland duct
Arrector pilius
Sebaceous gland
Sweat gland
Root sheath
Bulb
Papilla

Normal Skin

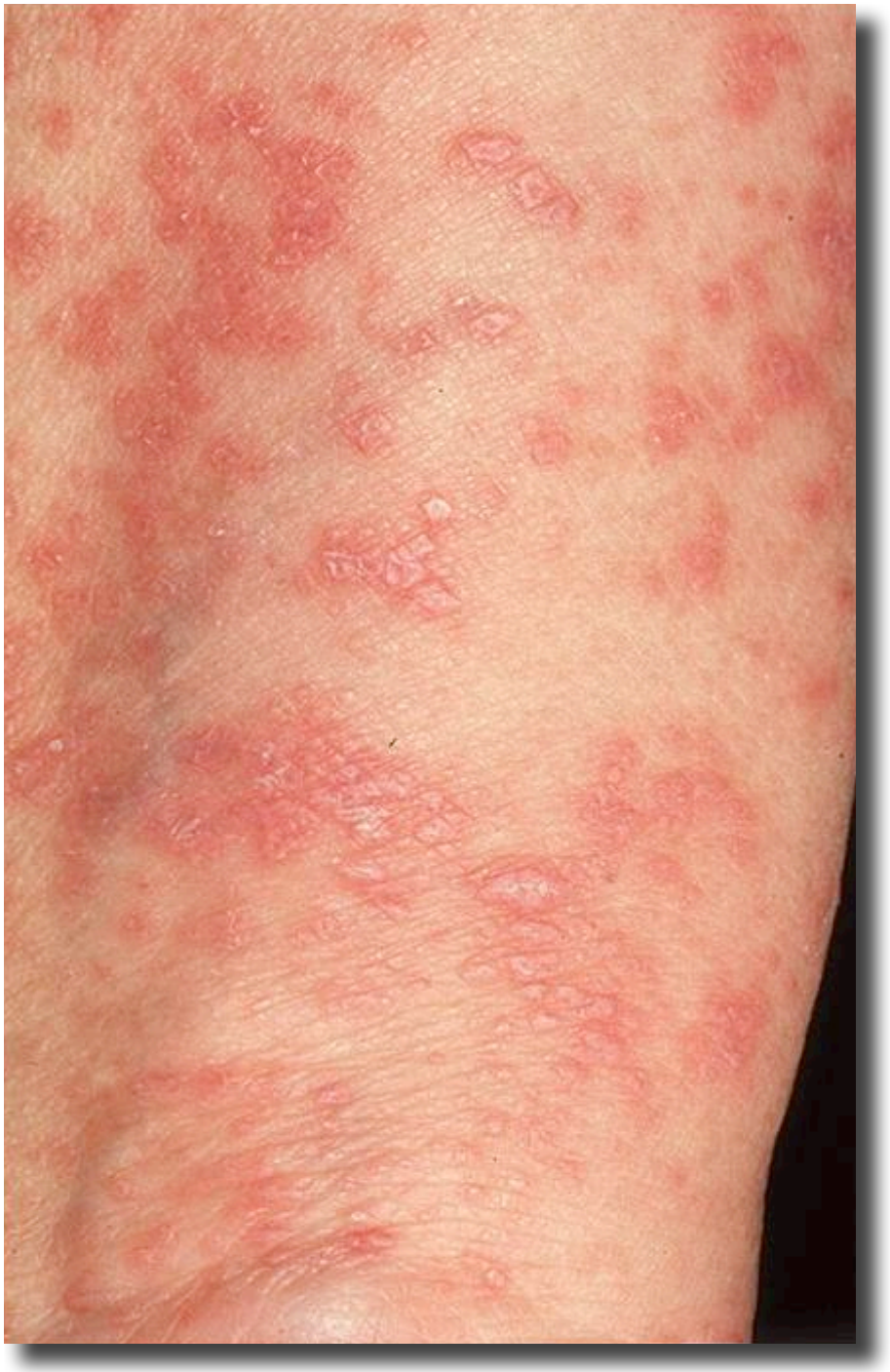


Descriptive Language of Dermatology

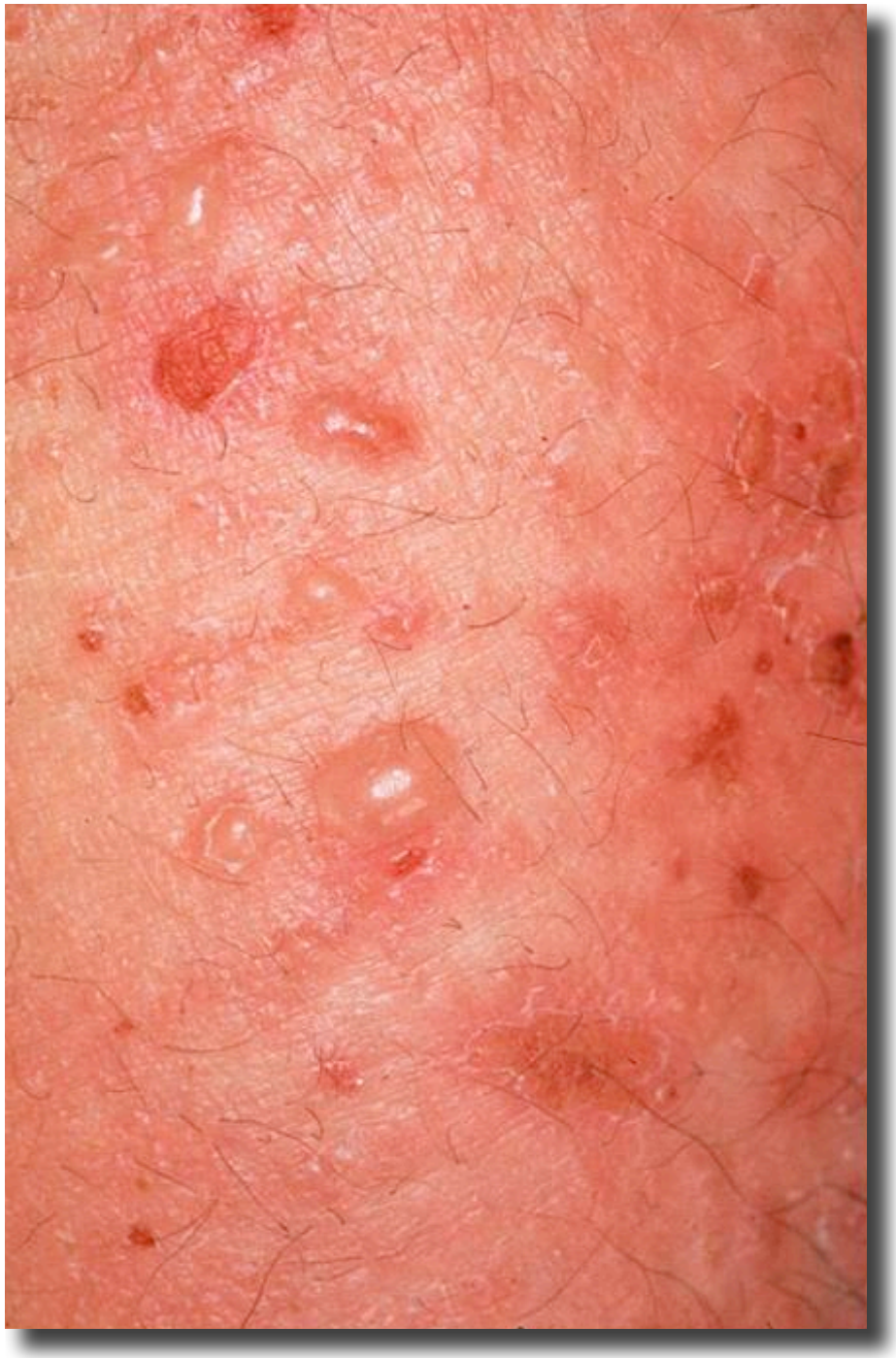
Macule (<1 cm flat area)



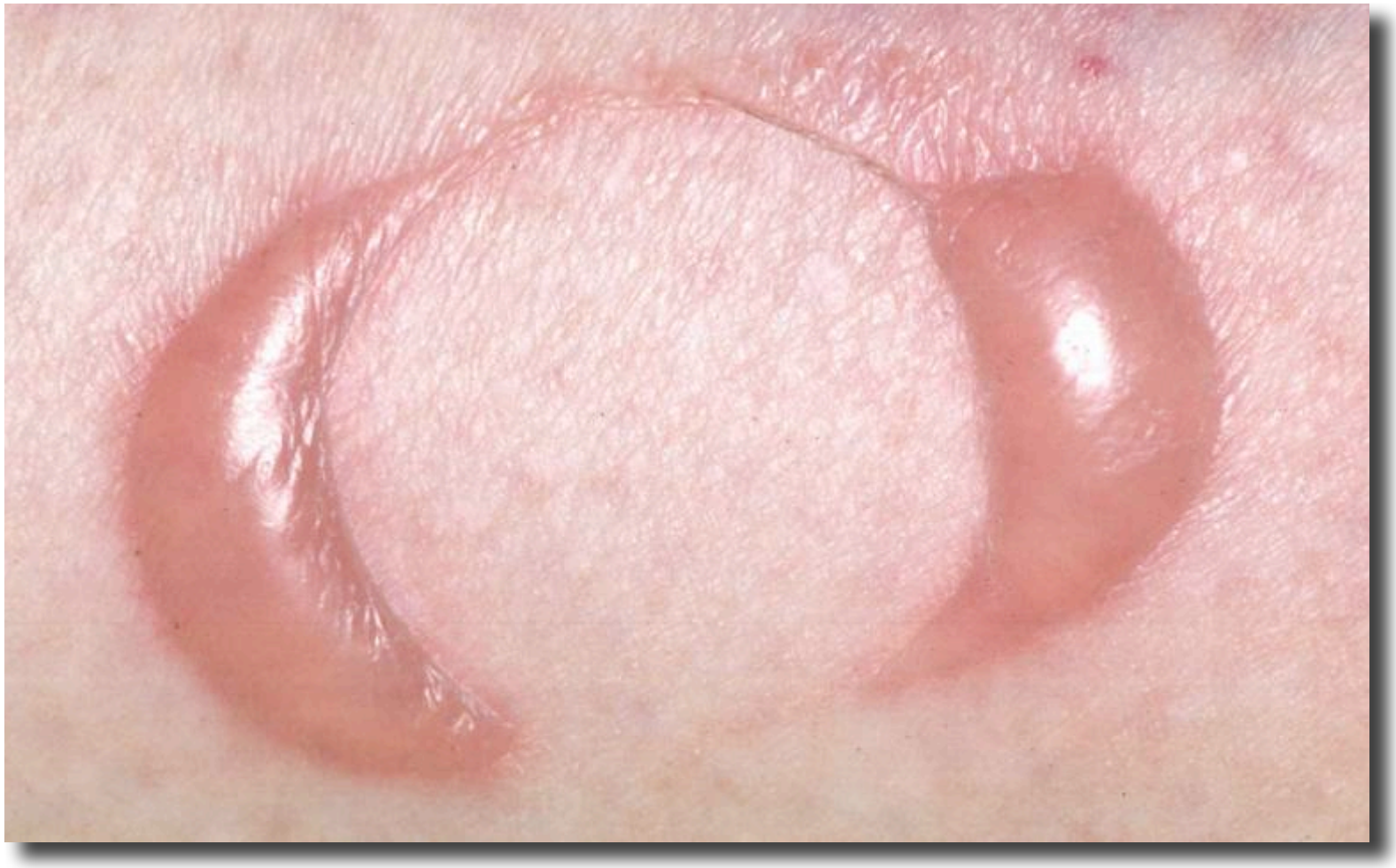
Papules
(<1 cm, elevated, palpable lesion)



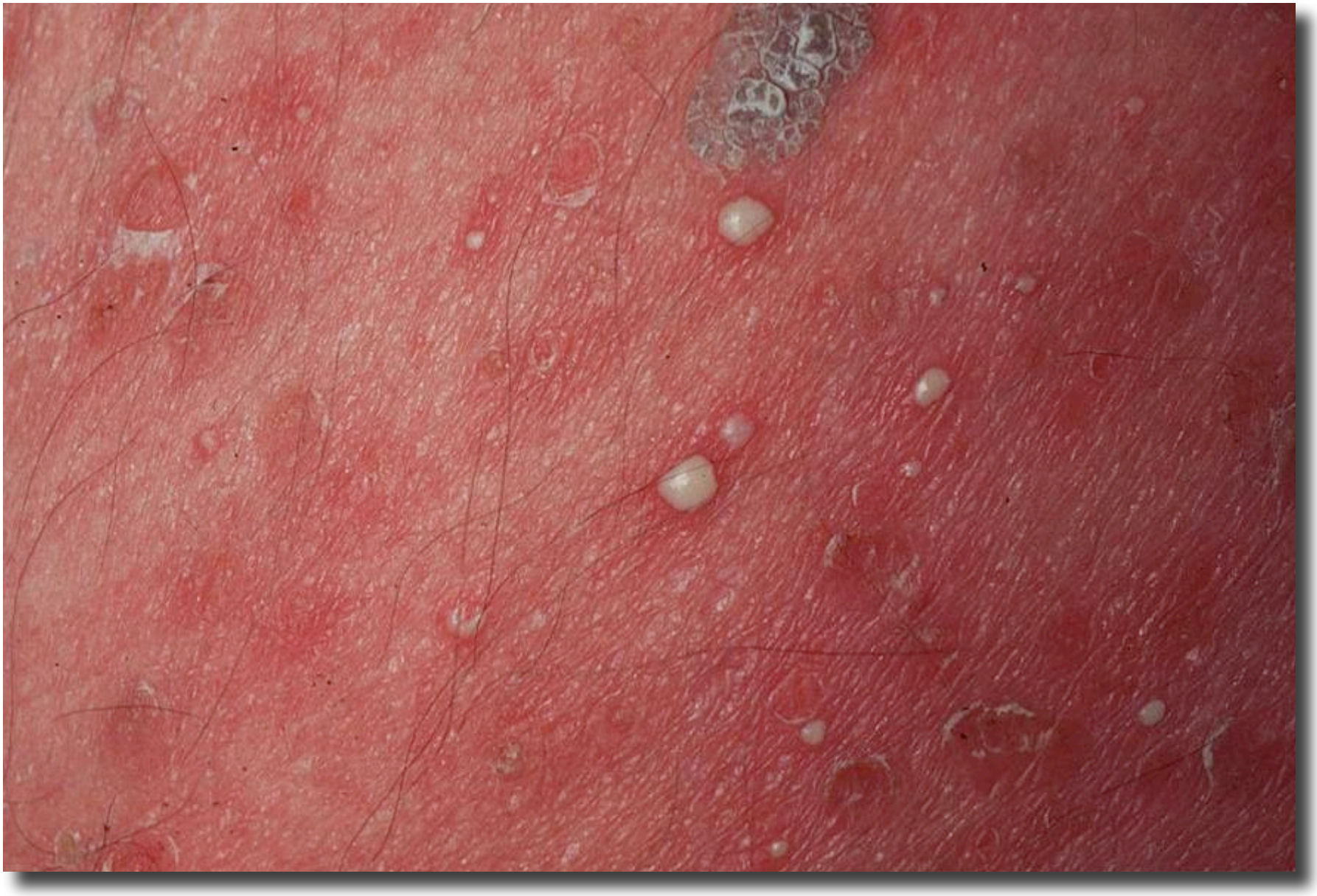
Vesicles (fluid-filled space, < 1 cm in diameter)



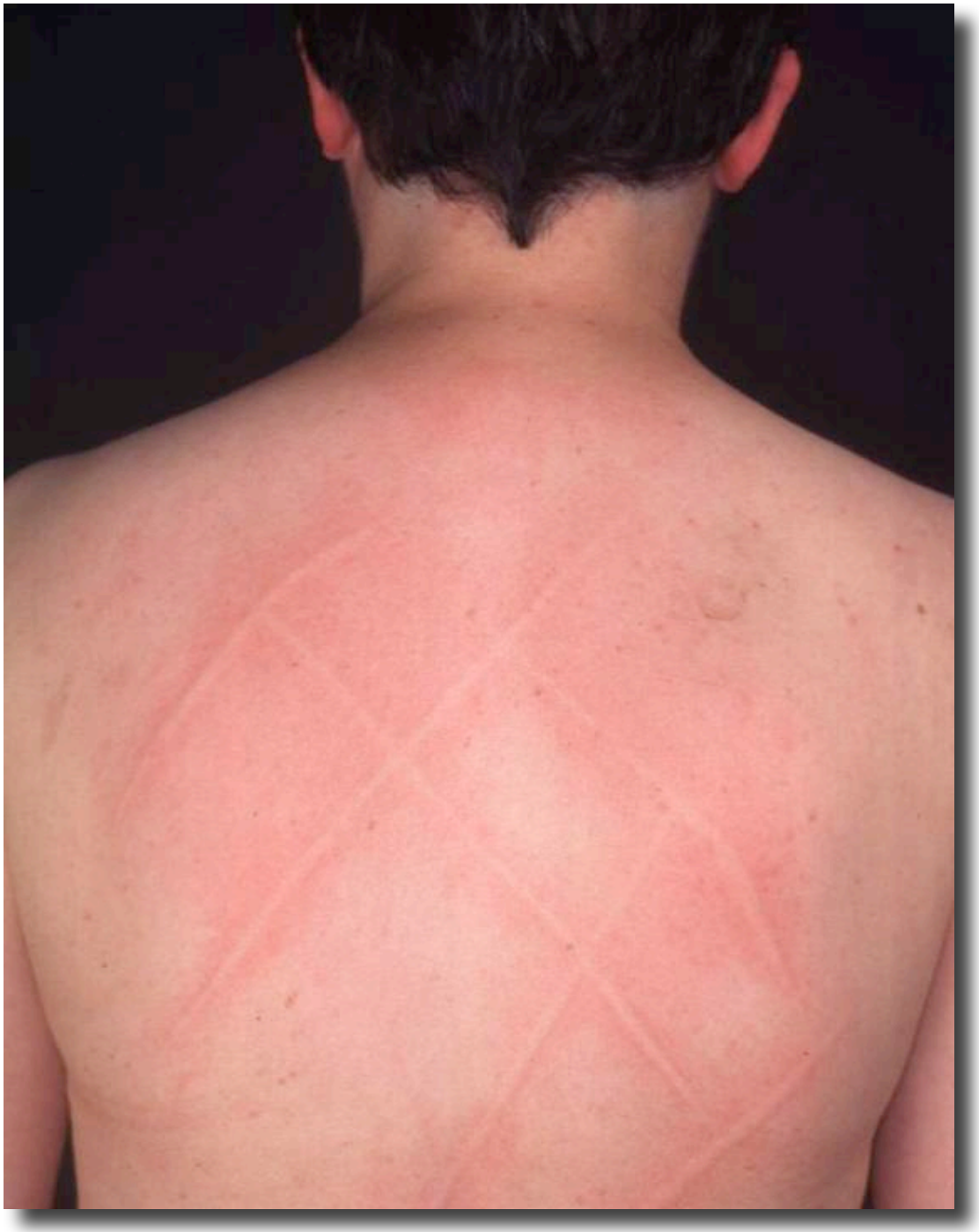
Bullae (fluid-filled space, >1 cm in diameter)



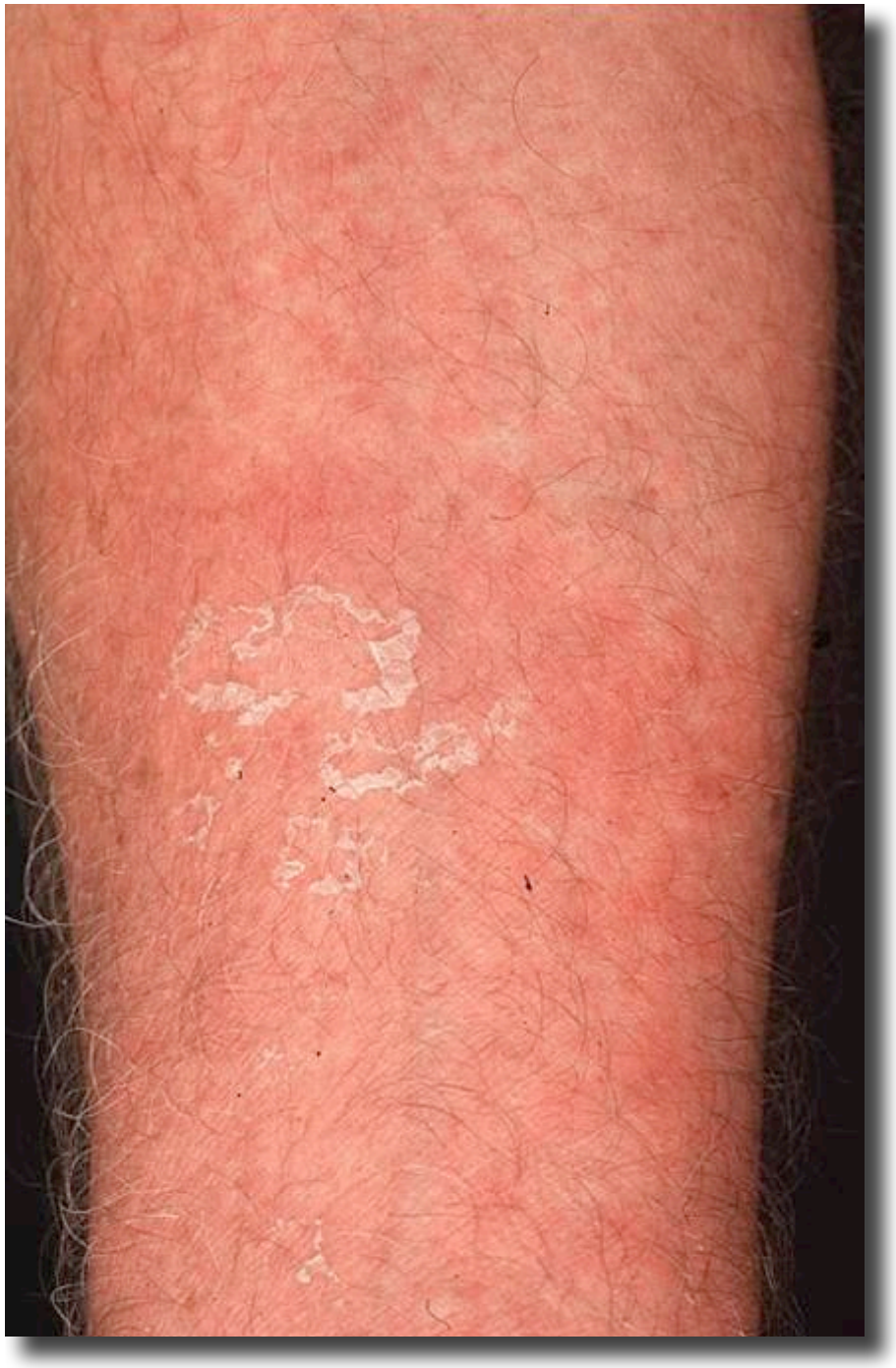
Pustules (pus-filled space)



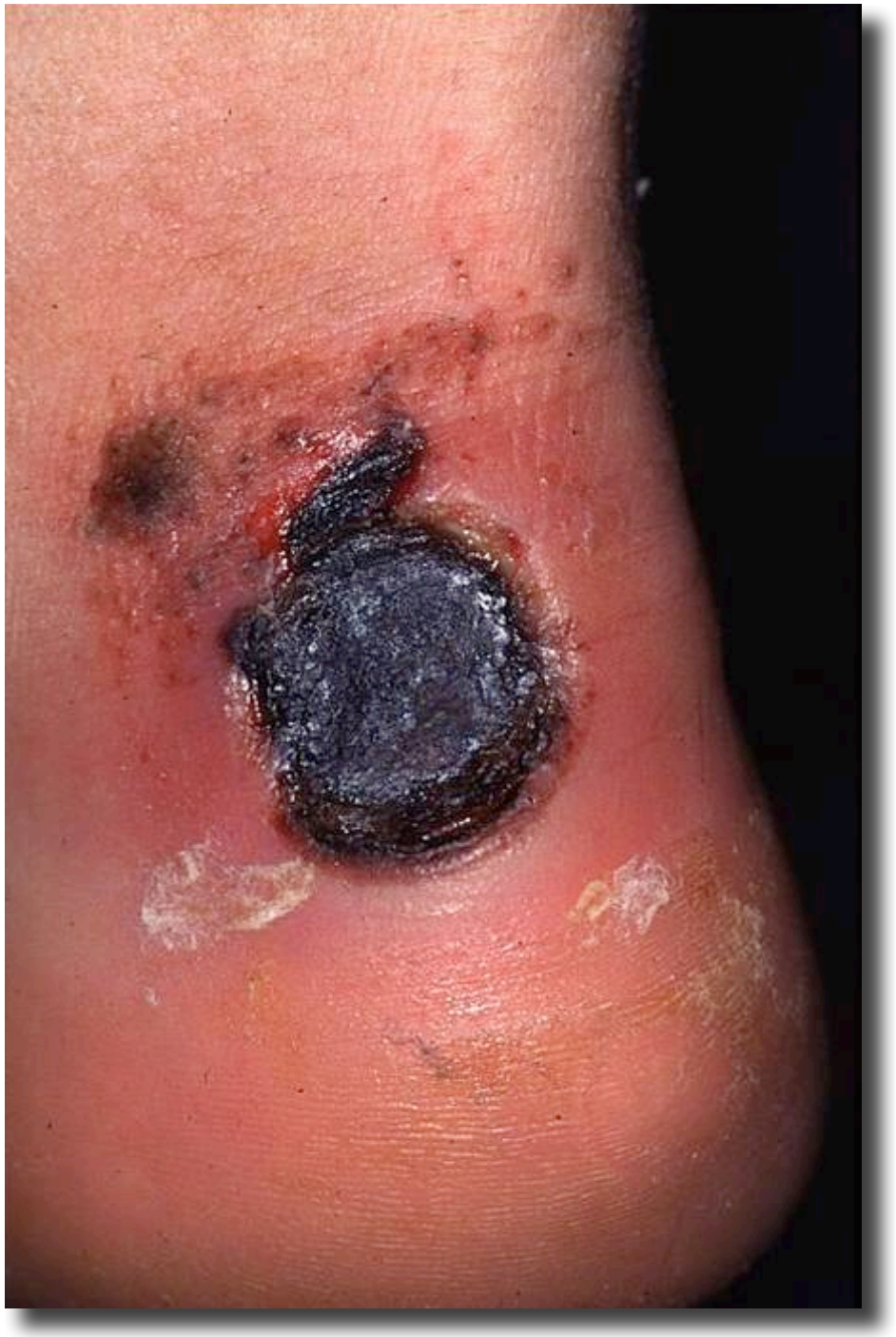
Wheal
(urticaria)



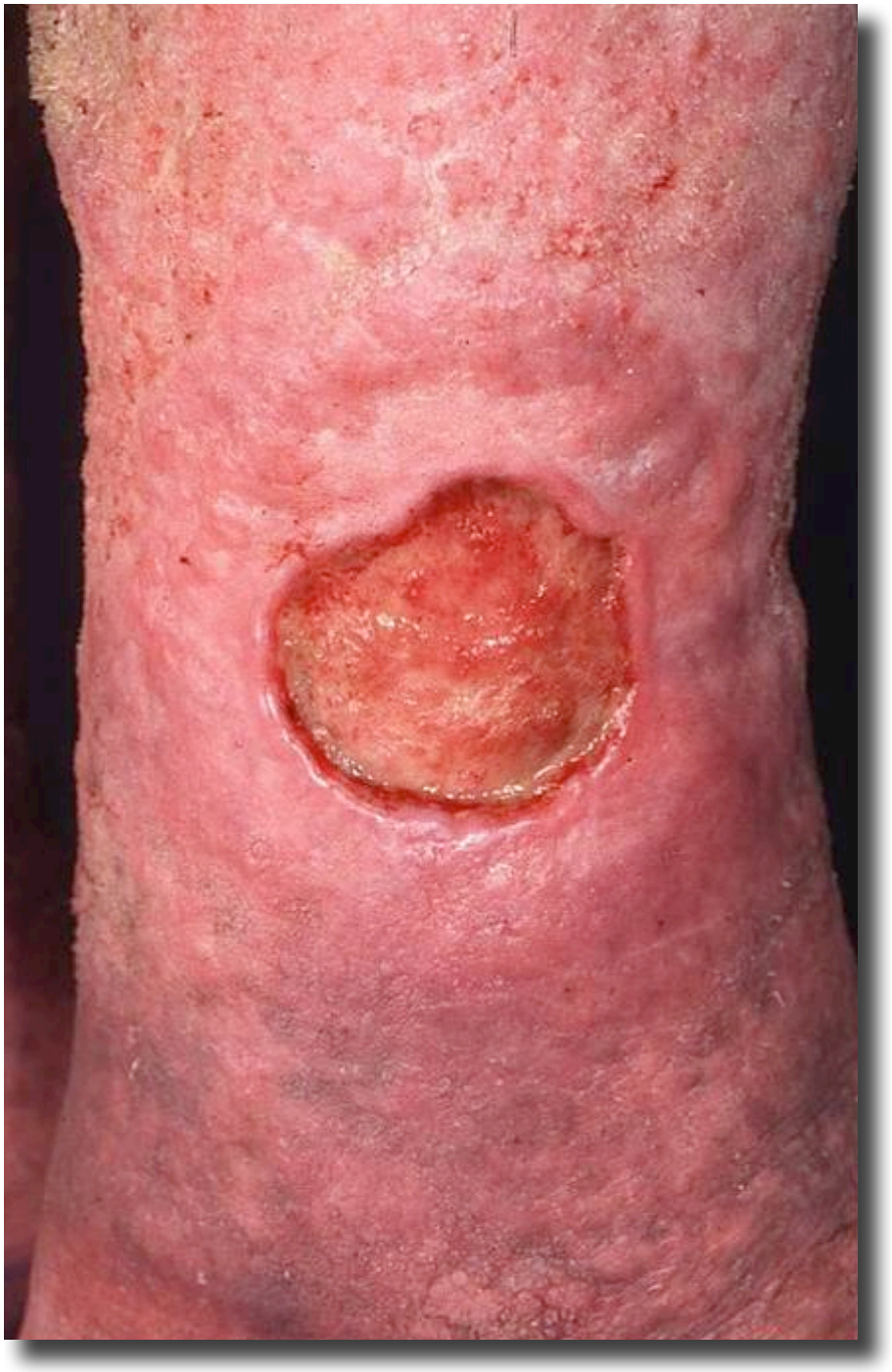
Scale



Eschar



Ulcer

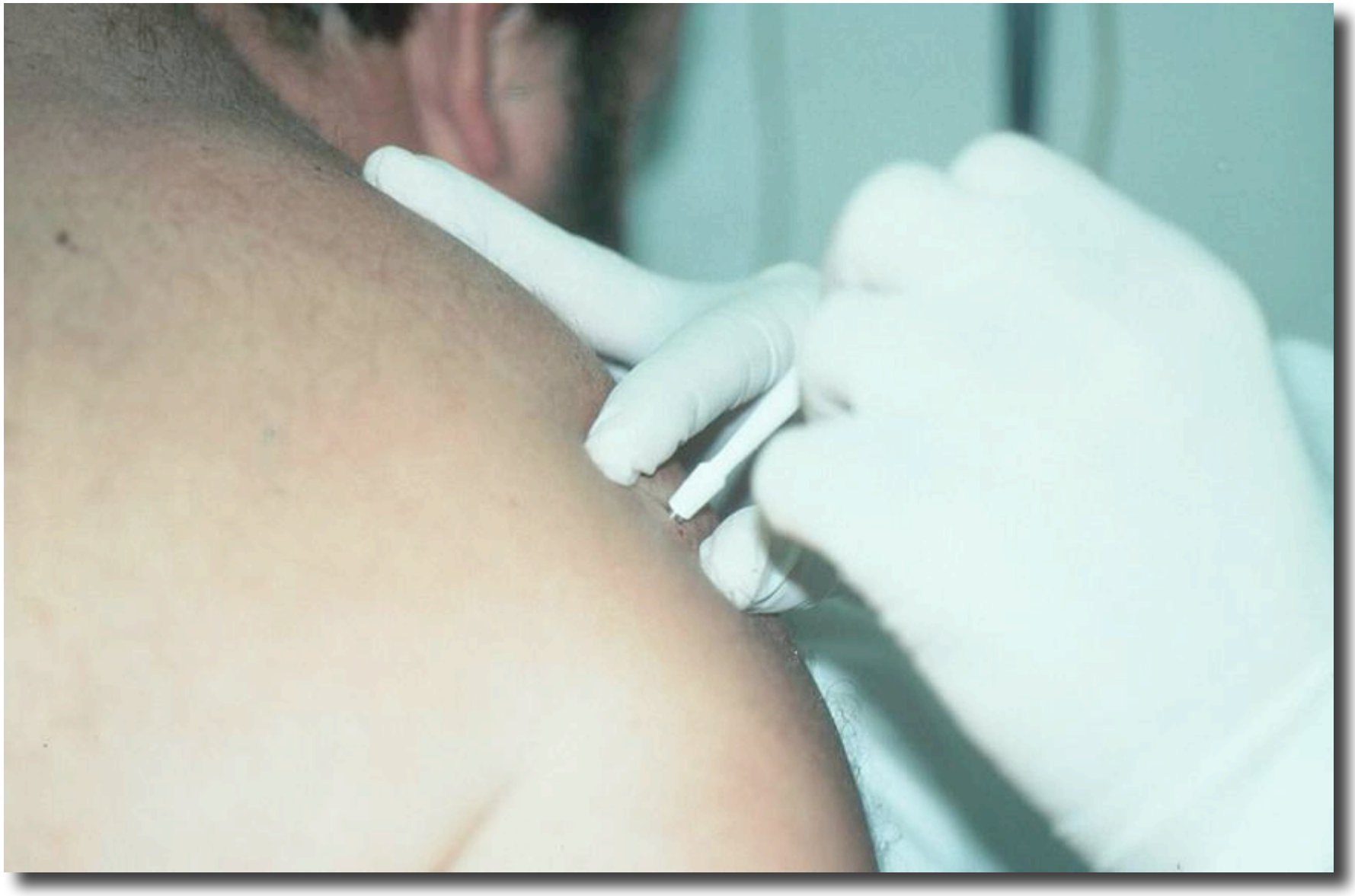


How do we diagnose skin diseases?

