The physiology of the Skin

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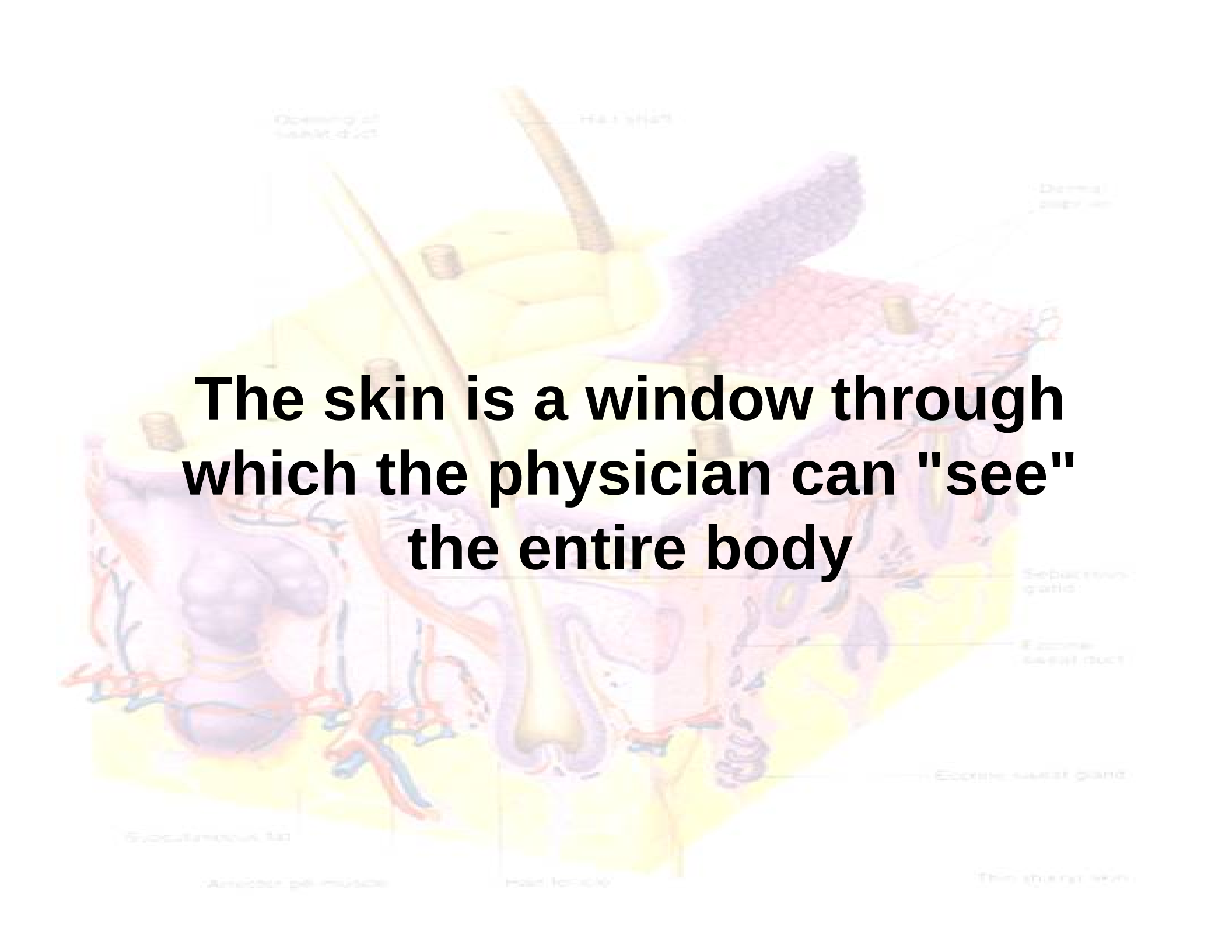
