

EST 13

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**Esthetician – Skin Care Technician**  
**Skin Physiology, Types, and**  
**Conditions**

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# Skin Physiology, Types, and Conditions

## Rationale

*Why is it important to learn this skill?*

The ability to identify skin types is critical to the Esthetician. Once a skin type is determined, the knowledge can be used to match treatments, and anticipate and avoid the negative effects of possible courses of action and application of products. The information in the ILM can also be used to remediate damage that has already occurred to the skin. Identifying skin disorders is essential to: avoid hurting clients or worsening a condition; determine which conditions prevent or restrict a service; and prevent the spread of pathogens.

## Outcome

*When you have completed this module, you will be able to:*

Describe the basic parts of the cell and the skin, their functions, and characteristics.  
Identify skin types and conditions.

## Objectives

1. Describe the cell, its components, and their functions.
2. Describe skin anatomy and physiology.
3. Describe skin types.
4. Demonstrate identifying skin types.
5. Describe general information relating to skin conditions.
6. Describe skin conditions A- D.
7. Describe skin conditions E- L.
8. Describe skin conditions M- S.
9. Describe skin conditions T- W.
10. Demonstrate analyzing skin for the common features of conditions.

# Introduction

Anatomy is the study of the structure of body parts, whereas physiology is the study of the functions and relationships of body parts. As of yet, this ILM is not perfectly organized according to these principles, but will be in the future.

## Special Note

A contraindication may restrict or prevent a service for many reasons. For example, performing a service on a contraindication may injure the client, so the service must be altered or not performed at all. In other circumstances, a contraindication may be contagious and the client cannot be served. Many of the disorders in this ILM make a client unsuitable for services. At worst, a disorder may be contagious, and serving a client with such a disorder can lead to severe economic and legal repercussions. Always check with the AHJ and your employer to determine which contraindications either restrict or prevent services. Never diagnose a contraindication. If a client appears to have a contraindication, refer them to a physician.

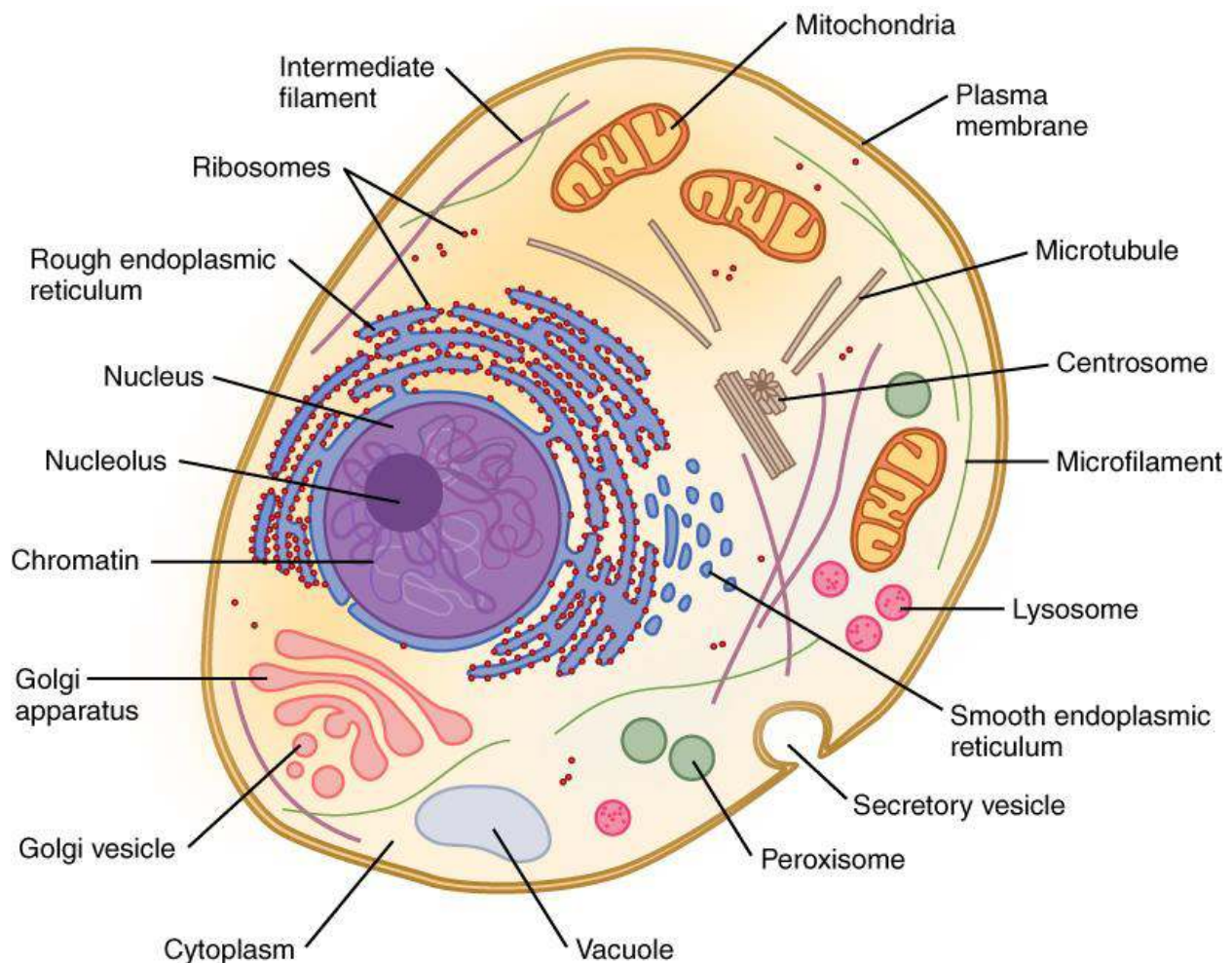
# Objective One

*When you have completed this objective, you will be able to:*

Describe the cell, its components, and their functions.

## The Cell

The cell is the basic unit of life. Each cell is like a brick. Bricks combine with each other to form all life. Each cell is structured similarly, but they perform different functions. For example, the cells that make up the eyes help a person see, while the cells of bone marrow help manufacture blood. A cell is like a bedroom. The room has a boundary which defines 'inside' and 'outside'; the room has a door to let things in and out; and the room contains many pieces that fulfill specific functions (a bed for sleeping, a closet for holding clothes).



Each cell is surrounded by a layer called a cellular or plasma membrane. The membrane is composed of phospholipids (fatty material) and protein. The membrane functions to keep the contents of the cell contained, separating its contents from the surroundings. The membrane works on a principle called **selective permeability**; it prevents the entrance and exit of some things, but allows nutrients to enter and wastes to exit. The blood that surrounds the cell brings food, water, and oxygen to the cell, and carries waste products such as carbon dioxide away. The **cellular membrane** is made up of two phospholipid layers that have a thin layer of water between them.

