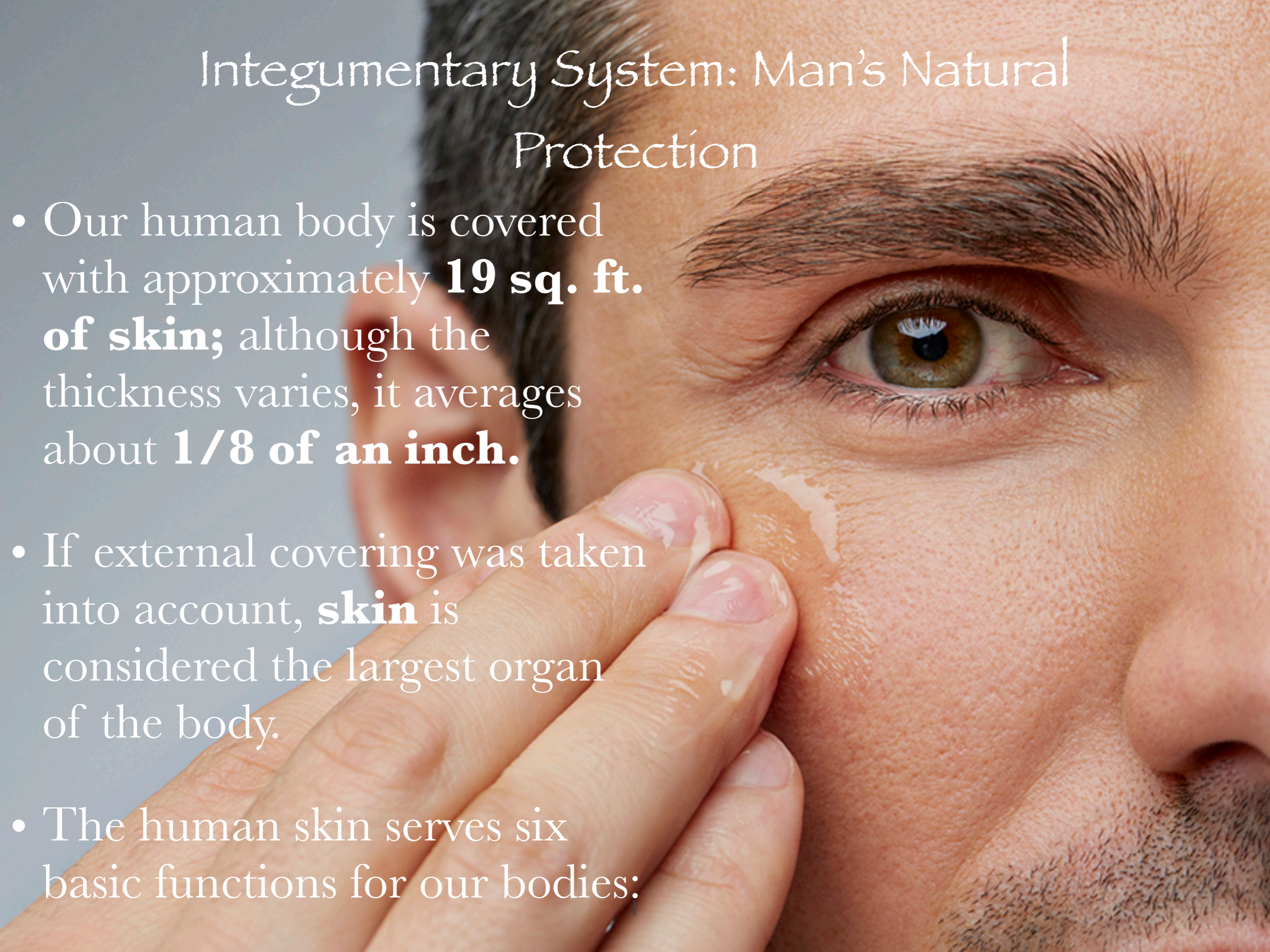


Integumentary System: Man's Natural Protection

- Our human body is covered with approximately **19 sq. ft. of skin**; although the thickness varies, it averages about **1/8 of an inch**.
- If external covering was taken into account, **skin** is considered the largest organ of the body.
- The human skin serves six basic functions for our bodies:



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- **1. Protection-** Skin is an effective barrier against bacteria, viruses, and common chemicals that you constantly touch. It also prevents air and water from going in/out of body.
- **2. Sensation-** Nerve receptors for touch, pressure, temperature, and pain are distributed unevenly throughout the skin.

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- **3. Heat control-** The amount of blood being carried to the surface of skin is regulated to control the amount of heat lost in the atmosphere.
- **4. Excretion-** Body wastes can be eliminated through sweat.
- **5. Manufacture of vitamin/hormone-** The skin is able to produce small amounts of vitamin D and testosterone.

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- **6. Absorption-** The skin is able to absorb certain chemicals, drugs, and amounts of oxygen.

- The human skin is composed of three basic layers:

- **1. Epidermis-** The epidermis is the outermost layer of the skin.

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- In the epidermis, a layer known as the **stratum basale** serves the purpose of producing new skin cells.
- Older skin cells eventually are pushed up to the surface, are filled with *keratin*, and die.

