

# The Integumentary System

## Skin, Hair, Nails & Dermatological Terminology

Dr. Hussein Safaa  
Plastic Surgeon



# What is the Integumentary System?



## Comprehensive Protection

Comprises skin, hair, nails, and associated glands working together as the body's primary protective barrier.



## Largest Organ System

Protects internal structures, regulates body temperature, and continuously senses environmental changes.



## First Line of Defence

Acts as the initial barrier against pathogens, physical injury, chemical exposure, and harmful radiation.

# Layers of the Skin: The Structural Triad

## Epidermis

**Outermost protective layer**

**Stratified squamous keratinised epithelium** that continuously regenerates. Contains melanocytes and keratinocytes responsible for pigmentation and barrier function.

## Dermis

**Middle connective layer**

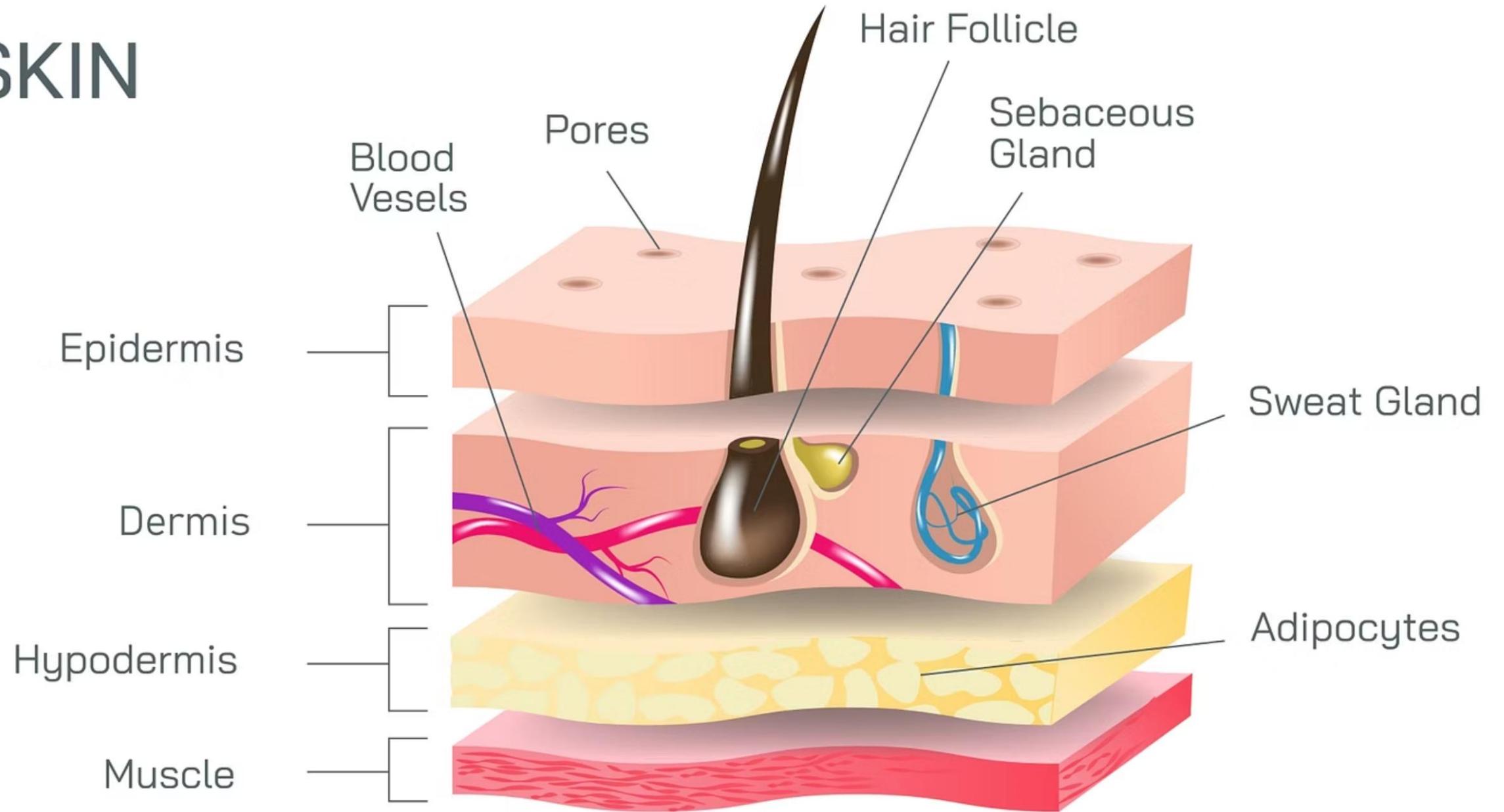
Dense connective tissue housing blood vessels, lymphatics, hair follicles, sebaceous and sweat glands. Provides structural support and elasticity.