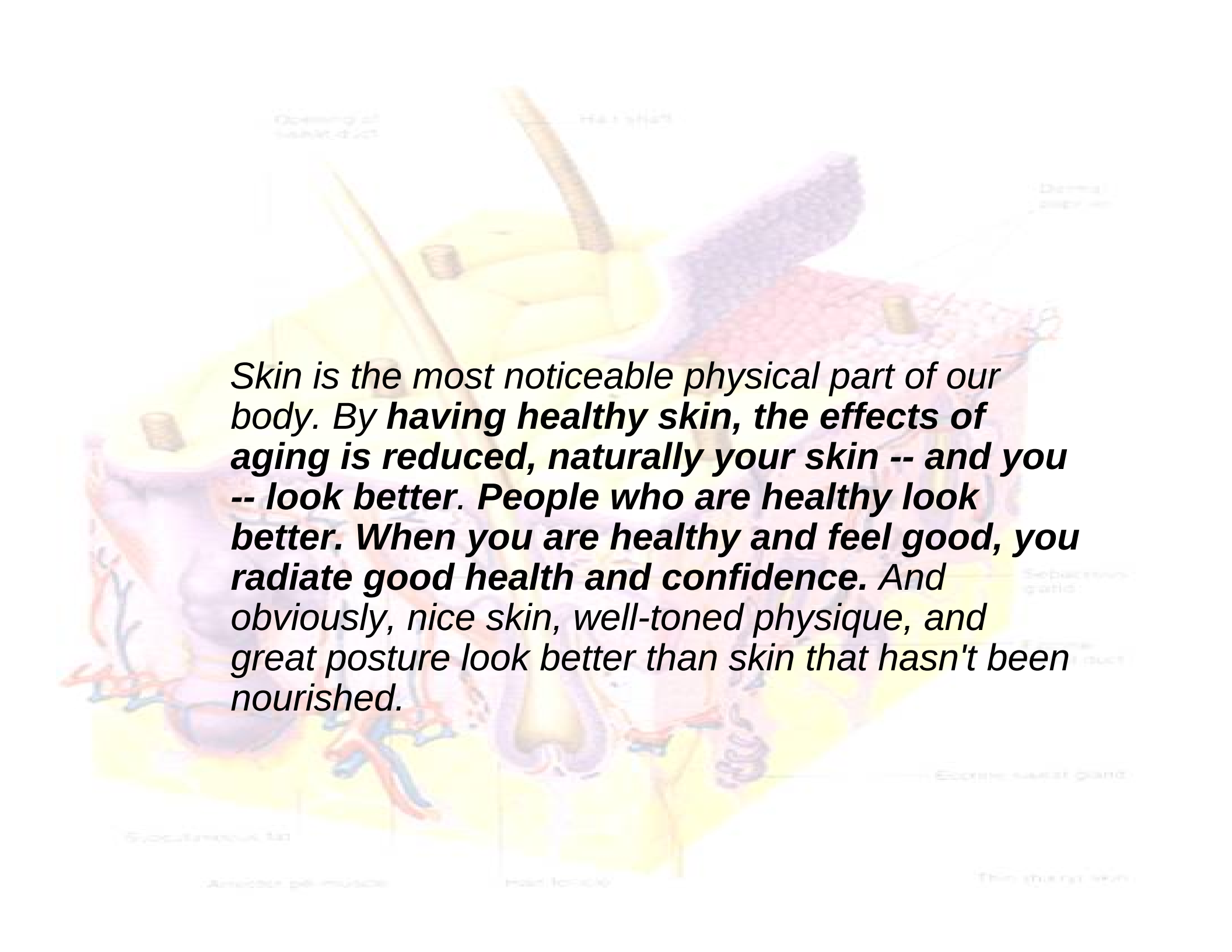
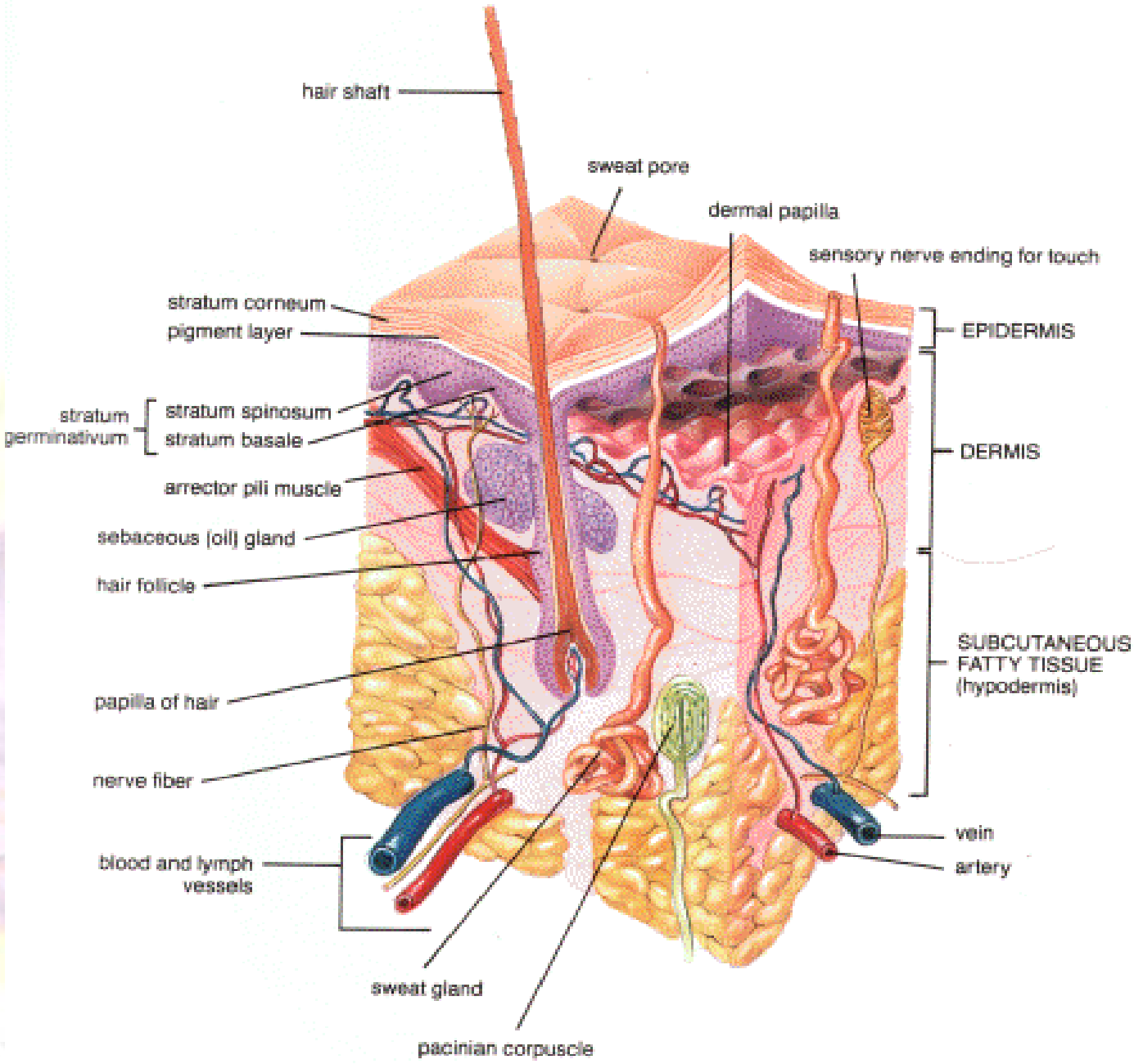