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- **Keratin** is a waxy material making up hair, nails, feathers, horns, claws, hooves, calluses, and of course the outer layer of skin.
- With the dying of old skin cells, a completely new epidermis covers the body about every **25 days**.

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- **2.** The second layer of skin is known as the **dermis**; It is the *most complex layer of skin* because it contains most of the nerves and blood vessels.
- The dermis is first composed of *hair follicles*.
- **Hair follicles** are small sacs of epidermal cells in the dermis.

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- As new hair cells are produced, old hair cells die and are pushed out of the follicle.
- **Your visible hair is made up of dead cells.**
- Hairs are located on all of the body except the *palms of the hand* and the *soles of the feet*.
- Scalp hair grows about **1/2 inch** per month.

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- Hair growth is affected by **diet, hormones, general health,** and **age.**
- **Baldness,** however, is an *inherited trait.*
- Most hair follicles are attached to an **erector muscle,** which contracts causing the hair to stand on end. (goosebumps)
- **Temperature and high emotions** usually can trigger contractions of the *erector muscles.*

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- The **nails of the fingers and toes** are similar to hair since they develop from the skin and the visible portion is dead cells filled with protein.
- Fingernails are replaced every **6 months** and toenails require about **one year**.
- The dermis is secondly composed of *sebaceous glands*.

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- The sebaceous glands produce **sebum**, an oily secretion which moisturizes the skin and helps it stay soft and flexible.
- The amount of oil produced by sebaceous glands is also an *inherited trait*.

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- The dermis is thirdly composed of *sweat glands*.
- There are approximately **80 sweat glands to every square inch of skin.**
- These tube-shaped glands produce *perspiration*.
- **Perspiration** is a substance that is about **99% water, 0.5% salt, and 0.5% sugars, amino acids, and wastes.**

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- Normally, the entire body is constantly sweating and excretes about **1/2 pint of water daily**.
- This occurs even if a person remains in a comfortable room and does no strenuous activity.
- Because this amount evaporates quickly, this perspiration goes unnoticed.

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- On a hot day, with strenuous activity a person can lose almost **2 gallons of water**.
- Sweat itself *does not have an odor*, but odors are released when sweat combines with substances on the skin or with wastes from bacteria growing on dead skin cells.

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- **Washing with warm water** and **wearing clean clothing** minimizes the body odor resulting from perspiration.
- **Antiperspirants** contain chemicals that stop sweat glands from producing sweat; while *deodorants* are usually perfumes to cover body odor, with little antibacterial substance.

Integumentary System: Man's Natural Protection

- **3.** The **subcutaneous layer** is not actually part of the skin.
- It is the portion of the integumentary system that attaches the dermis to the muscles and is composed of connective tissue.
- **Fat deposits** found in almost all subcutaneous layers serve to *insulate, cushion, and smooth* the contours of the body.

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- Many of the fibers in the connective tissues of the dermis and subcutaneous layers are **elastic**.
- Just as a rubber band loses some of its elasticity when it is old, so the elastic fibers of the skin lose some of their elasticity with **age**.

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- **Acne** is the number one medical problem of the skin in adolescents (ages 12-18)
- **Acne** is an inflammation of sebaceous glands caused by a blockage of the skin pores.
- This blockage will tend to result in the accumulation of **oil and white blood cells** within the gland.

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- Although the causes for every case of acne are not completely understood, we do know that **cleanliness, bacteria, diet, and heredity** are usually involved.
- Because acne is directly related to cleanliness, one should always practice good hygiene; this should involve **washing of the face *daily***.

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- Likewise avoiding *junk foods* that are high in **fats, oils, sodium,** and **sugars** has been known to reduce the likelihood of severe acne.
- As a final tip about dealing with acne:
- **Do not over wash** (resulting in dry, irritated skin), **do not pick at pimples** (resulting in scars or more surface bacteria), **do not stress** (resulting in more outbreaks)

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- The pink color of a person's skin is his blood showing through; other colors are the result of **pigments**.
- **Melanocytes** are the cells of the epidermis that produce *melanin*.
- **Melanin** is the brown, black, or yellow pigment that colors the skin.

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- Both the **number of melanocytes** and the **color of melanin** are another example of *inherited traits*.
- **Ultraviolet radiation** (from the rays of the sun) stimulates melanocytes to produce melanin.
- Melanin in the upper layers of the epidermis *absorbs* ultraviolet radiations before they penetrate and kill skin cells.

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- Thus a person who has inherited many melanocytes that produce dark melanin has a **darker skin color**.
- This person with darker skin color can **withstand more of the sun's harmful ultraviolet rays** without skin damage than a person with fair skin.

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- Many people have the idea that sunbathing is good and that a deep tan is an indication of good health; *both ideas are in error.*
- When sunbathing to obtain a tan, one actually forces his body to put up a screen against excessive exposure to the sun.
- **Excessive sunbathing** damages or kills skin cells by exposing them to the mutation inducing ultraviolet rays of the sun.

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- These cells must then be replaced at a rate faster than normal, and the skin consequently **ages prematurely**.
- Ultraviolet radiation from the sun can also lead to mutations that can cause **skin cancer**.
- Although tans may be in fashion, if you have to work at one, it might be best for you to be out of fashion.