## Hypodermis

**Subcutaneous foundation**

Adipose and loose connective tissue connecting skin to underlying muscles and bones. Provides insulation and cushioning.

# HUMAN SKIN LAYERS



# Key Skin Cells and Components



## Keratinocytes

Predominant cells producing keratin protein, forming the skin's robust protective barrier. They undergo continuous differentiation as they migrate from basal layer to surface.



## Melanocytes

Specialised pigment-producing cells synthesising melanin to protect against ultraviolet radiation damage. Responsible for skin tone variation and photoprotection.



## Langerhans Cells

Dendritic immune cells providing immunological surveillance. They detect and process antigens, initiating adaptive immune responses to pathogens.



## Merkel Cells

Mechanoreceptor cells located in the basal epidermis, functioning as highly sensitive touch receptors essential for tactile discrimination.

# Hair and Nails: Accessory Structures

## Hair Structure

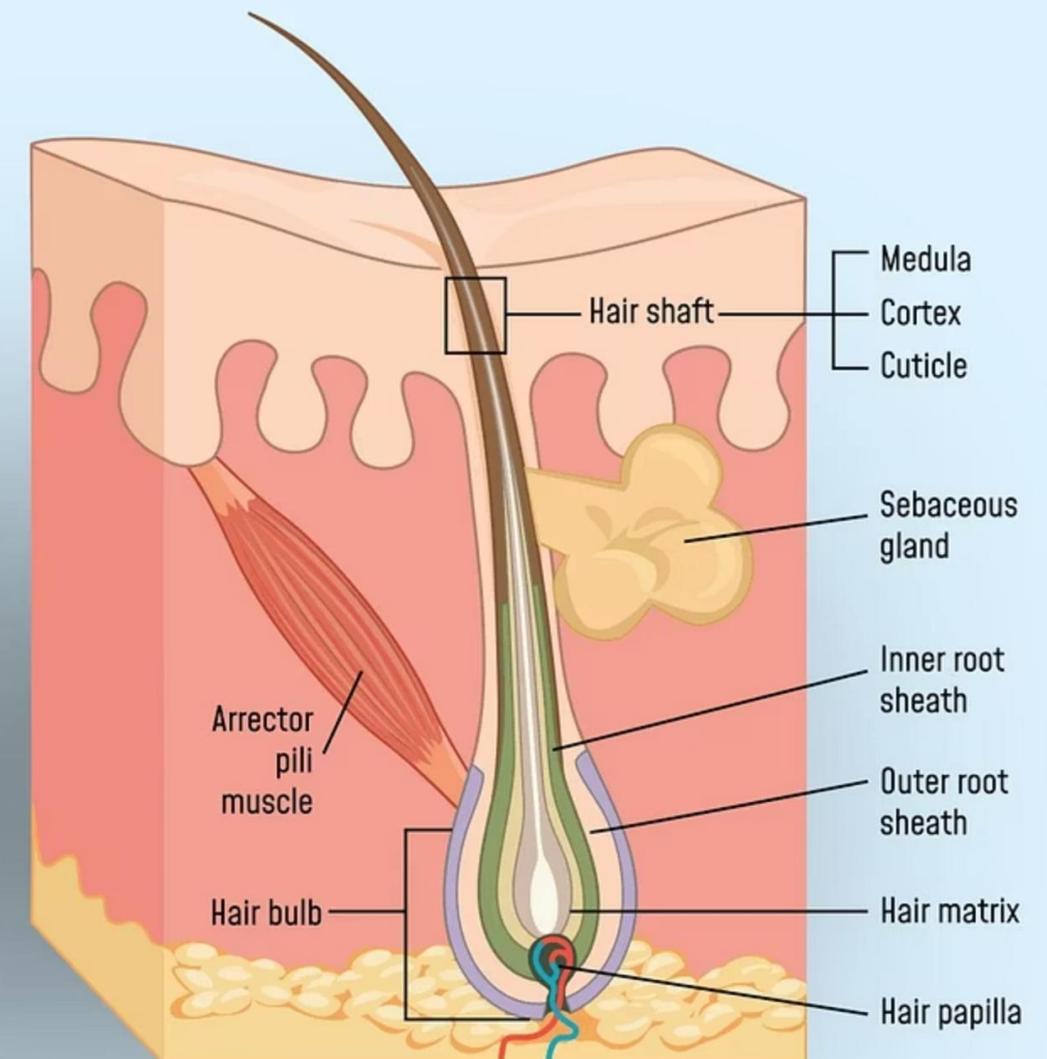
Keratinous filaments emerging from hair follicles embedded in the dermis. Functions include thermoregulation, protection from UV radiation, and sensory perception through follicular nerve endings.