The skin is a window through which the physician can "see" the entire body

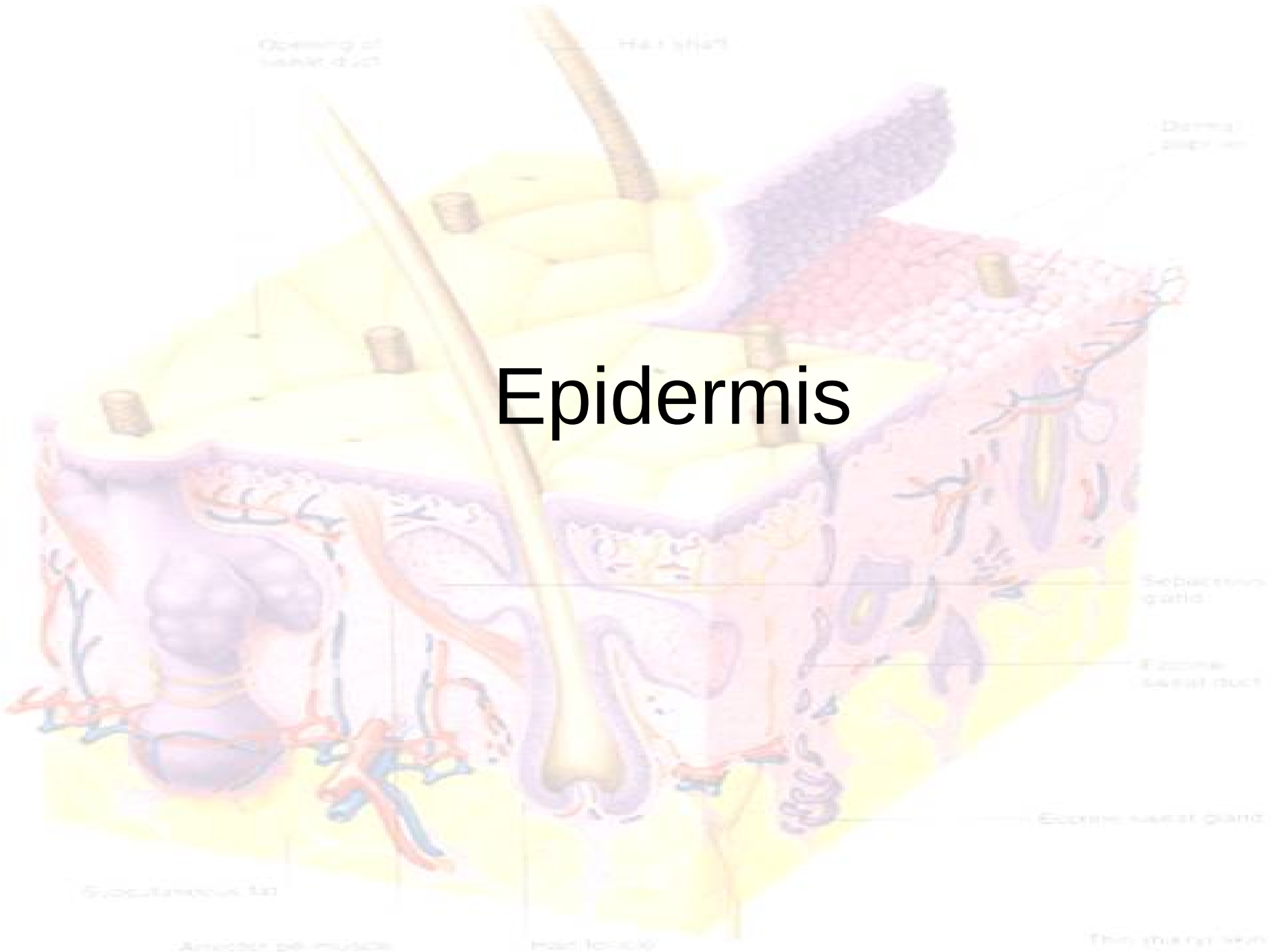


Skin is the most noticeable physical part of our body. By ***having healthy skin, the effects of aging is reduced, naturally your skin -- and you -- look better****.* ***People who are healthy look better. When you are healthy and feel good, you radiate good health and confidence.*** *And obviously, nice skin, well-toned physique, and great posture look better than skin that hasn't been nourished.*

Skin Architecture

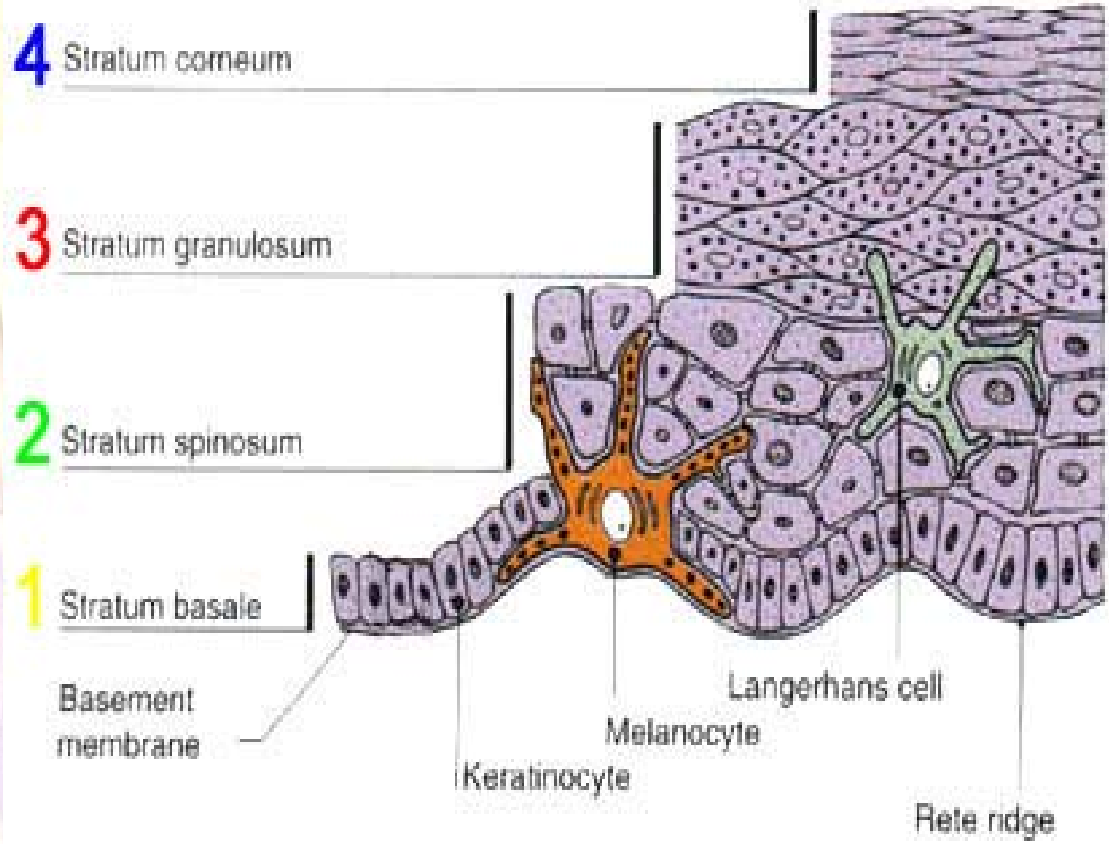

hair shaft
sweat pore
dermal papilla
sensory nerve ending for touch
stratum corneum
pigment layer
EPIDERMIS
stratum germinativum
stratum spinosum
stratum basale
DERMIS
arrector pili muscle
sebaceous (oil) gland
hair follicle
SUBCUTANEOUS FATTY TISSUE (hypodermis)
papilla of hair
nerve fiber
vein
artery
blood and lymph vessels
sweat gland
pacinian corpuscle

Epidermis



The epidermis

- ✓ the top most layer of skin
- ✓ 0.1 to 1.5 mm thickness
- ✓ It is made up of 4 layers:
  1. basal cell layer,
  2. squamous cell layer
  3. stratum granulosum
  4. stratum corneum.