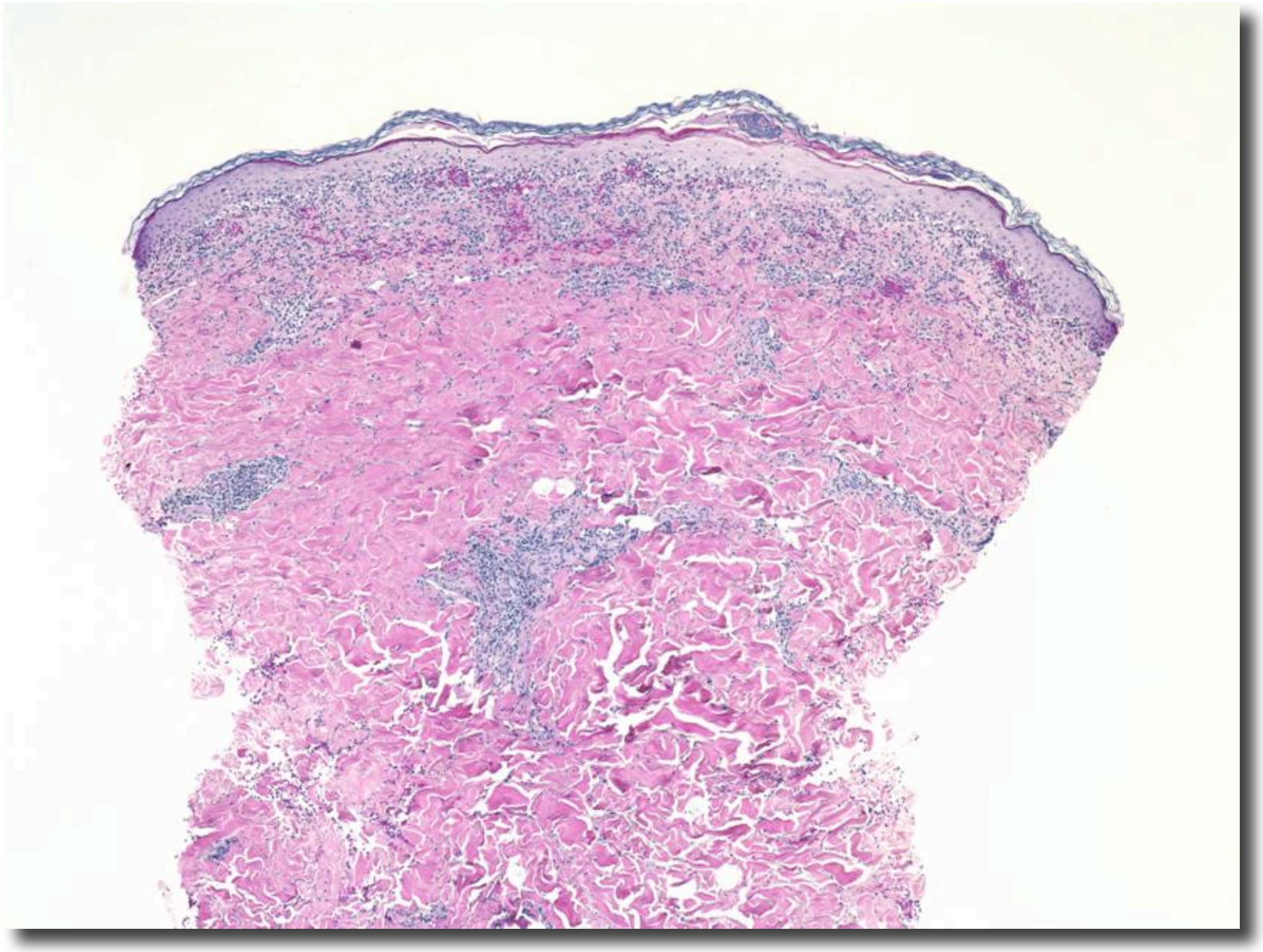
Skin Diagnosis

- Interview the patient
- Examine the rash, or growth
- Ancillary tools include skin scraping, biopsy, or excision

Skin Punch Biopsy



Skin Punch Biopsy



Types of Skin Diseases

- Malformation
- Inflammation ("rashes" or dermatitis)
- Infection
- Hyperplasia
- Neoplasia ("growths" or tumors)

Skin Neoplasms ("Growths")

Nomenclature Issues

- Is it benign or is it malignant?
- What's the lineage?
  - Surface epithelial?
  - Adnexal epithelial? (hair follicle or sweat gland)
  - Melanocytic?
  - Non-epithelial? (mesenchyme, nerve, muscle, fibrous, fat)

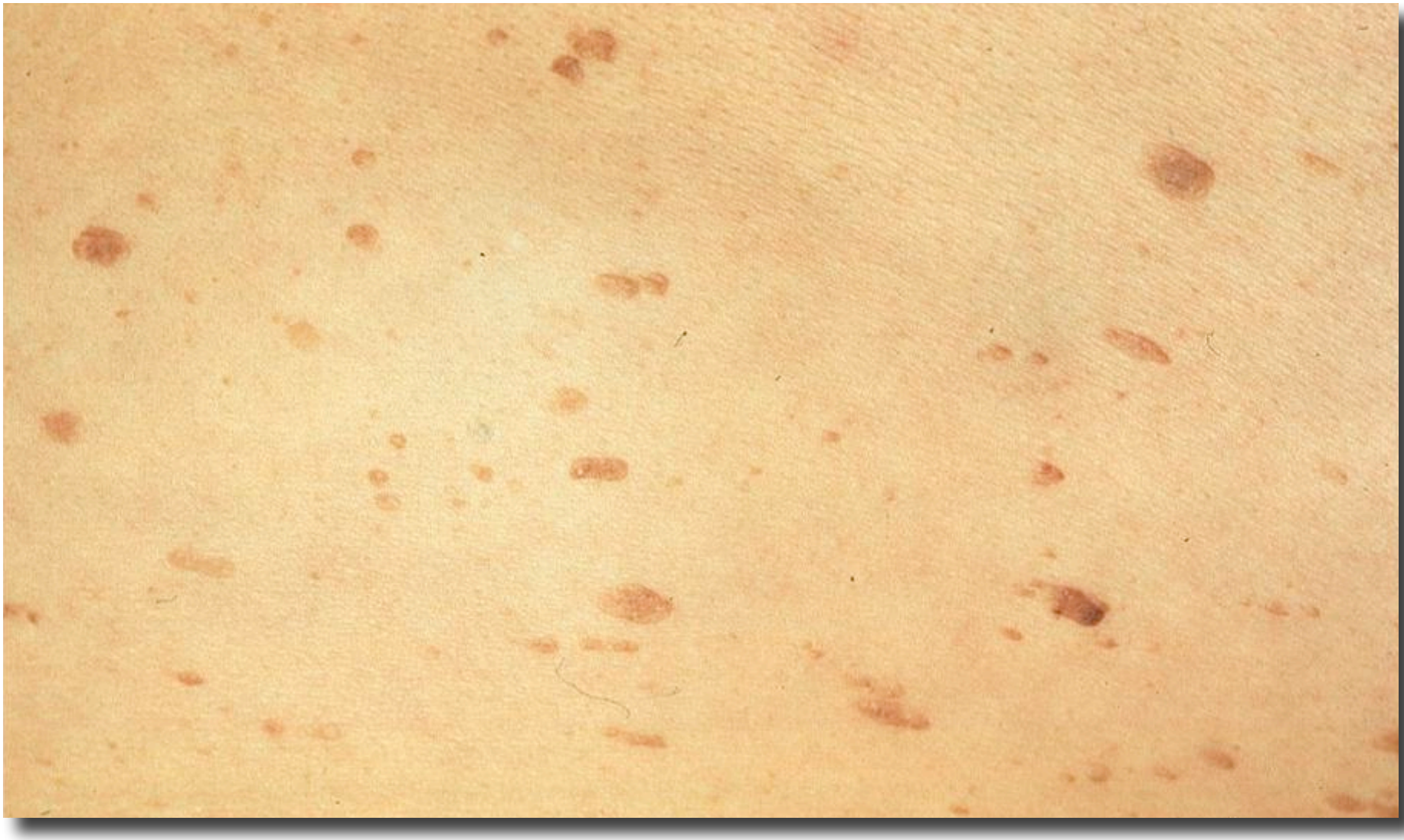
Benign Epithelial Neoplasms (keratoses)

- Seborrheic keratosis
- Verruca vulgaris (could be considered a hyperplasia)
- Solar (actinic) keratosis

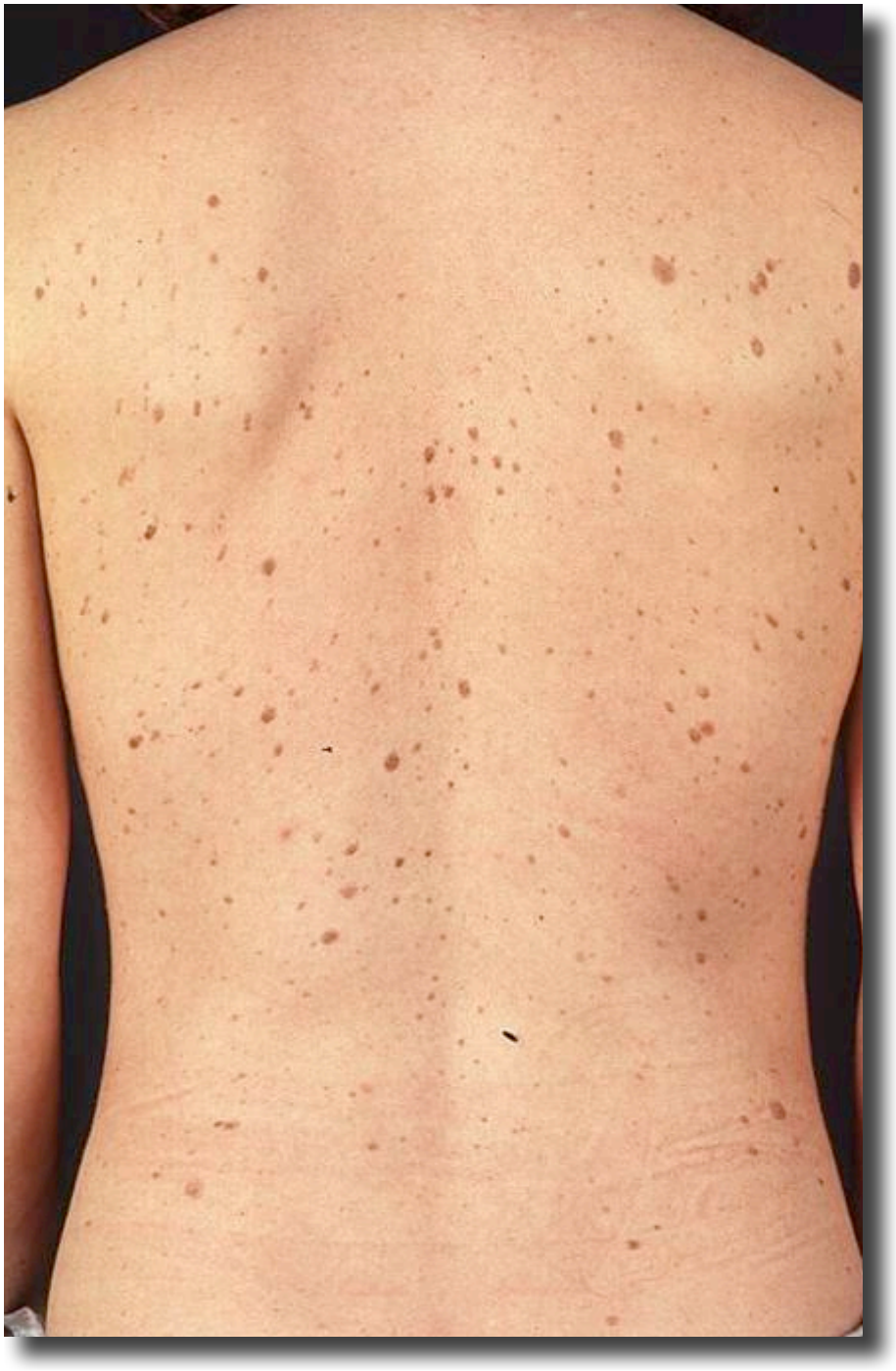
Seborrheic Keratosis

- Scaly benign growth
- Usually occurs after age 50
- Resembles a wart, but does not contain HPV
- Cosmetic concern
- Clinical simulator of melanoma
- Not “precancerous”

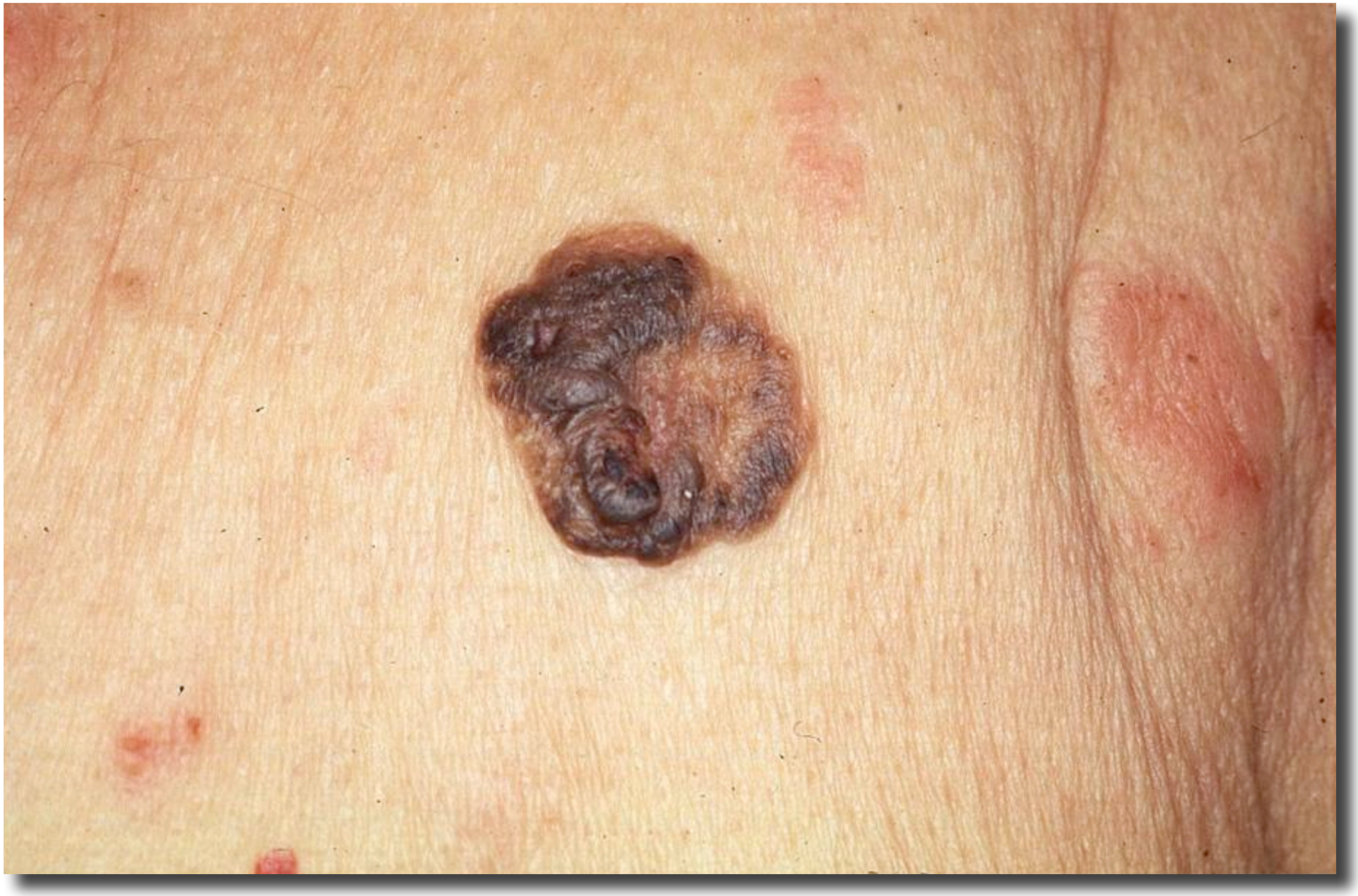
Seborrheic Keratosis



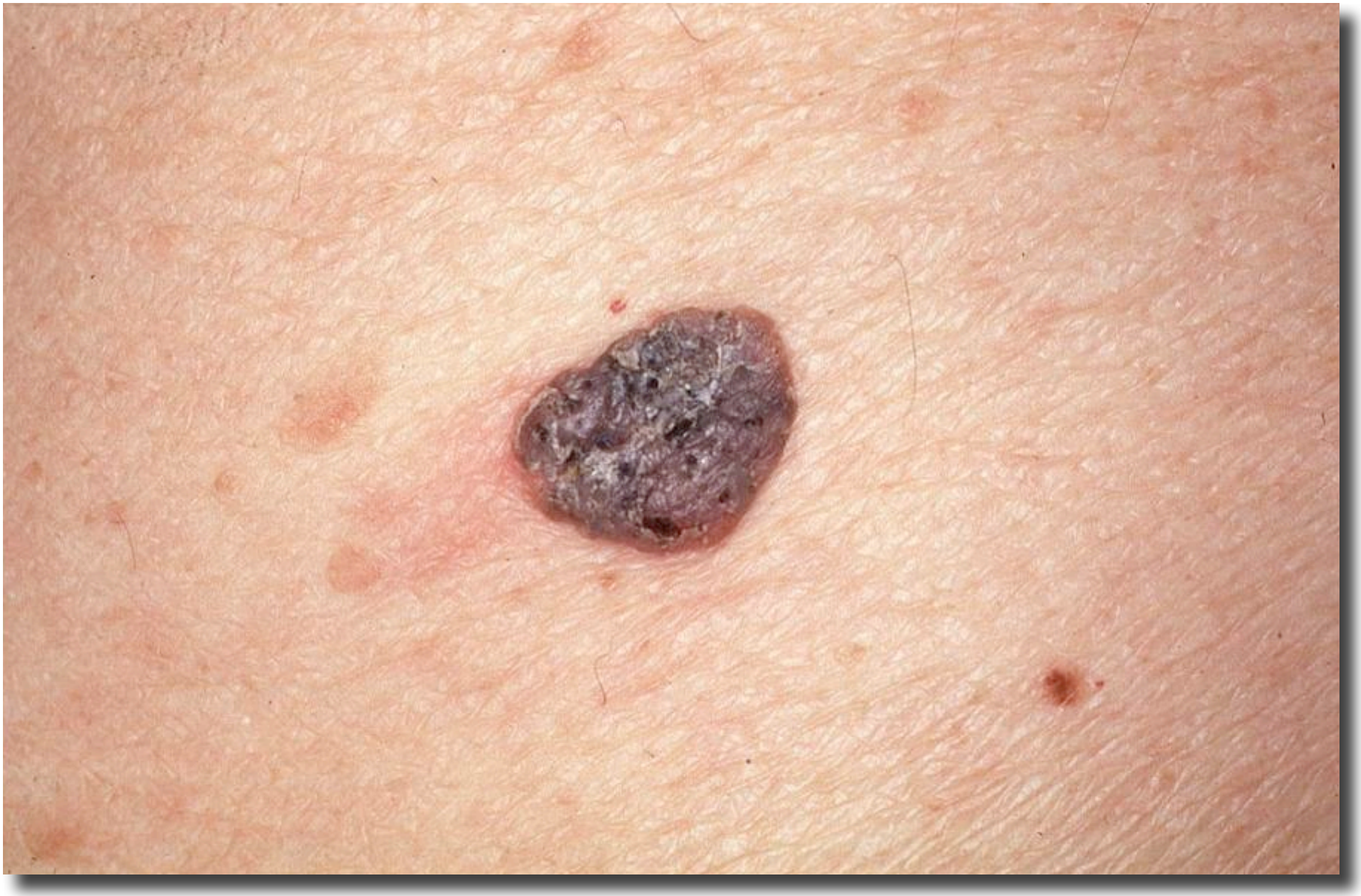
Seborrheic Keratosis



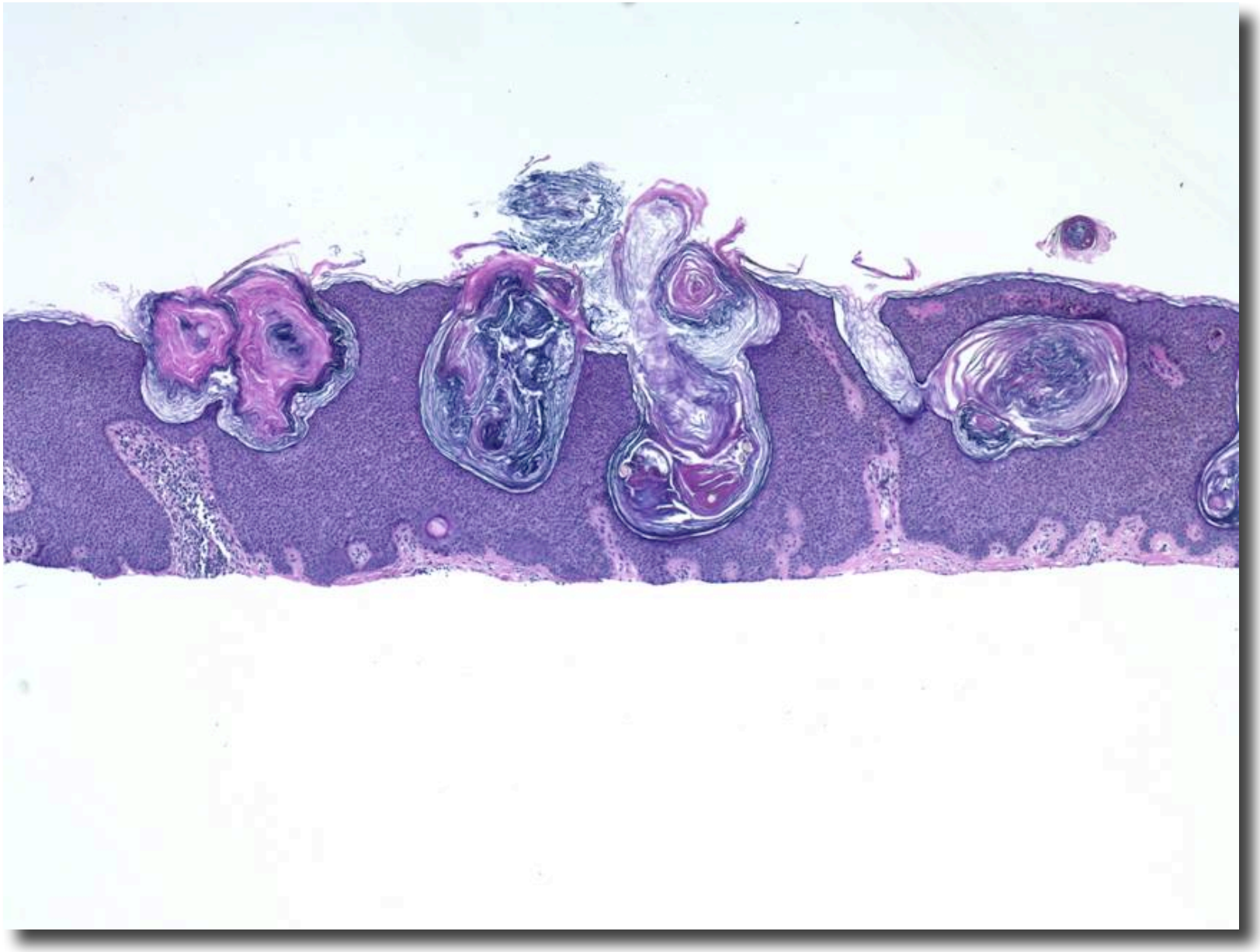
Seborrheic Keratosis



Seborrheic Keratosis



Seborrheic Keratosis



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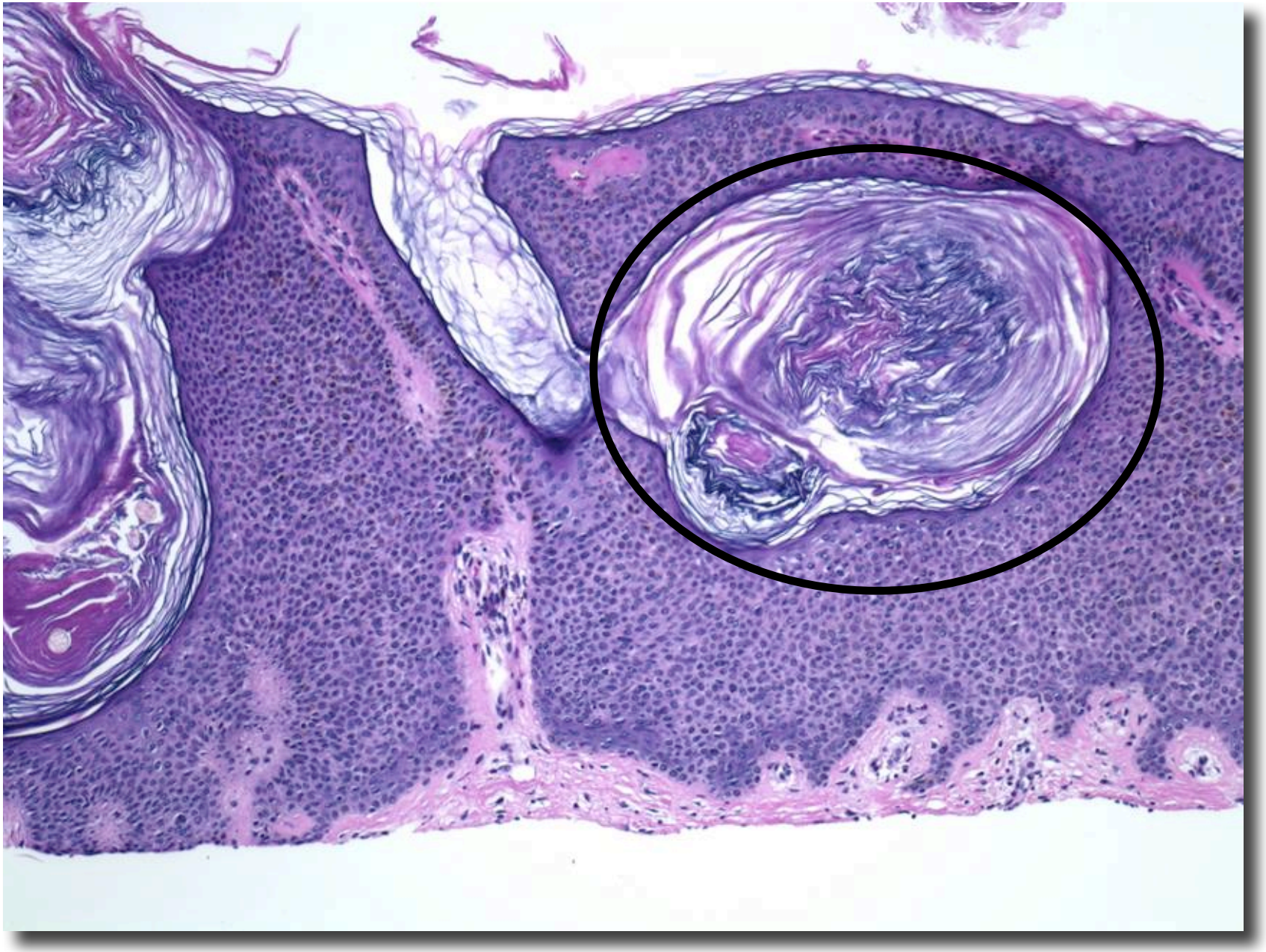
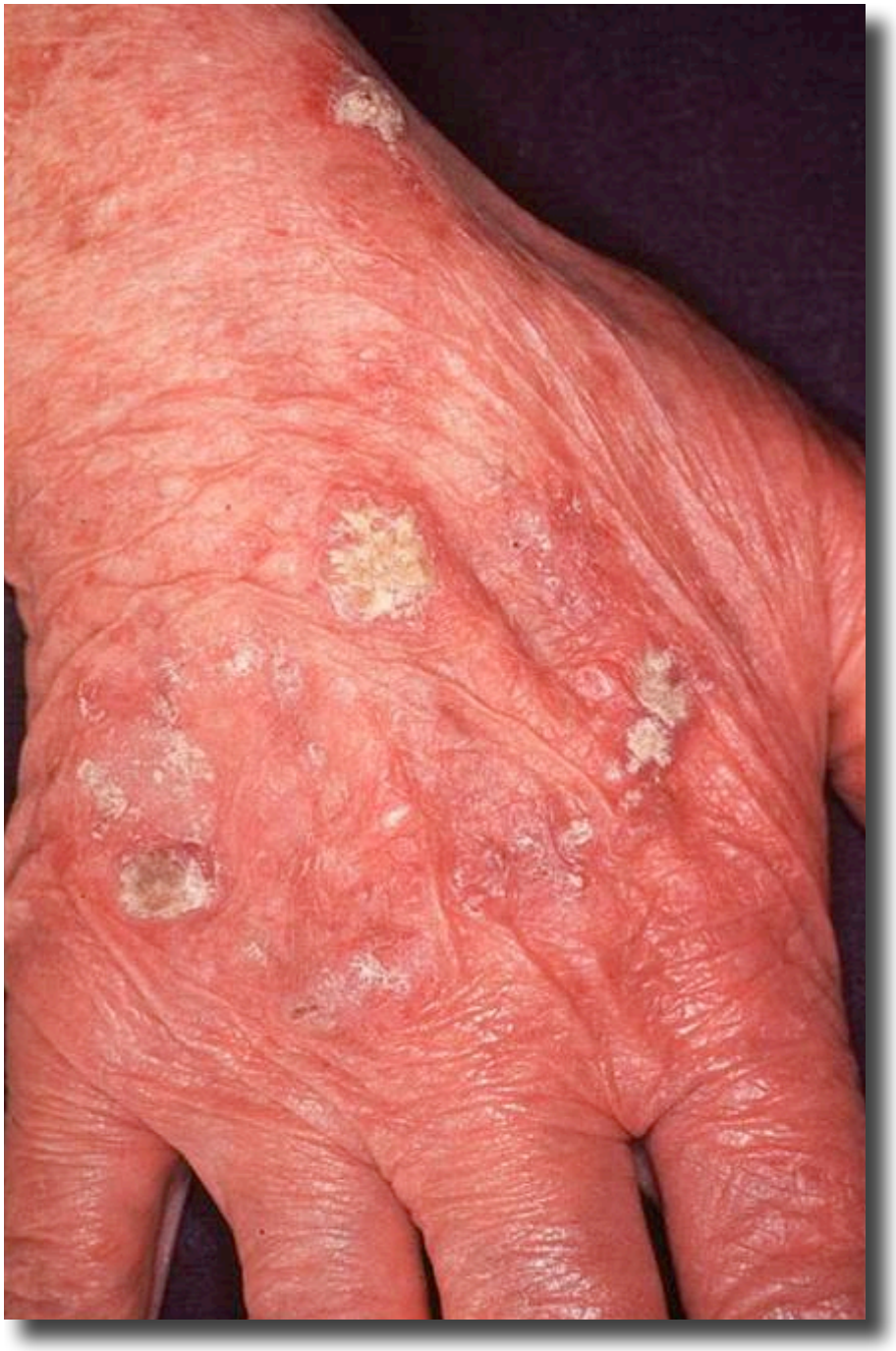


Solar Keratosis (AK)

- Scaly papule, or plaque
- Induced by cumulative ultraviolet light "overdose"
- Considered "precancerous" as may precede invasive skin cancer

Solar (actinic) Keratosis



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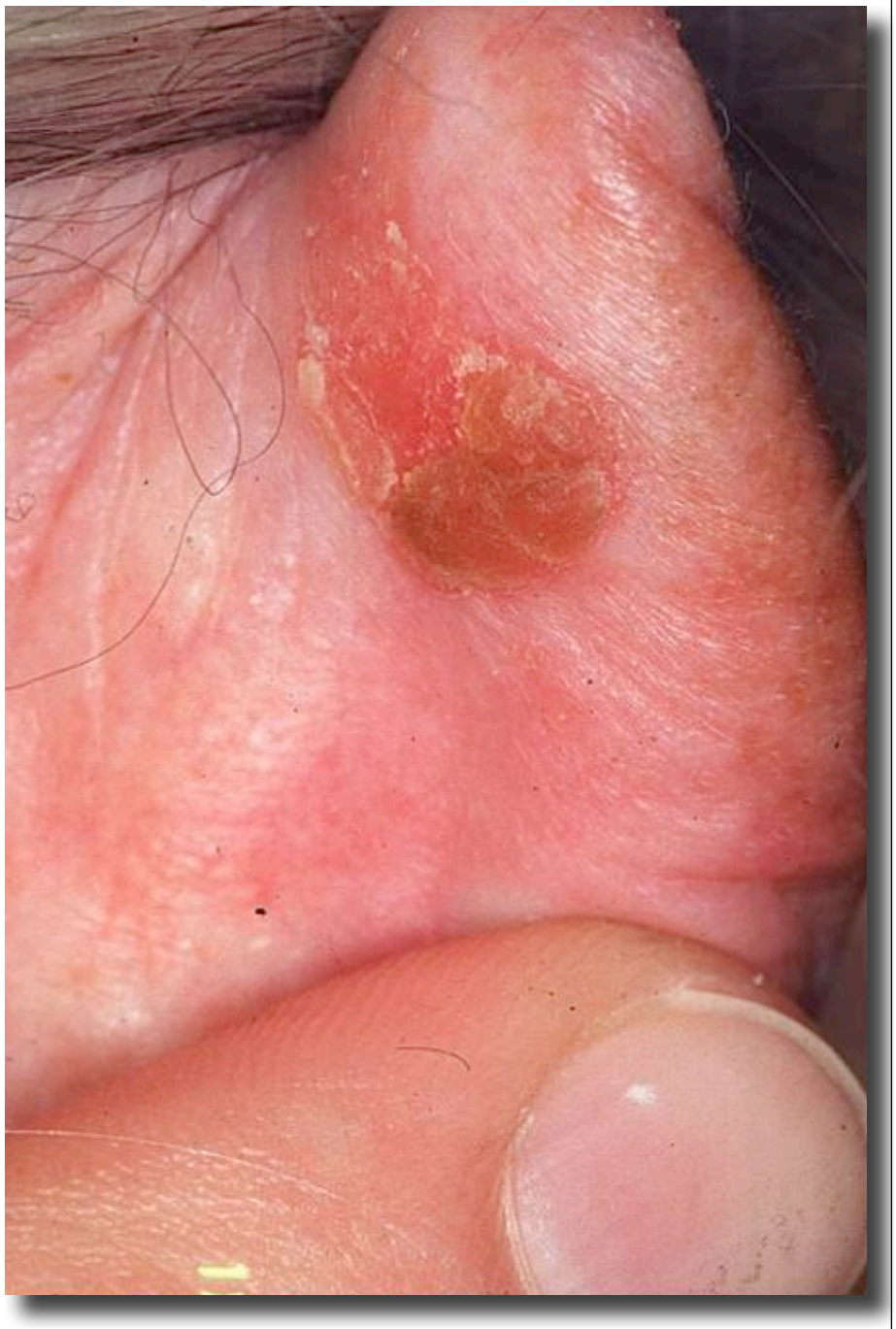

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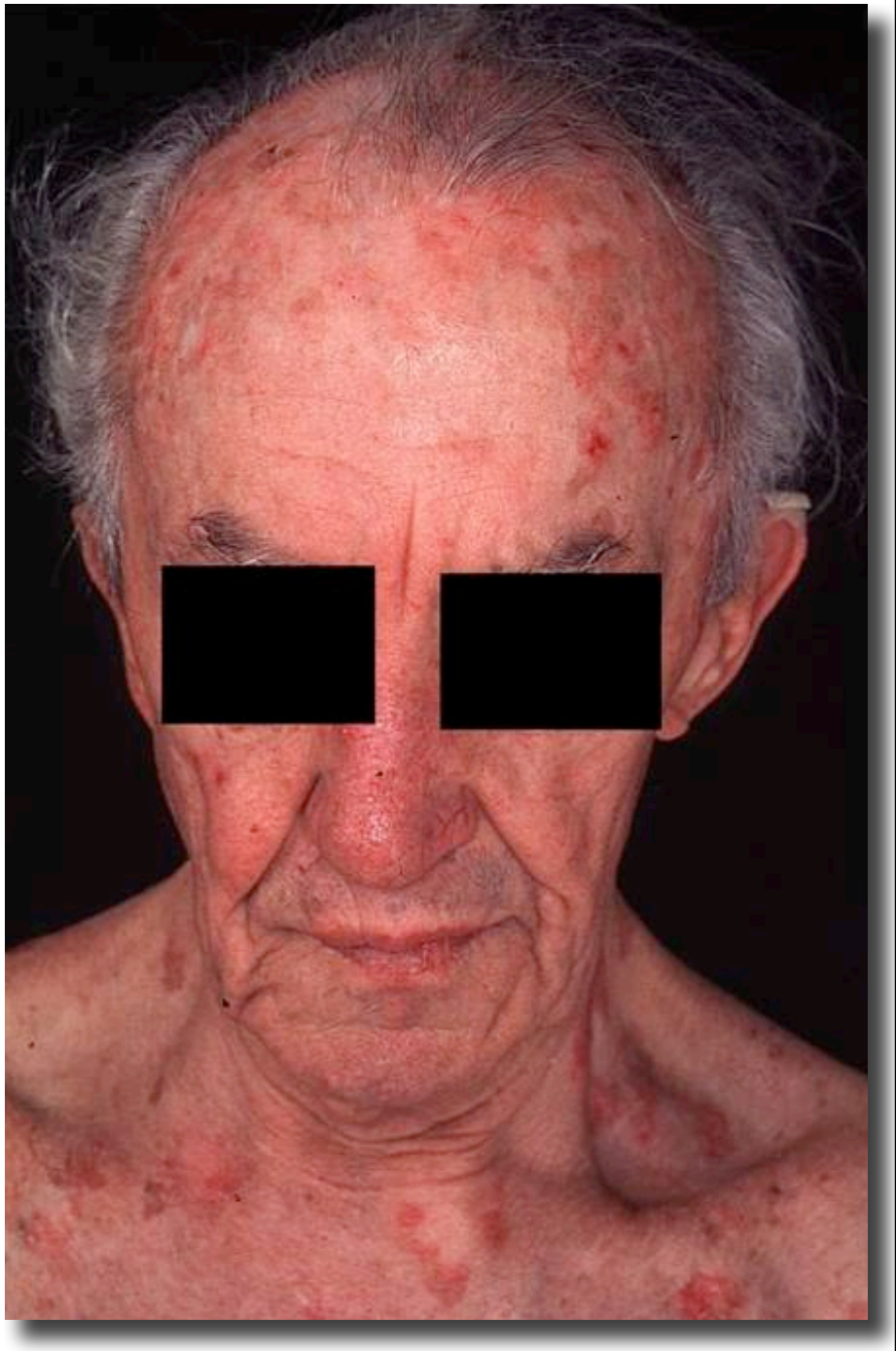

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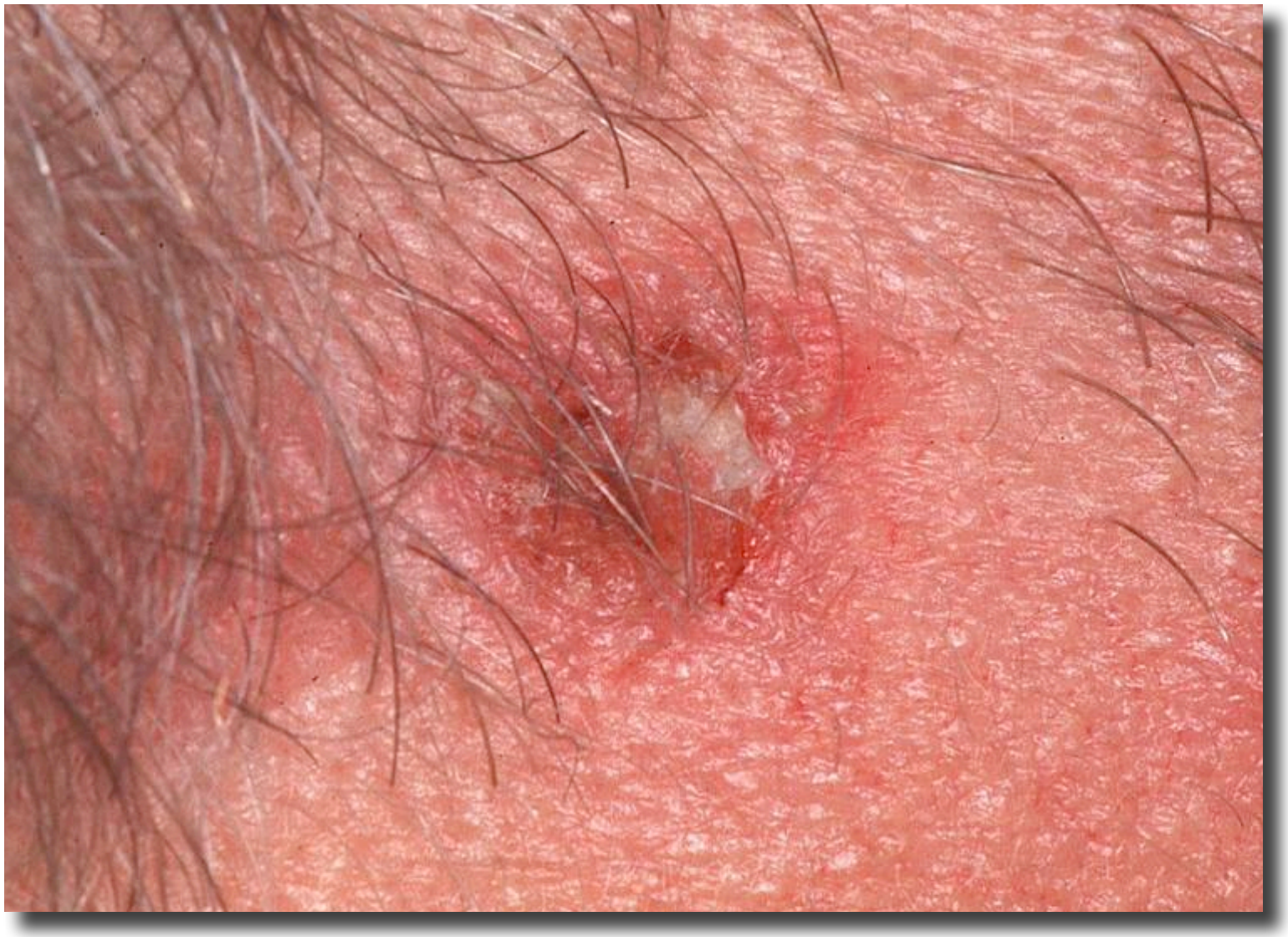

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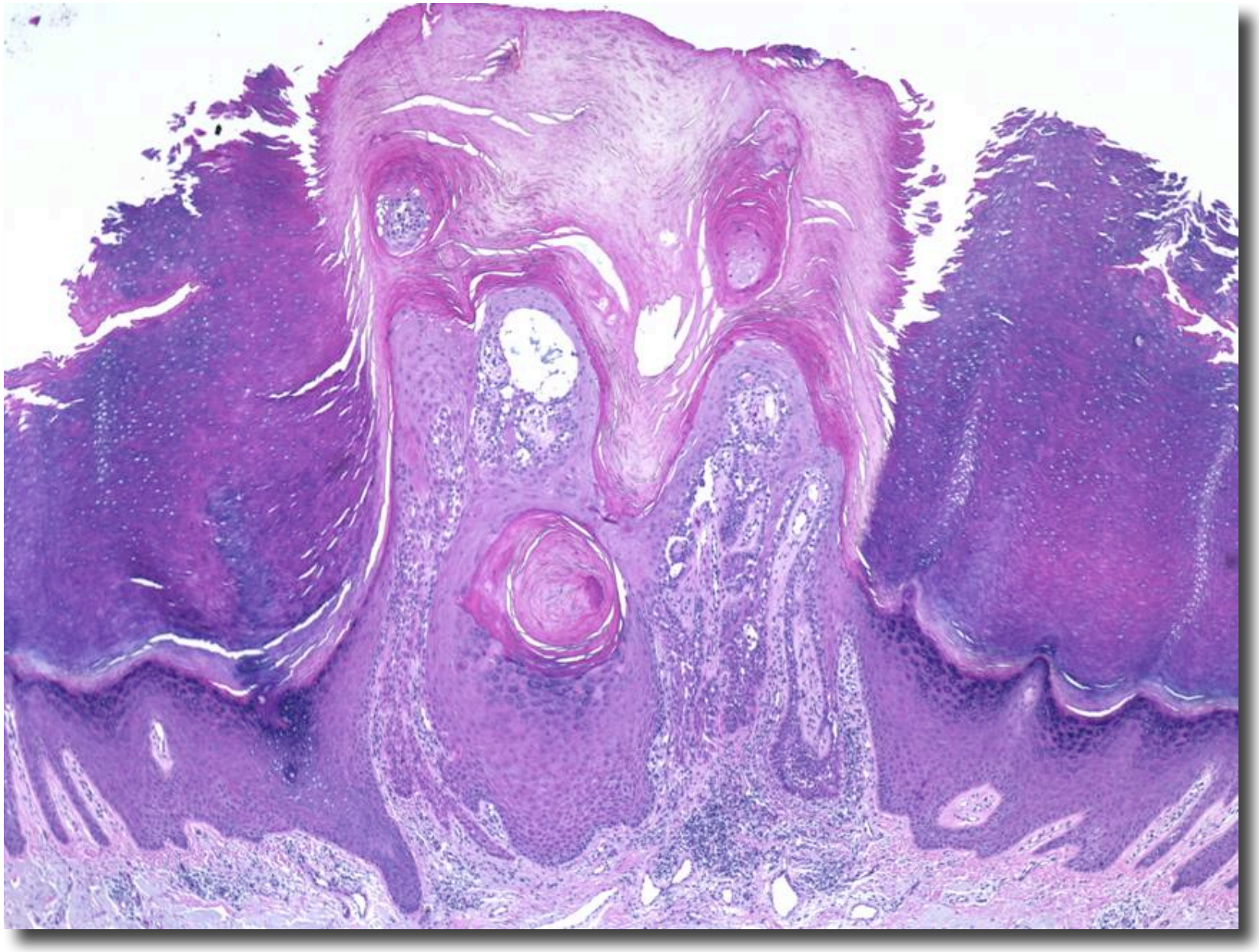