## Nail Anatomy

Hardened keratin plates formed by the nail matrix, protecting distal phalanges whilst enhancing fine motor manipulation and tactile sensitivity of fingertips and toes.

## Associated Glands

Sebaceous glands secrete lipid-rich sebum for skin lubrication and antimicrobial protection. Eccrine and apocrine sweat glands regulate thermoregulation and pheromone production.



# Common Word Roots & Prefixes

## derm/o, dermat/o

Meaning: skin.

Example: **dermatitis** (inflammation of the skin).

## epi-

Meaning: upon, above.

Example: **epidermis** (outer layer of skin).

## hypo-

Meaning: below, under.

Example: **hypodermic** (pertaining to beneath the skin).

## sub-

Meaning: beneath.

Example: **subcutaneous** (located or placed under the skin).

## onych/o

Meaning: nail.

Example: **onychomycosis** (fungal infection of the nail).

## trich/o

Meaning: hair.

Example: **trichotillomania** (impulse to pull out one's hair).

## melan/o

Meaning: black, dark.

Example: **melanoma** (a type of skin cancer originating in melanocytes).

## erythr/o

Meaning: red.

Example: **erythema** (redness of the skin).

# Common Word Roots & Prefixes (continued)

## leuk/o

Meaning: white. Example: **leukoderma** (patches of abnormal

## xer/o

Meaning: dry. Example: **xeroderma** (dry skin).

## seb/o

Meaning: sebum, oil. Example: **seborrhea** (excessive discharge

## kerat/o

Meaning: hard, horny tissue (keratin). Example: **keratosis** (a growth of keratin on the skin).

## -itis

Meaning: inflammation. Example: **dermatitis** (inflammation of

## -osis

Meaning: condition, disease (often abnormal). Example: **dermatosis** (any skin disease).

## -ectomy

Meaning: surgical removal. Example: **rhytidectomy** (surgical removal of wrinkles, facelift).

## -plasty

Meaning: surgical repair. Example: **rhinoplasty** (surgical repair of the nose).

# Building Medical Terms: Examples

01

---

## Dermatologist

**Dermat/o/logist** – Medical specialist in the diagnosis and treatment of skin disorders, utilising comprehensive knowledge of integumentary pathophysiology.