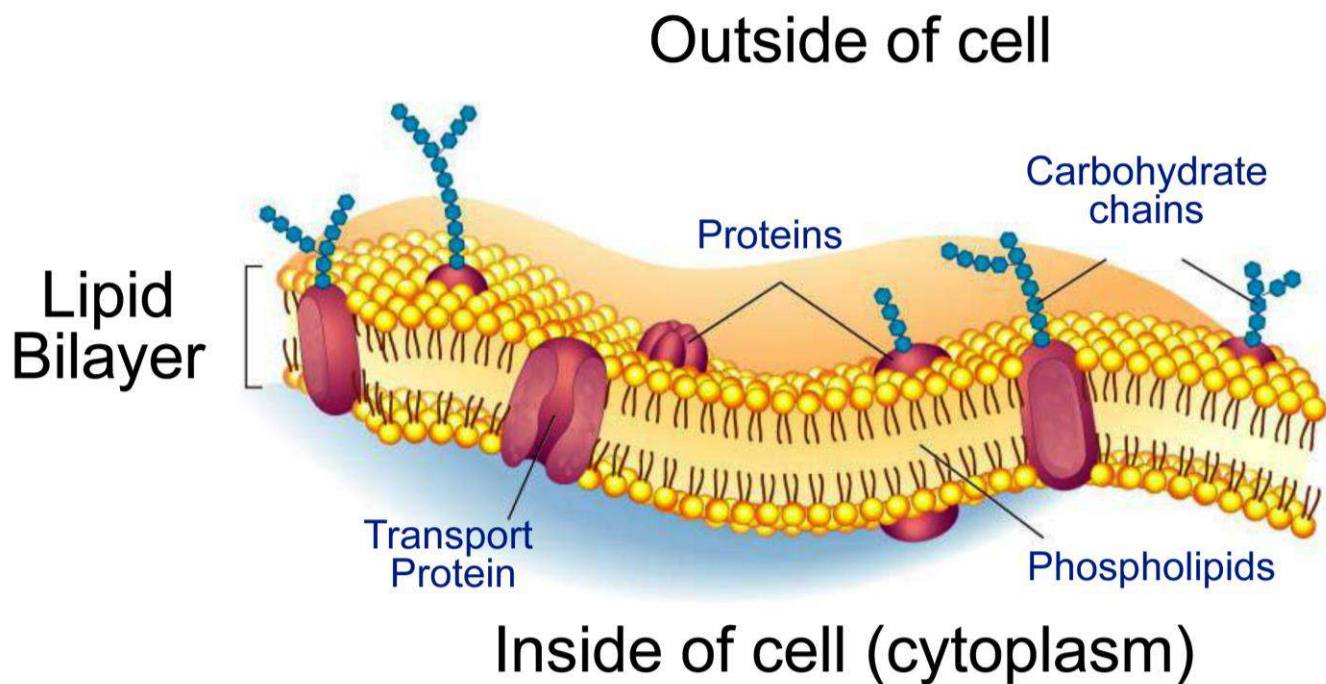


Image courtesy of socratic.org

Substances such as carbon dioxide ( $\text{CO}_2$ ) and oxygen ( $\text{O}_2$ ) can move across the plasma membrane by a passive process called **diffusion**, while other substances are transported through channels called **transport proteins**.

Special protein molecules called receptors are also located in the membrane. A **receptor** allows cells to communicate with the body. When a chemical (such as a hormone) binds to a receptor, it delivers a message to the cell. The cell will then perform a certain function.

# An Overview of Cellular Function

Oxygen from the lungs and nutrients from the digestive system are transported by the blood to the cell. Oxygen, sugars, fats, and proteins pass through the cellular membrane and enter the cell. Once inside, a series of channels and tubes move the substances to various places where they are broken down, reassembled, or used. Carbon dioxide, waste, and excess food are expelled from the cell and carried away by the blood.

## Cytoplasm

The cell is filled with a fluid—mostly water and salt—called **cytoplasm**. Cytoplasm is the substance that ‘holds’ all of the other components inside the cell. Other functions of cytoplasm are to break down waste, assist in metabolic activity, and allow materials to pass from one organelle to another.

## Organelles

Think back to the metaphor of a cell being like a bedroom. There are structures inside a bedroom that perform a specific function. A bedroom may contain a desk used for studying or a shelf for holding books. **Organelles** are small structures within a cell that perform specific functions.

## Endoplasmic Reticulum

**Endoplasmic Reticulum** (ER) is a network of membranous tubules within the cell. ER helps substances and other organelles move around inside the cell, as well as assisting in the protein and lipid synthesis. **Synthesis** is the production of chemical compounds by reaction from simpler materials. Finally, ER has a role in the manufacturing of steroid hormones and detoxification.

## Ribosomes

**Ribosomes** are organelles that construct proteins. Messenger RNA molecules deliver instructions regarding which proteins to create, and transfer RNA molecules select amino acids from within the cell, then collect and carry them to the ribosomes.

## Mitochondria

Mitochondria are organelles that are shaped like capsules. Mitochondria are responsible for respiration and energy production. They metabolize carbohydrates and fatty acids to generate energy, while converting oxygen into carbon dioxide. Mitochondria create an energy substance called adenosine triphosphate (ATP) which is an energy packet consumed by the other organelles.

Research indicates that manipulating ATP can improve the look of skin. Microcurrent treatments, red light therapy, and antioxidants all seem to have a positive impact regarding ATP and therefore the skin's appearance.

## Golgi Apparatus

The **Golgi apparatus** is like a shipping and receiving department within the cell. It receives proteins from the endoplasmic reticulum (ER), then modifies the proteins for use within the cell or excretion. The Golgi apparatus is also involved in transporting lipids and forming lysosomes.

## Lysosomes

**Lysosomes** are organelles that function as the digestive system of the cell. Lysosomes contain different enzymes that break down substances such as acids, proteins, lipids, carbohydrates, and obsolete components of the cell itself. When a cell dies, lysosomes release enzymes that help destroy the cellular membrane.

## Nucleus

The **nucleus** is the 'brain' of the cell. The majority of the cell's genetic material is housed here, in the form of DNA molecules. The proteins that form chromosomes are also held here. The nucleus also builds certain proteins and holds chromatin fibres that are responsible for cellular division.



## Nuclear Membrane

The **nuclear membrane** is a selectively permeable layer that surrounds the nucleus. The nuclear membrane is made of two layers that allow chemical messages to pass between the nucleus and the rest of the cell.

## Nucleolus

The **nucleolus** is a round organelle located inside the nucleus. The nucleolus manufactures ribosomal subunits and ribosomal RNA. The nucleolus then sends the subunits out of the nucleus where they combine into complete ribosomes.

## The Cell Cycle

Each cell goes through a 'life cycle' of birth, growth and development, and then death. A cell begins its life cycle by dividing. Dividing is not simple, and many tasks must be performed during the process. First, the cell must grow, then copy its genetic material (DNA), and then physically split into two cells called 'daughter cells'. After each daughter cell has existed for a period of time, they will begin the process of dividing.

Human cells are referred to as 'eukaryotic cells', or cells with a nucleus. Eukaryotic cells divide in two major phases: 1) interphase and 2) the mitotic (M) phase. During interphase, the cell grows and produces a copy of its DNA. During the mitotic (M) phase, the cell separates its DNA into two sets and divides its cytoplasm, forming two new cells.