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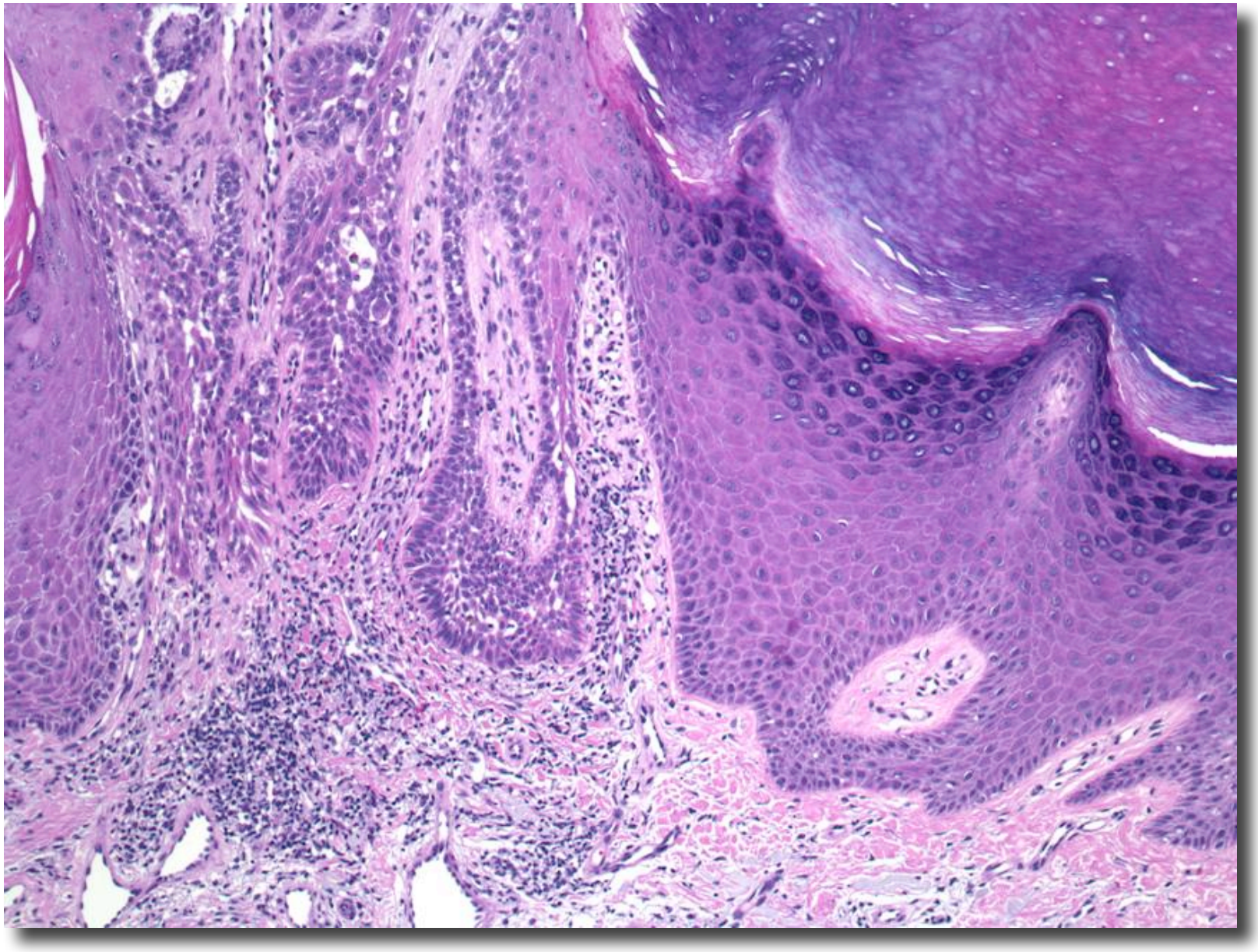

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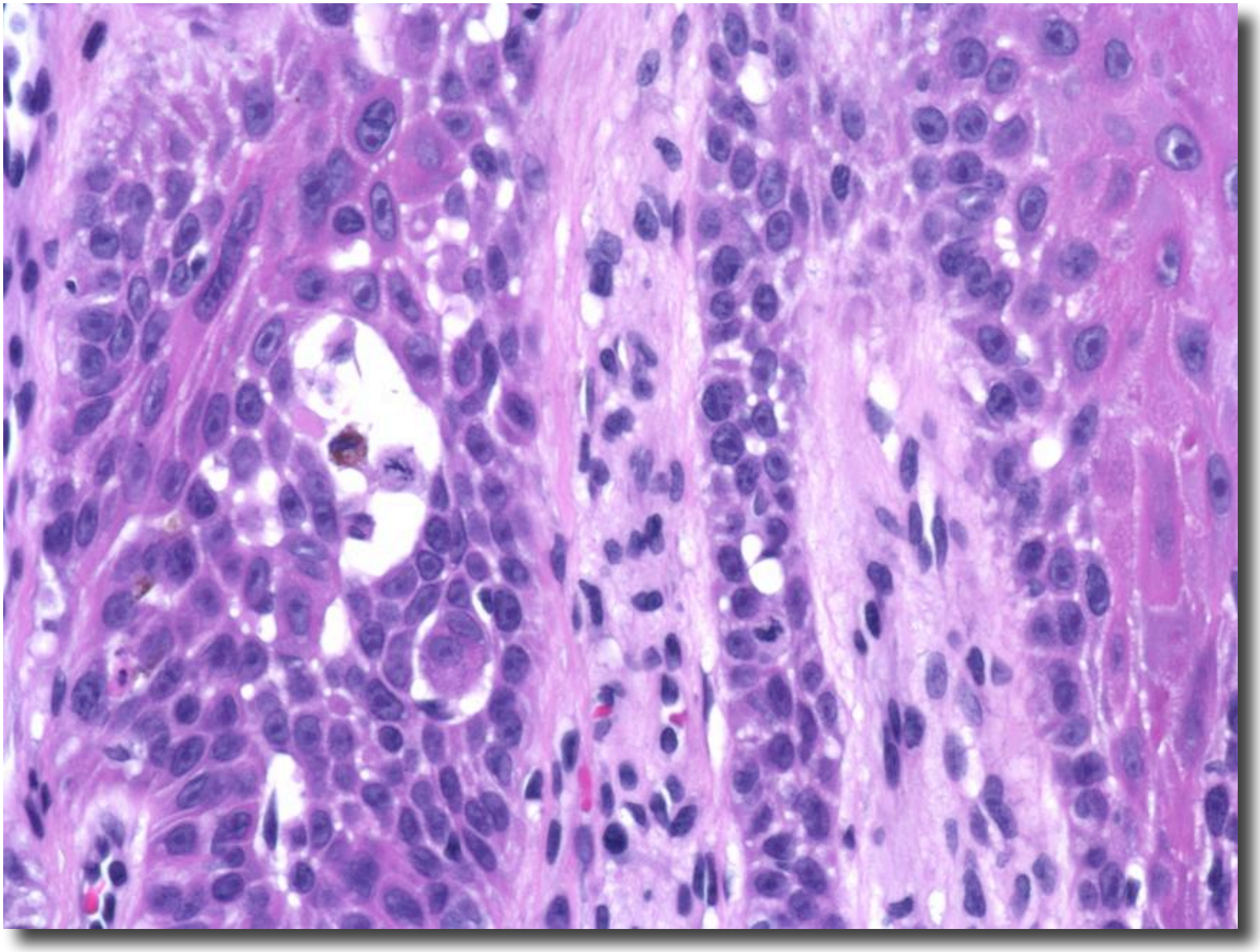
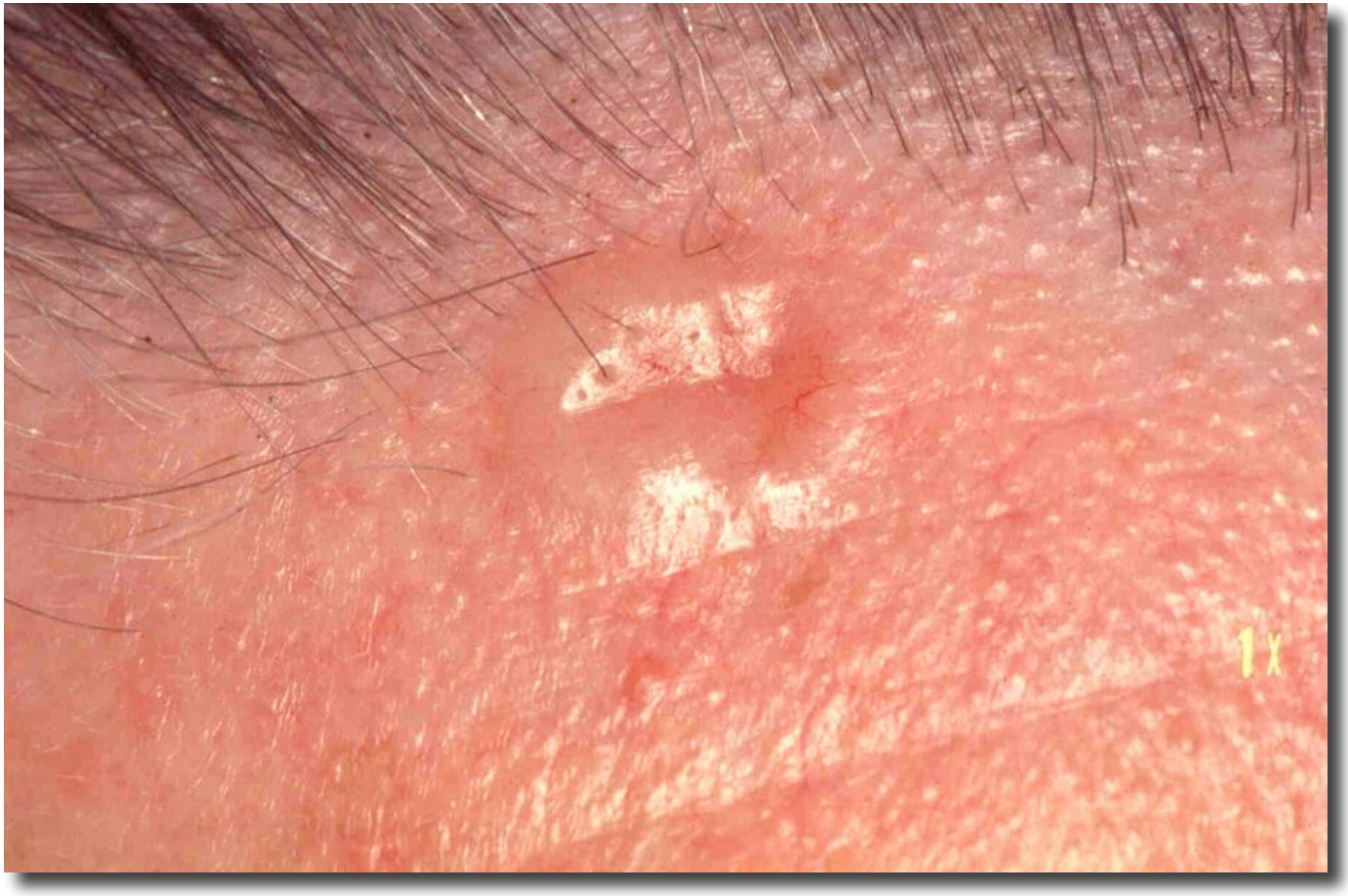


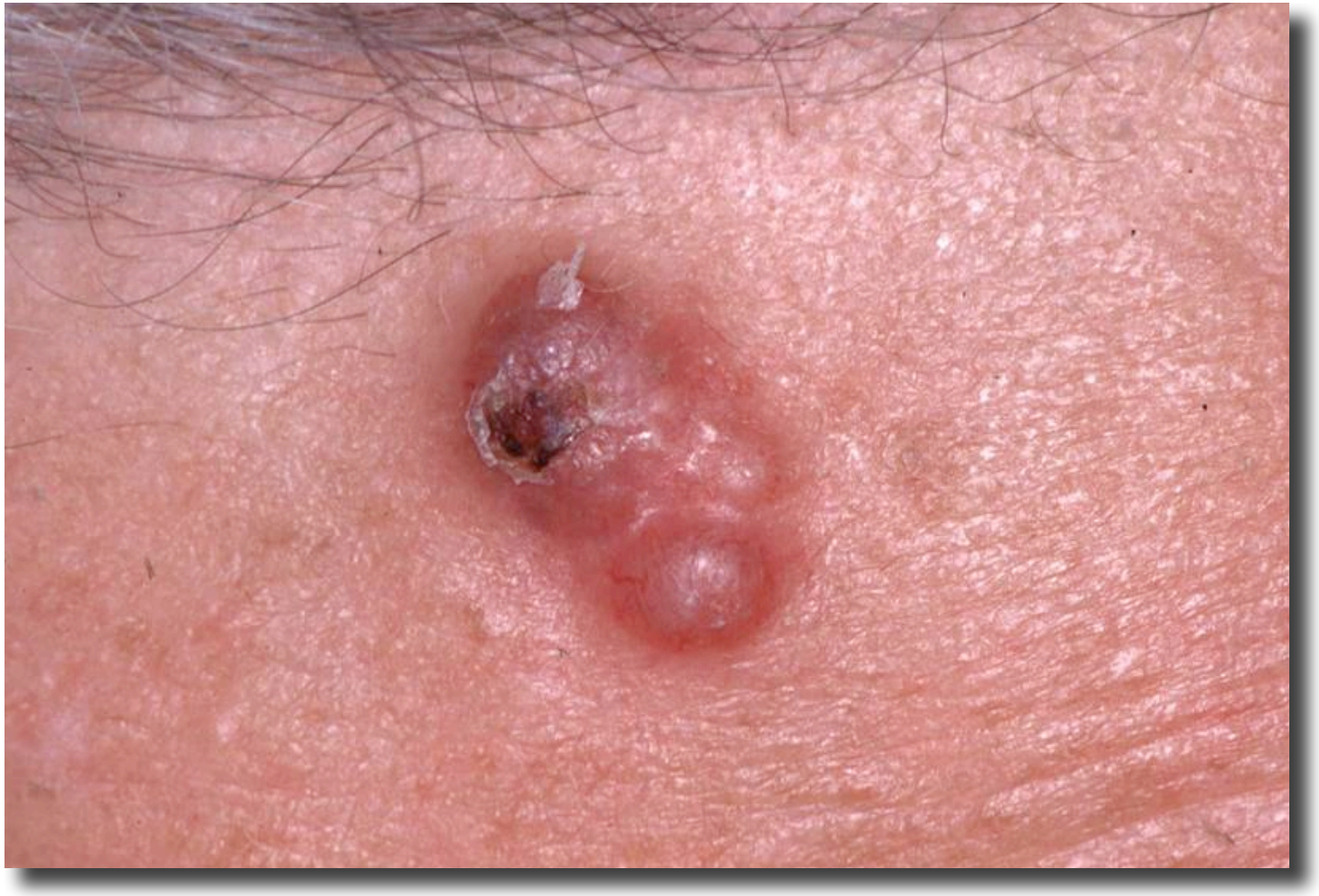
Malignant Epithelial Neoplasms (carcinomas)

- Basal cell carcinoma (BCC)
  - Most common malignancy
  - Over 900,000 new cases yearly
- Squamous cell carcinoma (SCC)
  - Also relatively common
  - Over 250,000 new cases yearly

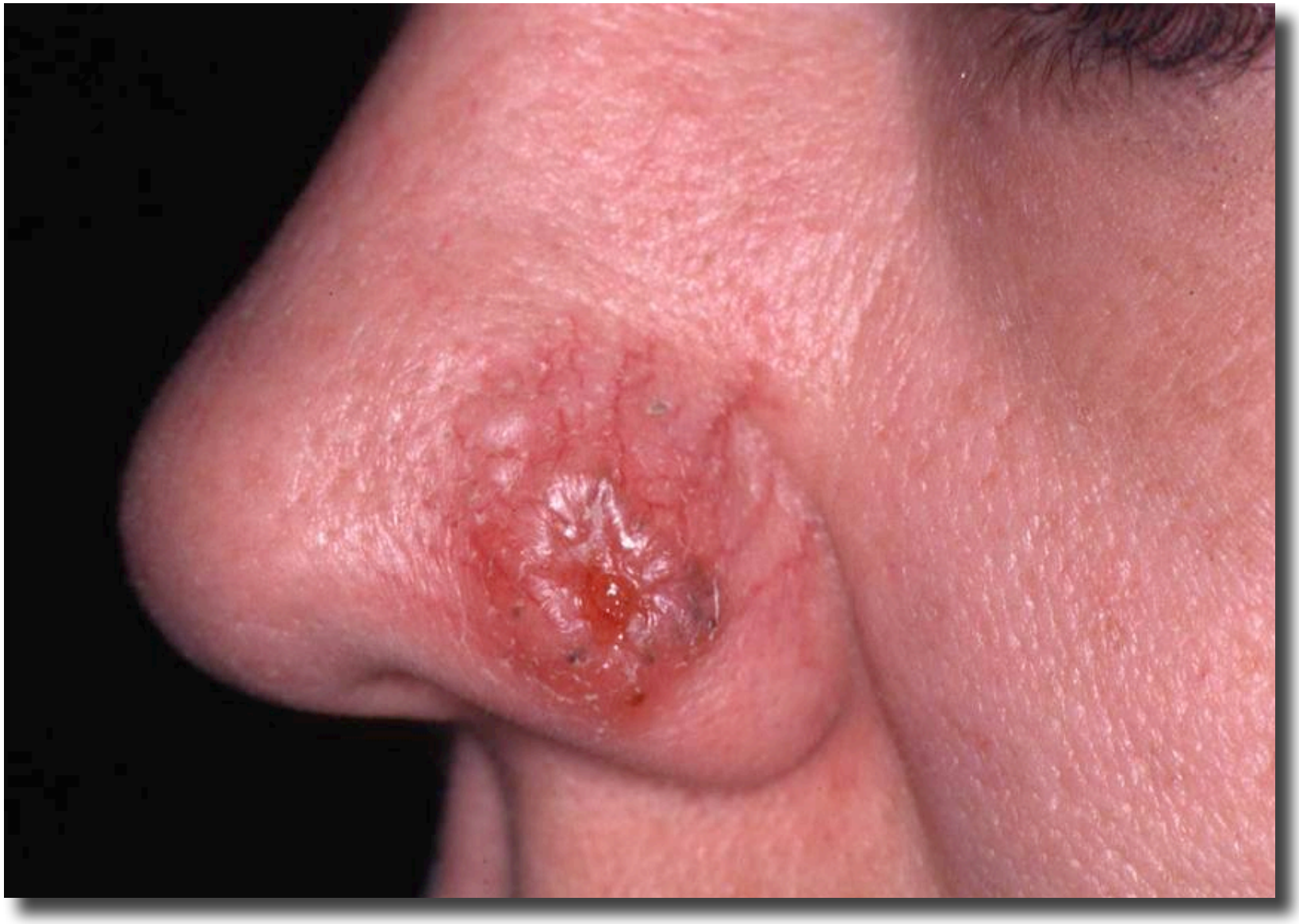
Basal Cell Carcinoma



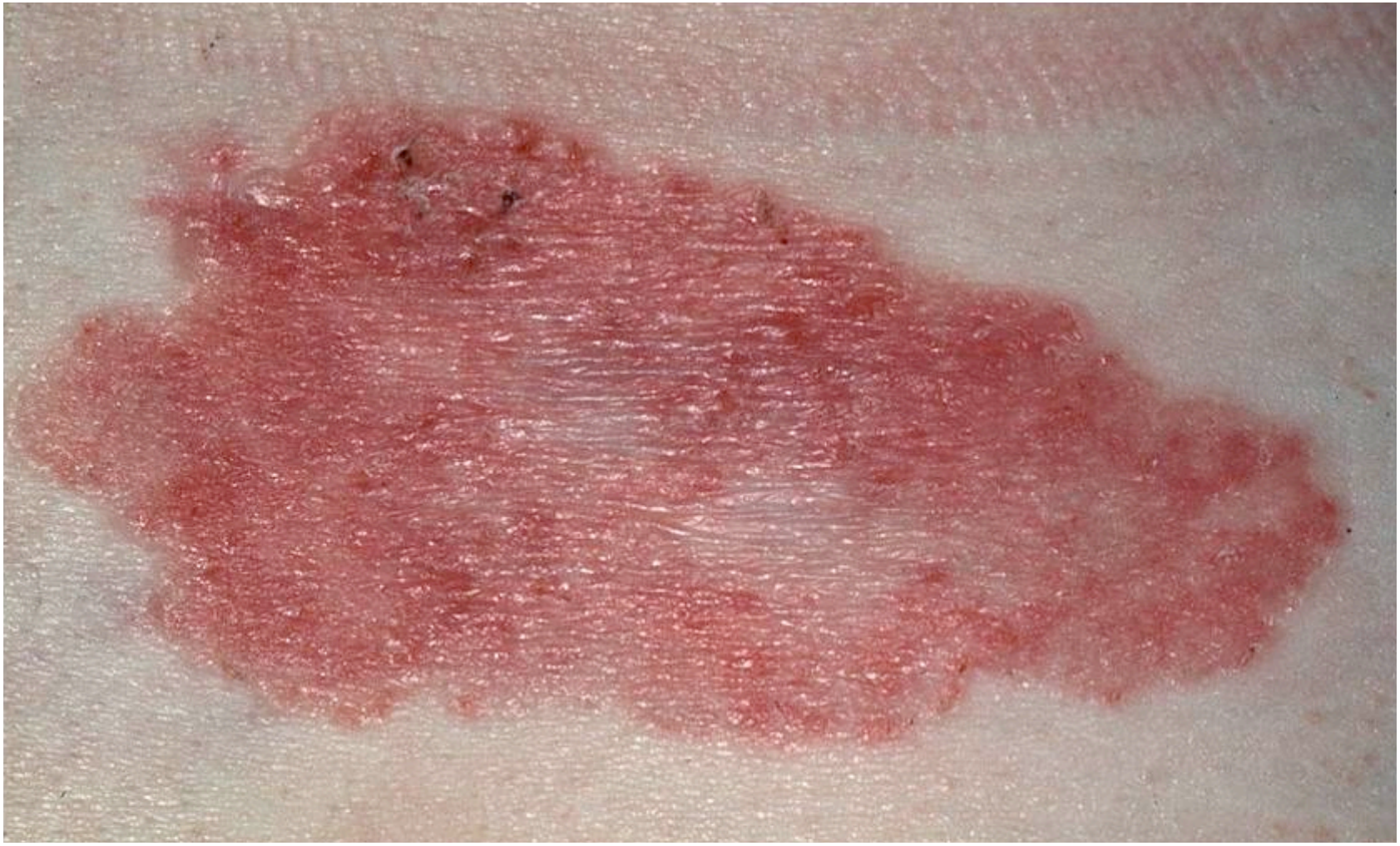
Basal Cell Carcinoma



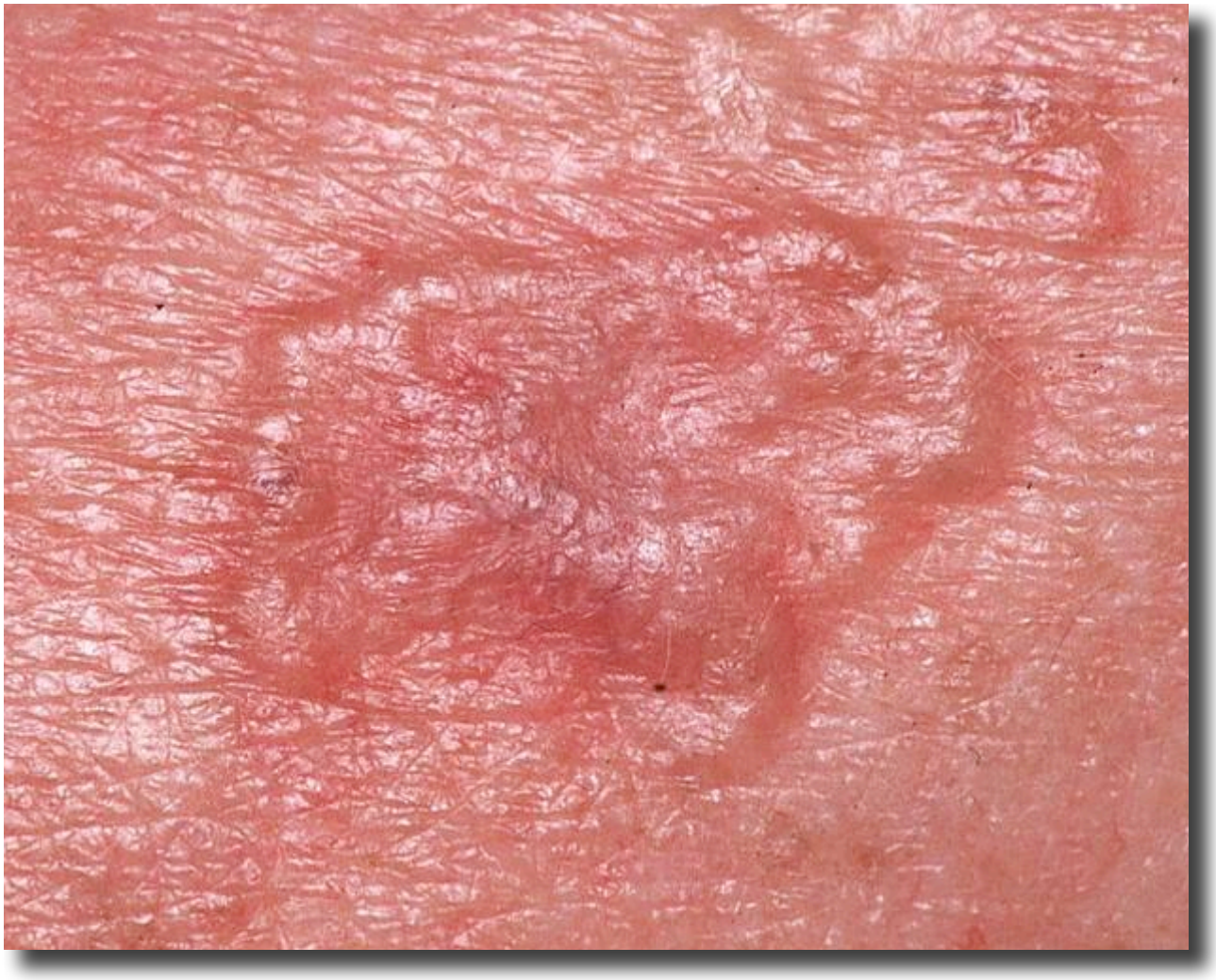
Basal Cell Carcinoma



Basal Cell Carcinoma



Basal Cell Carcinoma



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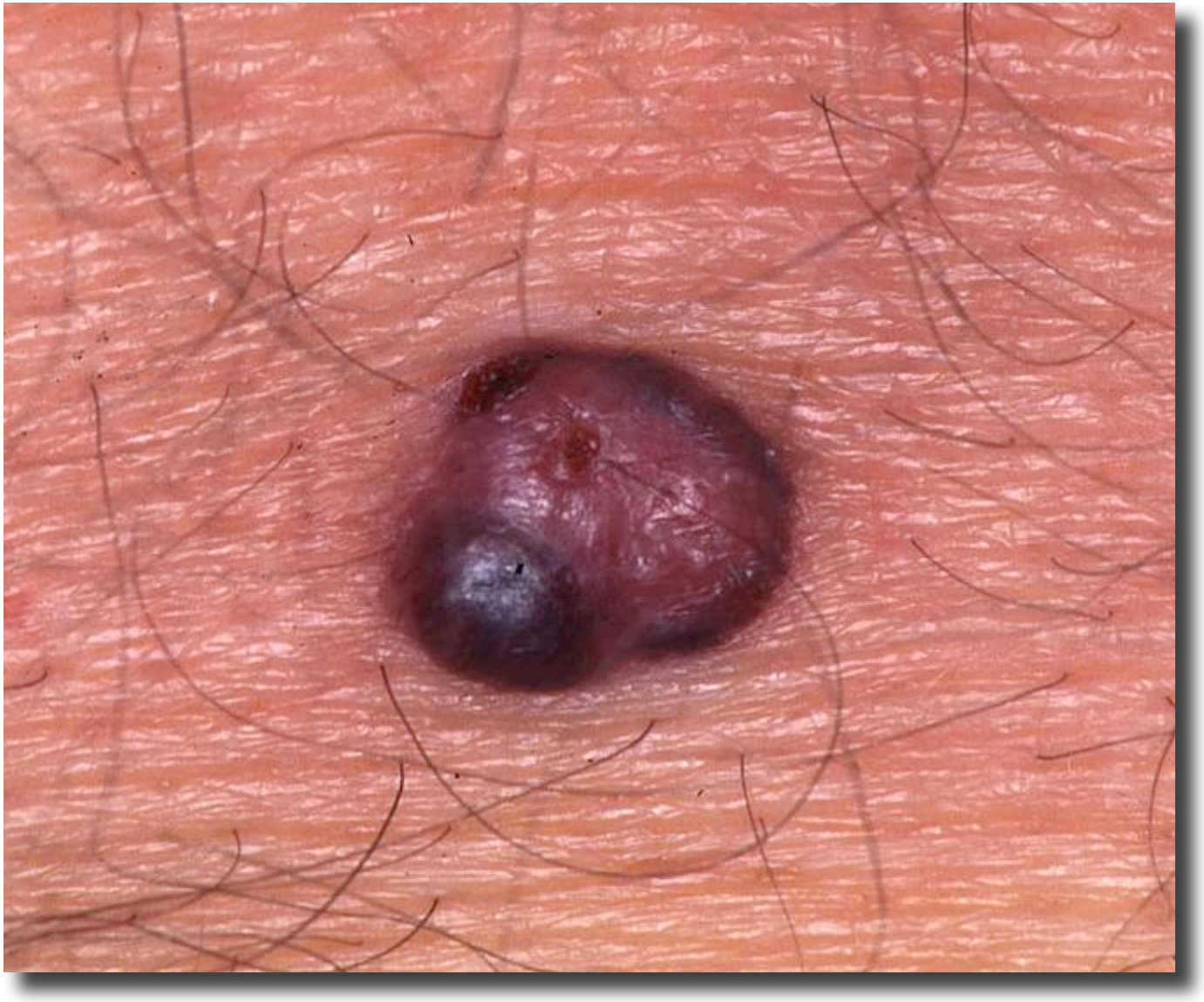

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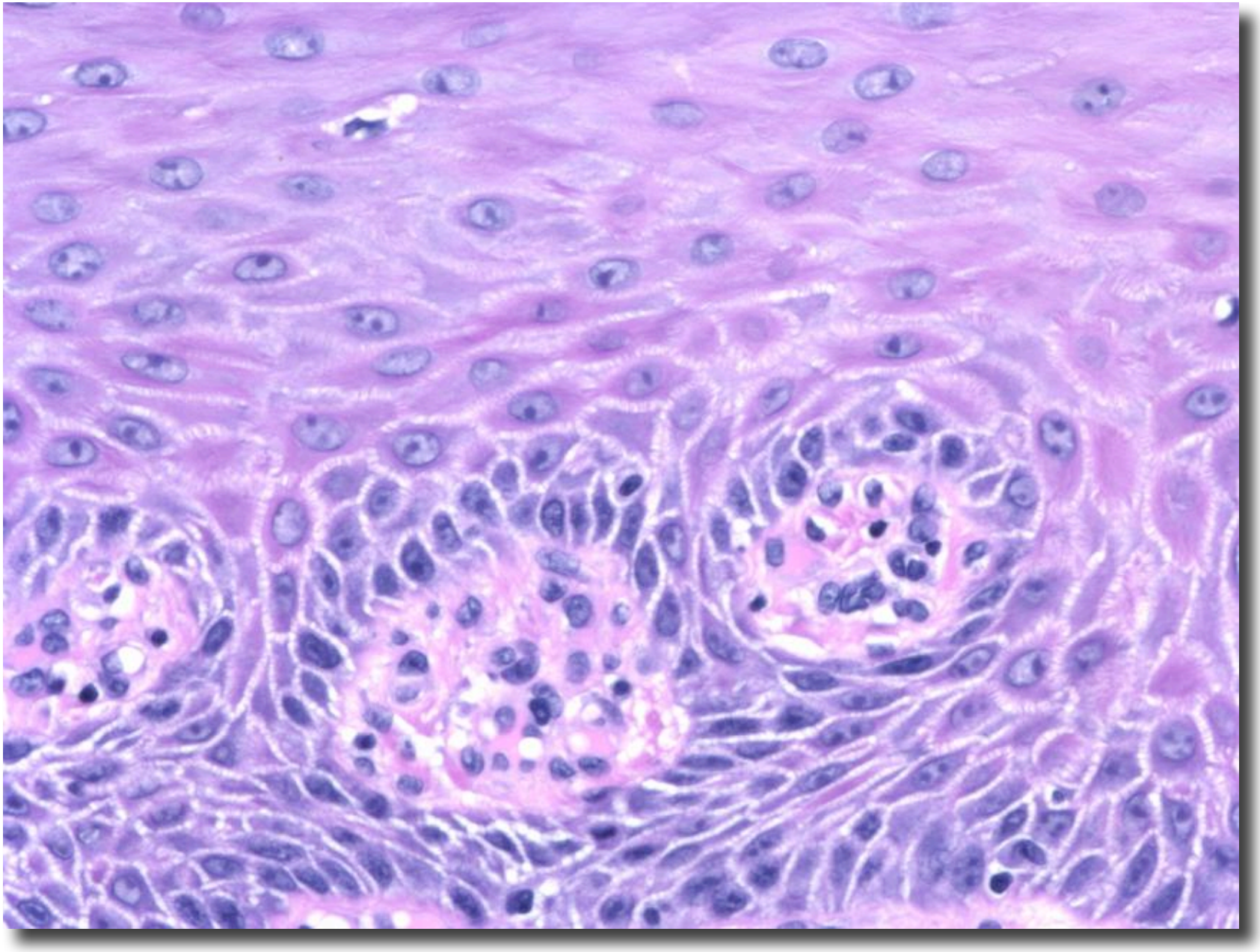
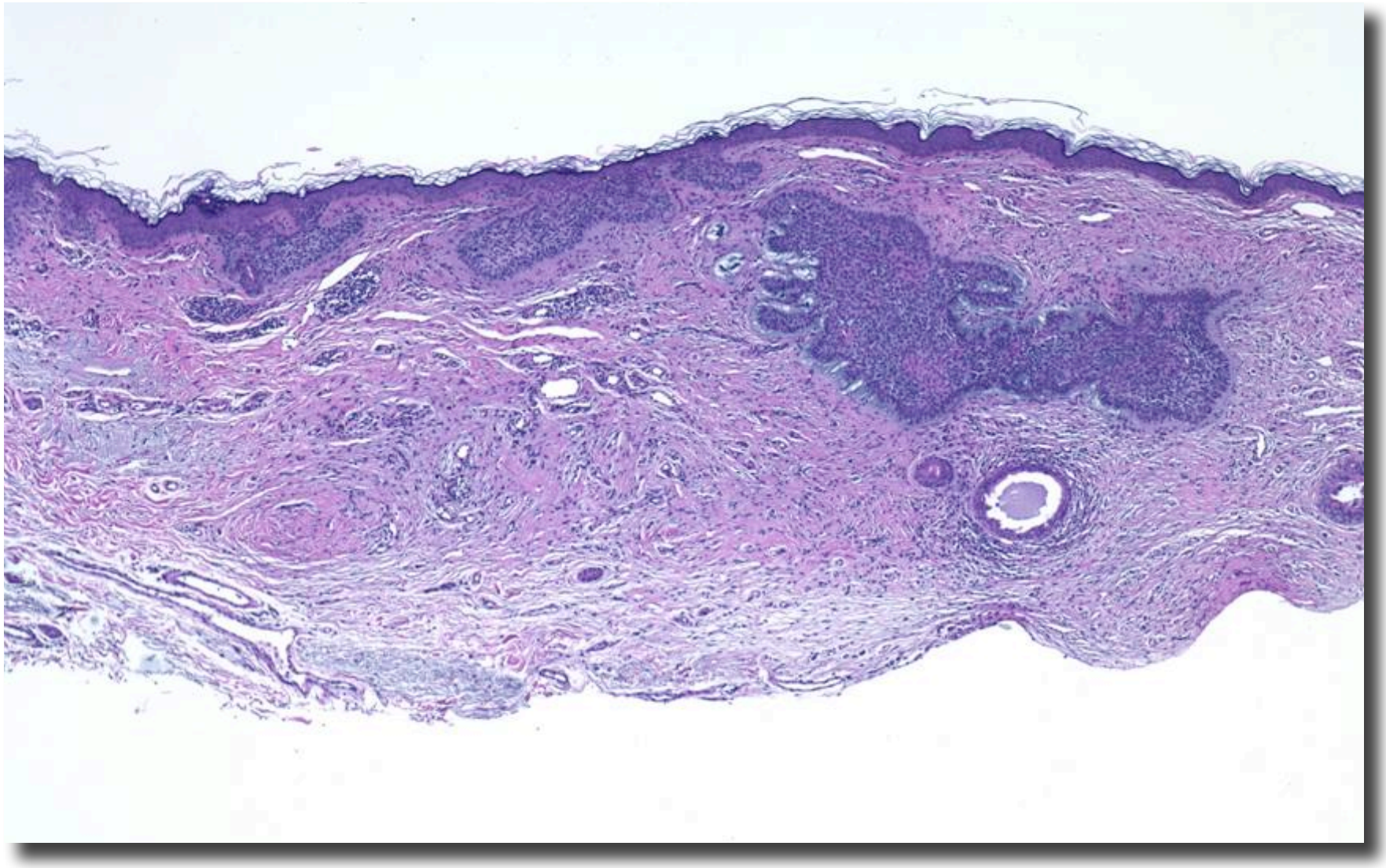