03

---

## Hypodermic

**Hypo/derm/ic** – Beneath the skin; commonly refers to subcutaneous injection methods delivering medication below the dermal layer.

02

---

## Epidermal

**Epi/derm/al** – Pertaining to or situated upon the epidermis, the outermost stratified layer of the skin providing barrier function.

04

---

## Onychomycosis

**Onych/o/myc/osis** – Fungal infection affecting nail plates, characterised by discolouration, thickening, and potential separation from the nail bed.

# Dermatological Terms Related to Skin Conditions

## Acne Vulgaris

Inflammatory disorder of pilosebaceous units resulting from excess sebum production, follicular hyperkeratinisation, and bacterial colonisation.

## Eczema (Dermatitis)

Inflammatory skin condition manifesting as pruritic, erythematous rash with potential vesiculation, often triggered by allergic or irritant exposure.

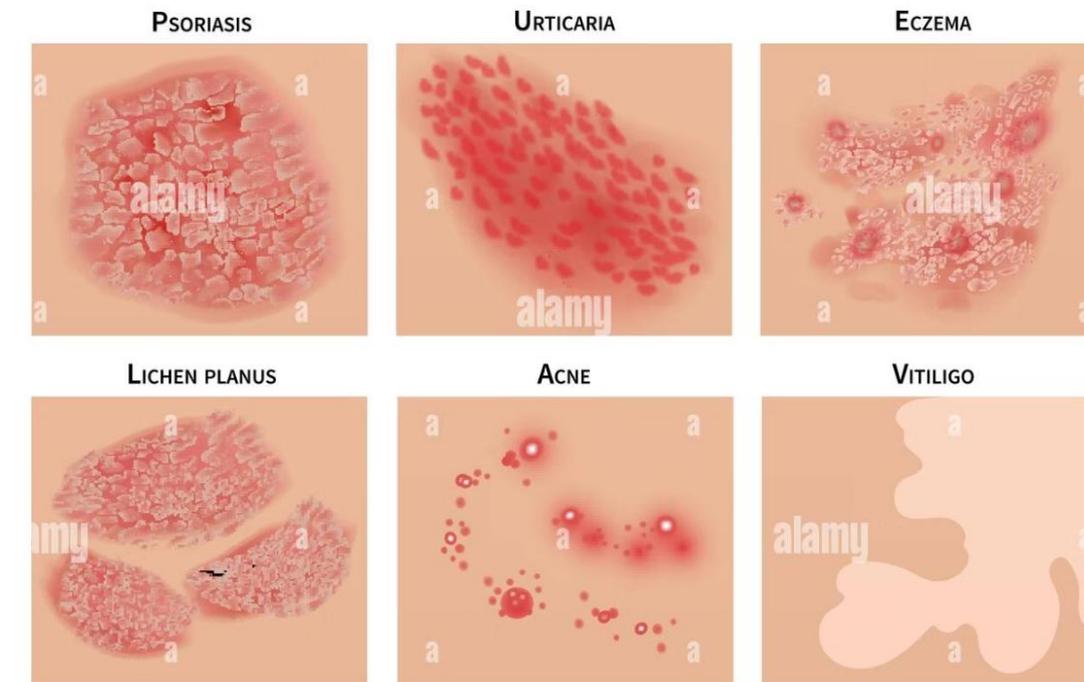
## Basal Cell Carcinoma

Most prevalent form of skin malignancy arising from basal keratinocytes, typically presenting as pearly nodules with telangiectasia.

## Keloid Formation

Excessive fibroproliferative response producing raised scar tissue extending beyond original wound margins, representing aberrant wound healing.