# Interphase

Interphase can be broken down into three phases: G<sub>1</sub>, S, and G<sub>2</sub>. During **G<sub>1</sub> phase**, the cell grows larger, copies organelles, and makes the molecular building blocks it will need later. G<sub>1</sub> phase is also referred to as the first gap phase.

In **S phase**, the cell synthesizes a complete copy of the DNA in its nucleus, and duplicates a structure called the centrosome. The centrosomes will help separate DNA during M phase.

G<sub>2</sub> phase is also referred to as the second gap phase. During this time, the cell continues to grow, make organelles and proteins, and begin to reorganize its contents in preparation for mitosis.

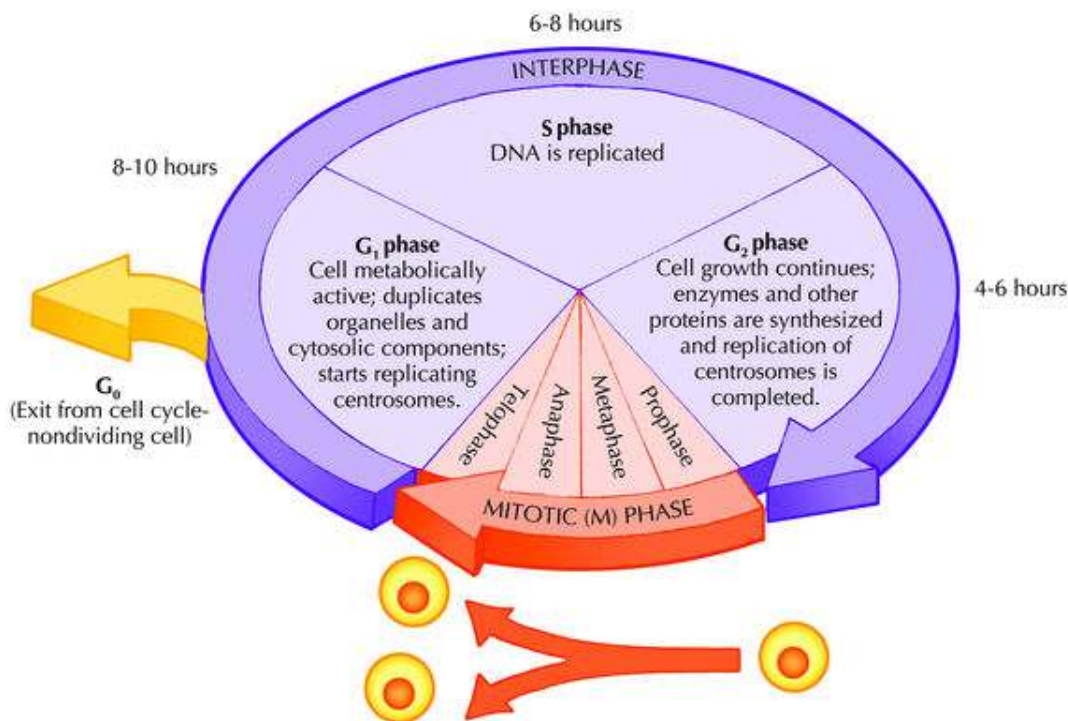


Image courtesy of Quizzez.com

The mitotic (M) phase occurs after G<sub>2</sub>. During the mitotic phase, the cell divides its copied DNA and cytoplasm to make two new cells. M phase involves two distinct division-related processes: mitosis and cytokinesis. In **mitosis**, the nuclear DNA of the cell condenses into visible chromosomes and is pulled apart. Mitosis itself takes place in four stages: prophase, metaphase, anaphase, and telophase. In **cytokinesis**, the

cytoplasm of the cell splits in two, making two new cells. Cytokinesis usually begins just as mitosis is ending, with a little overlap.

Different cells take different lengths of time to complete the cell cycle. A typical human cell requires approximately 24 hours to divide; fast-cycling mammalian cells, like the ones that line the intestine, can complete a cycle every 9-10 under ideal conditions. Different types of cells also distribute their time between phases in different ways.

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# Objective One Self-Test

1) What is selective permeability?

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2) What are the functions of Endoplasmic Reticulum?

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3) What are the functions of mitochondria?

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4) Where is the majority of the cell's genetic material contained?

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5) What happens during the first phase of eukaryotic cell division?

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6) What happens during the second phase of eukaryotic cell division?

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# Objective One Self-Test Answers

- 1) Selective permeability is the ability of the plasma membrane to prevent the entrance and exit of some things, but allow nutrients to enter and wastes to exit.
- 2) The Endoplasmic Reticulum helps substances and other organelles to move around inside the cell, as well as assisting in the protein and lipid synthesis.
- 3) Mitochondria are responsible for metabolizing carbohydrates and fatty acids to generate energy, while converting oxygen into carbon dioxide.
- 4) The nucleus contains the majority of the cell's genetic material.
- 5) During the first phase of eukaryotic cells division, the cell grows and produces a copy of its DNA.
- 6) During the second phase of eukaryotic cells division, the cell separates its DNA into two sets and divides its cytoplasm, forming two new cells.

# Objective Two

*When you have completed this objective, you will be able to:*

Describe skin anatomy and physiology.

The skin is the body's largest organ. It averages 3.6 kilograms and 2 m<sup>2</sup>. Skin provides waterproofing and guards the body against temperatures, ultraviolet light, chemicals, and foreign substances. The skin is also packed with nerves that keep the brain in touch with the outside environment.