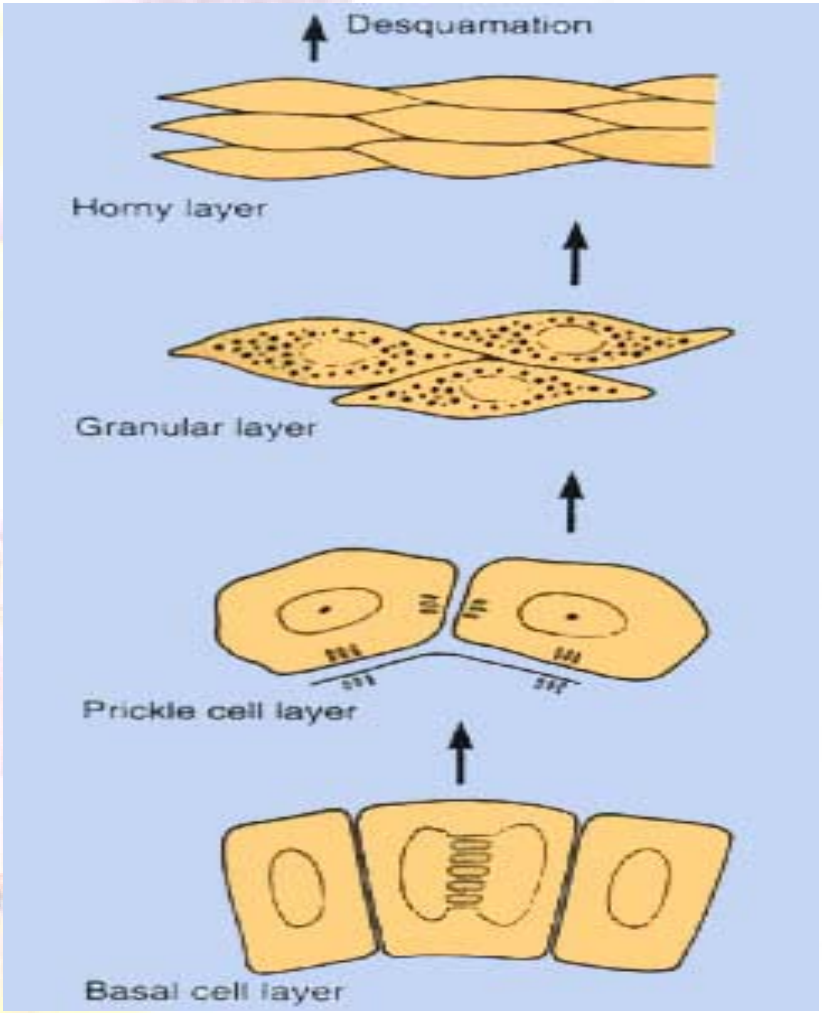


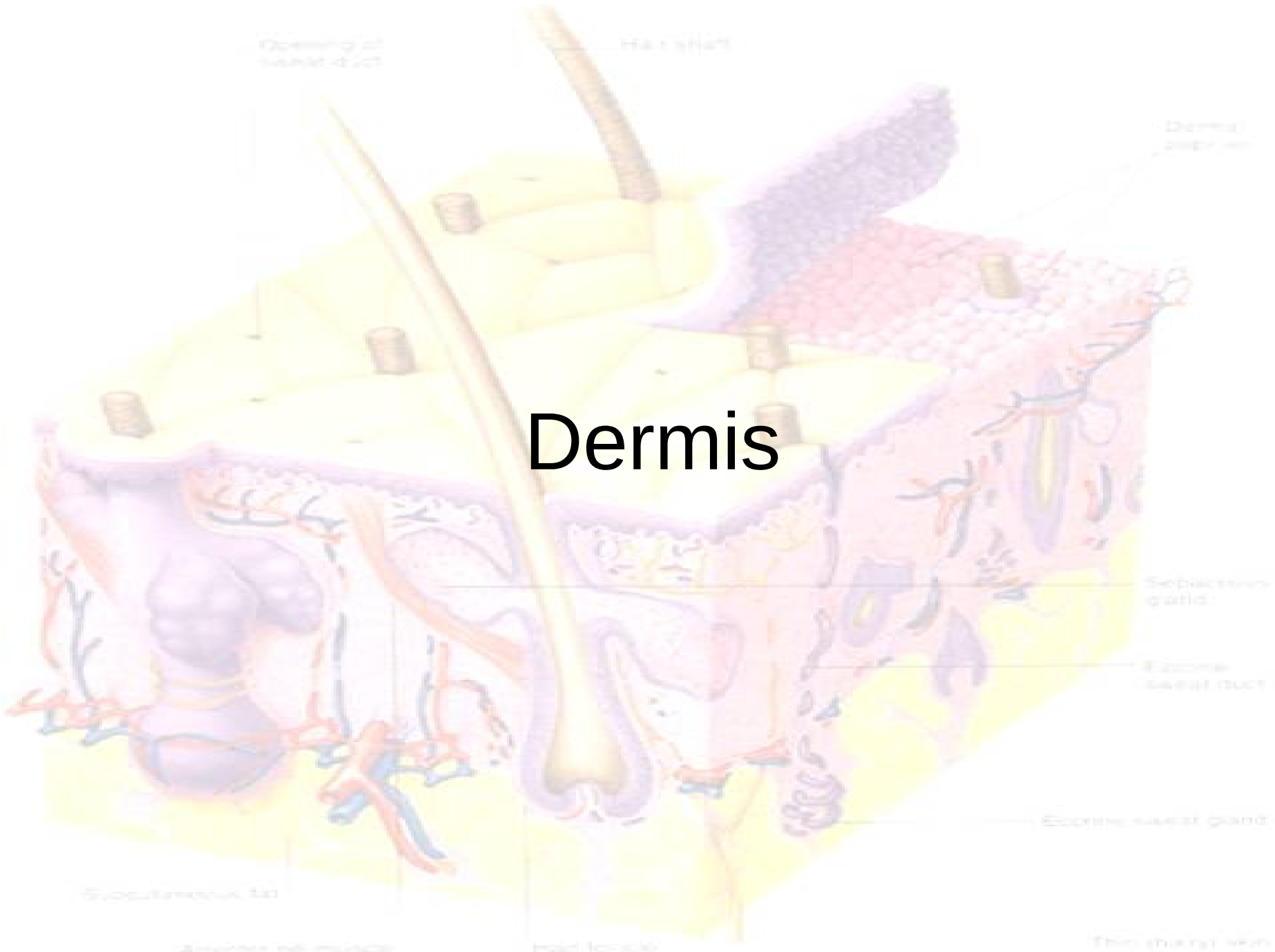
Melanin

- Produces by melanocytes (specialized cells in the basal cell layer)
- Protects the skin against sun damage
- Rate of production determines skin color—the more melanin produced in the skin, the darker the skin appears.
- Melanin production increases when skin exposure to the sun (in an effort to shield the skin from the damaging ultraviolet rays; suntan effect).
- Caused freckles, birthmarks, and age spots (pathes of melanin within the skin.

The Skin Renewal Process

- The 4 layers are continually rebuild the surface of the skin from within
- The continuous process maintain the skin's strength and helping thwart wear and tear.
- In the average adult, it takes nearly a month for the stratum corneum to be completely replaced.
- The replacement process generally slows with age, though in some people it becomes abnormally accelerated, causing a flaky, scaly skin condition known as psoriasis.





Dermis

Dermis

- ✓ Lies beneath the epidermis
- ✓ 1 .5 to 4 mm thick (the thickest of the three layers of the skin).
- ✓ Home to most of the skin's structures, including sweat and oil glands, hair follicles, nerve endings, and blood and lymph vessels.
- ✓ The main components of the dermis are collagen and elastin.
- ✓ Storage much of the body's water supply
  - ✓ When the amount of stored water is increased, the skin becomes tight and stretche.
- ✓ The dermis also contains scavenger cells from the immune system.
  - ✓ In the event that a foreign organism makes it past the epidermis, these cells will engulf and destroy it.

Sweat glands

- Two types:
  - the apocrine glands and the eccrine glands.
  - Apocrine glands
    - are specialized glands found only in the armpits and pubic region. In animals, it is the apocrine glands that secrete the scents used to attract a mate; however, no one is sure of their function in humans.
    - secrete a milky sweat that encourages the growth of bacteria responsible for body odor.
    - These glands are activated at puberty when stimulated by hormones.