## DISEASES OF THE SKIN

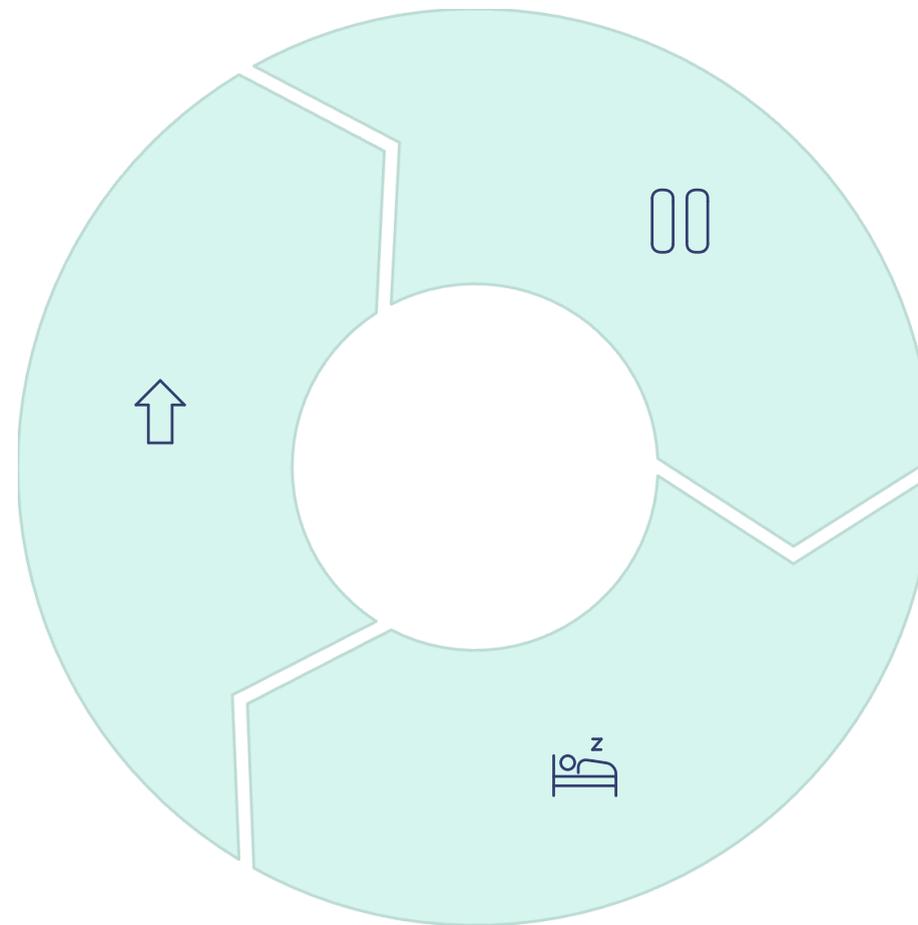


# Hair Growth Cycle Terminology

Understanding the hair follicle cycle is essential for comprehending alopecia pathophysiology and therapeutic interventions in trichological disorders.

## Anagen Phase

Active growth phase lasting 2–7 years, during which follicular keratinocytes rapidly proliferate to produce the hair shaft. Approximately 85–90% of scalp hairs are in anagen.



## Catagen Phase

Brief transitional phase of 2–3 weeks where cell division ceases, the follicle regresses, and the hair shaft becomes a club hair detached from blood supply.

## Telogen Phase

Resting phase lasting approximately 3 months before natural shedding occurs. The follicle remains dormant until anagen reinitiation signals new growth.

# Common Cosmetic Treatment Terms

## Exfoliation

Mechanical or chemical removal of stratum corneum cells to improve skin texture, enhance cellular turnover, and facilitate penetration of topical agents.

## Microdermabrasion

Non-invasive mechanical exfoliation employing fine crystals or diamond tips to abrade superficial epidermis, stimulating collagen synthesis and improving skin texture.

## Chemical Peel

Controlled application of acidic solutions (glycolic, salicylic, trichloroacetic acid) to remove damaged epidermal layers, treating photodamage, hyperpigmentation, and acne scarring.