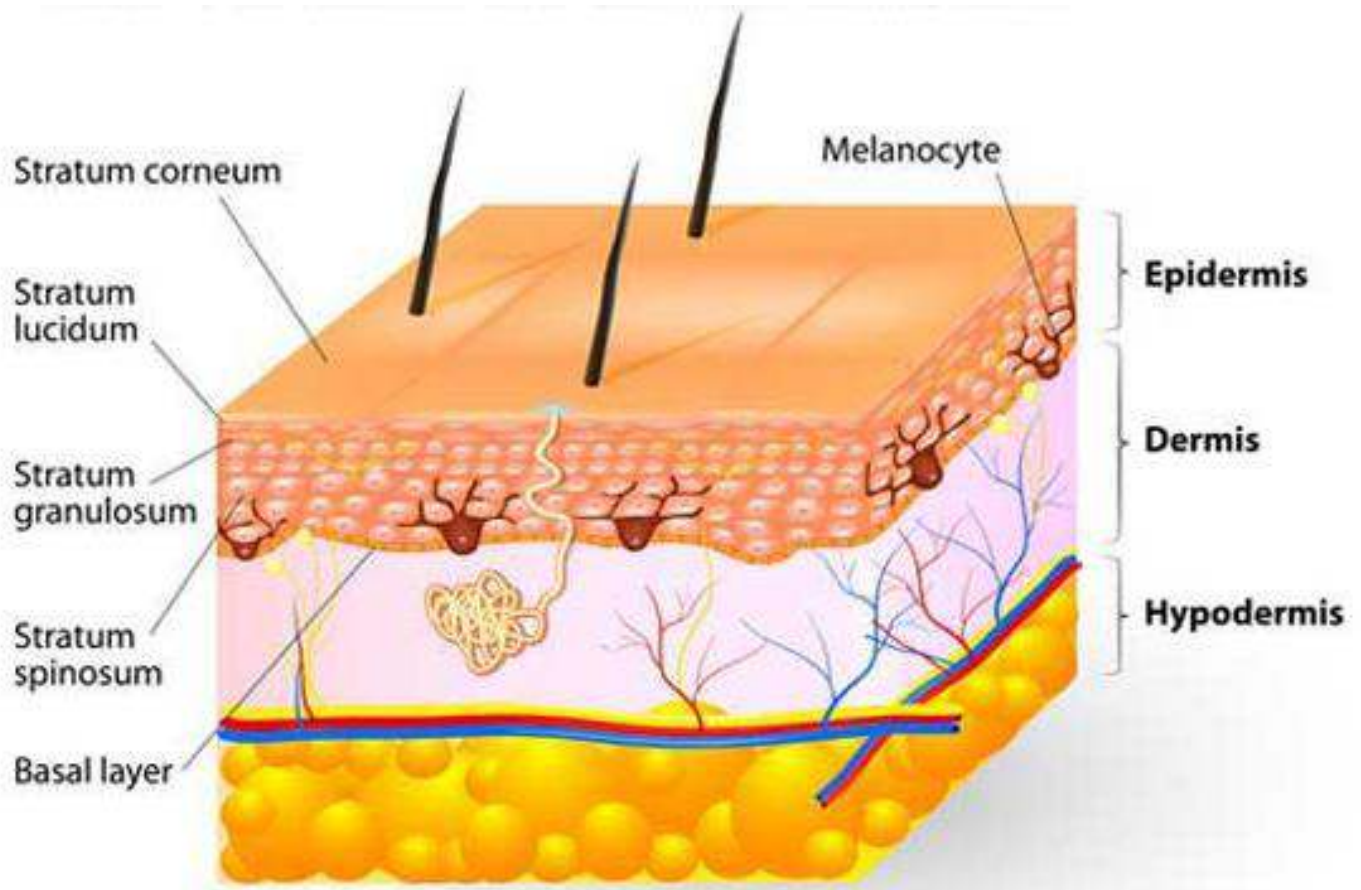


Image courtesy of Consumer Health Digest

## The Epidermis

Skin is made up of three layers. The top layer, on the surface of the body, is called the epidermis. It contains nerves, blood vessels, sweat glands, oil (sebaceous) glands and hair follicles. The epidermis is made up of 3 types of cells:

- Squamous cells are flat, thin cells on the surface of the skin.
- Basal cells are round cells that lie under the squamous cells.

- Melanocytes are found in between the basal cells.

About 90% of the cells in the epidermis are keratinocytes: cells made from the tough protein keratin. New skin cells are manufactured in the basal layer, and move outward toward the surface of the skin. After the cells reach the exterior, they eventually die and flake off. A newly created keratinocyte takes about five weeks to reach the surface. The outermost covering of dead skin is known as the stratum corneum, and its thickness can vary based on the location of the body. For example, the stratum corneum is very thick on the soles of the feet.

Specialized cells called **Langerhans** cells are located in all layers of the epidermis except the stratum corneum. These defensive cells alert the body's immune system to viruses and other infectious agents. Langerhans cells are most prominent in the upper layer of the epidermis, called the stratum spinosum.

A **melanocyte** is a cell in the basal (bottom) layer of the epidermis. Melanocytes produce **melanin**, a light-absorbing pigment derived from the amino acid tyrosine. **Melanosomes** are organelles found in animal cells. These organelles are the site for synthesis, storage, and transport of melanin. Melanosomes are responsible for colour and photo-protection in animal cells and tissues. Melanocytes make up 5 to 10 percent of the cells in the basal layer. For each 10 keratinocytes, only 1 melanocyte exists. Cancer of a melanocyte is known as melanoma.

## The Dermis

The **dermis** is bonded to the underside of the epidermis. The dermis gives the skin its qualities of strength and elasticity. The strength and elasticity are due to the presence of collagen and elastin protein fibres. Fibroblast cells in the dermis aid in healing. Blood vessels located in this layer help to regulate the body's temperature. Heat from inside the body is transferred to the blood and then brought to the skin so that the heat can dissipate. When the body is cold, blood flow is restricted. The dermis also contains a network of nerve fibers and receptors that sense things like temperature and pain, relaying them to the brain.

Hair follicles are located in the dermis, along with glands and ducts that pass up through the skin. Sweat glands in this layer help reduce internal temperature through

perspiration while expelling waste fluids such as urea and lactate. Apocrine glands in the dermis produce a scented sweat linked to sexual attraction and body odor. The sebaceous glands secrete an oil-like sebum that functions to lubricate the hair and skin.

## The Subcutis

The skin's base layer is called the **subcutis** or subcutaneous layer. This layer contains fat held together by connective tissue. The fat serves as a fuel reserve, insulation, and a cushion against physical encounters.

## Skin Repair

Not much happens when the epidermis is broken by a light scratch; however, when something cuts into the dermis, blood appears and the body initiates a process to heal the wound. The first priority is to stop the loss of blood. Red blood cells form a blood clot to help stop the bleeding and create a temporary barrier that blocks pathogens from getting into the open wound.

The skin then develops a red and swollen appearance. This inflammation is an indication that white blood cells have moved to the area and are capturing and fighting off harmful bacteria that have penetrated the blood clot. White blood cells contain enzymes that digest and kill bacteria. White blood cells also kill infected cells with oxygen in a process called a respiratory burst. White blood cells can also produce a free radical that first becomes hydrogen peroxide, then hypochlorous acid.

After the white blood cells have prepared the site, specialized cells called fibroblasts (or fibrocytes) enter the wound and deposit collagen. Collagen forms connective skin tissue to replace missing tissue. Lastly, the dermis and epidermis connect and contract to close the wound.

Fibroblasts are also responsible for making collagen, elastin, and reticulin. Fibroblasts can become other cells, such as those that make up cartilage, muscle, or bone.

# Objective Two Self-Test

1) What are the three layers of skin?

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2) What are the main functions of the subcutis?

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3) What are the main functions of the dermis?

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4) What are the main functions of the epidermis?

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5) What are melanocytes, where are they located, and what do they do?

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6) What is the first type of cells that move into a cut, and what are their functions?

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7) In relation to a cut, what is the purpose of collagen?

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# Objective Two Self-Test Answers

- 1) The bottom layer is called the subcutis, the middle layer is called the dermis, and the outermost layer is called the epidermis.
- 2) The main function of the subcutis layer is to provide the body with a fuel reserve, insulation, and a cushion against physical encounters.
- 3) The main functions of the dermis are to: give the skin its qualities of strength and elasticity; contain fibroblast cells which aid in healing; contain blood vessels to help regulate the body's temperature; contain nerve fibers and sensory receptors; and contain sweat glands and ducts.
- 4) The main functions of the epidermis are to: protect the body; contain cells that heal wounds; contain nerves, blood vessels, and sweat glands; and produce melanin.
- 5) Melanocytes are organelles located in the cells of the basal layer of the epidermis. Melanocytes are a light-absorbing pigment. They store, synthesize, and transport melanin.
- 6) that white blood cells have moved to the area and are capturing and fighting off harmful bacteria that have penetrated the blood clot.
- 7) The role of collagen is to form connective skin tissue that replaces missing tissue.