Basal Cell Carcinoma



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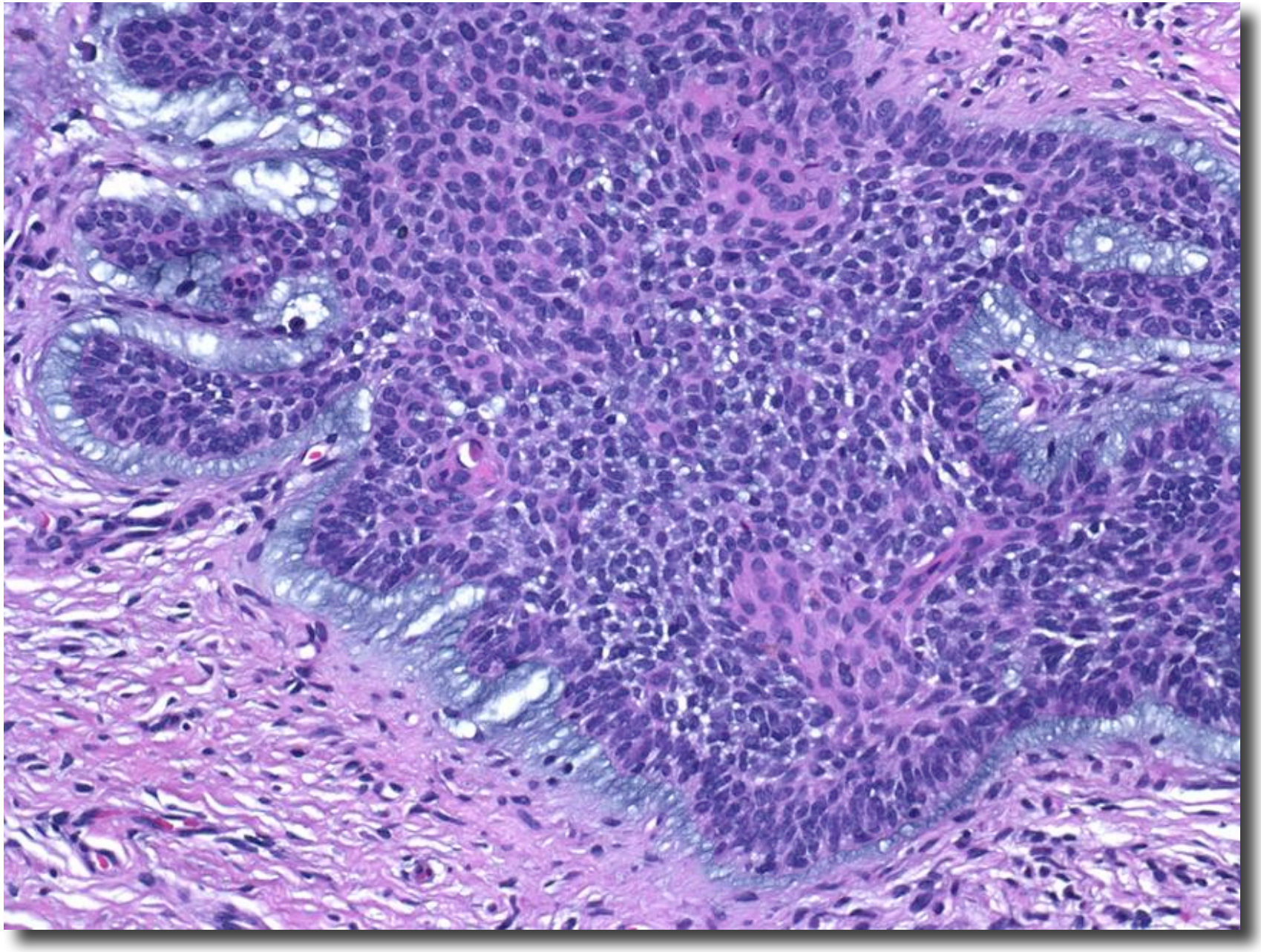

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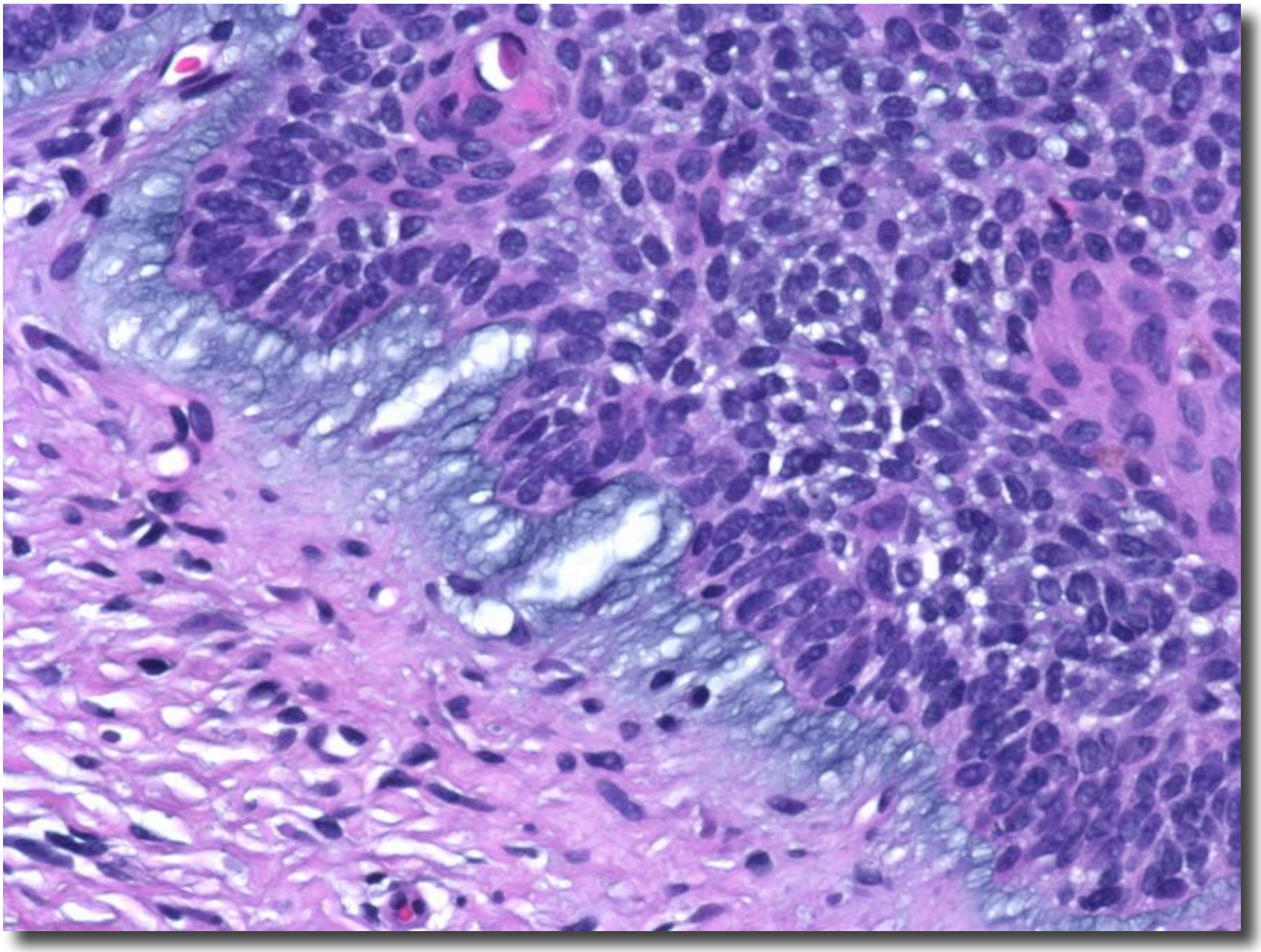
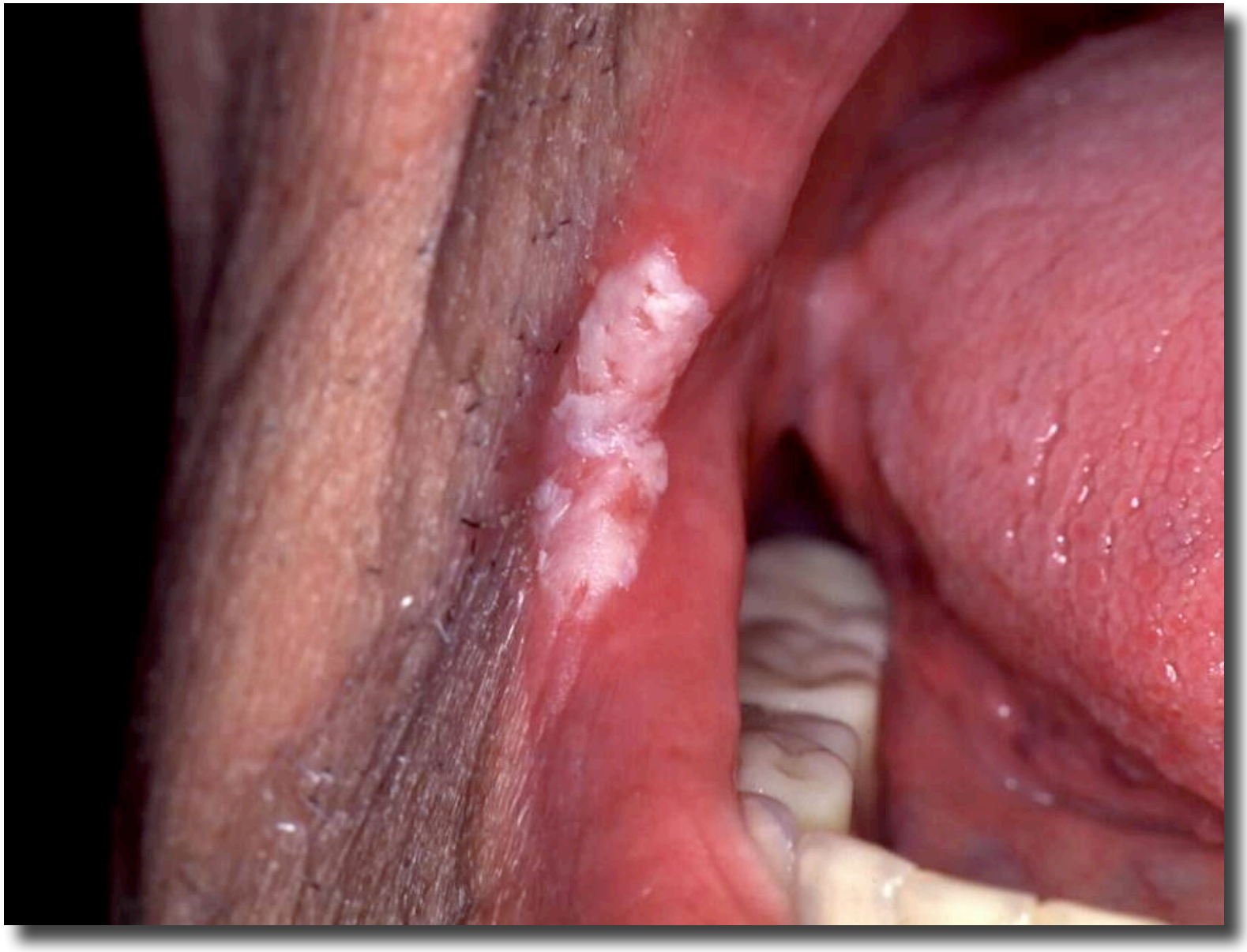
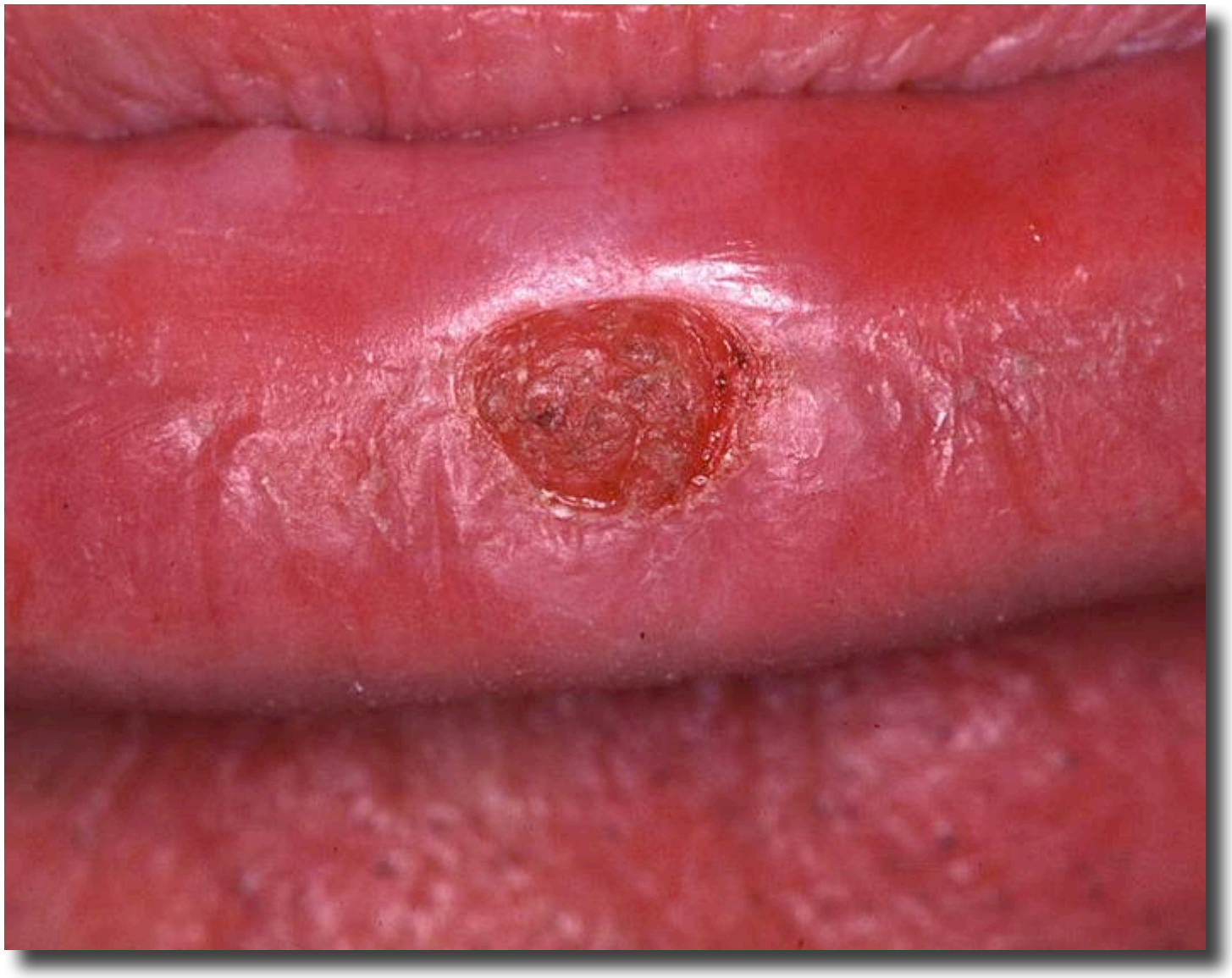


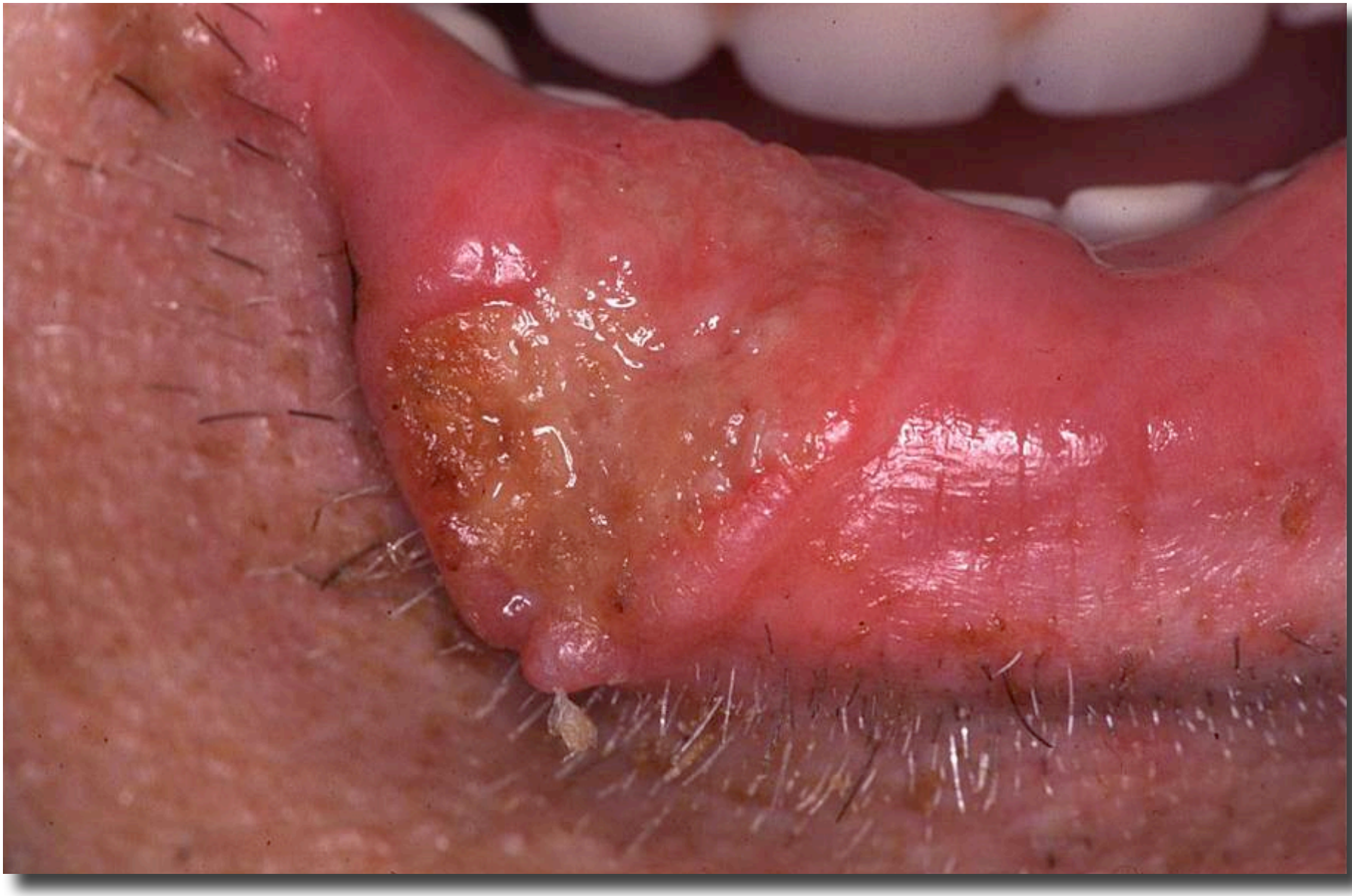
Squamous Cell Carcinoma



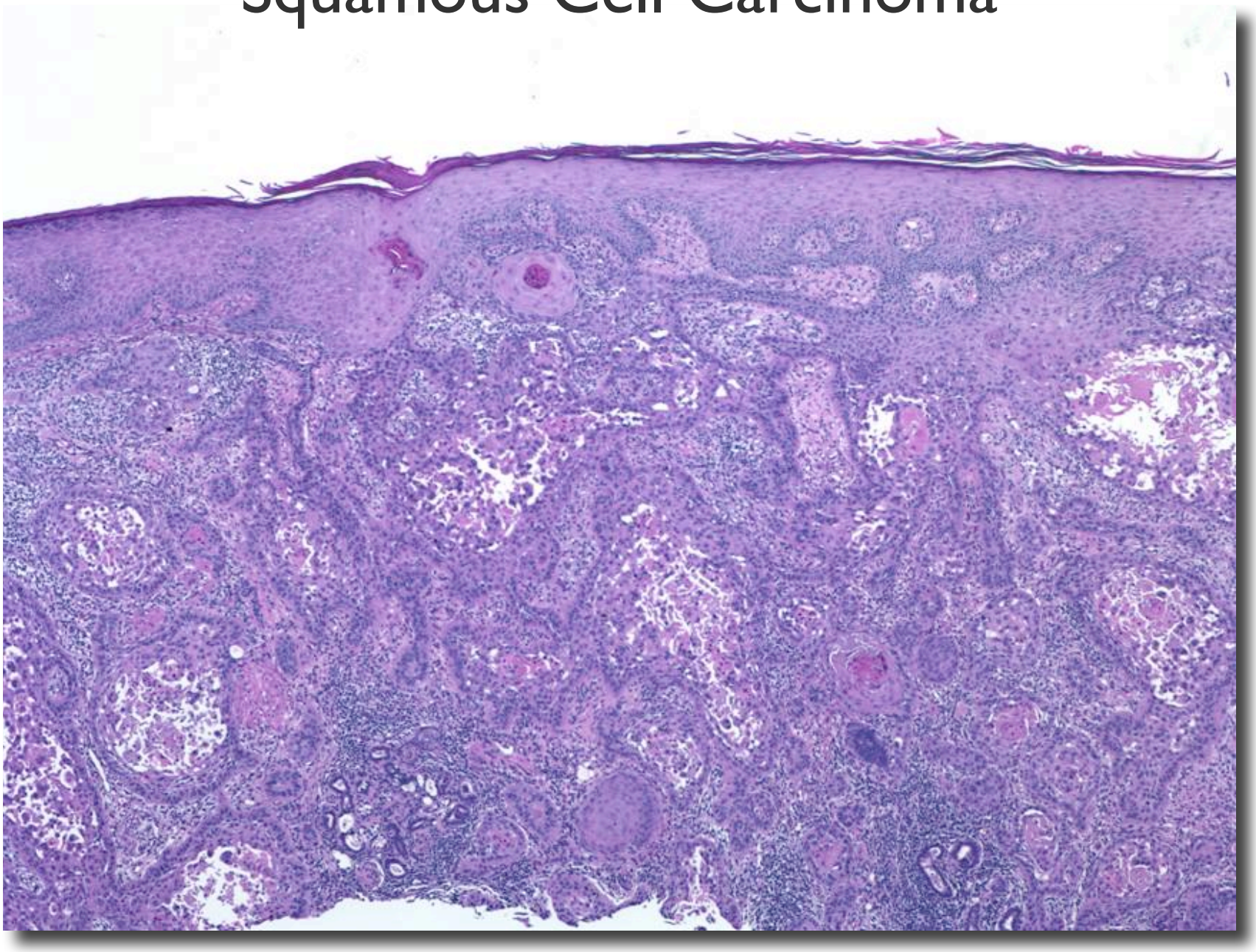
Squamous Cell Carcinoma



Squamous Cell Carcinoma



Squamous Cell Carcinoma



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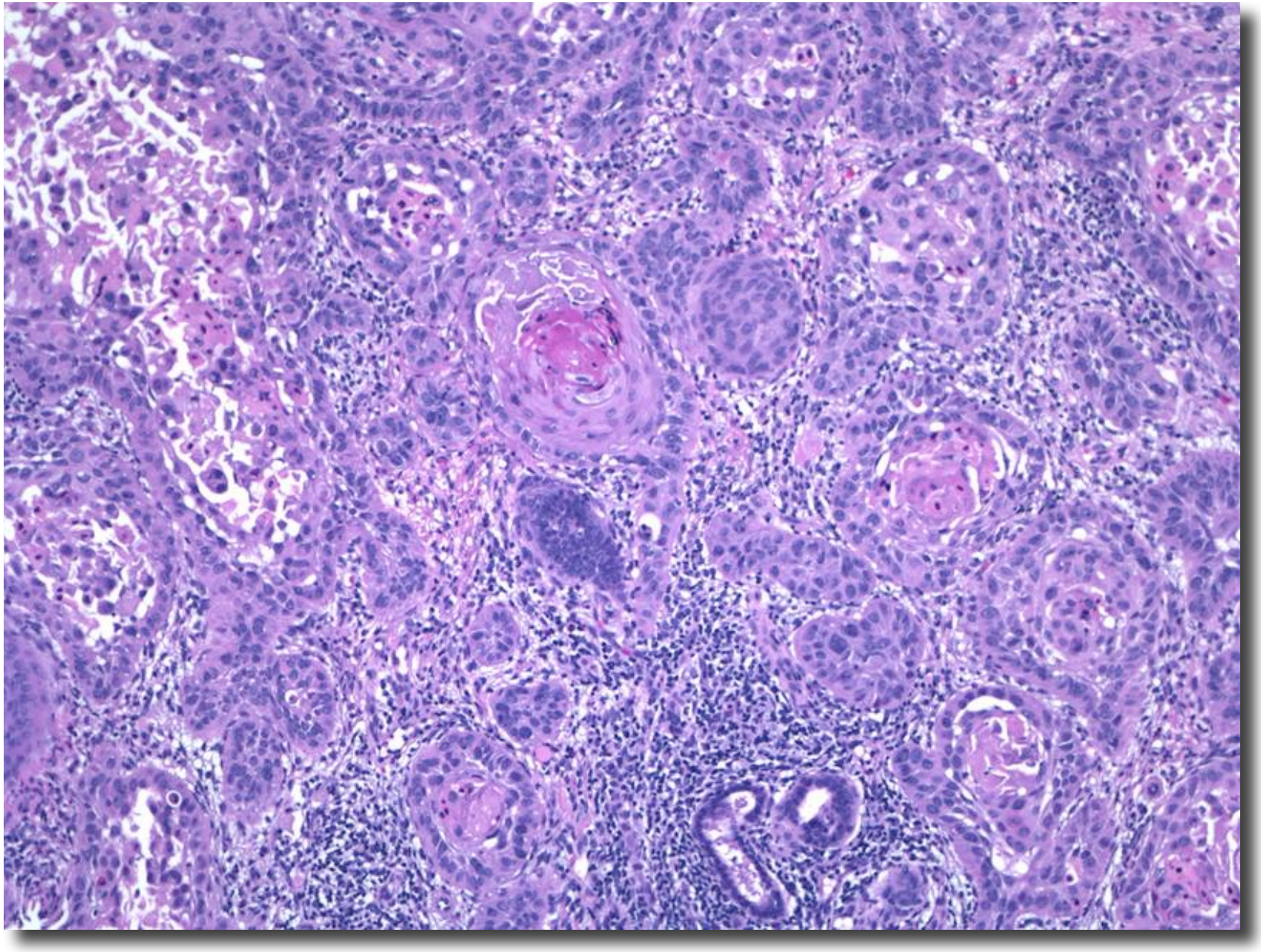


Ultraviolet Light

- UVA (320-400 nm)
  - Wrinkle rays (A for Aging), elicit photoreactions
- UVB (290-320 nm)
  - Sunburn rays (B for Burns), prominent in carcinogenesis
- UVC (200-290 nm)

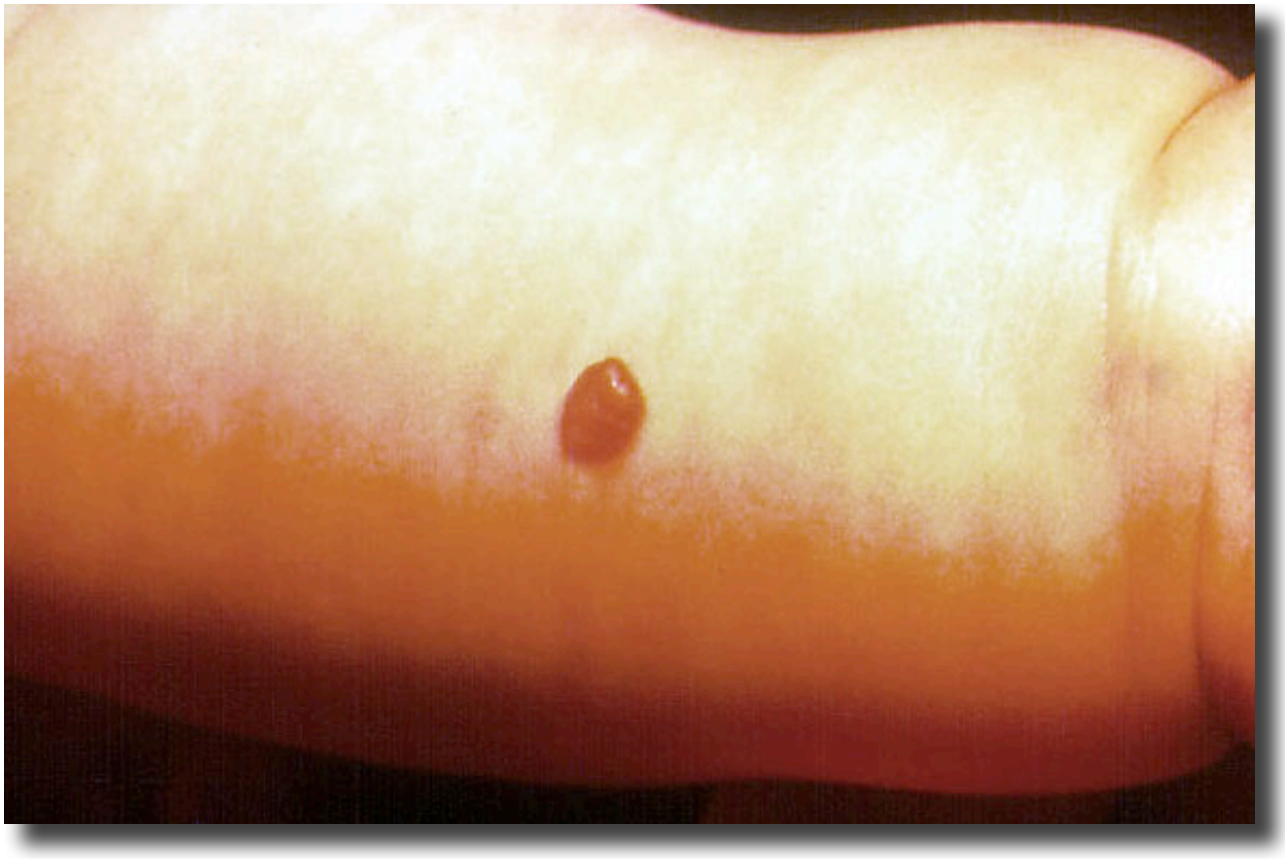
Solar Damage

- UV light has been established to cause solar keratoses and skin cancers
- Risk related to cumulative dose

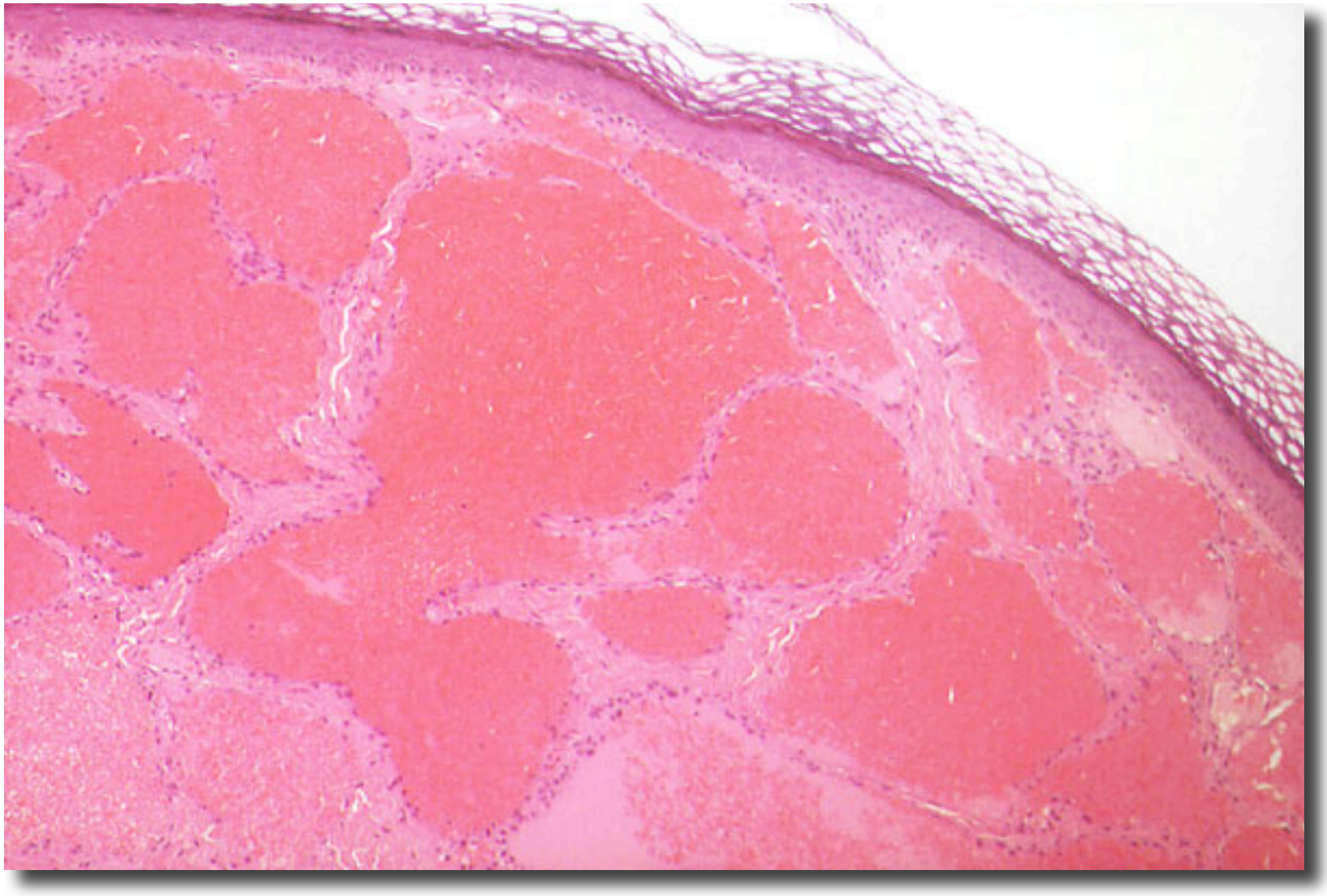
Selected Benign Mesenchymal Neoplasms

- Hemangioma
- Dermatofibroma

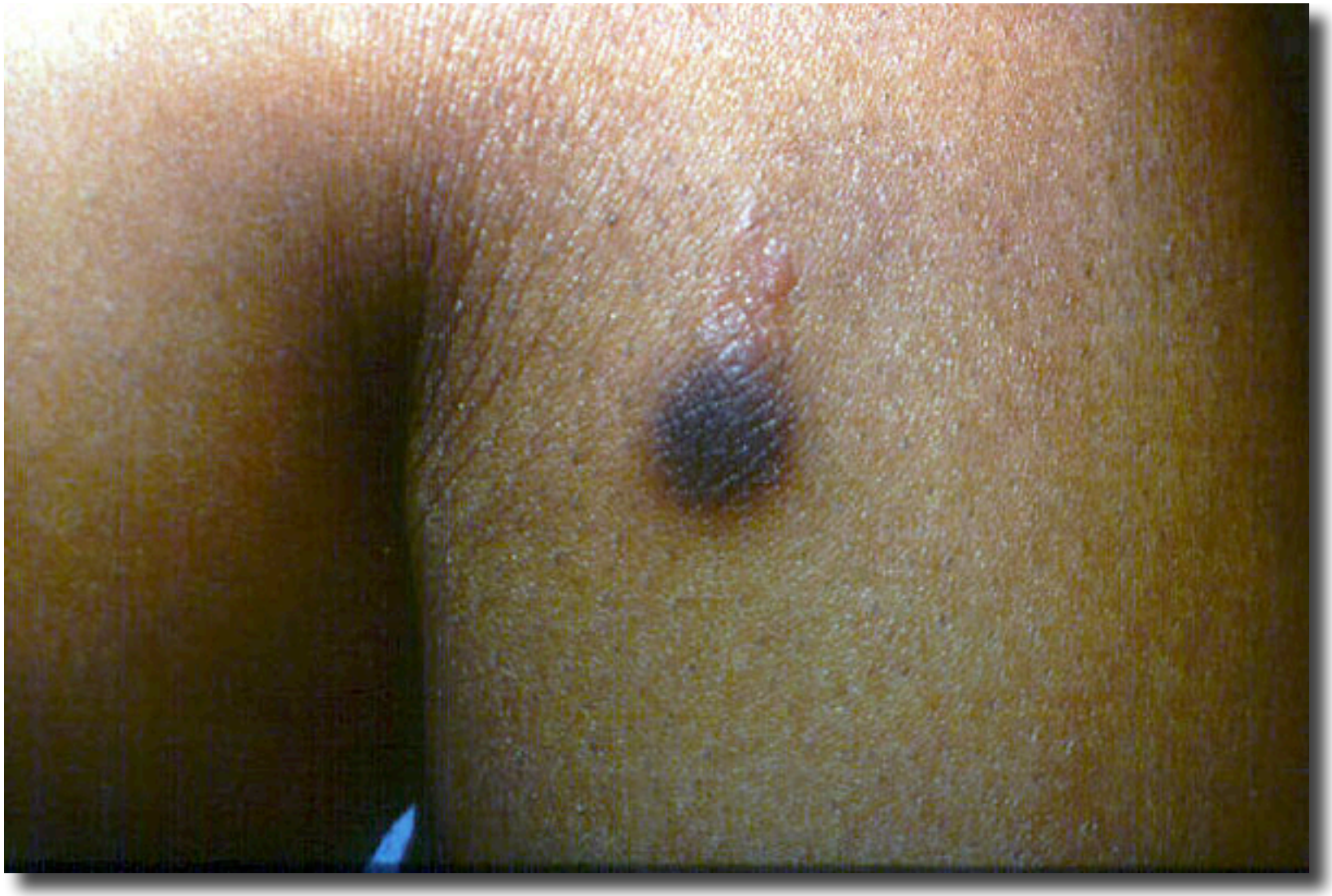
Hemangioma



Hemangioma



Dermatofibroma



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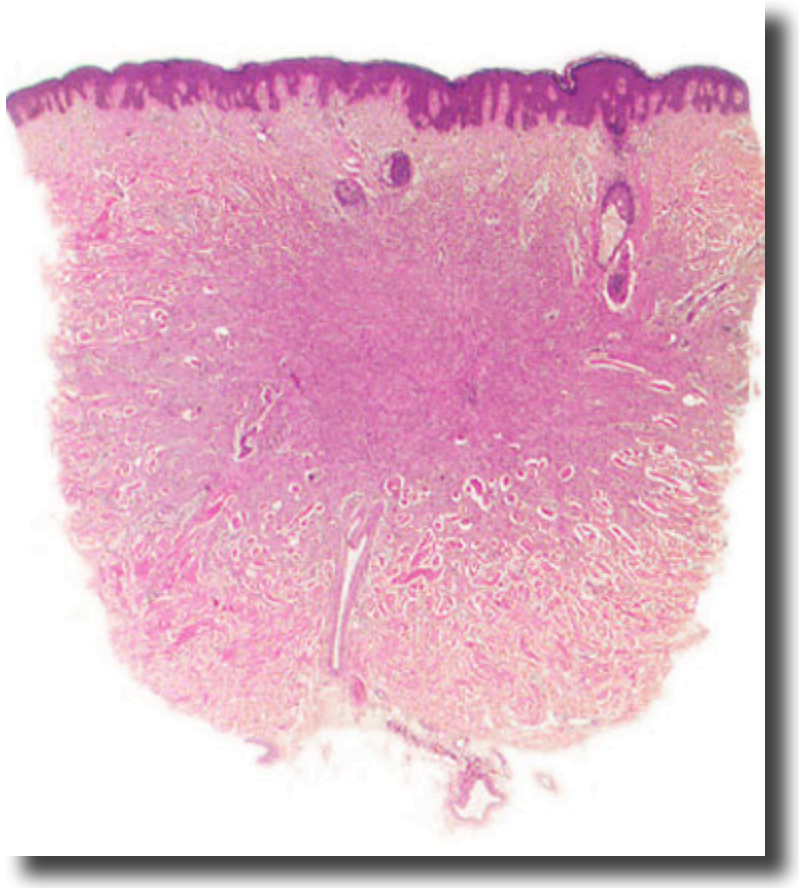
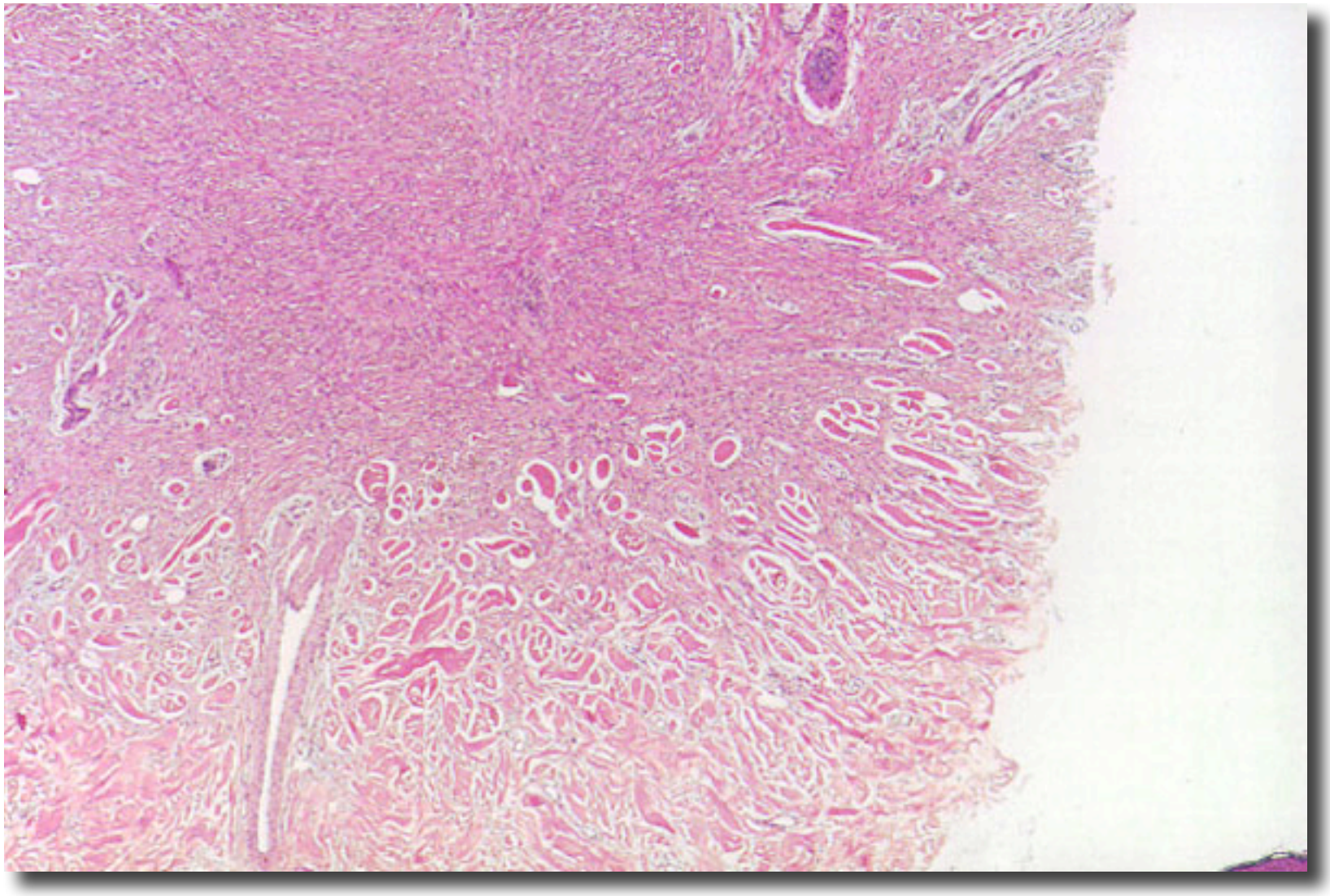