The eccrine glands

- ✓ The true sweat glands.
- ✓ Found over the entire body,
  - ✓ regulate body temperature by bringing water via the pores to the surface of the skin, where it evaporates and releases heat.
- ✓ Respond to heat, exercise, and fever
- ✓ Respond to emotional stress, (such as those on the palms).
  - ➢ give you clammy hands when you're nervous.
- ✓ Eccrine glands function from childhood, though they do increase their activity at puberty.
  - ➢ Though these glands can produce up to two liters of sweat an hour when they're working at their full potential, they're not usually to blame for body odor.
- ✓ These glands secrete mostly water, which doesn't encourage the growth of odor-producing bacteria.

The Sebaceous or Oil Glands

- Attached to hair follicles, cylindrical structures that house the roots of the hair.
- Can be found everywhere on the body except for the palms of the hands and the soles of the feet.
- Usually called into action by hormones during puberty
- Secrete oil that helps keep the skin smooth and supple.
- The oil also helps keep skin waterproof and protects against an overgrowth of bacteria and fungi on the skin.
- At times, these glands overproduce and cause acne, a condition in which pores become clogged and inflamed.

Nerve Cells

- ✓ Nerve endings can also be found in the dermis
- ✓ Responsible for the sense of touch, relaying information to the brain for interpretation.
- ✓ Signal temperature to the brain and, if necessary, trigger shivering, an involuntary contraction and relaxation of muscles. This muscle activity generates body heat.

Blood and Lymph Vessels

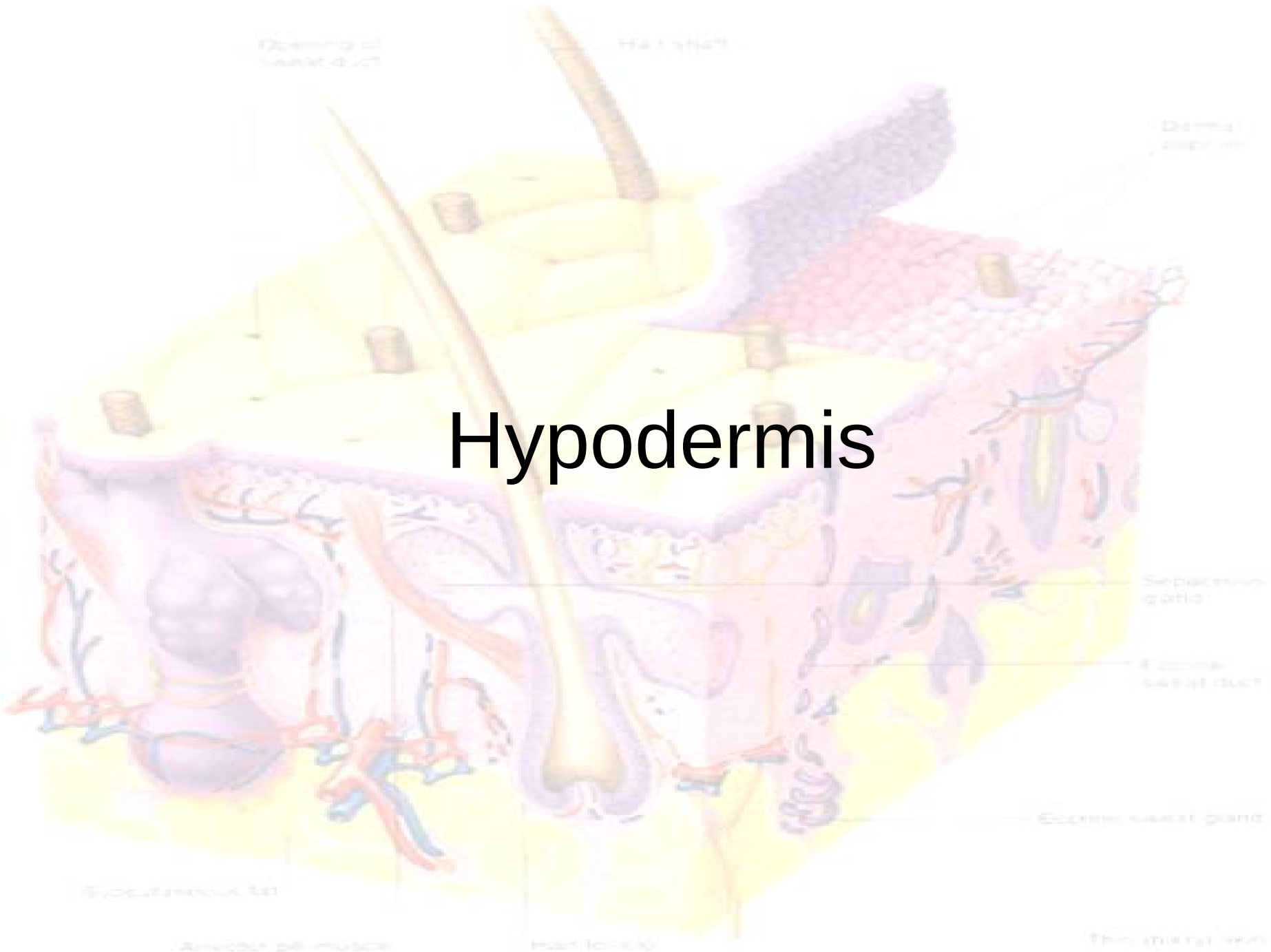
- The blood vessels bring nutrients and oxygen to the skin and remove cell waste and cell products.
- The blood vessels also carry the vitamin D produced in the skin back to the rest of the body.
- Enlarged vessels that can be seen through the skin are known as spider veins or vari-cose veins.
- Broken blood vessels appear as bruises.
- The lymph vessels bathe the tissues of the skin with lymph,
  - a milky substance that contains infection-fighting immune system cells. The cells work to destroy any infection or invading organisms as the lymph gradually circulates back through the body's tissues to the lymph nodes.

Collagen

- Collagen is a tough, insoluble protein found throughout the body in the connective tissues that hold muscles and organs in place.
- In the skin, collagen supports the epidermis, lending it its durability

Elastin

- A protein that keeps the skin flexible.
- The substance that allows the skin to spring back into place when stretched
  - (the scientific reason a funny face won't stay that way)
- The properties of collagen and elastin fade with age, giving rise to wrinkles and sagging skin.



Hypodermis

Hypodermis

- The subcutaneous tissue (hypodermis) is the deepest layer of the skin.
- It is missing on parts of the body where the skin is especially thin—the eyelids, nipples, genitals, and shins.
- Subcutaneous tissue acts both as an insu-lator, conserving body heat, and as a shock absorber, protecting in-ternal organs from injury.
- It also stores fat as an energy reserve in the event extra calories are needed to power the body.
- The blood vessels, nerves, lymph vessels, and hair follicles also cross through this layer.

Skin Types and Its Care

NORMAL SKIN

- “peach complexion”.
  - It is not easy to describe it. Like happy people it has no story, not a rough look but on the contrary, soft and smooth. No open pores, but invisible or barely visible. No special redness or blemishes. It is uniform. Good tint with a certain matte look which is defined as
- the normal skin is a well balanced skin.
- All its activities are efficient:
  - the cellular life pace is well established;
  - its epidermal renewal is regular
  - its deep circulation is normal and its secretions are sufficient to insure a good humidity rate without obstructing the pores.
  - Its deep fibres are flexible and resistant because the collagen is healthy.