# Objective Three

*When you have completed this objective, you will be able to:*  
Describe skin types.

## Why Analyze Skin?

Estheticians can analyze skin for acne, aging, dryness, oiliness, sensitivity, tone, pigment, and overall health. The collected information can be used to: determine treatments (both techniques and products); calibrate machinery for services; and predict the effects of treatments. Possible effects are important to predict, in order to determine the most effective treatments, avoid 'overtreatment', and avoid treatments that may damage the skin.

The client's skin is evaluated each visit and observations are recorded on the client consultation card. No single method is comprehensive, and a credible evaluation usually involves multiple methods.

## Lamps

Magnifying lamps and Woods' lamps are both used to evaluate skin. Magnifying lamps can be used to determine elasticity, overall texture, and some visible conditions such as sebaceous hyperplasia.

A Wood's lamp is a small handheld device that emits ultraviolet light. A Wood's lamp examination detects bacterial or fungal skin infections, pigment disorders such as vitiligo, and other skin irregularities. This examination is also known as the black light test or the ultraviolet light test. The lamp is held over the skin in a darkened room. The presence of certain bacteria or fungi changes in the skin's pigmentation, and the depth of pigment damage will cause the affected area to appear differently.

# Fitzpatrick Skin Phototype

The Fitzpatrick skin type (or phototype) classification depends on the amount of melanin pigment in the skin. This is determined by constitutional colour (white, brown, or black skin) and the result of exposure to ultraviolet radiation (tanning). Pale or white skin burns easily and tans slowly and poorly: it needs more protection against sun exposure. Darker skin burns less and tans more easily. It is also more prone to develop post-inflammatory pigmentation after injury (brown marks). This skin classification method can help an esthetician predict the skin's response to various treatments.

The three main factors that influence skin type are:

## Genetic disposition:

Skin type is determined genetically and is one of the many aspects of your overall appearance, which also includes color of eyes, hair, etc.

## Reaction to sun

**exposure:** The way your skin reacts to sun exposure is another important factor in correctly assessing your skin type.

**Tanning habits:** How often do you tan?

A person can be rated in each of these three categories. Each category is worth 0-4 points. After a person has been given points in each category, the total is added up and their Fitzpatrick skin type is determined.

Genetic disposition + Reaction to sun exposure + Tanning habits = Fitzpatrick skin type

Client is given a score for each evaluation. The score can range from 0 to 16.

### Genetic Disposition

Score	0	1	2	3	4
Eye colour	Light blue, gray, or green	Blue, gray, or green	Blue	Dark brown	Brownish black
Natural hair colour	Sandy red	Blonde	Chestnut / dark blonde	Dark brown	Black
Skin colour in non-exposed areas	Reddish	Very pale	Pale with beige tint	Light brown	Dark brown
Freckles on non-exposed areas	Many	Several	Few	Incidental	none

Total score for genetic disposition:

Client is given a score for each evaluation. The score can range from 0 to 16.

### Reaction to Sun Exposure

Score	0	1	2	3	4
What happens when you have stayed in the sun too long?	Painful redness, blistering, peeling	Blistering followed by peeling	Burns sometimes followed by peeling	Rare burns	Never had burns
To what degree do you turn brown?	Hardly or not at all	Light colour tan	Reasonable tan	Tan very easily	Turn dark brown quickly
How deeply do you burn?	Very deeply	Deeply	Moderately	Lightly	Not at all or very little
How does your face react to the sun?	Very sensitive	Sensitive	Normal	Very resistant	Never had a problem

Total score for reaction to sun exposure:

Client is given a score for each evaluation. The score can range from 0 to 4.

### Tanning Habits

Score	0	1	2	3	4
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When did you last expose your body to sun or artificial sun lamps?	More than 3 months ago	2-3 months ago	1-2 months ago	Less than a month ago	Less than 2 weeks ago
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Total score for tanning habits:

All three scores are totaled and the client is placed on the scale below.

### Fitzpatrick Skin Typing Scale

Skin Type	Points	Typical Features	Tanning Ability
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I	0 - 7	Pale white skin, blue / green eyes, blonde / red hair	Always burns, does not tan
II	8 - 16	Fair skin, blue eyes	Burns easily, tans poorly
III	17 - 25	Darker white skin	Tans after initial burn
IV	26 - 30	Light brown skin	Burns minimally, tans easily
V	Over 30	Brown skin	Rarely burns, tans darkly easily
VI	Over 30	Dark brown / black skin	Never burns, always tans darkly

Need photos of machines matching skin type.

## **The Roberts Skin Type Classification System**

The Roberts Skin Type Classification System is a four-part system that identifies a patient's skin type characteristics, and provides data to predict the skin's likely response to insult, injury, and inflammation (i/i/i). The esthetician evaluates four elements (phototype, hyperpigmentation, photoaging, and scarring) and assigns a numeric "feature" to each, according to established and original scales.

The four-part profile is constructed from a combination of quantitative and qualitative assessment leading to the client's skin type classification. The following data is gathered:

- ancestral and clinical history,
- visual examination,
- test site reactions, and
- physical examination of the client's skin.

This classification system can help determine the course of treatment, clarify post-procedure expectations, and optimize outcomes. The Robert's system can help identify underlying potential for skin injury or pigmentation.

The Roberts system will help the esthetician determine the potential for post-inflammatory hyperpigmentation. If, when a client is cut, their wound changes from red to pink to brown, they are likely to hyperpigment with treatment. A test patch is often conducted near the ear to determine any possible pigment problems.

## **The Lancer Ethnicity Scale**

The Lancer Ethnicity Scale was created in 1998, and takes ethnicity into consideration when analyzing skin. The Lancer Scale addresses a weakness of the Fitzpatrick system, stating that pigmentation is not necessarily reflective of how skin will behave. According to the Lancer Scale, five different skin types exist, based on geography and heredity. Each type of skin has its own benefits and challenges.

LES I is extremely fair skin that burns quickly and tends toward sensitivity. Your ancestors are:

- Celtic
- Nordic

- Northern European

LES II is fair skin that does not burn quickly, but still wrinkles and sags and can scar easily. Your ancestors are:

- Central, Eastern, or Northern European

LES III is golden skin, possibly with olive undertones, that can scar easily or become easily inflamed. Your ancestors are:

- European Jews
- Native American and Inuit
- Southern European and Mediterranean

LES IV is olive or brown skin that can become easily inflamed and can tend toward acne. Your ancestors are:

- Sephardic Jews
- Central and South American Indian
- Chinese, Korean, Japanese, Thai, and Vietnamese
- Filipino and Polynesian
- Southern European and Mediterranean

LES V is black skin that can react to irritation with discoloration or texture changes. Your ancestors are:

- Central, East, and West African
- Eritrean and Ethiopian
- North African and Middle East Arabic

To determine a client's LES skin type, add up the four numbers that correspond to their grandparents' ethnicities on the maternal and paternal sides. Divide that total number by four to find the LES score. A higher LES score means a higher risk with treatments, such as adverse reactions to resurfacing treatments. *\*(use this for completing Objective 4).*

Fairer skin is more likely than darker skin to display visible redness caused by capillaries beneath. Darker skin often responds to trauma with hyperpigmentation that is easier to see than on fair skin. LES Types I-III are likely to have a quick response and possibly deeper treatment as a result of their skin types. LES Types IV-



VI may be difficult to treat and have complications such as **hypopigmentation** (the loss of skin colour caused by melanocyte or melanin depletion, or a decrease in the amino acid tyrosine, which is used by melanocytes to make melanin) and hyperpigmentation.

