

# Skin pathology

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## Normal histology:

### **Skin consists of 3 layers:**

Epidermis (keratinized, squamous),  
Dermis (connective tissue, skin adnexae),  
Subcutaneous fatty tissue

## Macroscopical terms in dermatopathology

1. **Macule:** any flat, colored lesion of skin 5 mm in diameter or less
2. **Patch:** any flat colored lesion more than 5 mm
3. **Papule:** elevated, solid lesion, equal or less than 5mm in diameter.
4. **Nodule:** elevated, solid lesion, more than 5mm in diameter.
5. **Plaque:** elevated flat-topped area, usually more than 5 mm in diameter
6. **Vesicle:** elevated, fluid filled lesion, equal or less than 5mm in diameter
7. **Bullae:** elevated, fluid filled lesion, more than 5mm in diameter.
8. **Pustule:** pus filled elevated area.
9. **Scale:** dry, horny, plate-like skin area (due to imperfect cornification).

## Microscopical terms in dermatopathology

1. **Hyperkeratosis:** hyperplasia of stratum corneum with abnormal keratin.
2. **Parakeratosis:** a mode of keratinization characterized by retention of nuclei in the stratum corneum.
3. **Acanthosis:** epidermal hyperplasia.
4. **Dyskeratosis:** abnormal keratinization occurring mainly within individual cells.
5. **Acantholysis:** loss of cohesion between keratinocytes (due to loss intercellular connections).
6. **Papillomatosis:** elongation &/or widening of dermal papillae.
7. **Spongiosis:** intercellular edema of epidermis.

## Inflammatory disorders of skin

1. **Acute inflammatory Dermatoses:** characterized by
  - Duration of days to weeks
  - Inflammatory cells infiltration mononuclear cells rather than neutrophils.
  - Edema, vascular, epidermal, & subcutaneous injury.
  - Examples: like URTICARIA, & ECZEMA.
- ❖ **Urticaria:**
  - Often between 20- 40 yrs.
  - Characterized by:
    - Localized mast cell degranulation.
    - Dermal microvascular hyperpermeability that result in formation of erythematous, edematous and pruritic plaques (Wheals).
    - The lesions may develop & fade within hours, & may persist for more than months.

**Sites:** any areas exposed to pressure such as the trunk, distal limbs & ears.

**Mic:** characterized by:

1. Perivenular infiltrate consisting of mononuclear cells, admixed with neutrophils or eosinophils
2. Superficial dermal edema result in widely spaced collagen bundles than in normal skin.

### ❖ **Eczema:**

- Is a clinical term for a number of pathogenetically different conditions, all are characterized by itchy, red, papulovesicular oozing & crusted lesions at an early stage, with time these lesions develop into raised, scaling plaques.

Examples: 1. allergic contact dermatitis (contact poisons)

2. atopic dermatitis
3. drug- related eczematous dermatitis

### **Mic:**

1. Spongiosis, which is accumulation of edema fluid within the epidermis.
2. Superficial perivascular, lymphocytic infiltrate associated with papillary dermal edema.
3. Prominent eosinophils infiltrate.

## **2. Chronic inflammatory dermatoses:**

- Have duration last for many months to years.
- Examples (psoriasis, lichen planus).

### ➤ **Psoriasis:**

- It is a common disorder affecting as many as 1% to 2% of people, that appears to have an autoimmune basis.

### **Pathogenesis:**

- As an immunologic disease, psoriasis is believed to be the product of environmental and genetic factors.
- It is not known if the inciting antigens are self or environmental.
- Sensitized populations of T cells enter the skin and accumulate in the epidermis, stimulating the secretion of cytokines and growth factors that induce keratinocyte proliferation.
- Psoriatic lesions can be induced in susceptible individuals by local trauma, a process known as the Koebner phenomenon, because trauma may induce a local inflammatory response that promotes lesion development.