OILY SKIN

- HOW TO RECOGNIZE OILY SKIN
  - The texture of the skin is thick
  - The ostium are enlarged by the over production of sebum which flows freely.
  - The aspect is shiny because the sebum spreads out constantly.
  - The touch is sticky (most often but not necessarily).
  - Make-up products are diluted by the sebum a few hours after application

TREATMENTS FOR OILY SKIN

- An oily skin is basically a healthy skin which functions well but with exaggeration.
- It is much easier to care for than, for example, to treat an acneic or asphyxiated skin.
- The treatment consists of:
  - a good (but not abrasive) cleansing
  - efficient exfoliating techniques (but not irritating)
  - secretion regularizing techniques
  - an adequate extraction of comedones (blackhead), as needed
  - tightening of the ostiums (
  - protection, appropriate to the sebum flow.

COMEDONIC SKIN (blackhead)

- HOW TO RECOGNIZE A SKIN WITH COMEDONE TENDENCY
  - Although oily, this type of skin is not shiny since secretions are retained within the ostiums. The skin surface is dull and sallow (comedones).
  - Its texture is coarse since the follicles are clogged with comedones accumulating under the surface.
  - This type of skin does not have the oily skin's resistance.
  - It is easily irritated and dehydrated.

CARE FOR SKIN WITH TENDENCY TO COMEDONES

- ✓ Treatment techniques to free comedones from the ostituns which are not abrasive.
- ✓ Hydrating products replace the increased water evaporation.
- ✓ Actions are gentle and progressive so as not to irritate the over-reacting glands.
- ✓ A comedone must be entirely drained. If not, it may spread and cause more harm, slow to heal and almost always leave some scarring.
- ✓ When the comedone is extracted, apply EMULSION PURE (anti-bacterial product) on the ostium and around follicles.

ASPHYXIATED SKIN

- HOW TO RECOGNIZE ASPHYXIATED SKIN
  - Complexion is sallow
  - The ostiums are filled with comedones.
  - The surface is lumpy (mass of raised tissue - cysts).
  - The exterior layer is covered with a film similar to varnish (furfur or squame),
  - Sometimes, desquamates (particularly the central part).
  - Sensitive to atmospheric changes, to rubbing and inappropriate cosmetics.

    To differentiate a cyst from a comedone, pull the skin (chin for example) between your indexes; if you see small nodules which rise to the surface, they are cysts. They cannot work their way out

CARE FOR ASPHYXIATED SKIN

- We tend to confuse it with dry skin because it is coarse to the touch and seems delicate. As with very dry skin, asphyxiated skin requires the same care as dehydrated skin to which we **add the secretions extraction** and **frequent exfoliation**, without causing irritation.

ACNEIC SKIN

HOW TO RECOGNIZE ACNEIC SKIN

- ✓ Signs are certainly easier to recognize than any other type of skin!
- ✓ Acneic skin is more or less oily. Its ostiums are enlarged and filled with comedones.
- ✓ Its surface is lumpy with cysts. Its texture is coarse.
- ✓ It has pimples of more or less density.
- ✓ It has rednesses (inflammations) and eventually scars.

LOCAL ACNE TREATMENTS

- Whatever causes acne, local treatment remains the same.
- THE THREE PRINCIPLES:
  - Appropriate cleansing
  - Control of secretions
  - Control of accumulation of dead cells (by means of exfoliation)
  - The individual's sensitivity and age, influence the procedure for these treatments.

Skin and Immunity

- Important front line defence of the body
- The immunological cells
  - **Langerhans Cell** (recognise antigen)
  - **T Lymphocyte**
  - **B lymphocytes**
  - **Mast Cell** (release histamine)
  - **Keratinocyte**

Hypersensitivity Reactions of the Skin

- Inappropriate or exaggerated adaptive immune response that results in **tissue damage**.
- There are four main types of hypersensitivity reactions:
  - **Type 1 (Immediate)**
  - **Type 2 (Antibody-Dependent Cytotoxicity)**
  - **Type 3 (Immune Complex Disease)**
  - **Type 4 (Cell-Mediated or Delayed)**

Factors affecting skin health

- **Tanning**
- **Ionizing radiation**
- **Free radicals**
  - not enough sleep, smoke, live in pollution, drink too much alcohol, stress, eat sugar, eat salt, processed foods, exercise too much (yes, it is true) and not getting enough antioxidants in our diet
- **Improper nutritions**

Ionizing radiation

- Caused by sunlight rays called
  - **UvA** (go deeper into the skin and are linked to aging, cancer and damage to the immune system) and
  - **UvB** (caused burning).
- Promotes the 2 stages of the carcinogenic process,
  - initiation and promotion.
- The rays damage your skins DNA, as well as protein and immune system cells.
- Can be the first sign of skin cancer. Malignant melanoma is a deadly form of skin cancer, which quickly spreads to the vital organs of the body, and that will kill you.
- Occasionally check for blemishes that are larger than a pencil eraser, multi-colored or a symmetrical in shape. If you have any questions, see a dermatologist.
- A sunscreen with an SPF (sun protection factor) as high as possible (but at least 15) should be used year-round, and applied every few hours while exposed to the sun.

Free radicals and Improper nutritions

- Free radicals multiply in our bodies when we don’t get enough sleep, smoke, live in pollution, drink too much alcohol, stress, eat sugar, eat salt, processed foods, exercise too much (yes, it is true) and not getting enough antioxidants in our diet.

Cosmeceuticals and Neutraceuticals for Skin Maintenance

Nutrition (Neutraceuticals)

- **Proper nutrition is essential for healthy, youthful skin**.
- **fruits and vegetables should be consumed as often as possible - at least five servings per day**
- **body requires essential fatty acids and fat-soluble vitamins for proper nutrition and functioning.**
- **Skin problems are often a sign of vitamin deficiency**

- Many neutraceuticals are available as food supplements. These products are recommended to people with unbalance nutritions due to many factors such as lifestyle, no appetite to certain type of foods etc