## Analyzing Aging Skin

Skin is analyzed for the effects of time. Effects can be intrinsic—originating from inside—or extrinsic—originating from outside. Genetics is an example of an intrinsic factor, while exposure to the environment is an example of an extrinsic factor. Differentiation between external and internal affects is important for determining treatments. A major cause of wrinkles is **photoaging**: skin damaged by exposure to ultraviolet light. The damage is mostly seen as discolouration and wrinkles. A thorough skin analysis involves the interaction of photoaging, other external factors, age, and skin type. The Glogau classification of photoaging is a scale that is used to 'place' clients. After placement, the esthetician can determine a treatment regime. A simple Glogau classification can be accentuated for the needs of an esthetician by incorporating information regarding the use of makeup and scarring of acne. The Glogau scale can be thought of as a spectrum, not as a series of inflexible categories, and a client can exhibit characteristics from multiple places on the spectrum.

## Glogau Classification of Photoaging

Group	Classification	Typical Age	Description	Skin Characteristics
I	Mild	28-35	No wrinkles	Early photoaging; mild pigment changes, no keratosis, minimal to no wrinkles, no 'age spots', minimal or no makeup, minimal or no acne scarring visible,
II	Moderate	35-50	Wrinkles in motion	Early to moderate photoaging; early brown spots visible, keratosis palpable but not visible, parallel smile lines begin to appear, pores more prominent, early changes in skin texture, wears some foundation
III	Advanced	50-65	Wrinkles at rest	Advanced photoaging; prominent brown pigmentation, visible capillaries (telangiectasias), visible keratosis, visible brown 'age spots', wears heavier foundation always
IV	Severe	60-75	Only wrinkles	Severe photoaging; yellow-grey skin colour, prior skin malignancies, pre-cancerous skin changes (actinic keratosis), wrinkles throughout – no normal skin, cannot wear makeup because it cakes and cracks

## Rubin's Classification of Photodamage

The Rubin classification of photodamage is similar to the Golgau, but the Rubin classification does not incorporate information regarding makeup and acne. The Rubin scale looks at visible skin changes as viewed on a very small scale. The depth to which damage exists is paired with a treatment that only penetrates as deep. As with the Golgau scale, the Rubin scale can be thought of as a spectrum, not as a series of inflexible categories, and a client can exhibit characteristics from multiple places on the spectrum.

### Rubin's Classification of Photodamage

Level	Description	Treatment
1	Superficial pigment and changes in the epidermis. Changes may include roughness, lentigines (liver spots, benign lesions that occur on the sun-exposed areas of the body), a dull or ashy appearance, and increased skin thickness.	Superficial chemical exfoliation such as glycolic acid. Home regimen can include combining alpha hydroxyl acids (AHA's) and/or beta hydroxyl acids (BHA's), and antioxidants.
2	Changes in the epidermis and papillary dermis, including actinic keratosis (rough scaly patches caused by years of exposure to the sun) and increased wrinkles.	Medium-depth peels such as TCA (trichloroacetic acid). Home care regimen including retinoids and hydroquinone.
3	Changes down to the reticular dermis. Skin looks leathery and shows severe sun damage. Skin may appear yellowish and display open comedones ('blackheads', small bumps (papules) frequently found on the forehead and chin of those with acne).	Laser resurfacing and other cosmetic procedures. Home care regime to be determined by the health care provider and the esthetician.

# Objective Three Self-Test

1) In which ways can an esthetician analyze skin?

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2) How can the information collected by a skin analysis be used?

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3) What are the three main categories of the Fitzpatrick Skin Phototype?

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4) What are the four parts of a Robert's skin type profile?

---

5) What is the typical age of a Group II candidate according to the Glogau Classification?

---

6) What is the typical treatment for a level 3 client according to the Rubin's Classification of Photodamage?

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# Objective Three Self-Test Answers

- 1) An esthetician can analyze skin for acne, aging, dryness, oiliness, sensitivity, tone, pigment, and overall health.
- 2) The information collected by a skin analysis can be used: determine treatments (both techniques and products); calibrate machinery for services; and predict the effects of treatments.
- 3) The three main categories of the Fitzpatrick Skin Phototype are: genetic disposition, reaction to sun exposure, and tanning habits.
- 4) The four parts of a Robert's skin type profile are: ancestral and clinical history; visual examination; test site reactions; and physical examination of the client's skin.
- 5) The typical age is 35 – 50 years old.
- 6) The typical treatment for a level 3 client is laser resurfacing and other cosmetic procedures. The home care regime is to be determined by the health care provider and the esthetician.

# Objective Four

*When you have completed this objective, you will be able to:*  
Demonstrate identifying skin types.

Working in pairs, analyze your partner's skin type according to the Fitzpatrick system.

Genetic Disposition					
Score	0	1	2	3	4
Eye colour	Light blue, gray, or green	Blue, gray, or green	Blue	Dark brown	Brownish black
Natural hair colour	Sandy red	Blonde	Chestnut / dark blonde	Dark brown	Black
Skin colour in non-exposed areas	Reddish	Very pale	Pale with beige tint	Light brown	Dark brown
Freckles on non-exposed areas	Many	Several	Few	Incidental	none
Total score for genetic disposition:					

Reaction to Sun Exposure					
Score	0	1	2	3	4
What happens when you have stayed in the sun too long?	Painful redness, blistering, peeling	Blistering followed by peeling	Burns sometimes followed by peeling	Rare burns	Never had burns
To what degree do you turn brown?	Hardly or not at all	Light colour tan	Reasonable tan	Tan very easily	Turn dark brown quickly
How deeply do you burn?	Very deeply	Deeply	Moderately	Lightly	Not at all or very little
How does your face react to the sun?	Very sensitive	Sensitive	Normal	Very resistant	Never had a problem
Total score for reaction to sun exposure:					

Tanning Habits					
Score	0	1	2	3	4
When did you last expose your body to sun or artificial sun lamps?	More than 3 months ago	2-3 months ago	1-2 months ago	Less than a month ago	Less than 2 weeks ago
Total score for tanning habits:					

Genetic Disposition	Reaction to Sun Exposure	Tanning Habits	Grand Total	Skin Type
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	+	+	=	
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Working in pairs, analyze your partner's skin type according to the Lancer Ethnicity Scale.

	Maternal Grandparents		Paternal Grandparents	
	Male	Female	Male	Female
LES Number				
LES Subtotal				
Subtotal Divided by 4				

1) What was your partner's skin type according to the Fitzpatrick system?

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2) What was your partner's skin type according to the Lancer scale?

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# Objective Five

*When you have completed this objective, you will be able to:*

Describe general information relating to skin conditions.