**Sites:** dorsal surfaces of limbs, scalp, lumbosacral areas, & glans penis.

**Gross:** Well defined, pink to salmon- colored plaques covered by loosely adherent silver- white scales.

- 30% of cases are associated with nail changes (pitting, onycholysis, & pustules formation).
- 10% may develop arthritis

### **Mic.:**

1. Marked epidermal thickening (acanthosis), with regular downward elongation of the rete ridges.
2. Thinning or absence stratum granulosum and extensive overlying parakeratotic scale.
3. Neutrophils form small aggregates within the superficial epidermis
4. Capillaries within dermal papillae are brought close to the surface, and lifting the scale from a plaque produces pinpoint areas of hemorrhage known as **Auspitz sign**.

### ➤ **Lichen planus:**

Lichen planus is self-limited and usually resolves spontaneously 1 to 2 years after onset.

### **Pathogenesis:**

The pathogenesis is not known. Expression of altered antigens at the level of the basal cell layer and dermo- epidermal junction may elicit a CD8+ T cell- mediated cytotoxic immune response.

**Sites:** characteristically, there are bilateral symmetrical lesions, mainly on the limbs (about the wrists, elbows, & glans penis, in 70% of cases associated with oral lesions.

**Gross:** itchy, violaceous, flat topped papules, which may coalesce focally to form plaques.

**Mic:**

1. Continuous infiltrate of lymphocytes along the dermoepidermal junction.
2. Dermoepidermal junction shows sawtoothing appearance.
3. Civatte bodies anucleated, necrotic basal cells incorporated into the inflamed papillary dermis.

### ❖ Infectious dermatoses

#### 1. Warts:

Affects any age, a self-limiting, regress spontaneously within 6 months- 2yrs.

**Etiological agents are HPV** (Most of the warts are caused by types of HPV that don't have the potential for malignant transformation).

**Divide according to sites to:**

1. Verruca Vulgaris: the commonest one, most frequently on the dorsal surface of the hands
2. Flat warts (verruca plana): common on the face & also dorsal surface of hands
3. Verruca palmaris & plantaris: on the palms & soles
4. Venereal warts (condyloma accuminatum): on the penis, female genitalia, perianal & rectal areas.

**Gross:** Multiple papules with rough surfaces

**Mic:**

- Papillomatosis (papillomatous epidermal hyperplasia) and cytopathic alterations including Koilocytosis (cytoplasmic vacuolization mainly at superficial epidermis)

#### 2. Impetigo:

The most common skin bacterial infections, which is primarily seen in children. The disease involves direct contact, usually with staphylococcus aureus or less commonly streptococcus pyogens. Often begins as a single macule that rapidly evolves into a larger lesion with a honey-colored crust. The areas most often involved are extremities, nose, and mouth.

#### 3. Fungal infection:

- Superficial infections with candida species (often associated with a neutrophilic infiltrate in the epidermis)
- Dermal infections often elicit a granulomatous response.
- Deeper infections are usually more destructive in particular Aspergillus species.

### ❖ Blistering (bullous)diseases:

- A group of autoimmune disorders characterized by formation of bullae.
- These bullae are either subepidermal or supraepidermal in their location.
- These bullae are due to acantholysis of epidermal cells junctions.
- Examples of bullous diseases are Pemphigus vulgaris, Bullous Pemphigoid, & dermatitis herpetiformis.

#### 1. Pemphigus vulgaris:

- Characterized by suprabasal acantholytic blisters or bullae.
- Bullae involve skin & rare the mucous membranes.
- The disease is due to type II hypersensitivity reaction.
- By immunofluorescent technique, there is netlike pattern of intercellular IgG deposits at the sites of acantholysis

#### 2. Bullous Pemphigoid.

- Affects skin & commonly the mucous membranes (in 30% of cases).
- Characterized by subepidermal, nonacantholytic blisters.
- Also caused by type II hypersensitivity reaction.
- By Immunofluorescent shows linear deposits of Immunoglobulins along the basement membrane zone.