Drink Plenty of Water

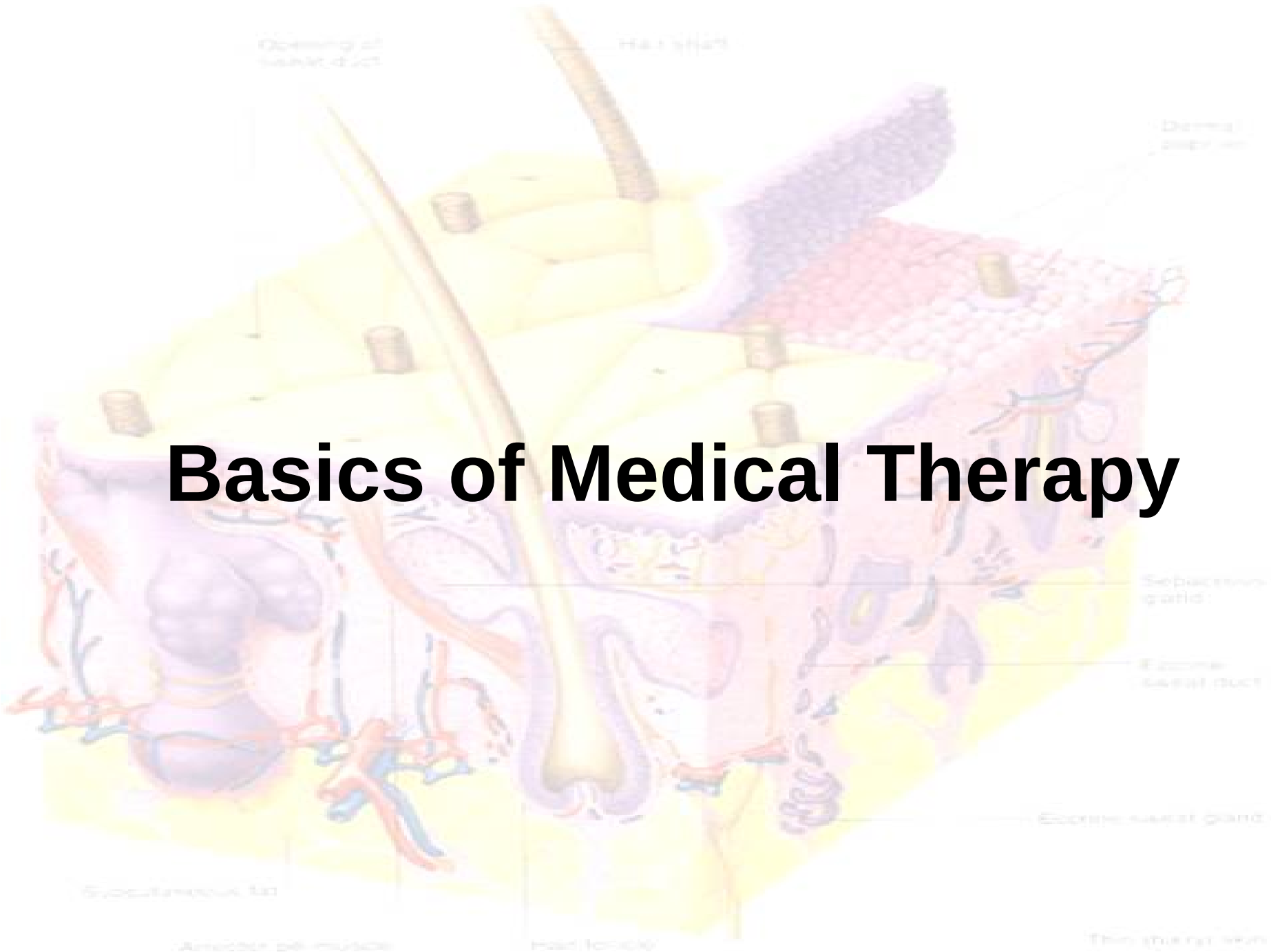
- Water is required by the body to hydrate and replenish cells.
- The body's water component is approximately 60-70%.
- It uses water to transport nutrients around the body and for dissolving and eliminating toxins.
- Aim to consume 1-2 litres of either bottled or filtered water per day,
- to assist in achieving a **smooth glowing appearance.**

Cosmeceuticals

- Cosmeceuticals (or alternatively, cosmaceuticals) are topical cosmetic-pharmaceutical hybrids intended to enhance the health and beauty of skin.
- **Cosmeceutical agents are:**
  - **Retinoic acid**
  - **Alpha-hydroxy acids** (AHA)
  - **Beta-hydroxy acids** (BHA)
  - **Hydroquinone**
  - **Vitamin E**
  - **Vitamin C**
  - **Kinetin** (hormone growth factor)
  - **Grape seed extract**
  - **Coenzyme Q10**
- **Many Malaysian herbes have cosmeceutical effects**

Physical Sun Shades

- Staying out of the sun
- Use sunscreen " physical" sunscreen that blocks in the sun’s ray
  - **eyewear (both regular glasses and sunglasses) be coated to screen for UV.**.
- Chemical Sunscreens are **"zinc oxide" or "titanium dioxide**"
- Use a sun protection factor (SPF) of 15 or higher, and one which blocks both UVA and UVB rays - a broad spectrum sunscreen.
- IT IS IMPORTANT TO REMEMBER THE FORMULATION OF COSMECEUTICALS MUST BE BASED ON COMBINATION OF SAFE CHEMICALS AND ACTIVE INGREDIENTS TO ENSURE THE TOTAL HEALTH OF THE SKIN AND BODY.



Basics of Medical Therapy

Basics of Medical Therapy

- Topical Therapy
- Systemic Therapy
- Phototheraphy
- Surgical Theraphy

Topical Therapy

- Advantages:
  - direct delivery and reduced systemic toxicity.
- Use a vehicle that carry an active ingredient. Vehicles are**:**

i) Cream – a semi-solid emulsion of oil-in-water; contains a preservative to prevent overgrowth of micro-organisms. Stabilized by an emulsifier. Mostly water so mostly evaporates; non-greasy so easy application and removal.

ii) Gel – a semi-solid transparent non-greasy emulsion.

iii) Lotion – liquid vehicle, aqueous or alcohol based, which may contain a salt in solution. Calamine lotion is a *shake lotion* which contains an insoluble powder. Lotions evaporate to cool the inflamed/exudative skin.

iv) Ointment – a semi-solid grease/oil, sometimes also containing powder, but little or no water. The active ingredient is suspended. Usually, no preservative needed. Ointments are best suited for dry skin disorders – rehydrate and occlude. Because they are greasy, they are difficult to remove.

v) Paste – An ointment with a high proportion of powder which gives a stiff consistency. Pastes can be applied to well-demarcated lesions. Due to its ointment base, they are difficult to remove.

- **vi) Emollients -** Emollients are useful in dry-skin disorders due to their ability to re-establish the surface lipid layer and enhancing rehydration of the epidermis. There are several emollient ointments, creams and oils added to baths.

Quantities Required

A useful guide is the fingertip unit (FTU) which equals ½ g. One FTU is the amount of topical agent that can be applied to the terminal phalynx of the index finger.

The whole body requires 20-30 g of ointment per single dose. In an adult:

- face or neck – 1 g
- trunk (each side) – 3 g
- arm – 1 ½ g
- hand – ½ g
- leg – 3 g
- foot – 1 g

Skin Problems

Common Skin Problems:

- **Rashes**
  - A rash is an area of red, inflamed skin or a group a individual spots. These can be caused by irritation, allergy, infection an underlying disease, as well as by structural defects - for example blocked pores or malfunctioning oil glands.
  - Examples of rashes dude acne, dermatitis, eczema, hives, pityriasis rosea, and psorasis.