Dermatofibroma



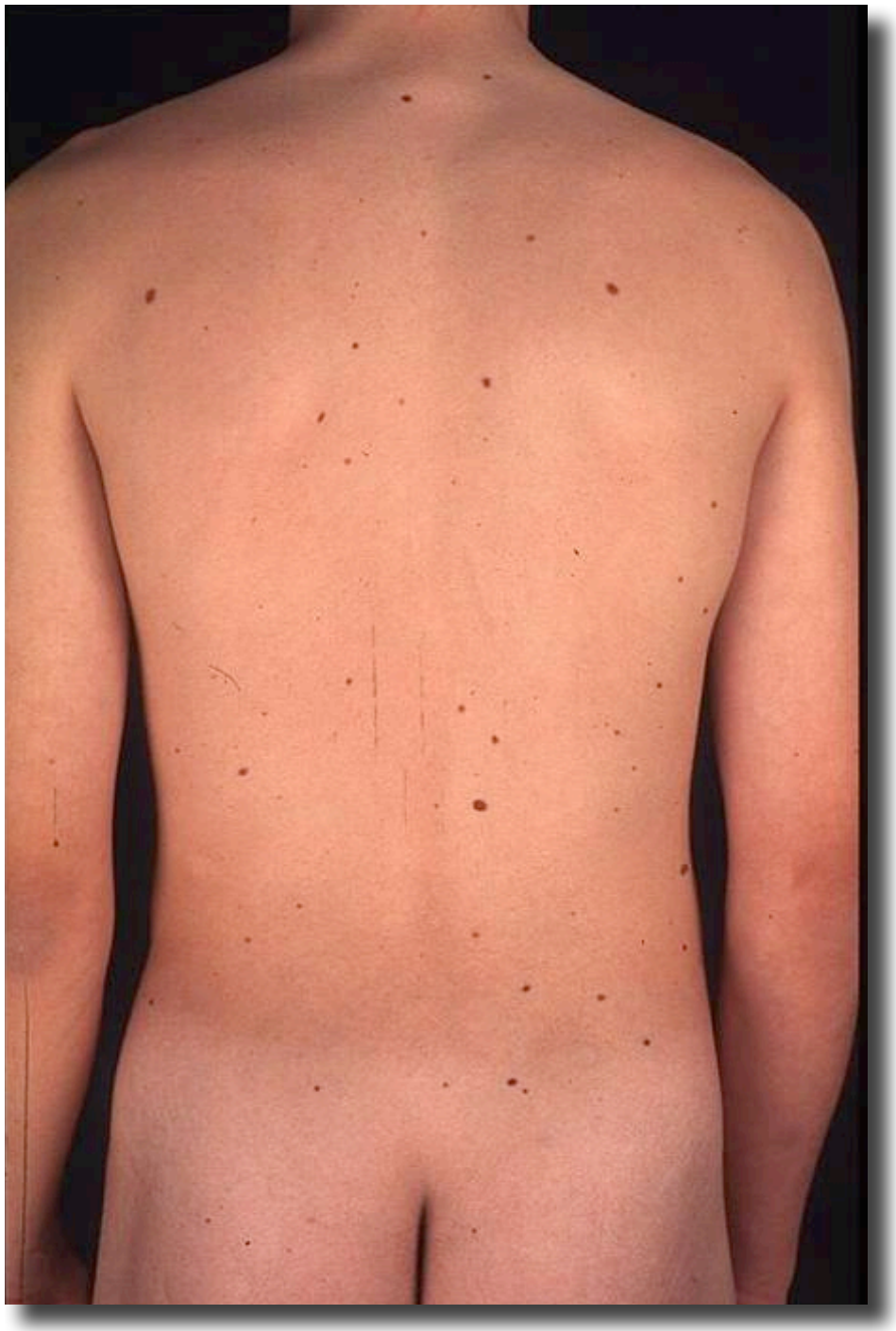
Melanoma and Nevi

- Melanocytic nevi (benign)
  - Acquired
  - Congenital
- Melanoma (malignant melanoma)

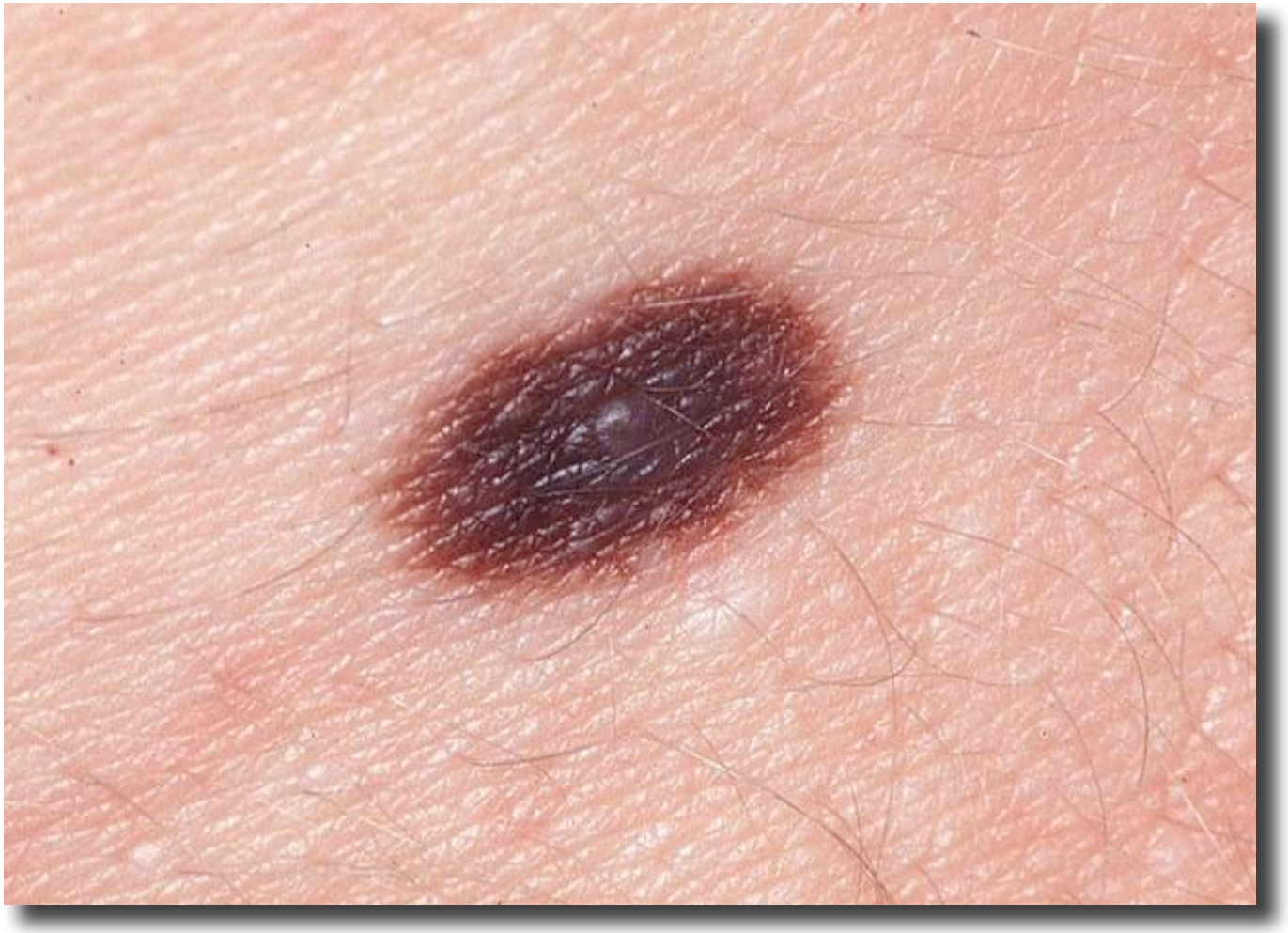
Melanocytic Nevi (AKA moles)

- The word "nevus" just means birthmark
- Acquired melanocytic nevi
- Congenital melanocytic nevi
  - Blue
  - Non-blue

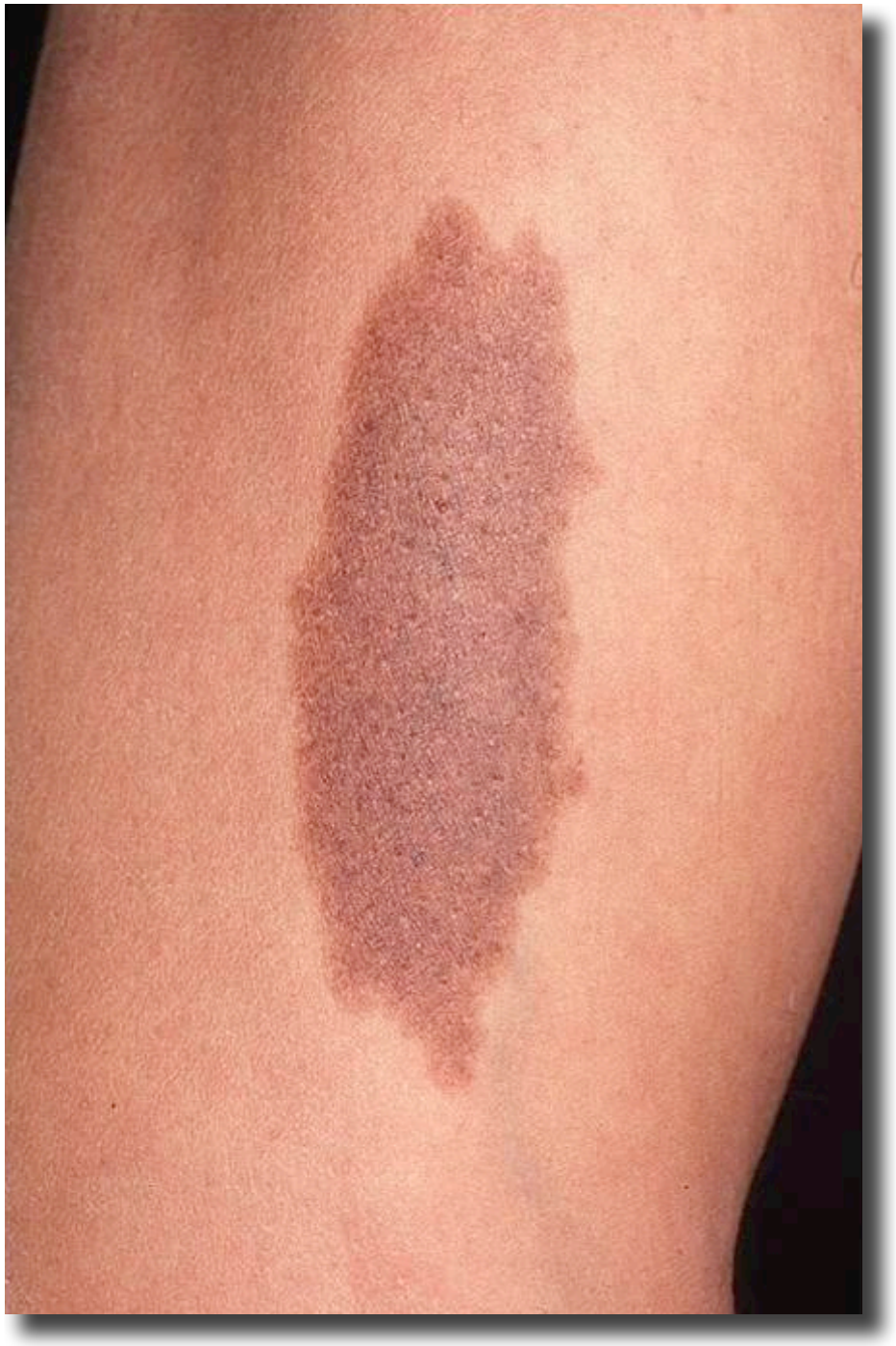
Nevi



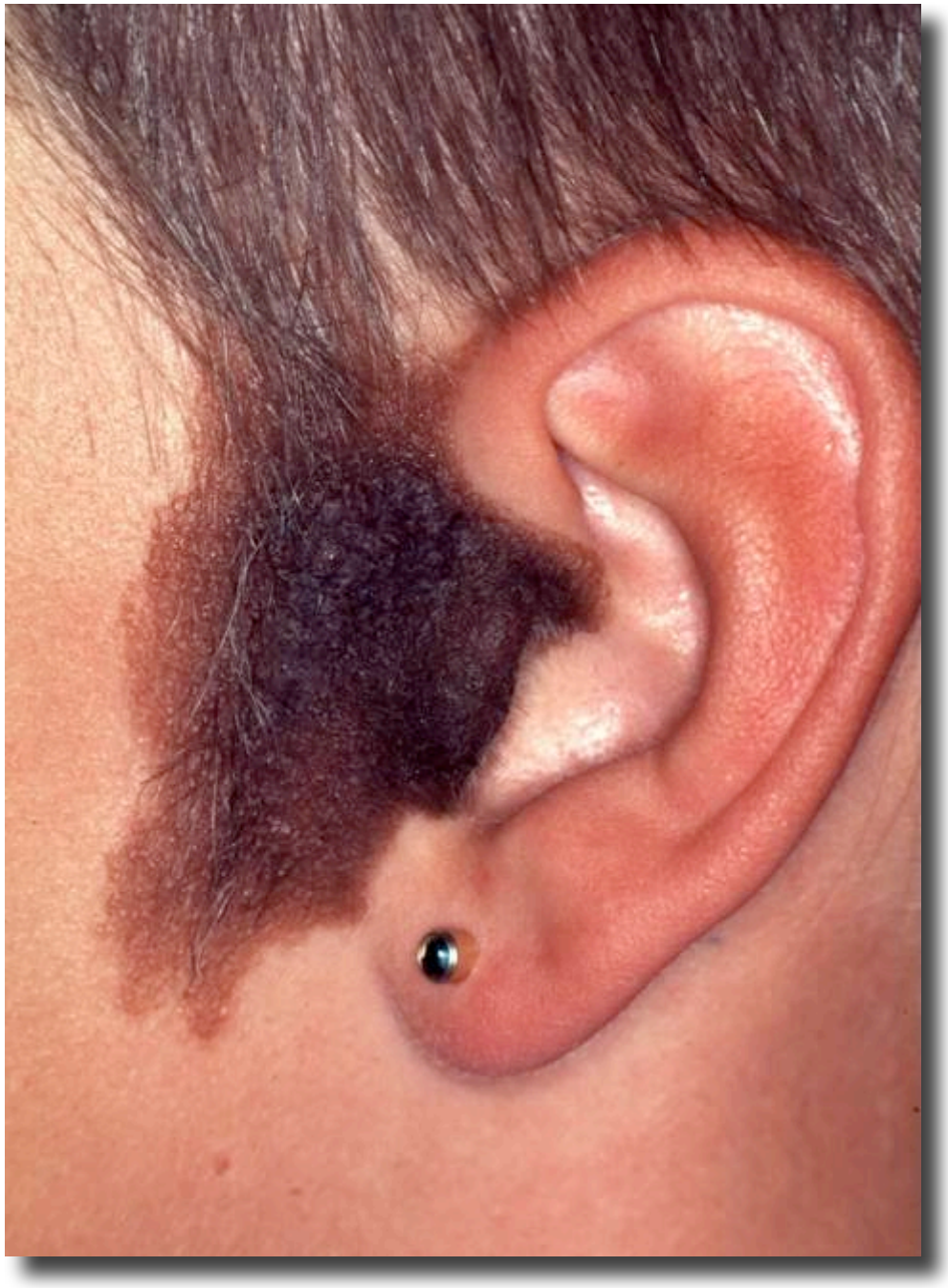
Nevus



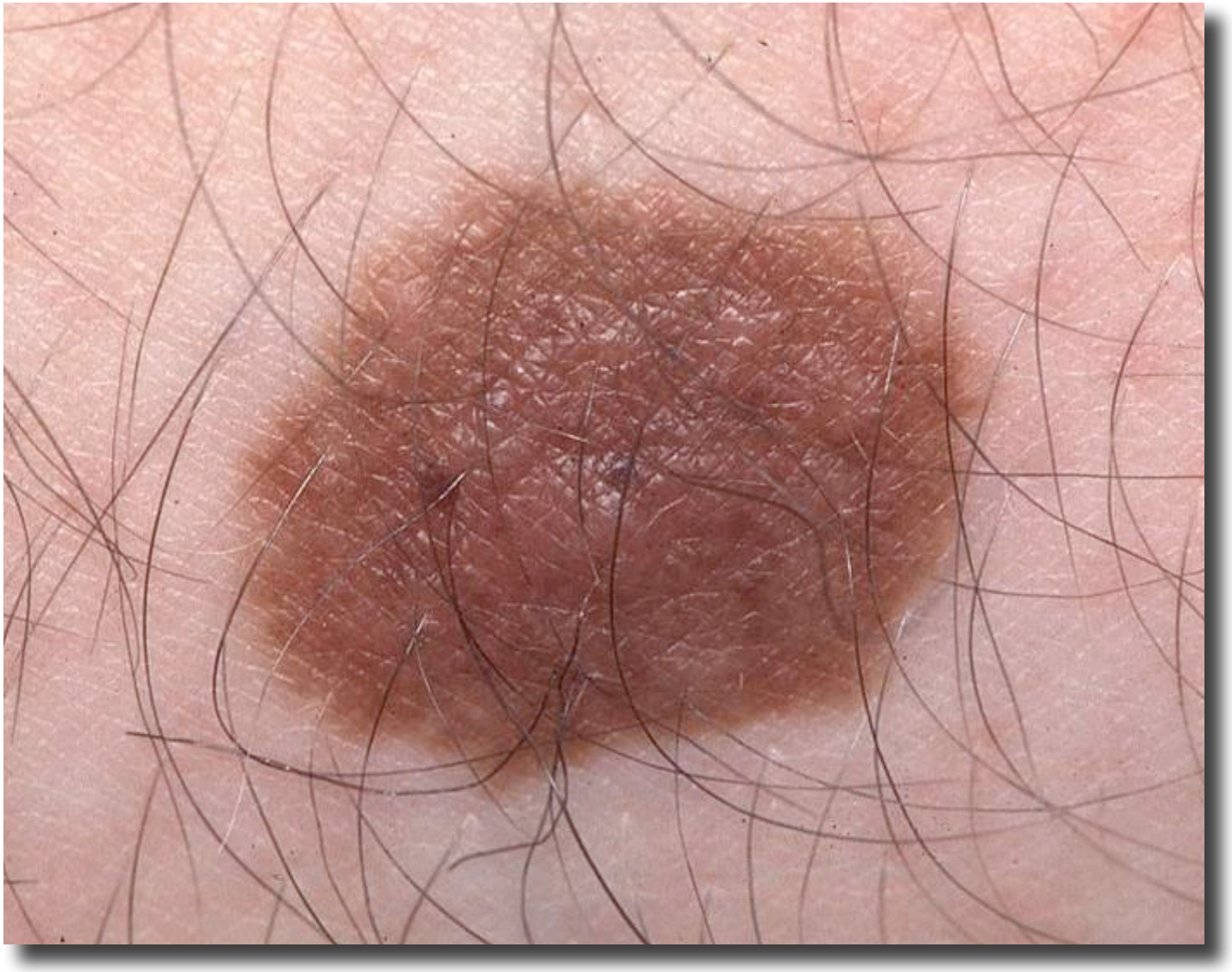
Congenital Nevus



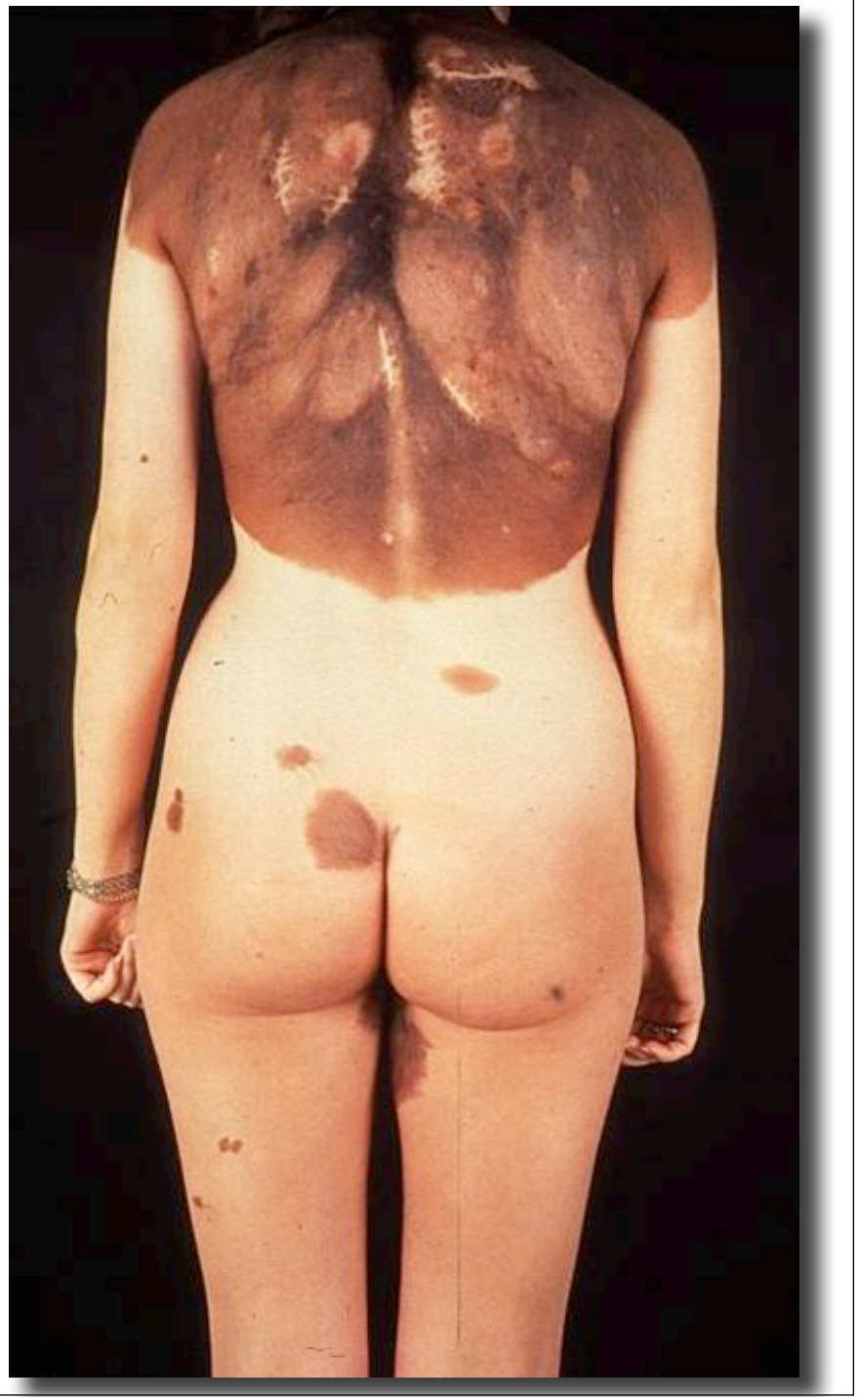
Congenital Nevus



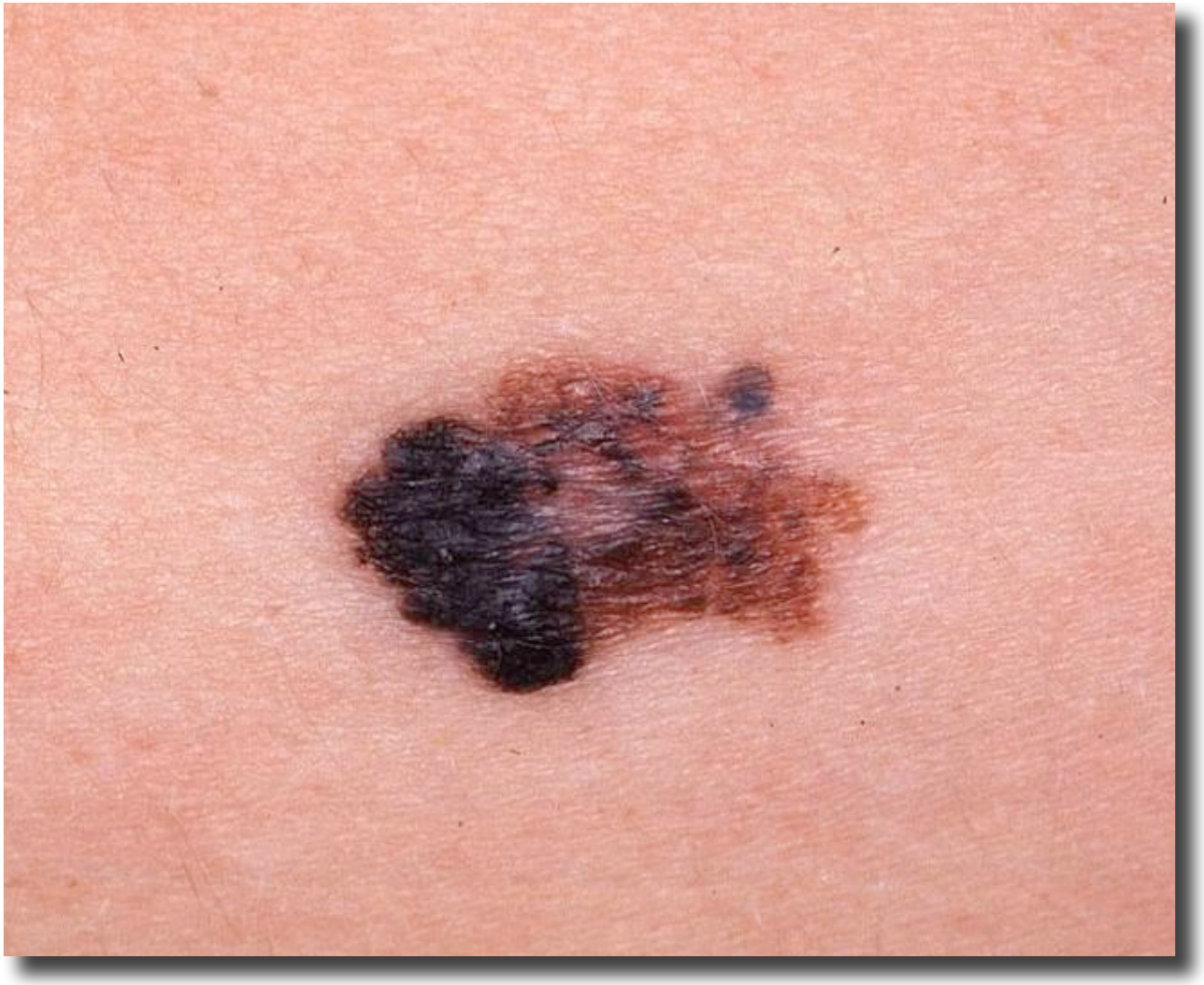
Congenital Nevus



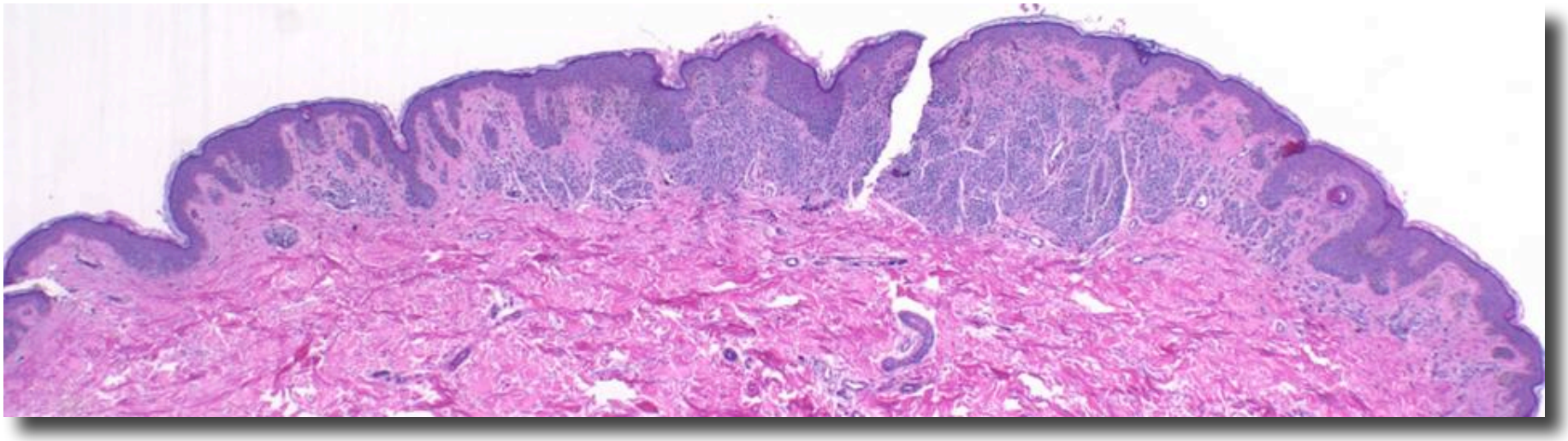
Congenital Giant Nevi



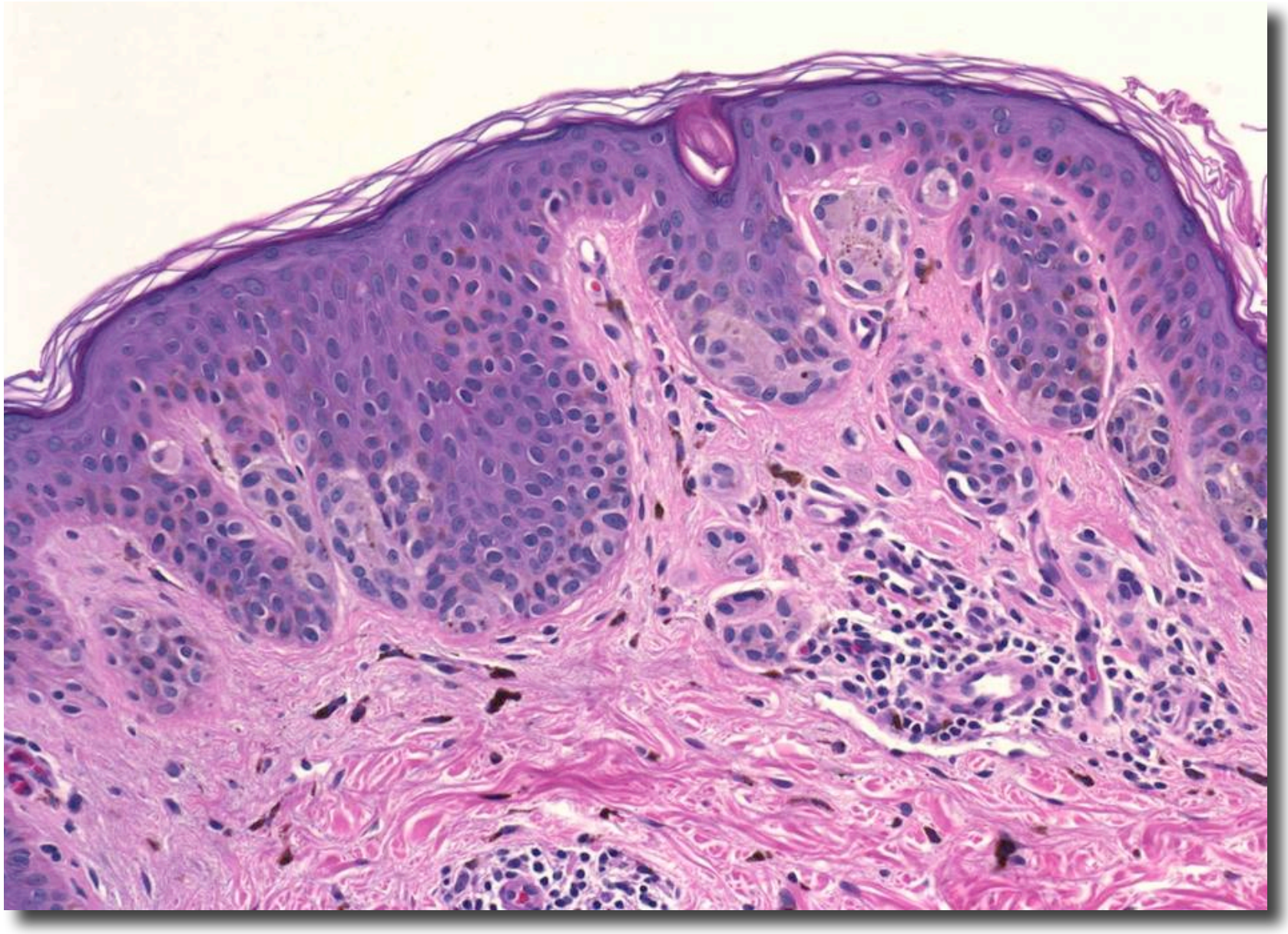
Dysplastic Nevus



Intradermal Nevus



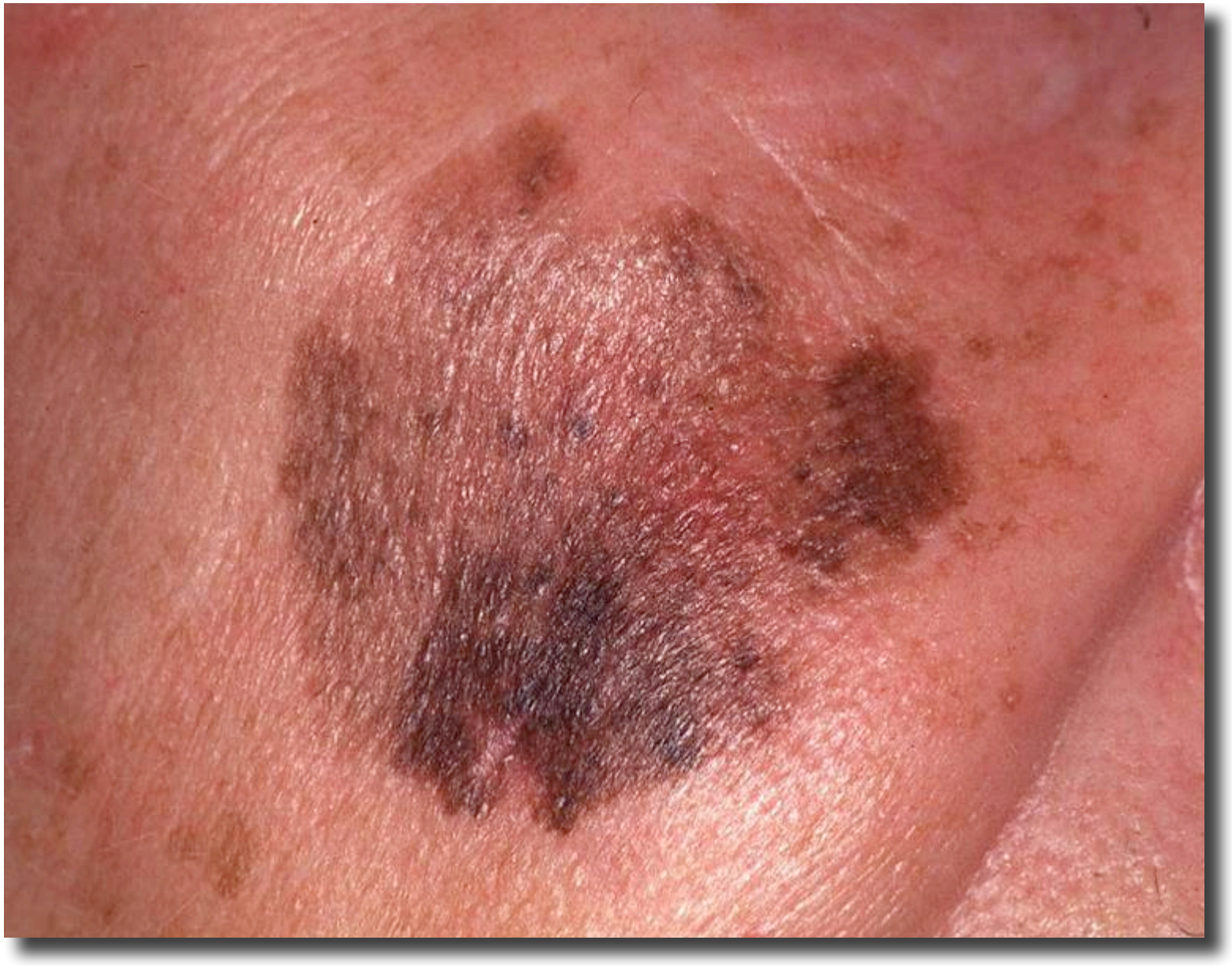
Junctional Nevus



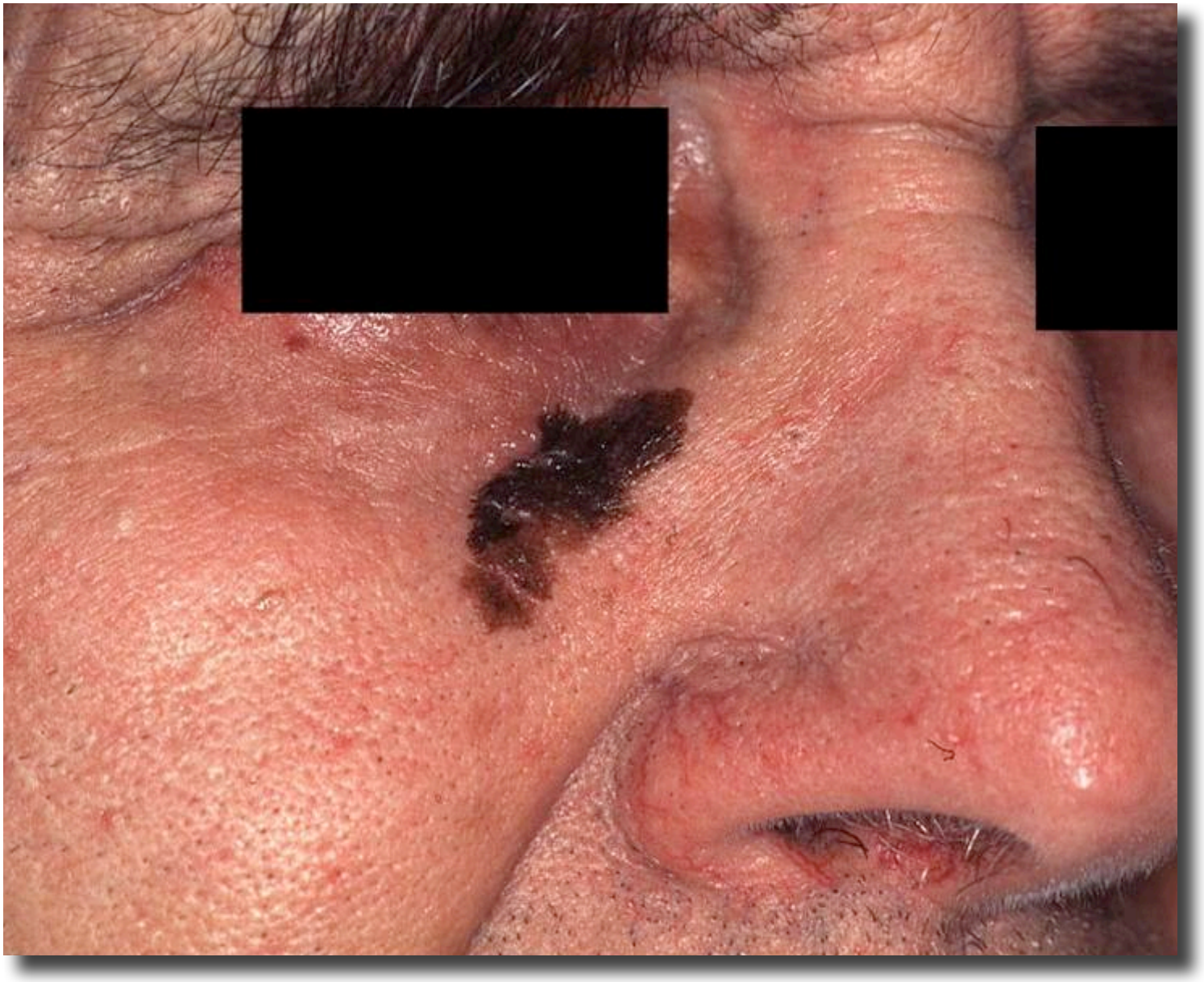
Melanoma: Clinical Facts

- Incidence is increasing (but may be due to early detection)
- Most common in light skinned people
- Having many nevi (moles) is a risk factor
- UV exposure is a risk factor