## Scope of Practice

A *scope of practice* is the procedures, actions, and processes that a person is permitted to undertake in performing their job. A scope of practice is defined within the law and limited by education, experience, training, and competency. Always consult with the authority having jurisdiction (AHJ) to be sure of a scope of practice. Examples of AHJ's include local and provincial health authorities, and Infection and Control Departments. Within their scope of practice, an esthetician cannot cut into live tissue, cannot diagnose diseases and disorders. Callus can be reduced, but not removed. Estheticians learn to recognize diseases and disorders, but cannot treat medical ailments. Estheticians can provide aid to some conditions such as excess callus reduction, and ingrown toenail prevention.

## Conditions, Disorders, and Diseases

The difference between disorders and diseases is not clear. Different texts will define these terms in different manners. For the purposes of Esthetician technical training, the term '*disorder*' refers to an unwanted condition, the cause of which is hard to determine. Disorders are often derangements or abnormalities of function. In contrast to a disorder, a 'disease' has a specific, identifiable cause and symptoms. A *disease* can be thought of as a definite pathological process having a characteristic set of signs and symptoms. Diseases are often the result of extrinsic factors like viruses. Disorders are often attributed to intrinsic abnormalities like genetic malfunctions. The term 'condition' is a general term that encompasses both disorders and diseases. A *condition* is a general term that can apply to either a disorder or a disease.

## General Information

Skin disorders vary greatly in causes, symptoms, duration, and severity. They can range from temporary to permanent, painless to painful, and highly contagious to non-



contagious. Some disorders stem from situational causes, while others have genetic origins. At worst, they can be life-threatening.

### **Features**

Skin conditions have a wide range of features/symptoms. Some features are not due to a skin disorder; for instance, a new pair of shoes may cause blisters. Skin problems that have no obvious cause may indicate a skin condition that requires treatment. Irregularities that are typically symptoms of a skin disorder include:

- Raised bumps that are red or white.
- Fleshy bumps, warts, or other skin growths.
- Rashes which can be painful or itchy.
- Scaly or rough skin.
- Peeling skin.
- Ulcers, open sores, and lesions.
- Dry, cracked skin.
- Discoloured patches of skin, loss of pigment, and excessive flushing.
- Changes in mole colour or size.

### **Common Causes**

Common known causes of skin disorders include:

- Bacteria trapped in skin pores and hair follicles.
- Fungus, parasites, and microorganisms living on the skin.
- Viruses.
- A weakened immune system.
- Contact with allergens, irritants, and another person's infected skin.
- Genetic factors.

Skin conditions can be caused by illnesses that affect the thyroid, immune system, kidneys, and other body systems. Lifestyle factors such as smoking and diet can also cause skin conditions.

### **Treatments**

Common treatment methods for skin conditions include:

- Antihistamines.
- Medicated creams and ointments.

- Medications such as antibiotics and steroids.
- Vitamin injections.
- Laser and light therapy.

### Prevention

Not all skin disorders are preventable, but some are; in addition, the comments below may help reduce symptoms:

- Wash hands with soap and warm water frequently.
- Avoid sharing **fomites** (objects or materials that are likely to carry infection, such as clothes, utensils, and furniture).
- Avoid direct contact with the skin of other people who have an infection.
- Clean things in public spaces, such as gym equipment, before using them.
- Sleep for at least seven hours each night.
- Drink plenty of water.
- Avoid excessive physical or emotional stress.
- Eat a nutritious diet.
- Get vaccinated for infectious skin conditions such as chickenpox.
- Use a moisturizer.
- Avoid contact with harsh chemicals or other irritants.

### Inflammation

*The following information is from [dermamedics.com](http://dermamedics.com)*

Inflammatory skin conditions come in many forms, from occasional rashes accompanied by skin itching and redness, to chronic conditions such as rosacea. Skin inflammation can be characterized as acute or chronic. Acute inflammation can result from exposure to UV radiation (UVR), ionizing radiation, allergens, or to contact with chemical irritants (soaps, hair dyes, etc.). This type of inflammation is typically resolved within 1 to 2 weeks with little accompanying tissue destruction. In contrast, chronic inflammation results from a sustained immune cell mediated inflammatory response within the skin itself. This inflammation is long lasting and can cause significant and serious tissue destruction

The process of skin inflammation is complex and is still not completely understood. When the skin is exposed to a 'triggering' stimulus, such as UV radiation, an irritant (e.g. soaps or fragrances), or to allergens, the cells in the skin produce a variety of inflammatory hormones called cytokines and chemokines. These 'inflammatory

messengers' bind to specific receptors on target cells, and stimulate the production of additional inflammatory signalling hormones. Some of these cause blood vessels to dilate--decreasing blood pressure--while others activate nerve cells. Still other cytokines cause immune cells to leave the blood and migrate into the skin where they then produce more inflammatory hormones, as well as enzymes, free radicals, and chemicals that damage the skin. The end result of the initial triggering event is the amplification of a large inflammatory response that, while designed to help the skin fight infection from invading bacteria, actually causes considerable damage to the skin.

By far the most effective and commonly used prescription drugs for treating inflammation are the corticosteroids. Corticosteroids can be used topically or orally. While current treatment regimens for most inflammatory skin diseases are dominated by topical or oral corticosteroids, these are typically used for only short periods of time because they exert some negative side effects on skin, including:

1. Anti-proliferative / thinning effect on the skin.
2. Suppression of the skin's ability to respond to infection (immunosuppression).
3. Elevation of blood glucose levels (hyperglycemia).
4. Impairment of adrenal gland function.

By understanding the cellular and biochemical events that are involved in skin inflammation, it has been possible to develop newer and more potent topical and injectable drugs to treat inflammatory skin problems. For example, recently injectable 'biological response modifiers' or simply 'biologics' have been made available to treat psoriasis and arthritis. Many of these biologics work by targeting and inhibiting the action of an inflammatory cytokine, TNF-alpha, that plays a key role in immune cell recruitment and activation. These immune cells cause many of the symptoms of psoriasis, and thus, by inhibiting these cells, the symptoms are diminished.

In contrast to the development of synthetic immunosuppressive drugs to fight inflammatory skin diseases, research is being conducted to identify compounds from nature that may have anti-inflammatory benefits without the negative immunosuppressive side effects of potent prescription drugs. This research has led to the identification of many botanically-derived antioxidants that also have significant anti-inflammatory activities. One of the most potent natural anti-inflammatories discovered to date is Curcumin. This yellow phenolic compound is a constituent of Turmeric. Curcumin has been one of the most widely researched natural compounds

to date and its anti-inflammatory and anti-cancer effects have led to the development of chemical derivatives of the compound for use in topical and oral therapeutics. What makes a botanical compound a good anti-inflammatory candidate depends primarily on the ability of the compound to block key inflammatory mediators produced by skin and immune cells. Two of the most important inflammatory mediators involved in skin disorders are TNF-alpha, as mentioned previously, and PGE-2 which is a major participant in all types of skin inflammation, and is perhaps the most important hormone 'mediator' involved in sunburn. Pain, redness and swelling are all due, in part to PGE-2, and studies conducted over many years have implicated PGE-2 as a key participant in the development of skin cancer. Further, PGE-2 suppresses collagen formation in the skin and thus, participates in photoaging.