Viral infections

- These occur when a virus penetrates the stratum corneum and infects the inner layers of the skin.
- Example viral skin infections include herpes simplex, shingles (herpes zoster) and warts.
- Some systemic viral infections, such as chicken pox at measles, may also affect the skin.
- Viral infections cannot be cured with antibiotics.

Bacterial infections

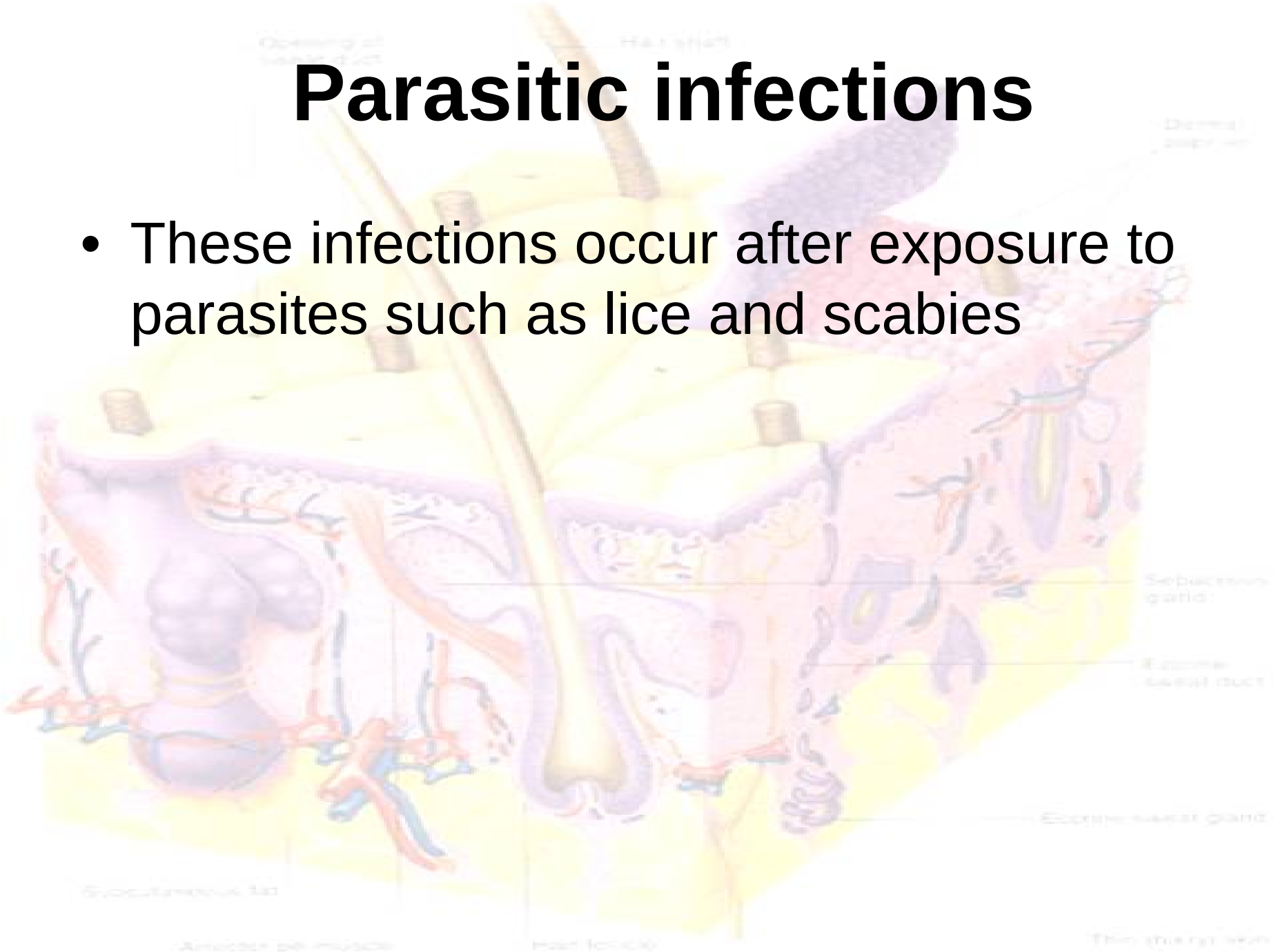
- Such infections are caused by a variety of bacteria, the most common types being staphylococ streptococci.
- Bacteria may infect the topmost layers of skin, the follicles, or the deeper layers of skin.
- If not treated correctly, these infections may spread throughout the body.
- Examples include impel folliculitis, cellulitis, and Lyme disease.
- Antibiotics are effective against bacterial infections

Fungal infections

- Harmless fungi are always present on surface of the skin, and infection occurs when these organisms entry into the body
- These infections are usually superficial, affecting the skin, hair, and nails; examples include athlete’s foot, lock itch, and ringworm.
- However, in people with suppressed immune systems or who have been taking antibiotics long-term, the fungi may spread to deep within the body, causing more serious disease.

Parasitic infections

- These infections occur after exposure to parasites such as lice and scabies



Pigmentation disorders

- The amount of pigment in the skin is determined by the amount of melanin being produced by the body
- Loss of pigment (hypo pigmentation) can be caused by an absence of melanocytes, malfunctioning cells, exposure to cold or chemicals, or some types of infection.
- An increase in pigment (hyperpigmentation) may be caused by skin irritation, hormonal changes, aging, a metabolic disorder, or another underlying problem.
- Age spots, freckles, and melasma are examples of hyperpigmentation
- Vitiligo is an example of hypopigmentation.

Tumors and cancers.

- These growths arise when skin cells begin to multiply faster than normal.
- Not every skin growth is cancerous: Some tumors are harmless and will not spread. Skin cancer is the most common of all the cancers
- It is caused, in 90 percent of cases, by sun exposure.
- The three types of skin cancer are basal cell cancer (the most curable), squamous cell cancer (which may grow and spread), and malignant mela-noma (the most deadly form).
- Prevention involves protecting the skin against damaging ultraviolet rays.
- Early detection helps to improve the chances of a cure, so regular self-examinations are recommended.

Trauma

- Trauma describes an injury to the skin caused by a blow, cut, or burn.
- Any time the surface of the skin is broken, the body becomes more susceptible to infection and disease

Uncategorized Skin Conditions

- **Wrinkles** are caused by a breakdown of the collagen and elastin within the dermis, which results in sagging skin.
- **Rosacea** is a long-term disorder in which the skin of the face becomes red and develops pimples, lesions, and more rarely enlargement of the nose. Its cause is unknown.
- **Spider veins** and **varicose veins** become apparent when blood vessels enlarge and become visible through the surface of the skin.

Skin Conditions

- **The epidermis of the skin is composed of living cells, melanin (color factor) and keratin.**
- **The term *keratosis* (kerr-uh-TQ-sis) refers to a condition of the skin involving keratin.**
- ***Hyperkeratosis* (HIGH-pur-kerr-uh-TOsis) refers to an abnormal increase of the horny layer of the skin.**
- **An example of this condition is a callus, which usually appears on the palms of the hands or soles of the feet.**