Malignant Melanoma



Malignant Melanoma



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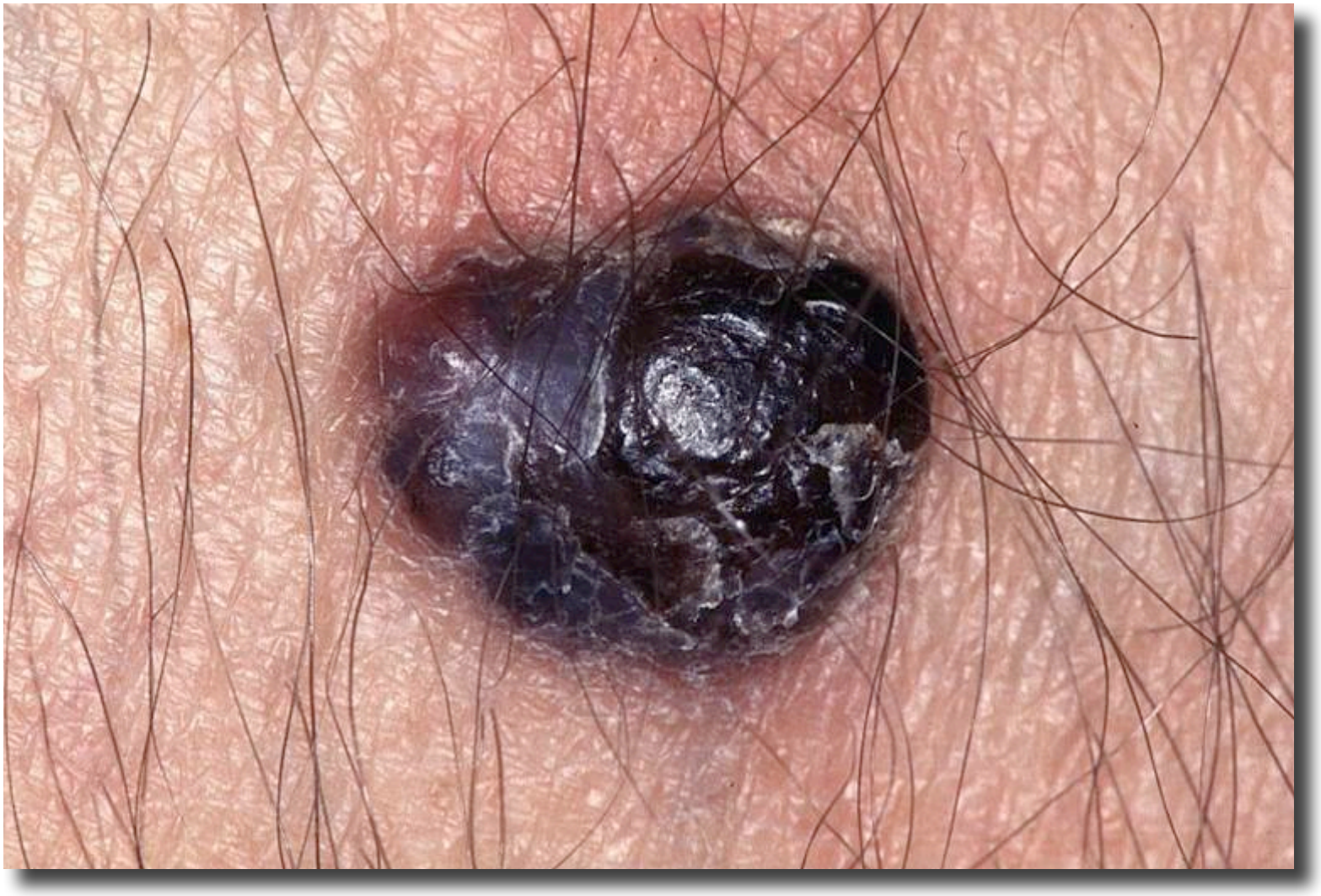

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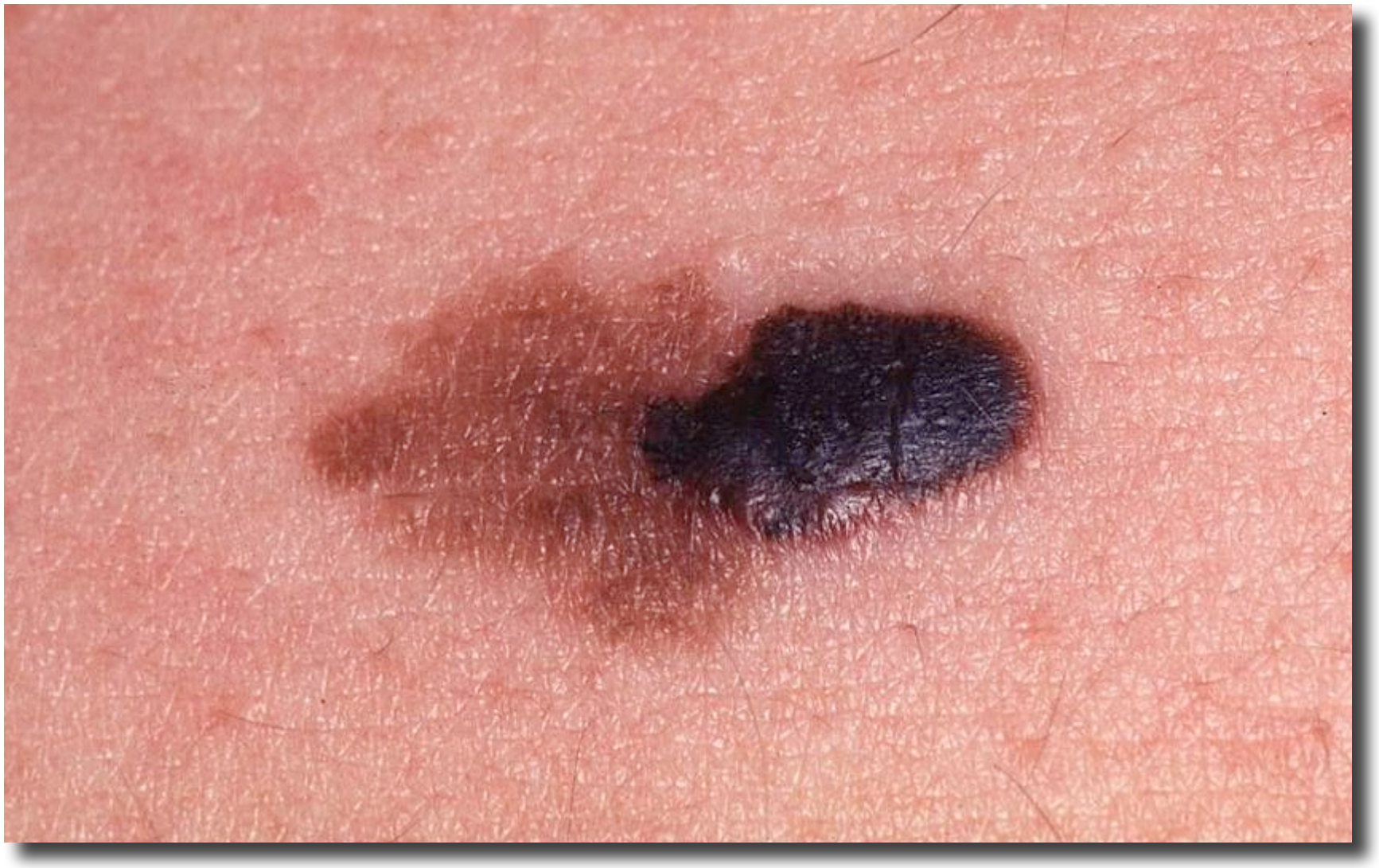

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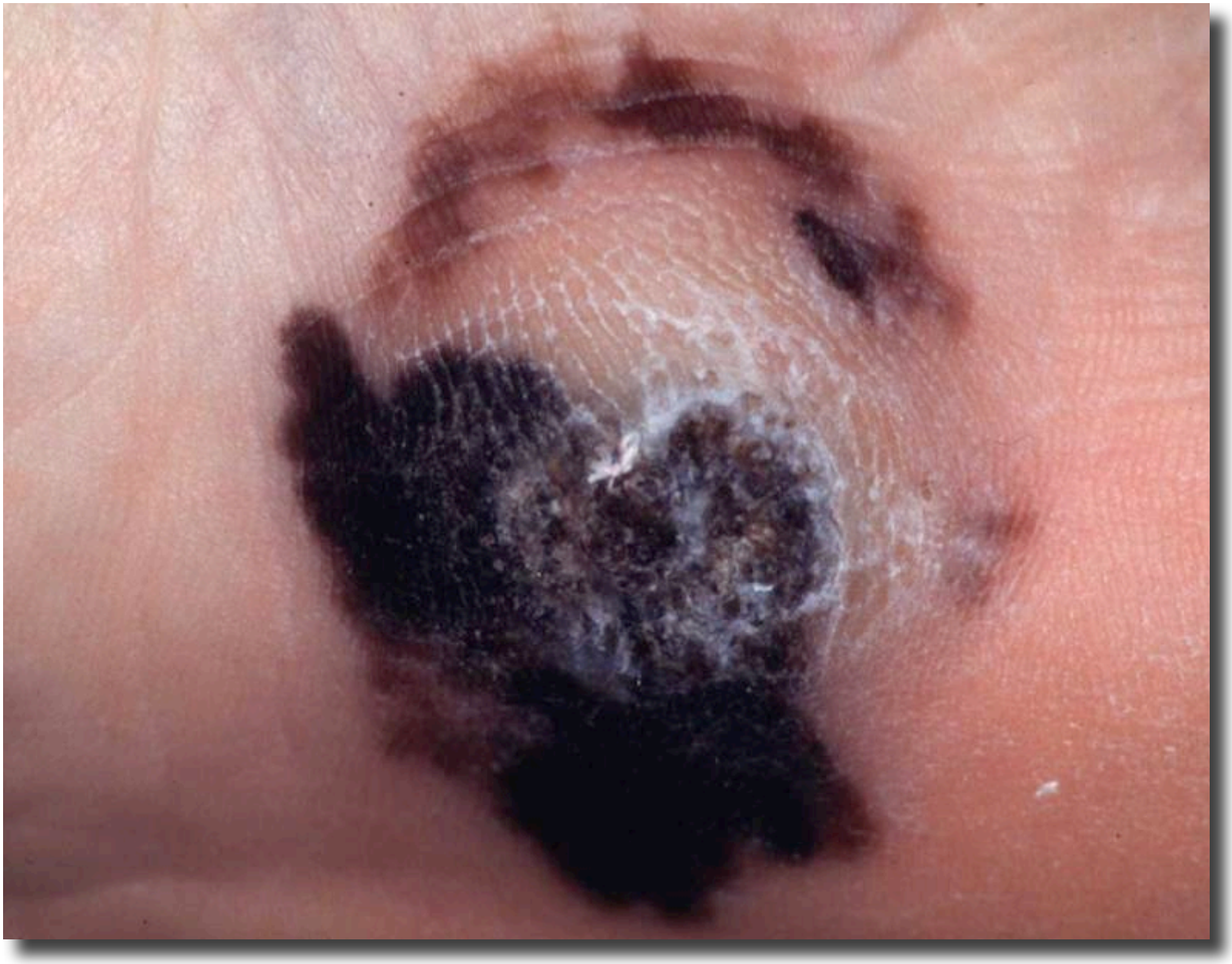
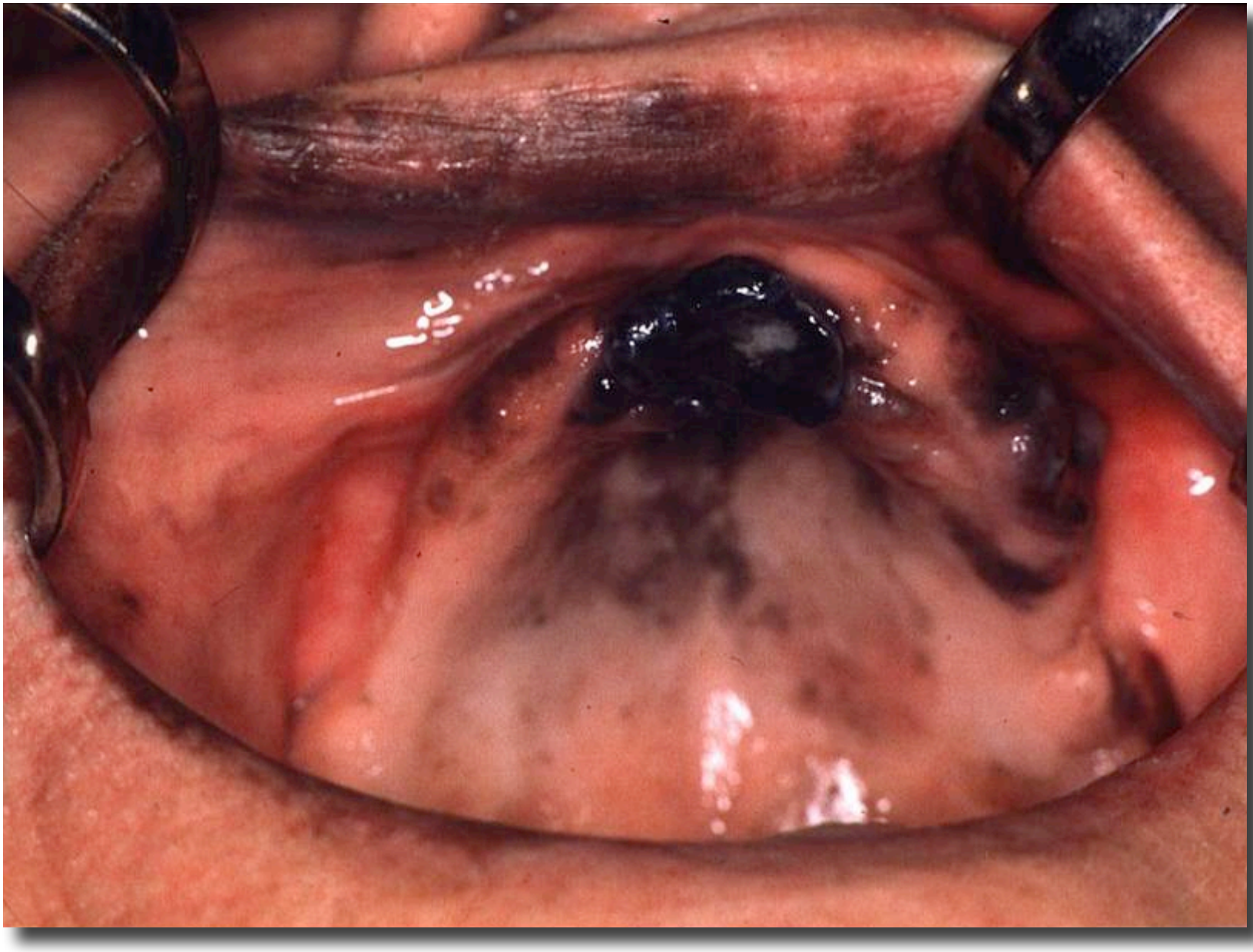
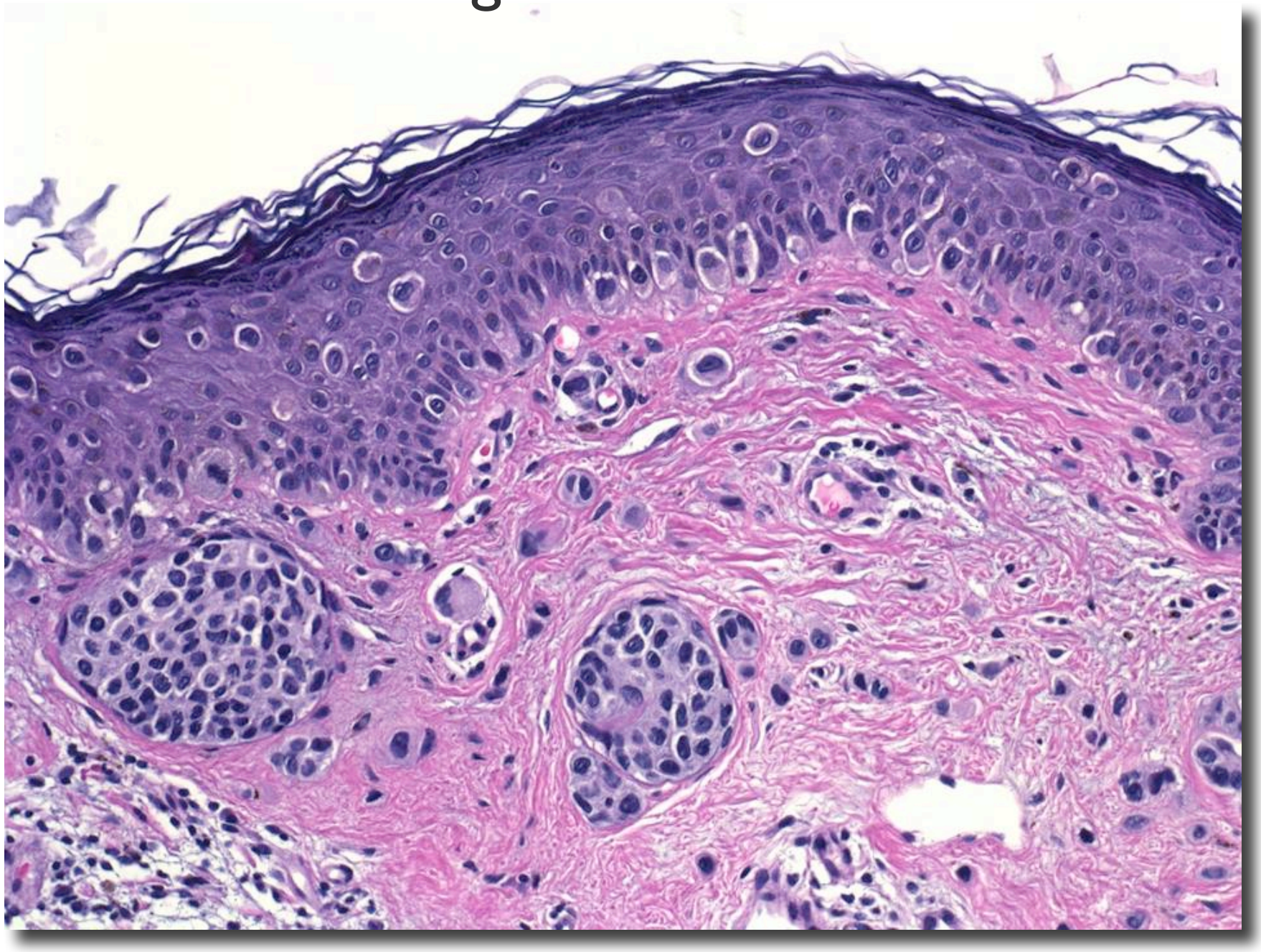


Malignant Melanoma



Malignant Melanoma



Prognosis of Melanoma

- Stage I >80% 5 yr. survival
- Stage II (+regional lymph node) has <50% 5 yr. survival
- Stage III (widespread mets) usually fatal in a short period
- Most important prognostic factor in stage I is tumor thickness
- Sex and site affect prognosis

Therapy of Melanoma

- Complete excision
- Re-excision if necessary
- Sentinel node biopsy if indicated
- Node dissection if sentinel node is positive
- Chemotherapy, biologic response modifiers don't work well

Skin Rashes (Dermatitides)

The curse of the ancients

- Hundreds of different rashes, each of which has an obscure name
- Nomenclature often unrelated to pathogenesis or even the microscopic features of the disorder

Why is dermatitis more common than hepatitis?

- Visibility:

  Inflammation in the liver and most other organ systems remains occult unless organ dysfunction or failure occurs

Why is dermatitis more common than hepatitis?

- Innervation:

  Skin has a sophisticated neural network and "feels" itching and burning

  In other organs, minor disorders are asymptomatic and occult

Why is dermatitis more common than hepatitis?

- Exposure:

  Skin (and bowel) receive a steady stream of insults from our noxious surroundings. Other organ systems have a "filtered" view of the world

Eight Common Patterns

- Spongiotic dermatitis
- Psoriasiform dermatitis
- Vesiculobullous dermatitis
- Interface dermatitis

Eight Common Patterns

- Vasculitis
- Granulomatous dermatitis
- Folliculitis
- Panniculitis

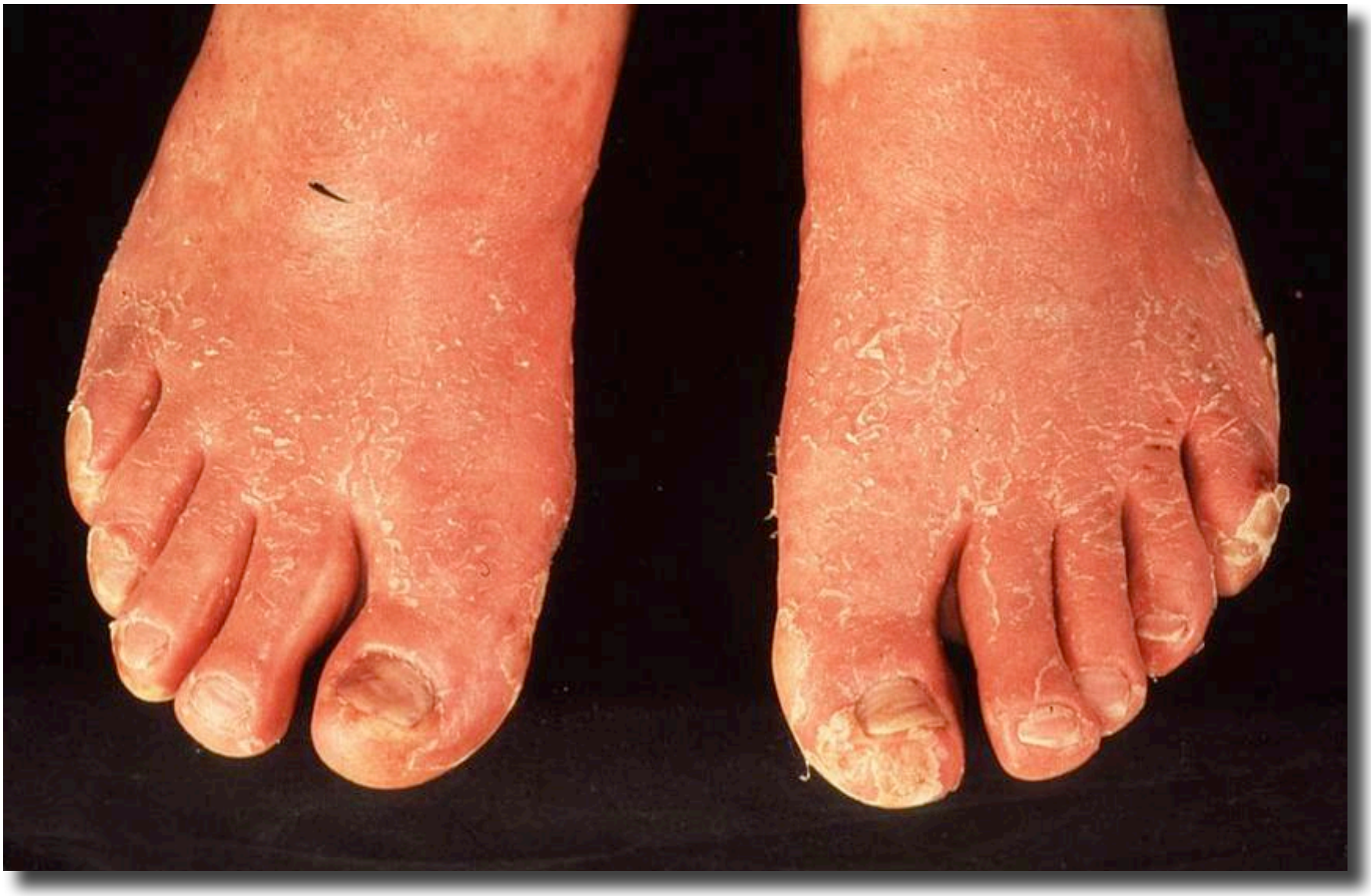
Spongiotic Dermatitis ("Eczema")

Prototype:

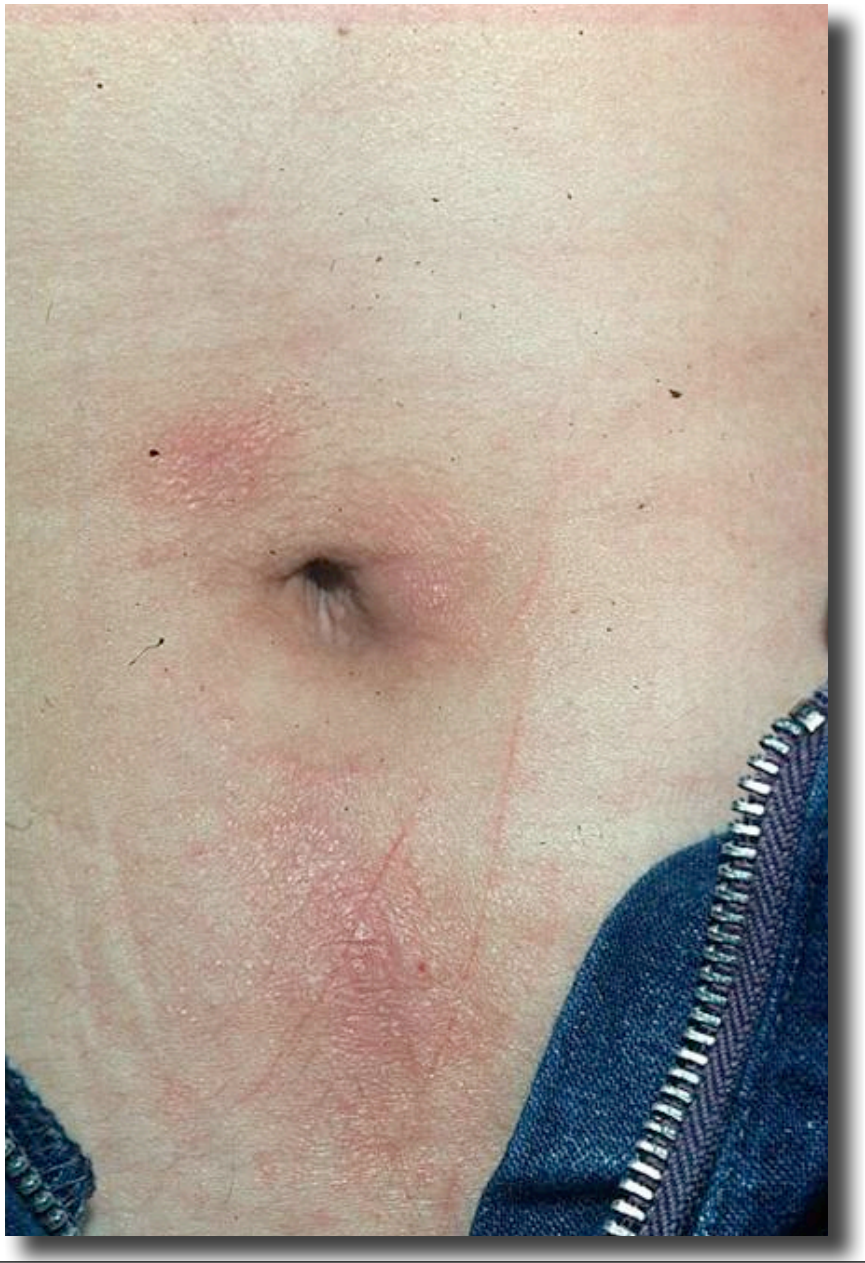
Allergic Contact Dermatitis

Allergic Contact Dermatitis

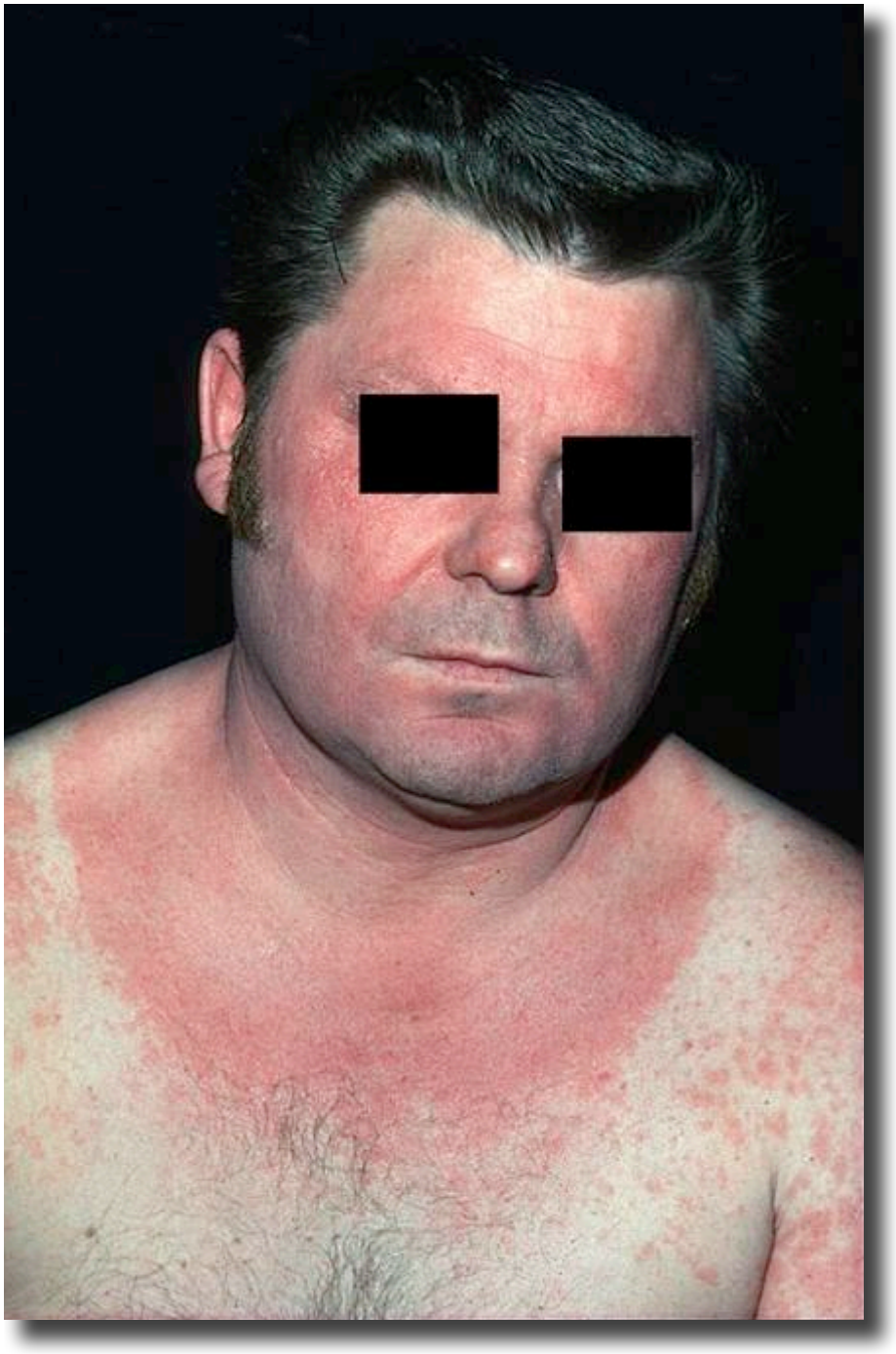
Allergic Contact Dermatitis



Allergic Contact Dermatitis



Allergic Contact Dermatitis



Definition: A type of dermatitis where spongiosis is prominent

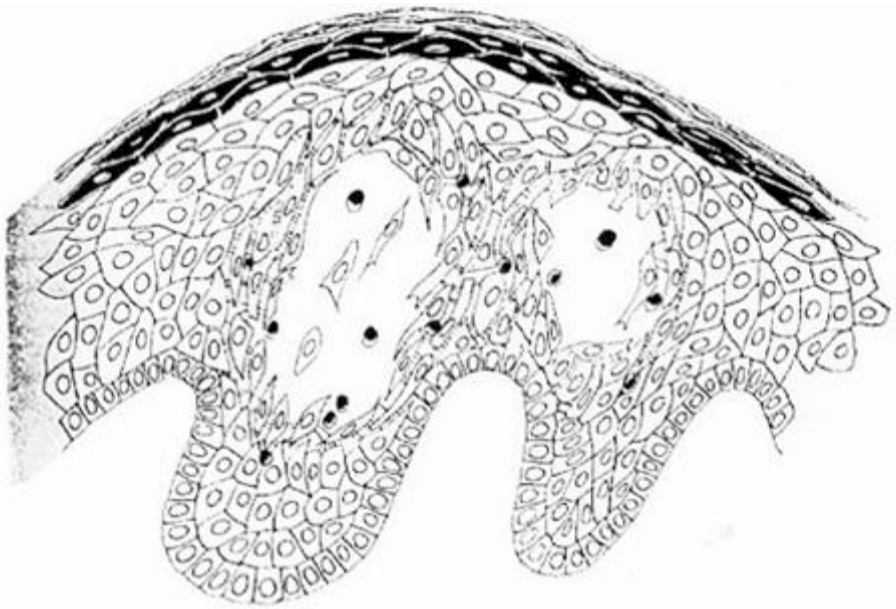
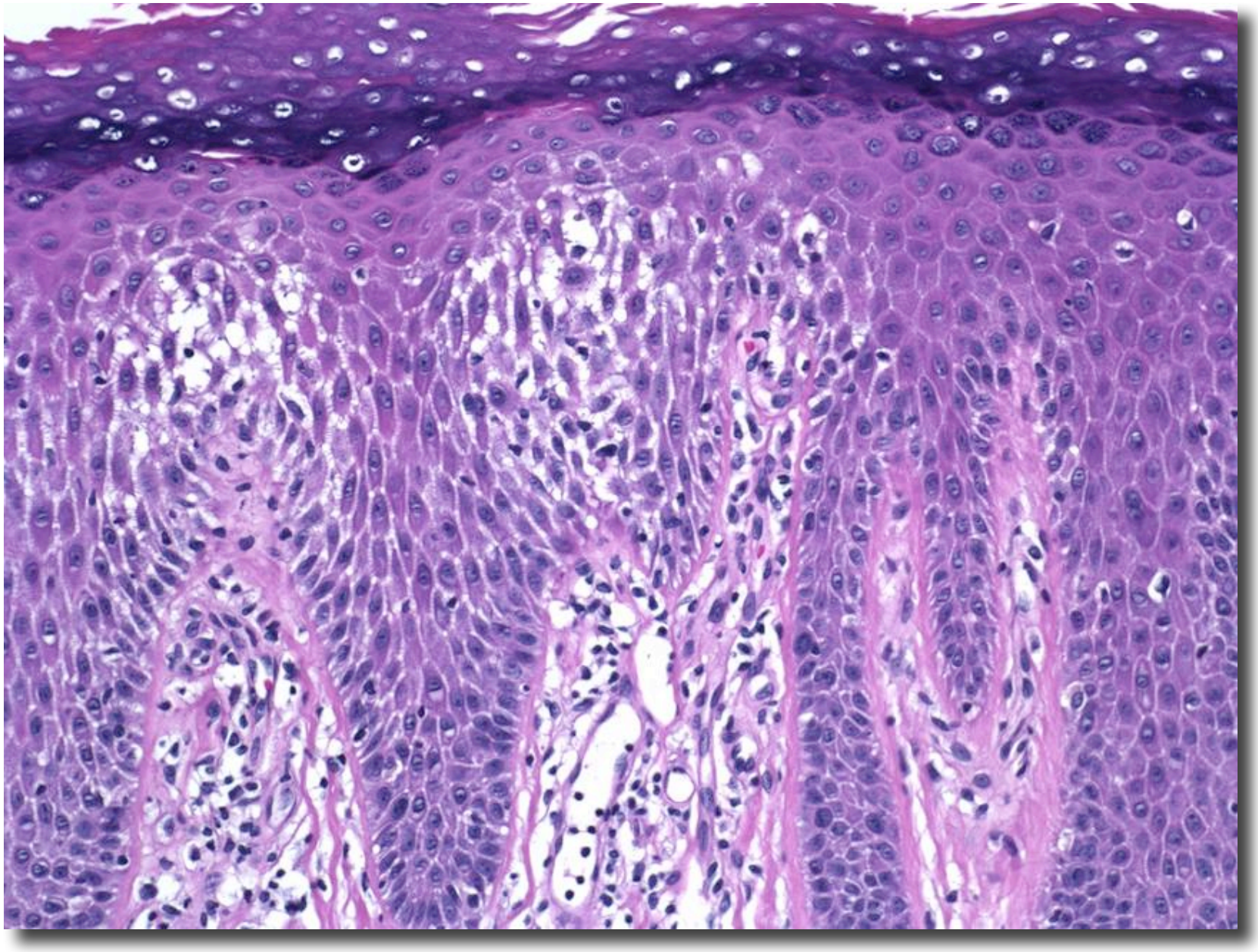
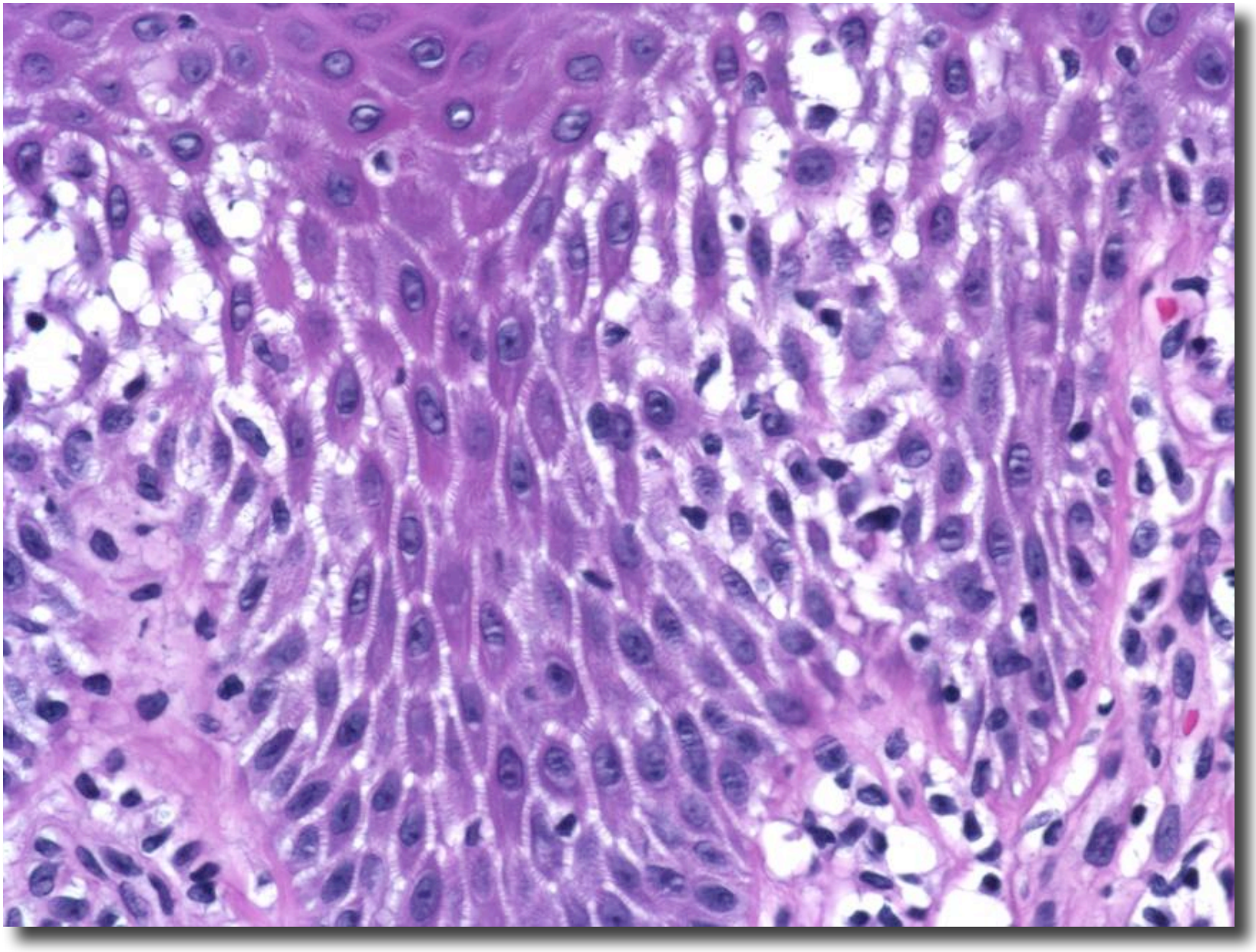


Figure 3.21. Spongiosis (intercellular edema).