### **3. Dermatitis heptiformis:**

- Affects male > female, at 3rd- 4th decades of life.
- In 10%- 20% of cases associated with celiac disease.
- Characterized by subepidermal bullae.
- By immunofluorescent, there are granular deposits of IgA along the tips of dermal papillae.

## **Tumors of Skin**

❖ The most common benign skin tumor is **nevus** which composed microscopically from: Round to oval cells that grow in nests along dermoepidermal junction (**junctional nevi**) that may grow into the underlying dermis (**compound nevus**) & in older lesions only the dermal nests persist (**pure dermal nevus**).

### **❖ Malignant tumors of skin**

#### **1. Squamous cell carcinoma:**

The most common tumor arising on the sun exposed sites in older people

Male > female

##### **Etiology:**

1. Sunlight (ultraviolet).
2. Industrial carcinogens (tar, oils)
3. Chronic ulcers.
4. Sinus of chronic osteomyelitis
5. Old burn scars
6. Arsenic compounds
7. Ionizing radiation
8. Tobacco (squamous cells carcinoma)
9. Immunocompromised patients.
10. Xeroderma pigmentosum

##### **Gross:**

- I. In situ carcinoma is usually sharply defined red plaques.
- II. Invasive carcinoma is nodular lesion, sometimes ulcerate.

##### **Mic:**

- I. In situ carcinoma: atypical malignant cells are involved the all levels of epidermis without break through the basement membrane.
- II. Invasive carcinoma: malignant cells are break through the basement membrane. Invasive carcinomas show variable degrees of differentiation ranging from tumors well differentiated carcinoma which is formed by polygonal squamous cells arranged in orderly lobules that exhibit numerous areas of keratinization to a highly anaplastic carcinoma that is formed by rounded cells with many zones of necrosis & dyskeratosis.

Less than 5% of squamous cells carcinoma shows metastases to regional lymph nodes.

#### **2. Basal cells carcinoma.**

Are common, slowly growing tumors that are rarely metastasizing.

Has the same etiology of Squamous cell carcinoma.

**Gross:** Pearly papules, often containing prominent, dilated subepidermal blood vessels.

Sometime contain melanin pigment (called pigmented Basal cell carcinoma).

Advanced lesions may ulcerate & extensively invade the local bone or facial sinuses (rodent ulcer).

**Mic:** tumor cells are resembling the normal basal cells of epidermis, with peripheral palisading, the tumor nests are surrounded by fibrous tissue & sometime lymphocytes infiltrate

### **3. Melanoma:**

Melanoma is the deadliest of all skin cancers and is strongly linked to acquired mutations caused by exposure to UV radiation in sunlight. is a relatively common neoplasm that can be cured if it is detected and treated when it is in its earliest stages.

**Sites:** skin, oral cavity, anogenital areas, esophagus, meninges, & eyes.

#### ***Etiology:***

1. Sunlight
2. Preexisting nevus (dysplastic nevus)
3. Industrial carcinogens
4. Hereditary & familial factors

#### ***Gross & clinical features:***

##### ***Warning clinical signs of malignant melanoma; are***

1. Enlargement of preexisting mole
2. Itching & pain in preexisting mole
3. Irregularity of borders of pigmented lesion
4. Variegation of color within the pigmented lesion
5. Development of new pigmented lesion during adult life

**Mic:** there are two patterns of growth in malignant melanoma.

1. *Radial pattern of growth:* represent the initial tendency of malignant melanoma to grow horizontally within the epidermis & superficial dermal layers, for long period of time, such pattern of growth has no tendency of metastasis & angiogenesis.
2. *Vertical growth:* with the time melanoma now grows downward into the deeper dermal layers as an expansile mass, with high tendency of metastasis & angiogenesis.

**Sites of metastasis:** regional lymph nodes, liver, lung, brain, & heart.

##### ***Characteristics of melanomas cells:***

1. Melanoma cells are larger than cells of nevus
2. Malignant cells have large nuclei, with irregular contour, & clumped chromatin
3. Have prominent eosinophilic nucleoli
4. Cells grow either in nests or single.