## Botulinum Toxin (Botox)

Neurotoxin injection temporarily paralysing facial musculature to reduce dynamic rhytids, particularly effective for glabellar lines and crow's feet.

# Skin Treatment Procedures & Terms



## Laser Therapy

Selective photothermolysis targeting chromophores (melanin, haemoglobin, water) for treating pigmentation disorders, vascular lesions, acne scarring, and permanent hair reduction.



## Cryotherapy

Application of liquid nitrogen inducing controlled tissue destruction through freeze-thaw cycles, effective for benign lesions, viral warts, and actinic keratoses.



## Dermabrasion

Surgical skin resurfacing technique using high-speed rotating instruments for controlled mechanical ablation, primarily treating deep acne scars and rhinophyma.



## Phototherapy

Therapeutic ultraviolet radiation (narrowband UVB, PUVA) modulating immune responses in inflammatory dermatoses including psoriasis, vitiligo, and atopic eczema.

# Understanding Skin Types & Conditions

## Classification of Skin Types

- **Xerotic (Dry) Skin:** Reduced sebum production and compromised barrier function resulting in scaling, pruritus, and increased transepidermal water loss
- **Seborrhoeic (Oily) Skin:** Hyperactive sebaceous glands producing excess lipids, predisposing to acne vulgaris and enlarged pores
- **Combination Skin:** Regional variation with increased sebum in T-zone (forehead, nose, chin) and normal to dry cheeks

## Pigmentation Disorders

- **Hyperpigmentation:** Excessive melanin deposition causing localised darkening, including melasma, post-inflammatory hyperpigmentation, and solar lentigines
- **Hypopigmentation:** Melanin deficiency manifesting as depigmented patches, notably in vitiligo (autoimmune melanocyte destruction) and pityriasis alba
- **Rhytids (Wrinkles):** Cutaneous folds resulting from intrinsic ageing, photoaging, gravitational effects, and repetitive muscle contraction

# Safety and Monitoring in Dermatology

## ☐ ABCDE Rule for Melanoma Detection

A systematic approach to identifying suspicious pigmented lesions requiring urgent dermatological evaluation and potential biopsy.

### **A – Asymmetry**

One half of the lesion does not mirror the other, suggesting irregular growth patterns characteristic of malignancy.

### **B – Border Irregularity**

Margins are poorly defined, notched, scalloped, or blurred rather than smooth and regular.

### **C – Colour Variation**

Multiple colours within a single lesion (brown, black, red, white, blue) indicating abnormal melanocyte activity.

### **D – Diameter >6mm**

Lesions exceeding 6 millimetres (pencil eraser size) warrant heightened suspicion, though melanomas can present smaller.

### **E – Evolution**

Changes in size, shape, colour, elevation, or new symptoms (bleeding, pruritus) over time are particularly concerning.

Early detection of melanoma and non-melanoma skin cancers dramatically improves prognosis. Dermatologists employ dermoscopy, biopsy, and histopathological analysis for accurate diagnosis and staging, enabling timely therapeutic intervention.



# Summary: Integrating Terminology with Clinical Insight

1

## Terminology Mastery

Comprehensive understanding of integumentary terminology facilitates accurate communication amongst healthcare professionals and enhances patient education regarding skin health maintenance.

2

## Holistic Health Reflection

The integumentary system serves as a visible indicator of systemic health status. Dermatological manifestations often signify underlying metabolic, autoimmune, or infectious conditions requiring multidisciplinary management.

3

## Advancing Therapeutic Options

Contemporary dermatology encompasses evidence-based medical treatments, innovative surgical techniques, and advanced cosmetic procedures that significantly improve both clinical outcomes and quality of life.



# Thank You

## Questions & Discussion

We welcome your enquiries regarding how mastery of integumentary terminology empowers enhanced clinical communication, facilitates accurate diagnosis, and supports evidence-based practice in dermatology and cosmetic care.