Allergic Contact Dermatitis



Allergic Contact Dermatitis



Definition:

- Contact dermatitis is a delayed-type hypersensitivity reaction to an allergen in contact with the skin surface

Diagnosis of Contact Dermatitis

- Clinical history
- Physical findings (geometric)
- Patch testing
- Biopsy (sometimes)

Forms of Spongiotic Dermatitis

- Contact dermatitis
- Nummular dermatitis
- Atopic dermatitis (childhood eczema)
- Seborrheic dermatitis

Psoriasiform Dermatitis

Prototype:

Psoriasis

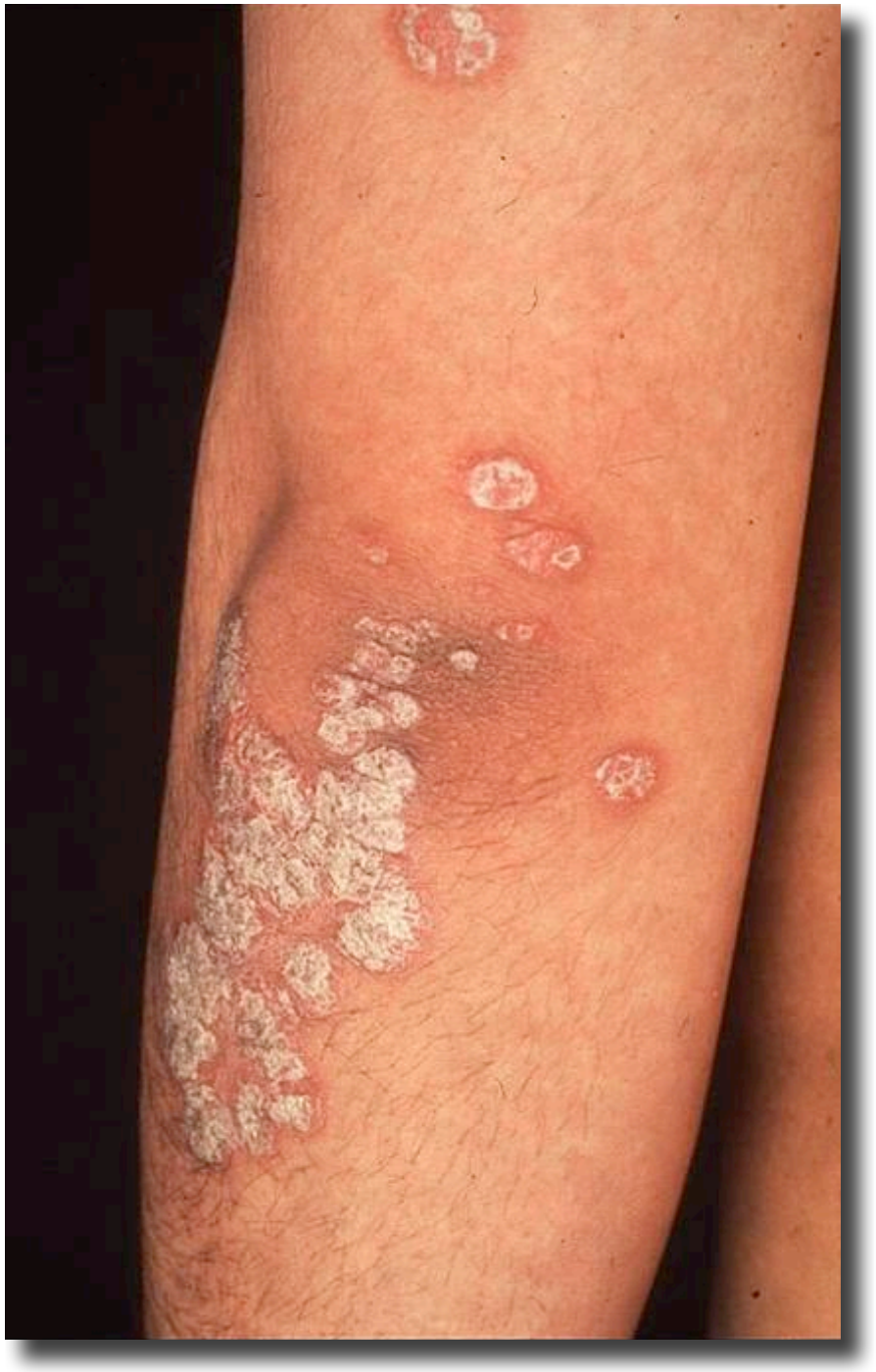
Definition:

- "Psoriasiform"= psoriasis-like, and is used both as a clinical and as a microscopic description

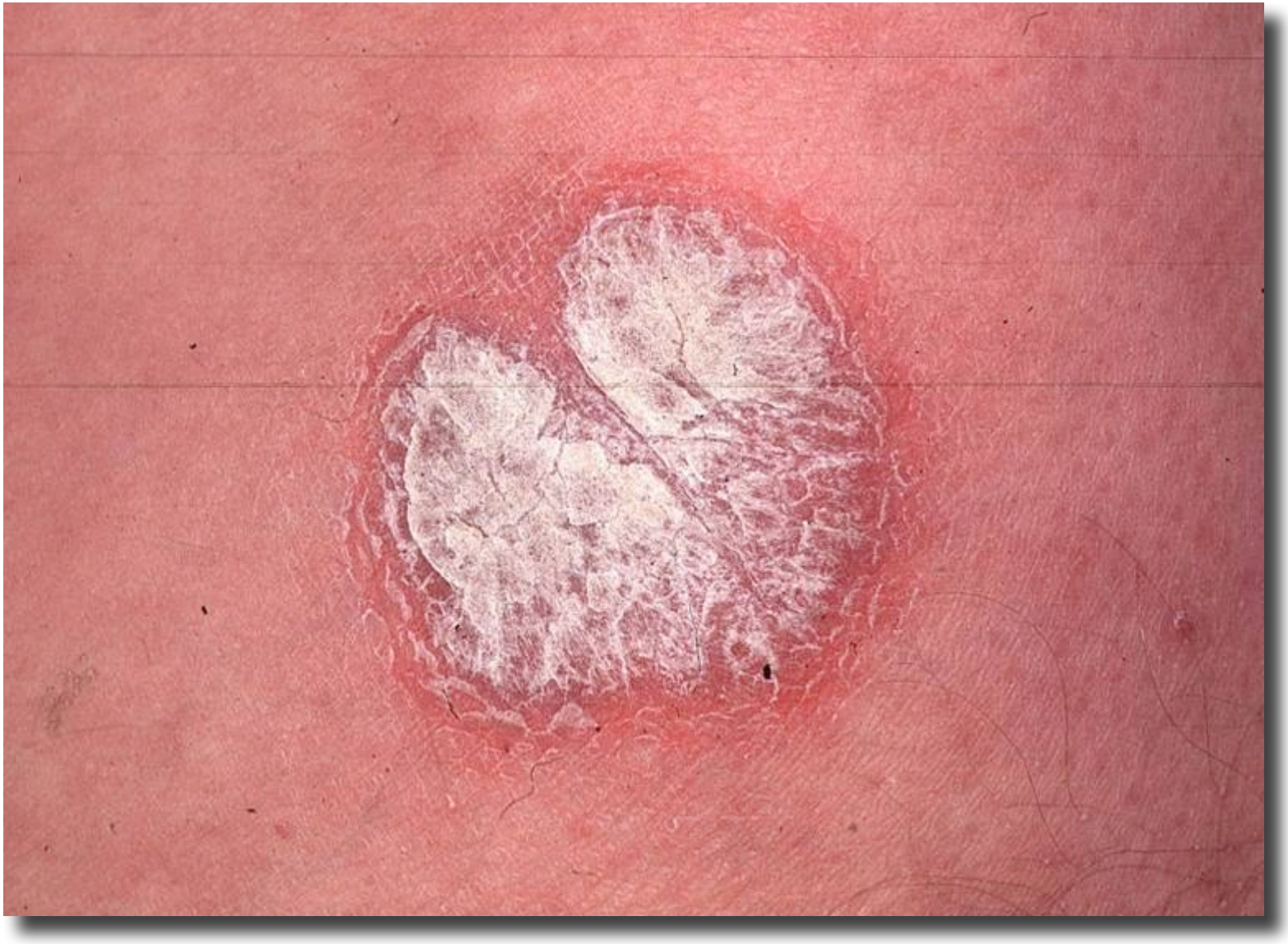
Psoriasis

- Up to 2% of humans have this chronic, scaly, treatment-resistant rash
- Red, sharply demarcated plaques with whitish scale
- Heritable, with variable expression

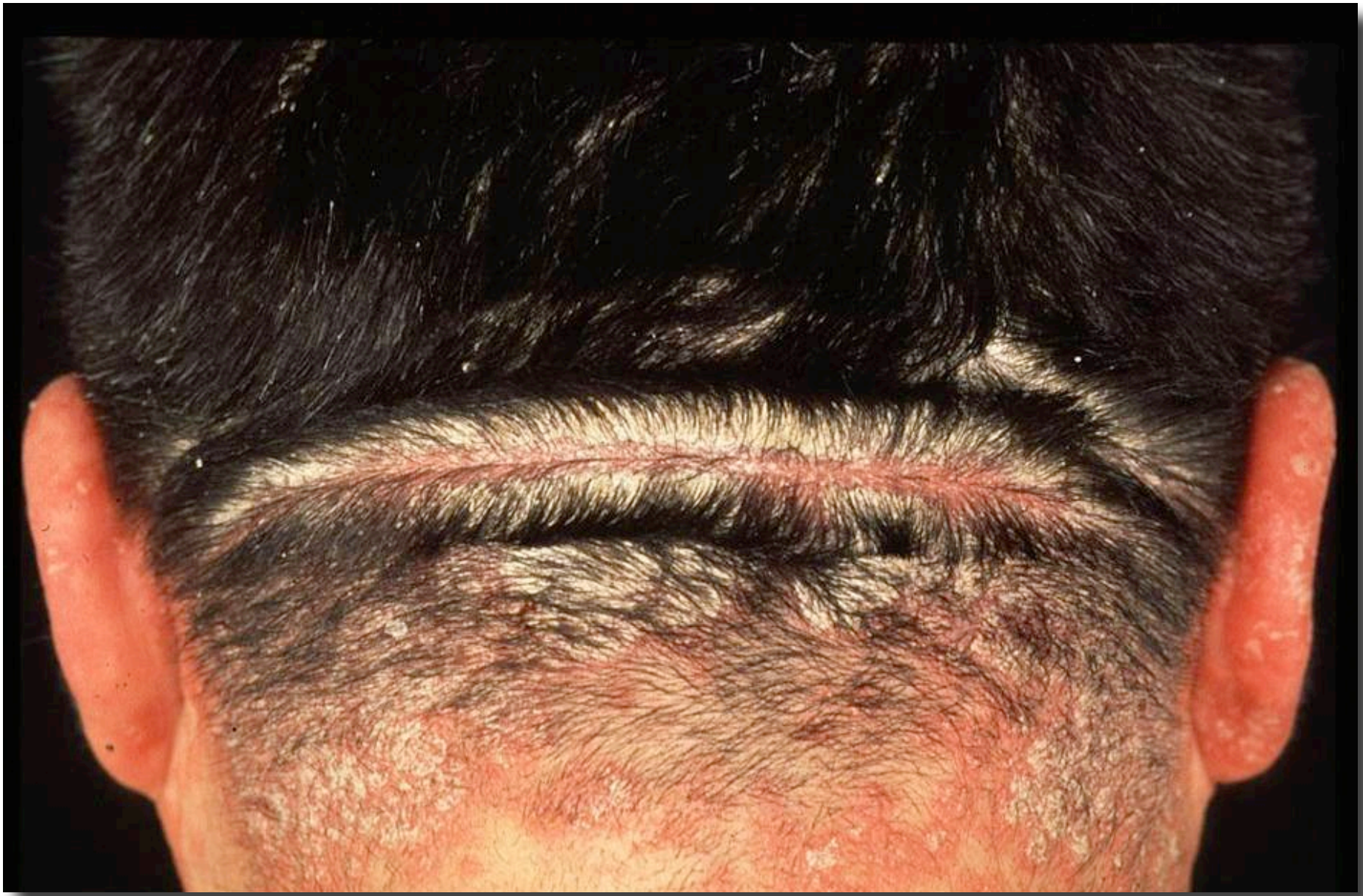
Psoriasis



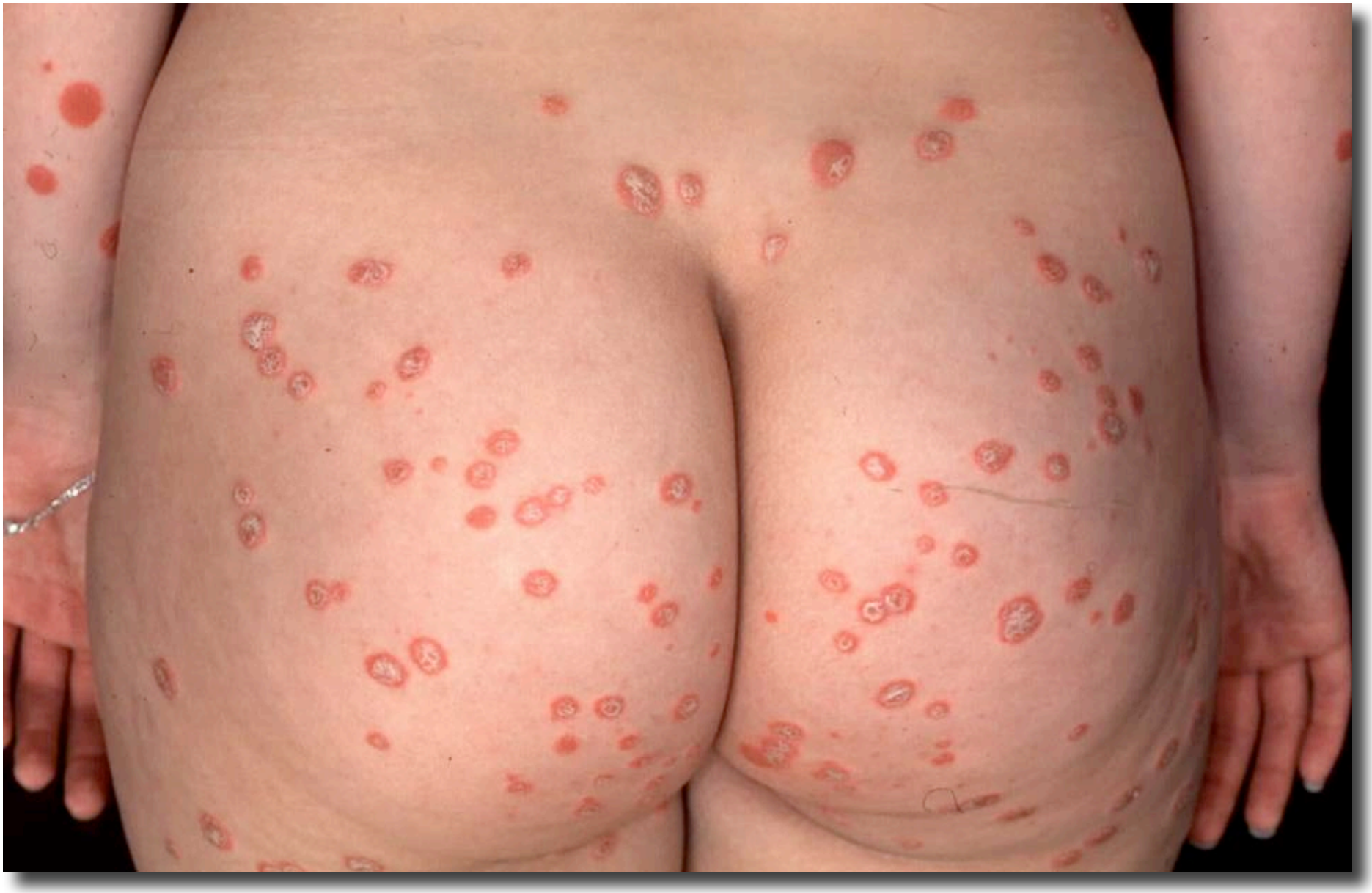
Psoriasis



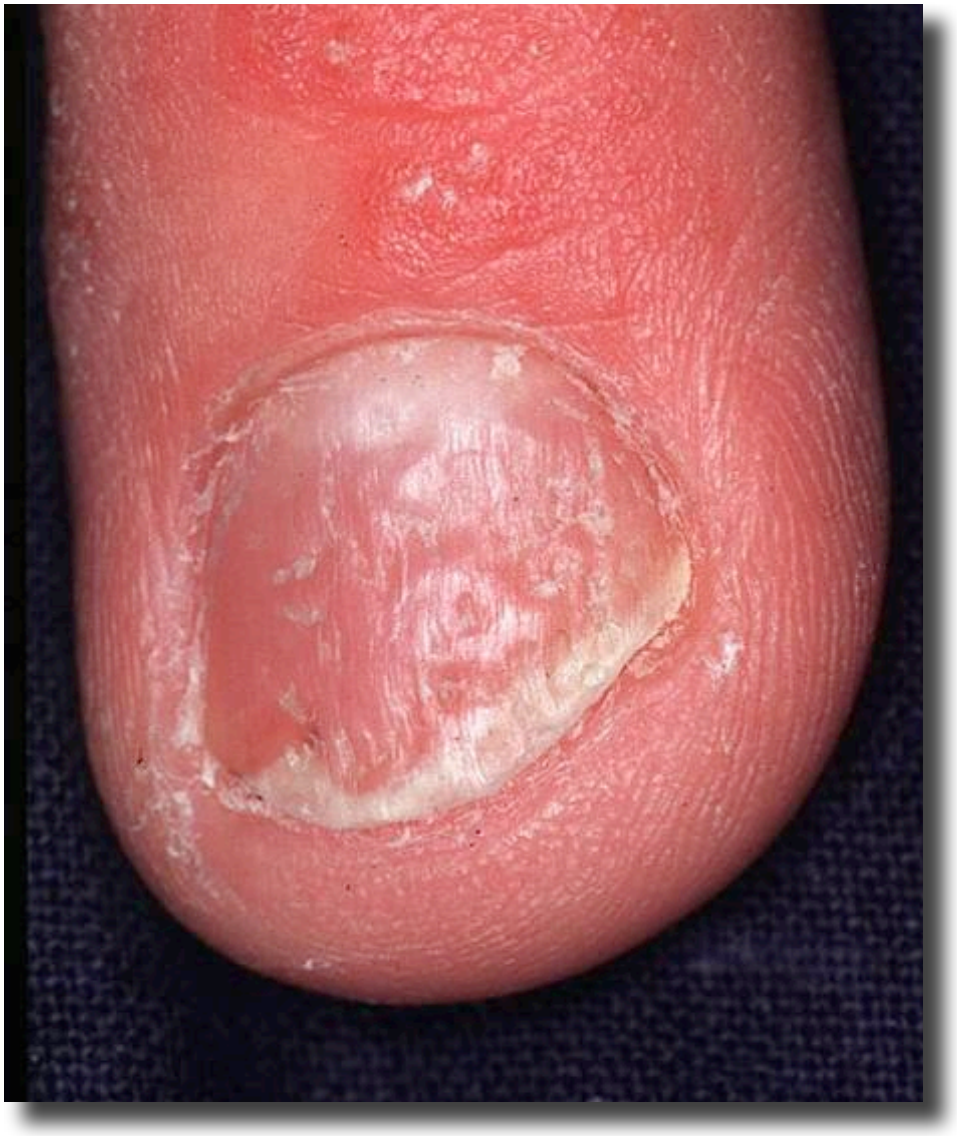
Psoriasis



Psoriasis



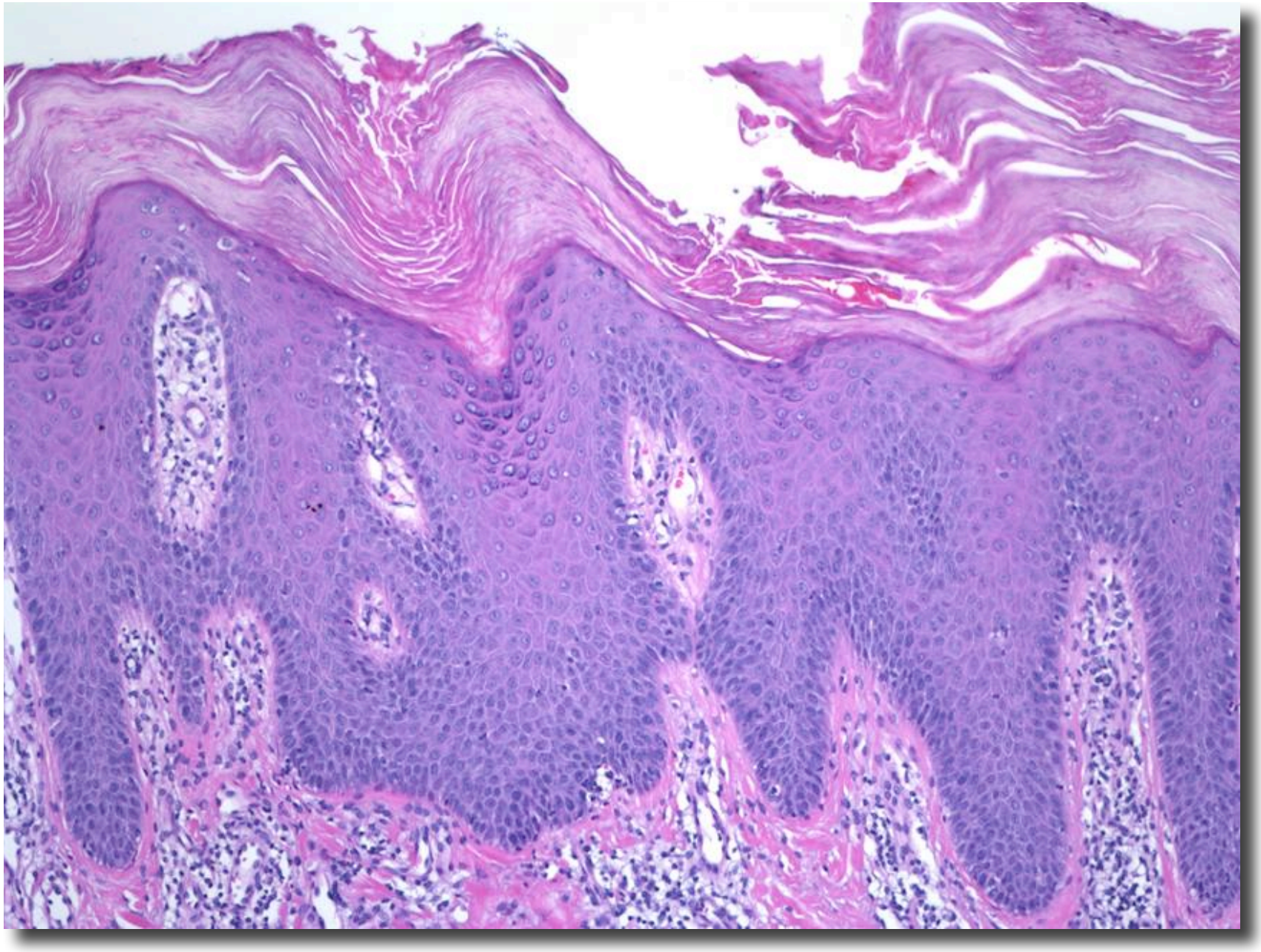
Psoriasis



Psoriasis

- Expression can be delayed (the oldest reported age of onset is 108 years)
- Severity variable:
  - Limited plaques, or
  - Lots of papules, or
  - Life-threatening erythroderma (generalized reddening)

Psoriasis



Psoriasis

- Systemic manifestations
  - Oligoarticular pattern of deforming arthritis
  - Spondylopathy

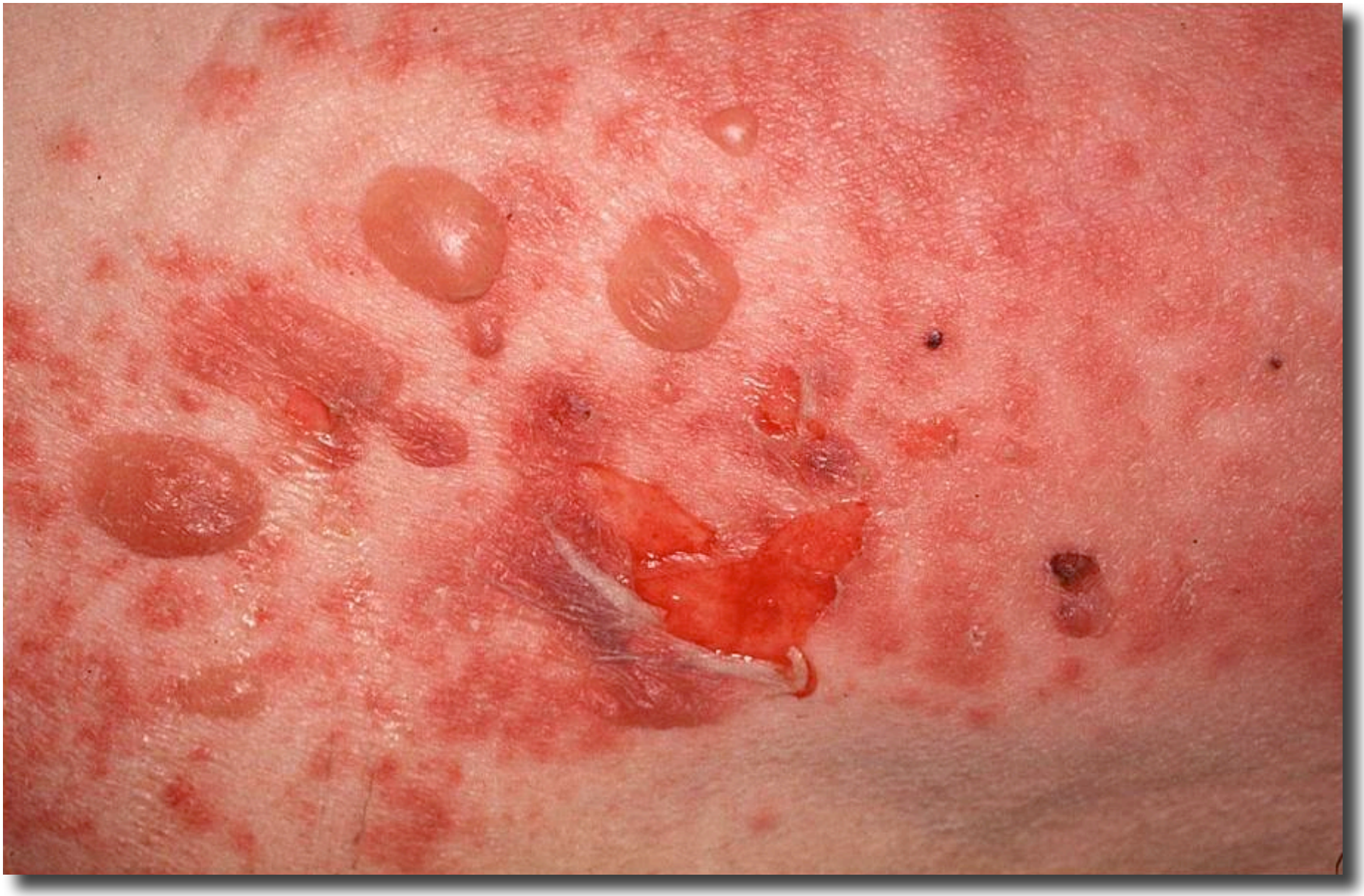
“Psoriasis” and “Eczema”

- Patients usually have one or the other and not both
- Common synonyms for chronic rashes in the lay community

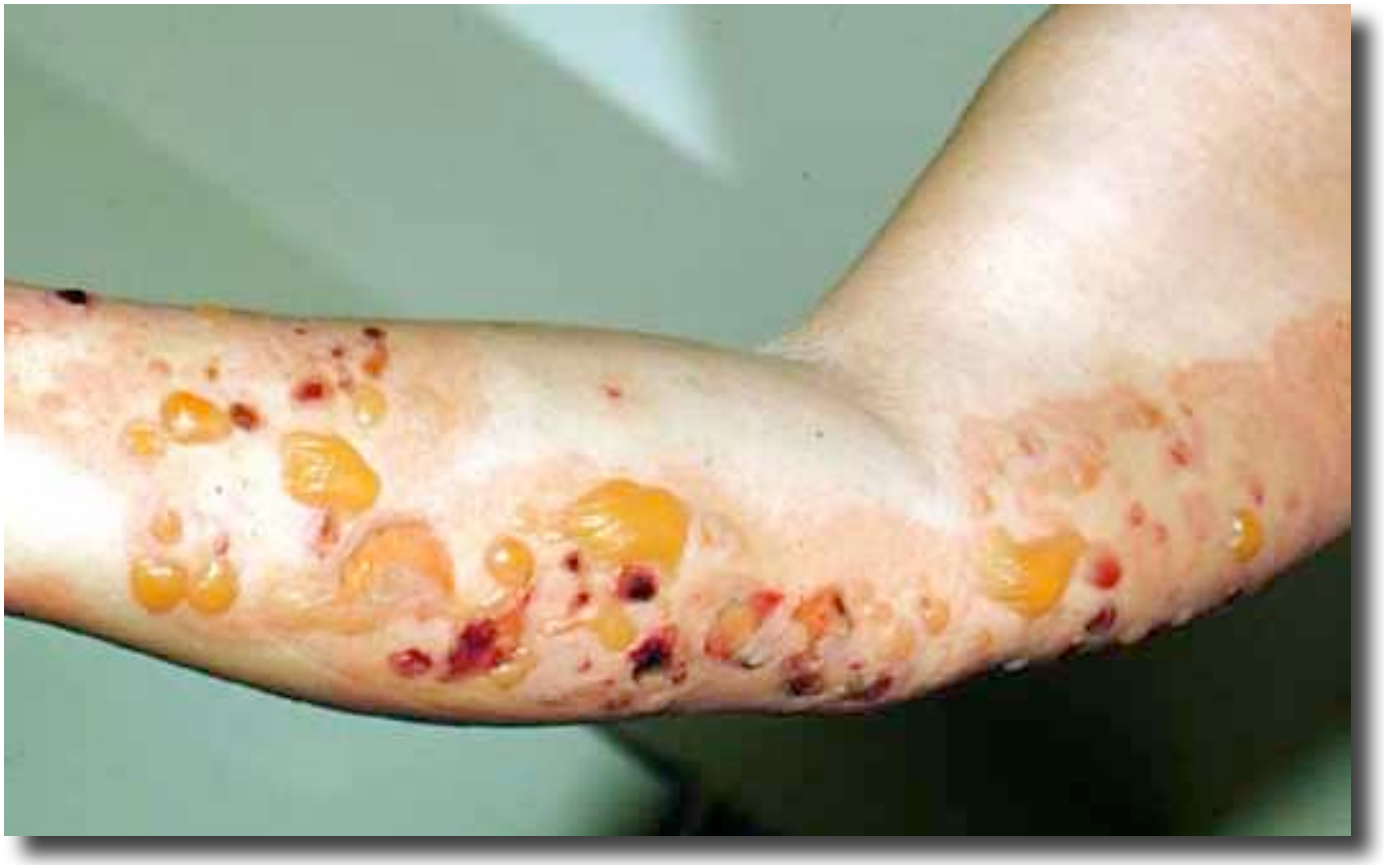
Vesiculobullous (blistering) Dermatitis

Prototype:
Bullous Pemphigoid

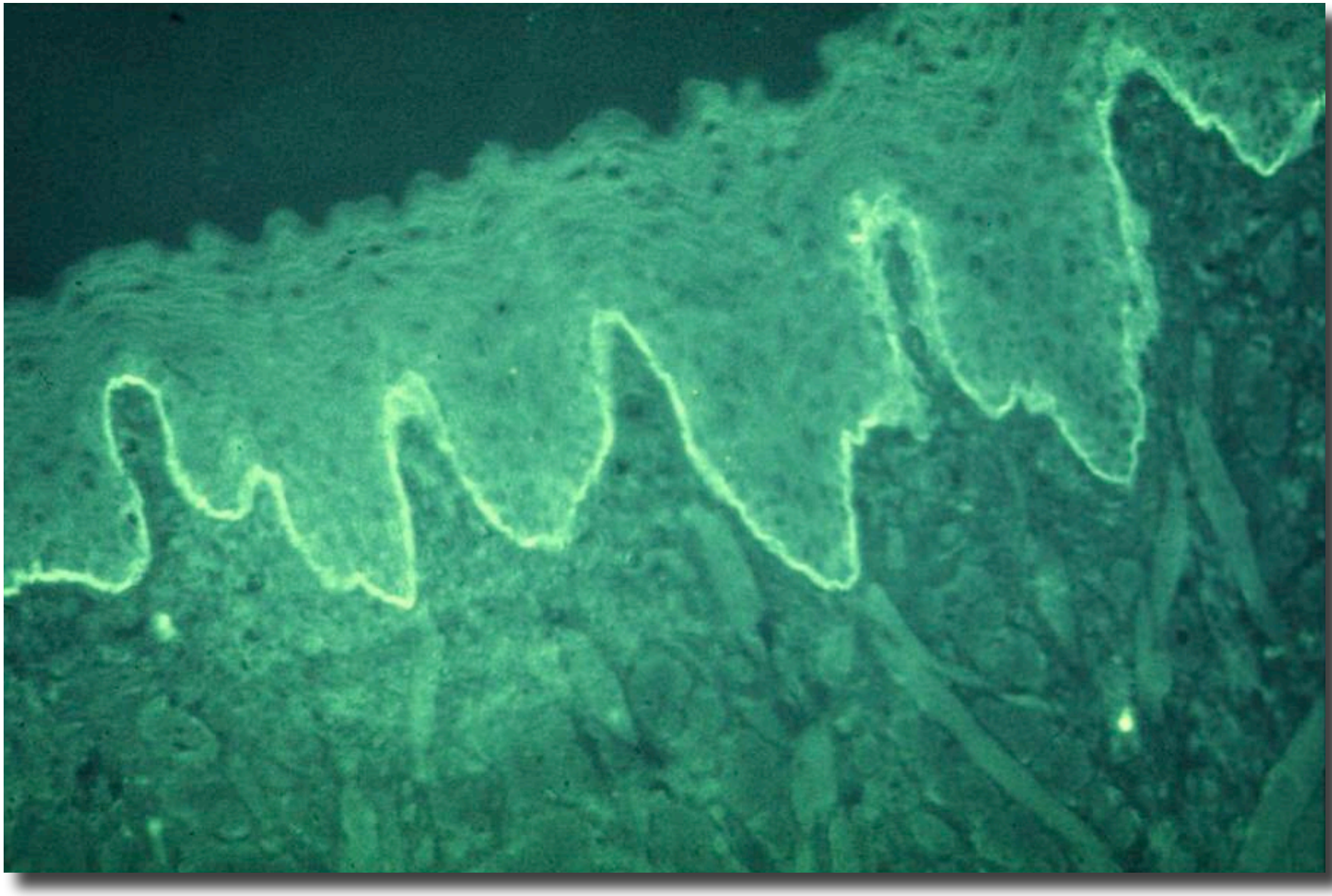
Bullous Phemphigoid



Bullous Phemphigoid



Bullous Phemphigoid

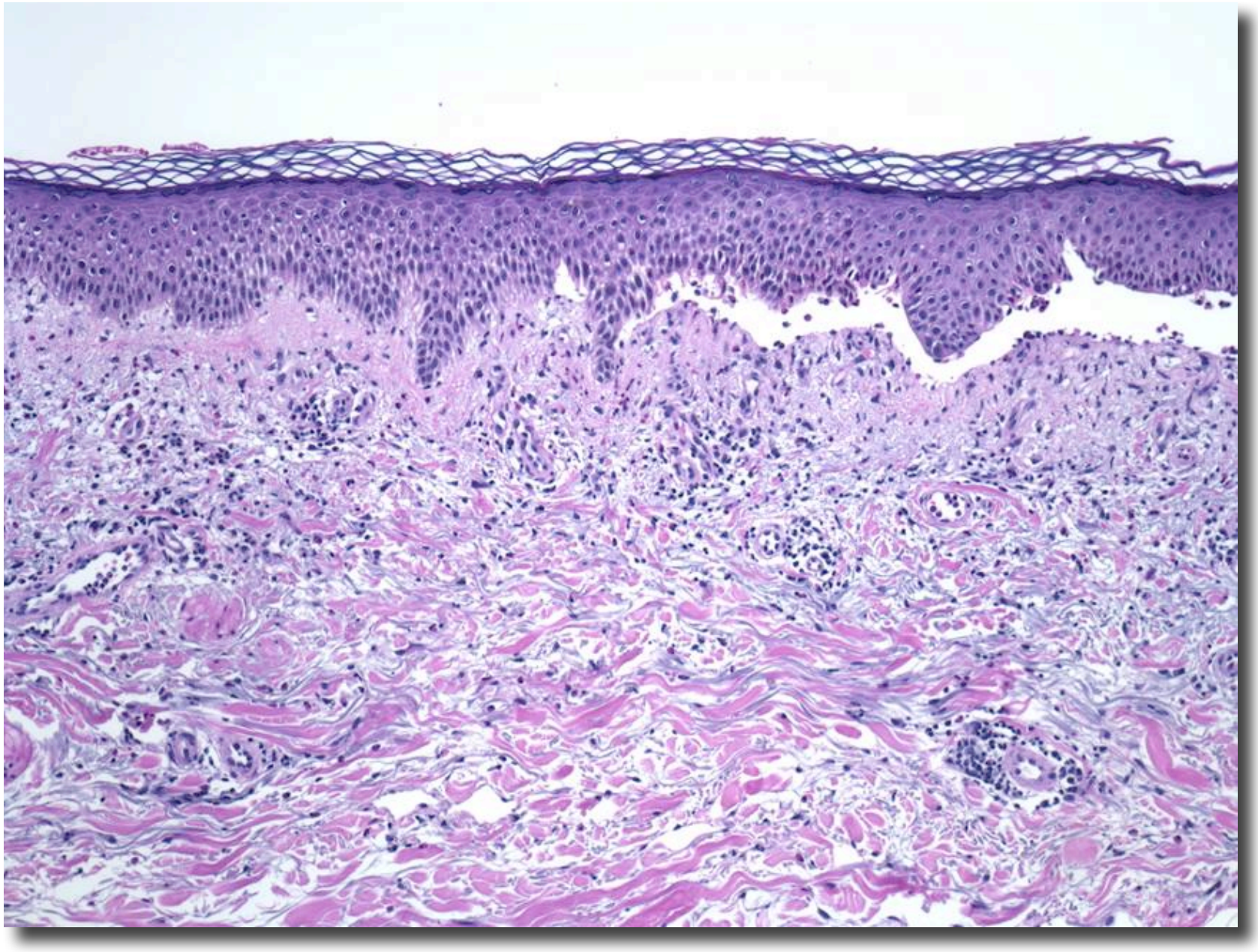


Blister Formation

Intraepidermal: Occurs within the epidermis, by separation between keratinocytes

Subepidermal: Occurs beneath the epidermis, with separation of the epidermis from the underlying dermis

Bullous Phemphigoid



Pemphigoid

- "Autoimmune" pathogenesis
- Type II hypersensitivity reaction:
  - Circulating antibodies react with structural proteins
  - IgG and complement can be found in the basement membrane zone

Interface Dermatitis

Prototypes:

Erythemia Multiforme

Lichen Planus

Definition:

- Rashes with an inflammatory reaction focused on the basal layer of the epidermis, at the ***interface*** between the epidermis and dermis

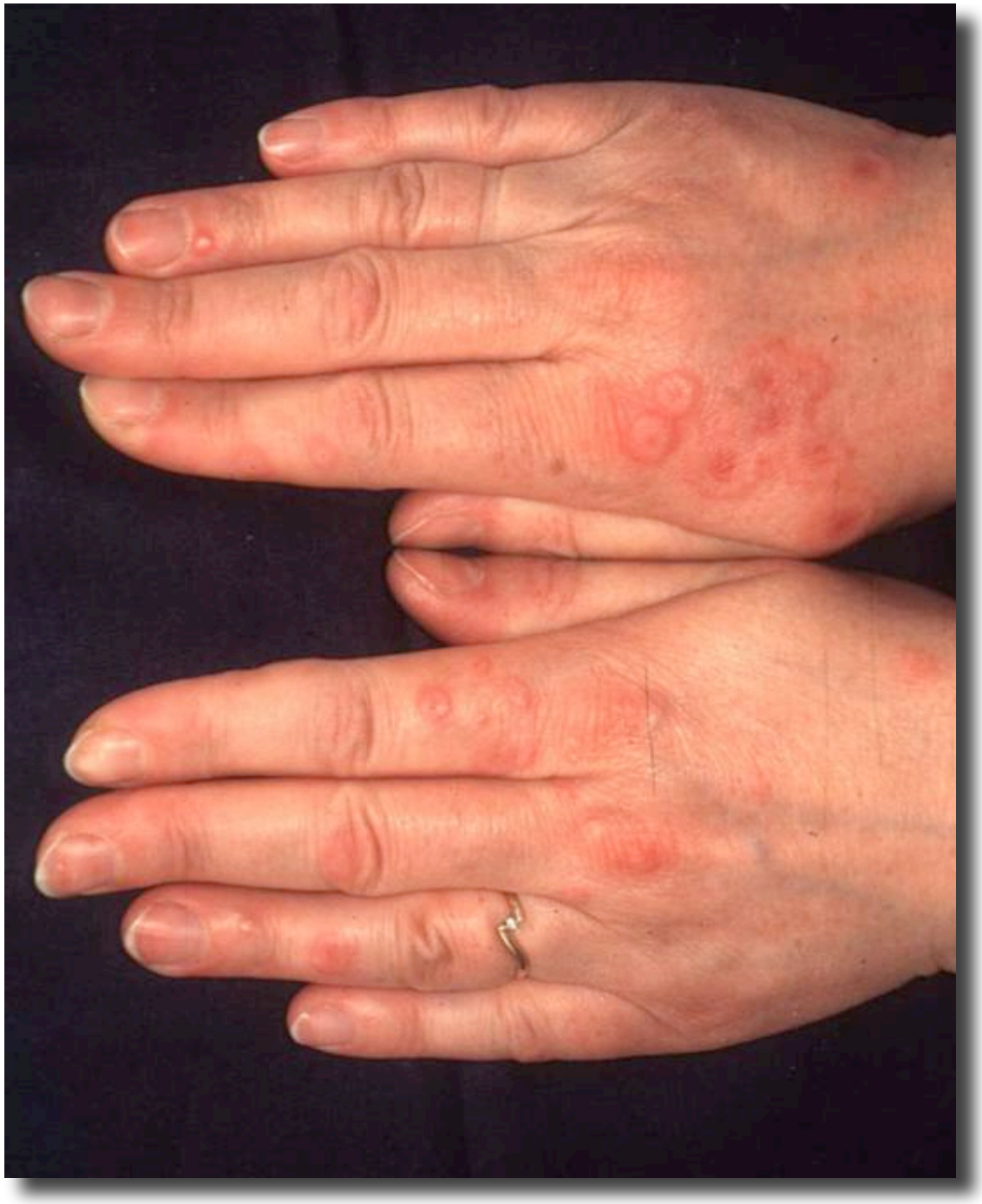
Erythema Multiforme

- Often presents with target lesions
- Widespread, or generalized involvement can occur
  - Stevens-Johnson syndrome
  - Toxic epidermal necrolysis

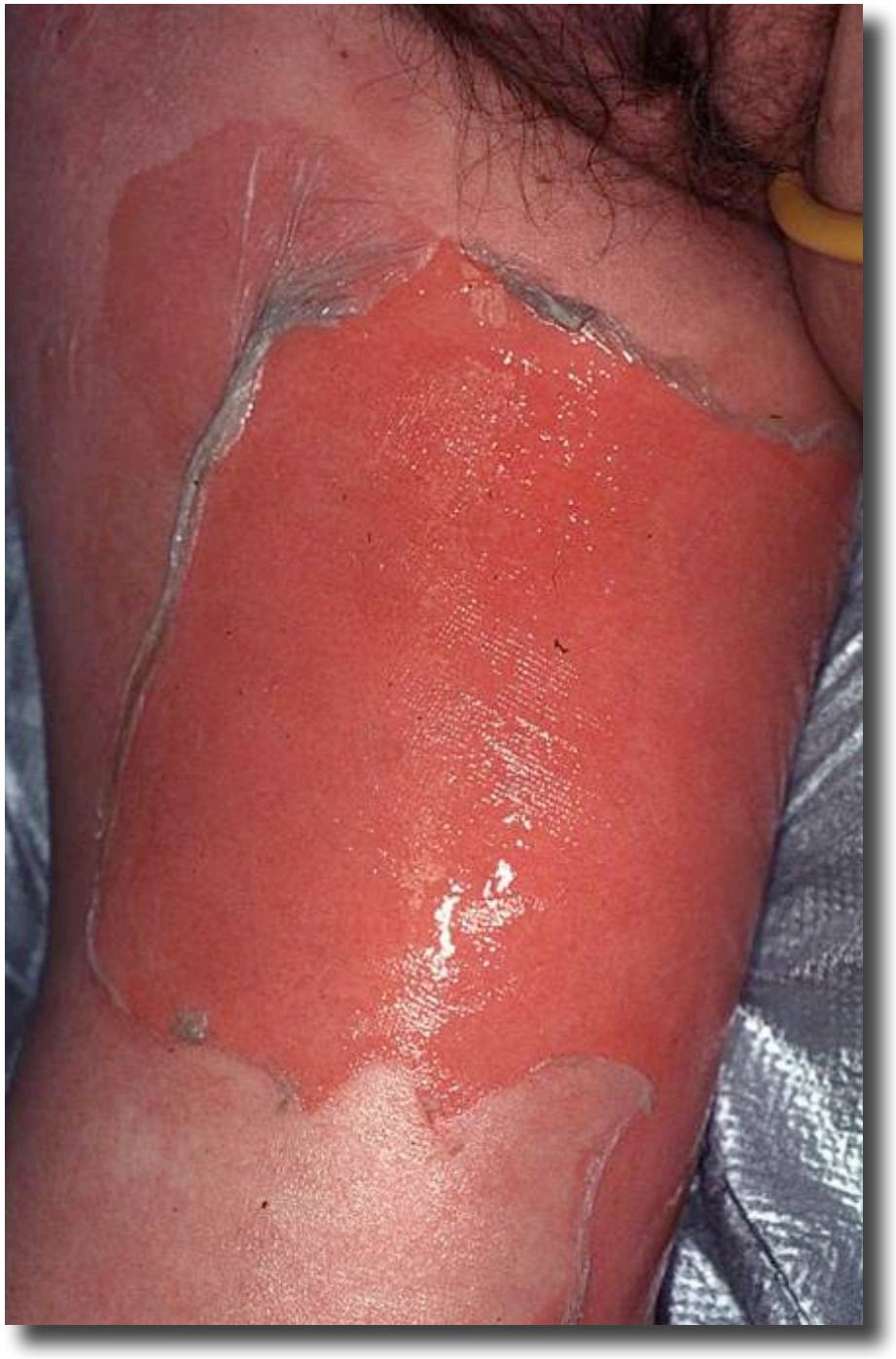
Erythema Multiforme

- Induced by HSV: episodes of EM may occur soon after a herpes labialis flare
- Induced by drugs, commonly antibiotics

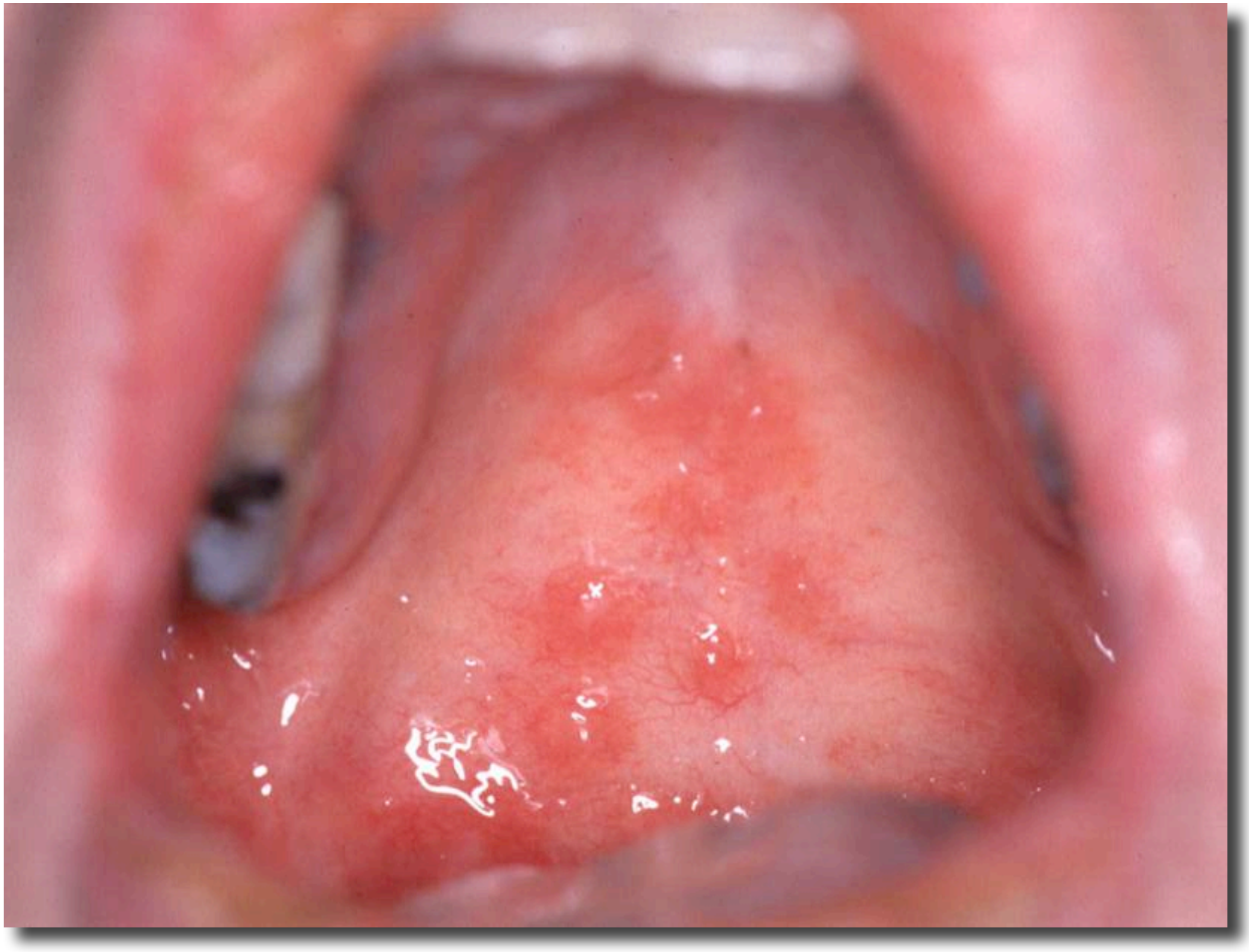
Erythema Multiforme



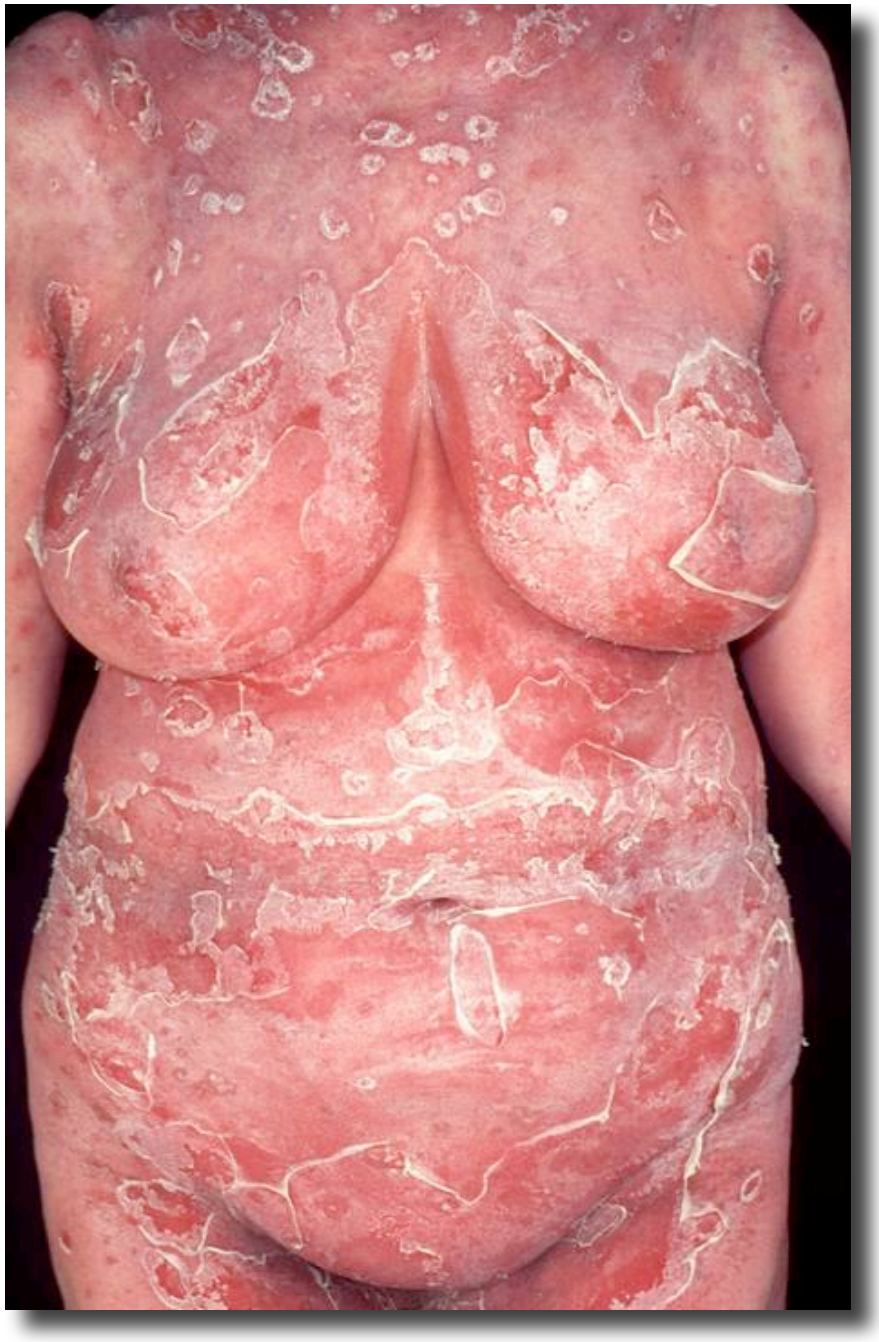
Erythema Multiforme



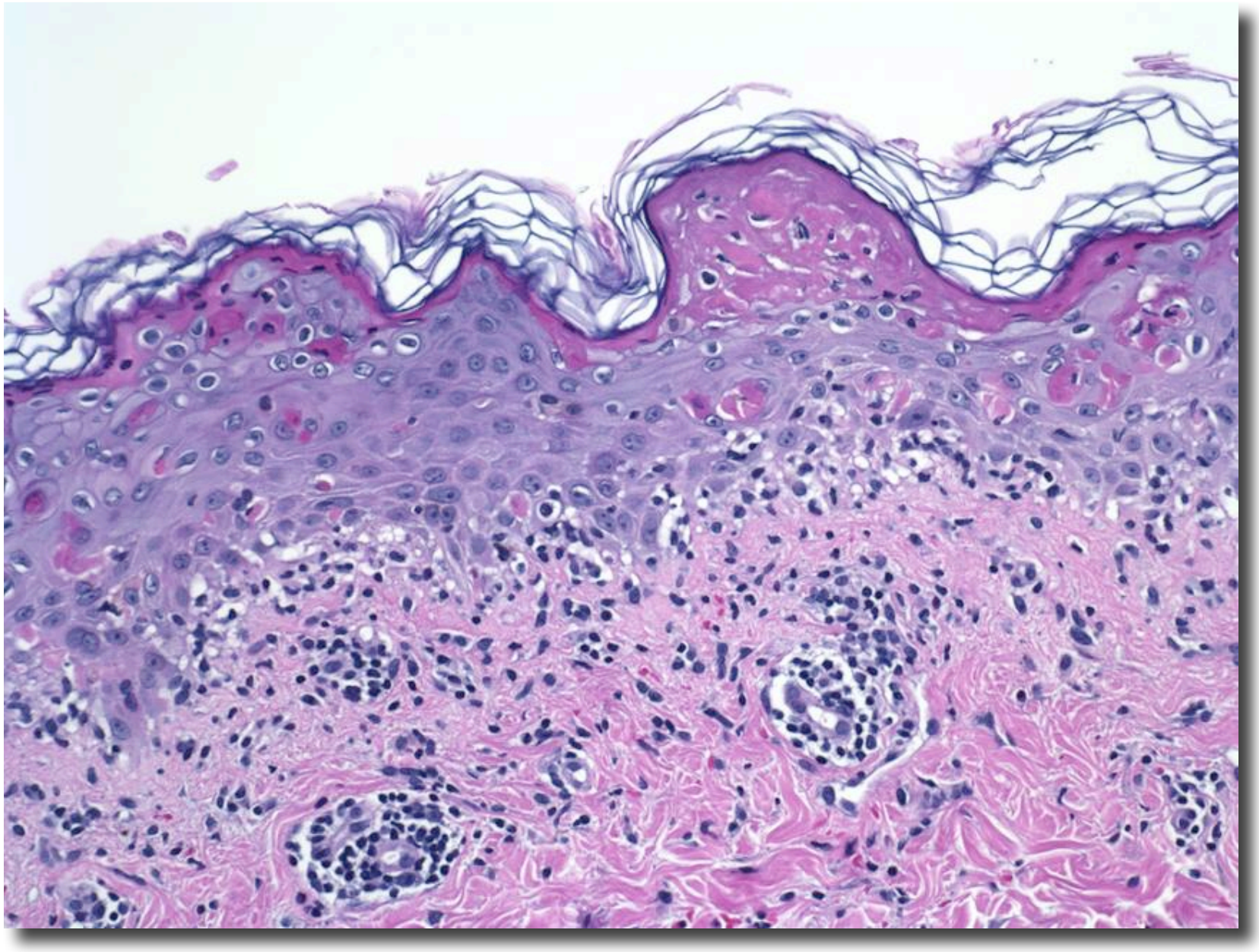
Erythema Multiforme



Erythema Multiforme



Erythema Multiforme



Folliculitis

Prototypes:

Suppurative Folliculitis

Acne Vulgaris

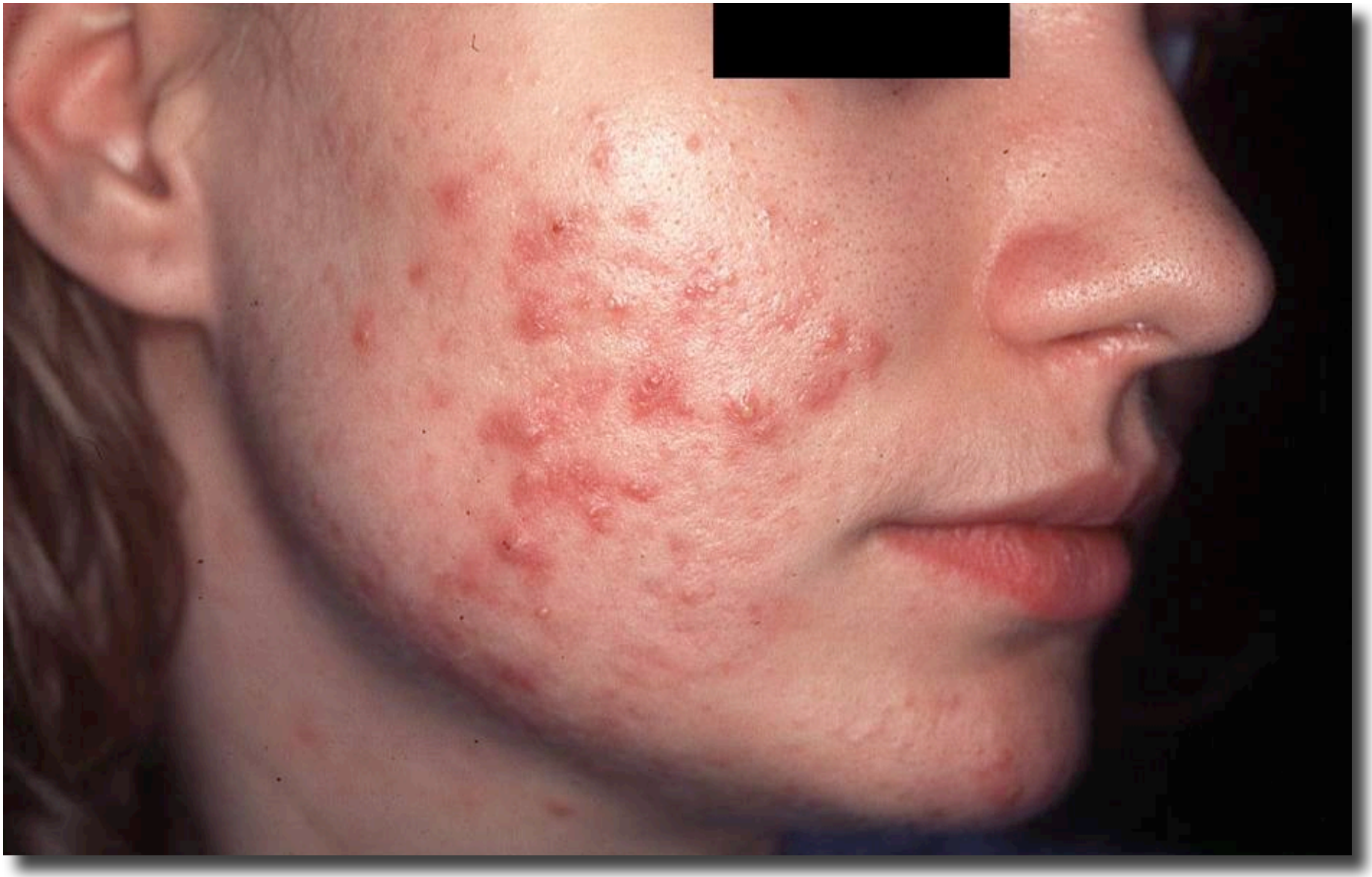
Definition:

- Condition in which inflammation permeates and sometimes destroys the hair follicule
- The medical term for “zit”

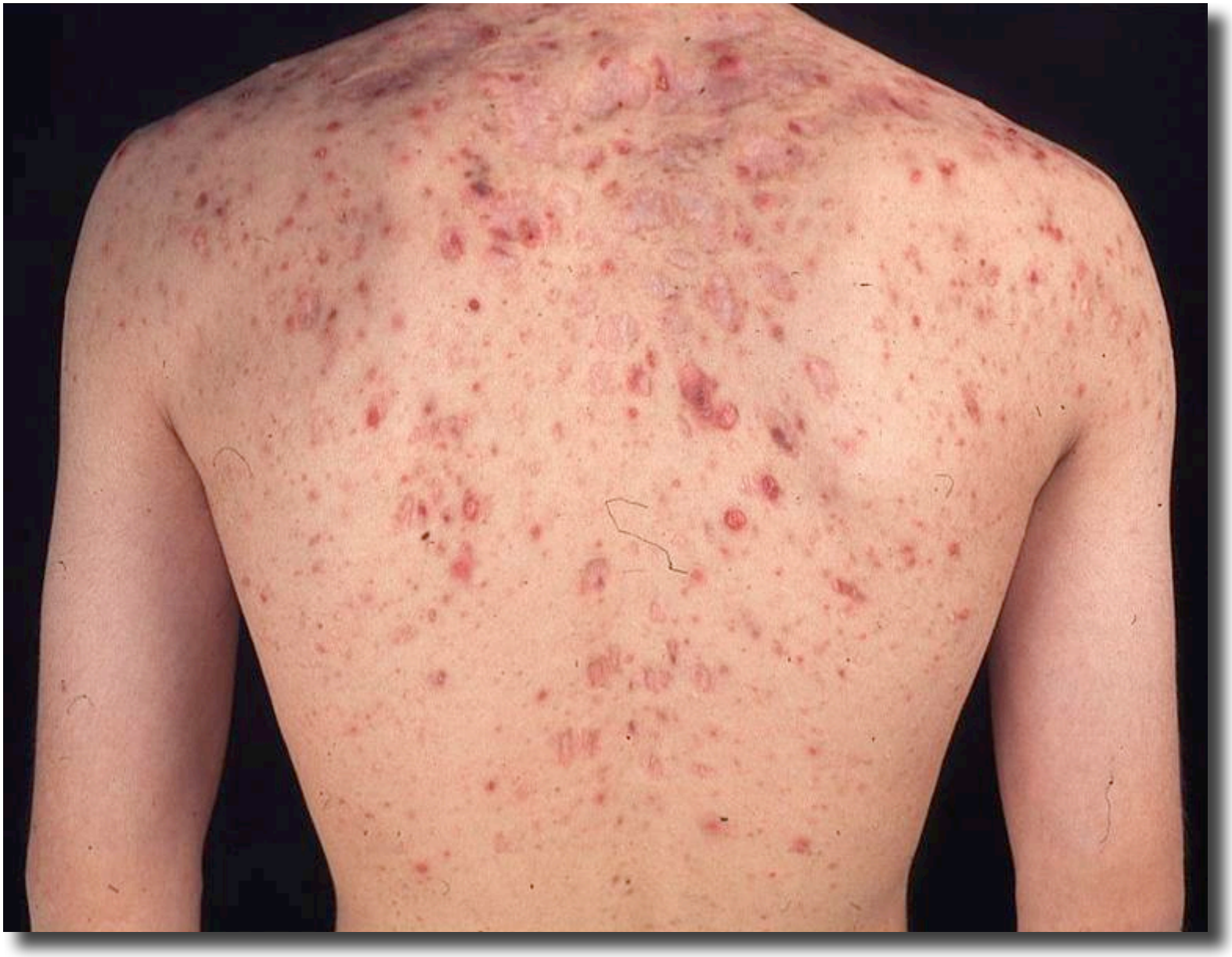
Acne Vulgaris

- Two fundamental processes
  - Abnormal follicular keratinization yielding comedo formation (plugged pores)
  - Follicular inflammation (secondary event)

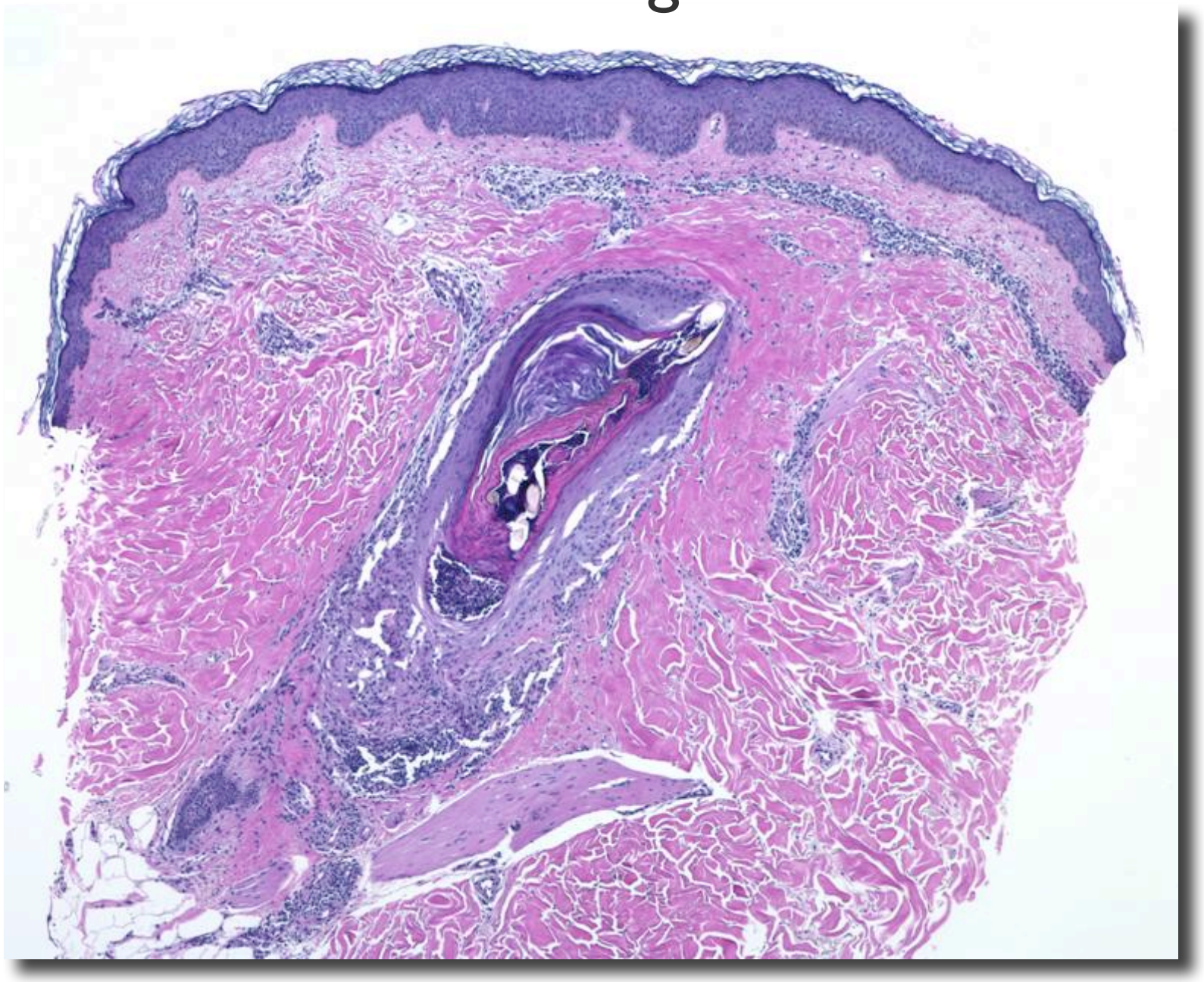
Acne Vulgaris



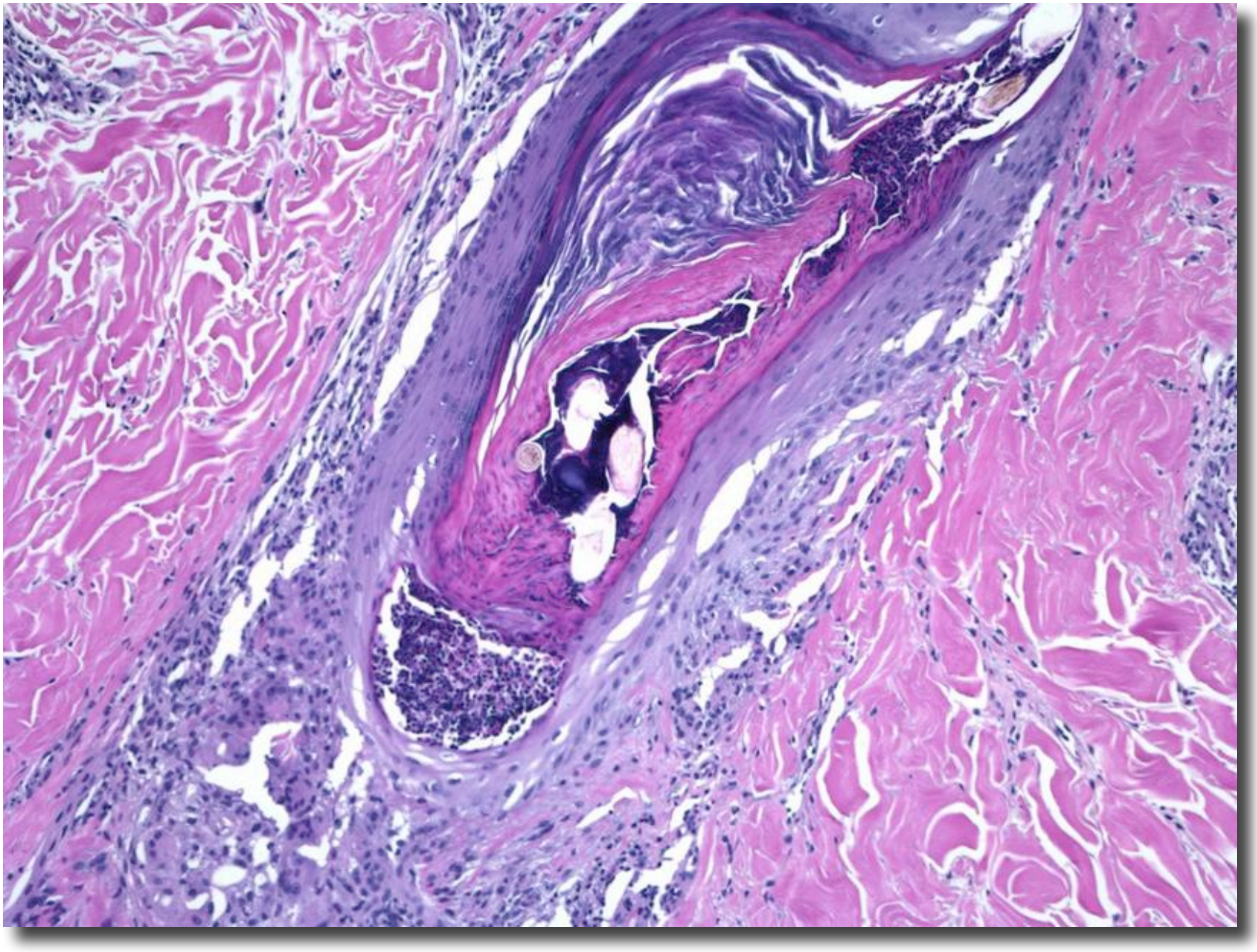
Acne Vulgaris



Acne Vulgaris



Acne Vulgaris



Acne Vulgaris

- Treatment
  - Abnormal follicular plugging is usually treated using vitamin A derivatives (Retin-A)
  - Inflammatory acne usually responds to antibiotics (by an anti-inflammatory mechanism)

Acne Myths: Debunked

- Acne is NOT related to diet
- Acne is NOT related to chocolate
- Acne cannot be scrubbed away
- Defects in follicular keratinization can be exacerbated by hormones, and thus acne is worst at puberty

Conclusions

- Any "funny-looking" moles should be examined by someone skilled in skin exams. This may save you or your patient's life!
- There is a science to diagnosing skin disease
- Pathologic examination aids precise classification
- Once a process is correctly classified, a range of behavior can be expected, and therapeutic options are more clearly defined