Natural antioxidant compounds that can prevent the production of PGE-2 in skin exposed to sunlight could be extremely useful in preventing skin aging and in reducing the risk of skin cancer.

The results of this research have shown that not all antioxidants have anti-inflammatory activities, and that some of the weakest anti-oxidants have the best anti-inflammatory and anti-aging effects on human skin cells. A group of very small, phenolic antioxidants that have wide ranging anti-inflammatory and anti-aging properties are commonly found in low amounts in basil, nutmeg, bourbon, rum, cheese, and in other foods. Interestingly, these compounds were all found to display a very unique 'cell-specific' profile with some compounds being extremely good at blocking inflammation in keratinocytes but poor in preventing inflammation in fibroblasts while others had just the opposite profile.

# Objective Five Self-Test

1) Identify four irregularities that are typically symptoms of a skin disorder:

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2) Identify four common causes of a skin disorder:

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3) Identify four common treatments of a skin disorder:

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4) Identify four common preventative measures against skin disorders:

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5) What are the most effective and commonly used prescription drugs for treating inflammation?

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---

6) How do many 'biologics' function?

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7) What are three negative effects caused by the inflammatory mediator PGE-2?

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# Objective Five Self-Test Answers

1) Any four of the following:

Raised bumps that are red or white.

Changes in mole colour or size.

Scaly or rough skin.

Peeling skin.

Dry, cracked skin.

Fleshy bumps, warts, or other skin growths.

Ulcers, open sores, and lesions.

Rashes which can be painful or itchy.

Discoloured patches of skin, loss of pigment, and excessive flushing.

2) Any four of the following:

Viruses.

Genetic factors.

A weakened immune system.

Bacteria trapped in skin pores and hair follicles.

Fungus, parasites, and microorganisms living on the skin.

Contact with allergens, irritants, and another person's infected skin.

3) Any four of the following:

Antihistamines.

Medicated creams and ointments.

Laser and light therapy.

Medications such as antibiotics and steroids.

Vitamin injections.

4) Any four of the following:

Use a moisturizer.

Eat a nutritious diet.

Drink plenty of water.

Sleep for at least seven hours each night.

Avoid excessive physical or emotional stress.

Wash hands with soap and warm water frequently.

Avoid contact with harsh chemicals or other irritants.

Get vaccinated for infectious skin conditions such as chickenpox.

Avoid direct contact with the skin of other people who have an infection.

Clean things in public spaces, such as gym equipment, before using them.

Avoid sharing fomites (objects or materials that are likely to carry infection, such as clothes, utensils, and furniture).

5) The most effective and commonly used prescription drugs for treating inflammation are the corticosteroids.

6) Many 'biologics' function by targeting and inhibiting the action of an inflammatory cytokine, TNF-alpha, that plays a key role in immune cell recruitment and activation.

7) The inflammatory mediator PGE-2 can cause redness and swelling, assist in the development of skin cancer, and suppress collagen formation in the skin.

# Objective Six

*When you have completed this objective, you will be able to:*

Describe skin conditions A - D.

## Acrodermatitis

**Acrodermatitis** is a condition caused by a response to viral infection in which there is a papular rash that lasts for several weeks. It affects children between the ages of 6 months and 12 years, and consists of itchy, red blisters usually on the arms, thighs, and buttocks. The blisters may turn purple and fill with fluid. It has rarely been described in adults. Cases are often clustered together, and they are commonly preceded by an upper respiratory infection.



Image courtesy of Dermnetnz.org

### Features

This condition presents over the course of 3 or 4 days. A profuse eruption of dull red spots develops first on the thighs and buttocks, then on the outer aspects of the arms, and finally on the face. The rash is often asymmetrical. The individual spots are 5–10 mm in diameter and are a deep red colour. Later they often look purple, especially on the legs, due to leakage of blood from the capillaries. They may develop fluid-filled blisters (vesicles). It is not usually itchy.

The child with acrodermatitis may feel quite well or have a mild temperature. Mildly enlarged lymph nodes in the armpits and groins may persist for months. When acrodermatitis is caused by hepatitis B, there may be an enlarged liver, but there is seldom any jaundice.

### Other Names

Gianotti-Crosti syndrome, papulovesicular acrodermatitis of childhood, papular acrodermatitis of childhood, and acrodermatitis papulosa infantum.



## Causes

Hepatitis B infection  
Cytomegalovirus  
Echo viruses

Epstein Barr virus  
Enterovirus infections  
Respiratory syncytial virus

Vaccination has also occasionally been associated with the onset of acrodermatitis.

## Diagnosis

The clinical appearance is quite characteristic, and many children do not require any specific tests; however, blood tests may include a blood count, liver function, and viral serology or PCR.

## Treatment

There is no specific treatment. A mild topical steroid cream or emollient may be prescribed for itch. This condition fades in 2–8 weeks with mild scaling. Recurrence is unlikely but has been reported. If hepatitis B is present, the liver takes between 6 months and 4 years to fully recover. Sometimes there is persistent hepatitis and long-term viral carriage.

## Allergic Eczema

**Allergic eczema** is an itchy skin rash that develops when the skin contacts an allergen. The condition often occurs hours after contact has been made with the allergen. The condition is known as a 'delayed allergy' because the allergic reaction is not immediately triggered.



Image courtesy of Healthline.com

## Features

Features may not develop for 24 to 48 hours after contact with the allergen. It is possible for allergic eczema to develop when the skin is exposed to chemicals in the presence of sunlight. For example, a reaction can occur after applying sunscreen and spending time in the sun. The features of allergic eczema can vary from person to person and change over time. They usually develop where contact with the allergen has occurred, but in rare cases, symptoms can spread to other areas of the body. Common features include:

### Other Names

Allergic dermatitis, contact dermatitis, allergic contact dermatitis, and contact eczema.

Thickened skin.

Inflammation, cuts, and/or rashes.

Skin that feels warm and tender.

Red bumps that may ooze, drain, or crust.

Sensations of itching, burning, and/or pain.

Skin that appears scaly, raw, dry, red, and/or rough.

## Causes

Perfumes found in cosmetics.

Clothing and hair dyes.

Soaps and cleaning products.

Nickel, often found in jewelry, belt buckles, and metal buttons on jeans.

Latex and adhesives.

Poison ivy and other plants.

Antibiotic creams or skin ointments such as neomycin.

## Diagnosis

A medical doctor will diagnose allergic eczema. In many cases, an epicutaneous or patch test will be used. This test involves placing patches that contain common allergens on the back. The patches remain in place for 48 hours. The doctor removes the patches and examines for symptoms of an allergic reaction. After two more days, the doctor will check the skin once more to identify any delayed allergic reactions.

If a patch test does not produce a diagnosis, the doctor may perform a skin lesion biopsy. A skin lesion biopsy will determine if another health condition is causing the skin condition. The doctor removes a small sample of the affected skin and sends it to a laboratory for testing.

## Treatment

The severity of symptoms will determine the course of treatment for allergic eczema. In all cases, however, it is important to remove all traces of the allergen by washing the affected skin with plenty of water. Symptoms can be reduced by applying a moisturizing cream to keep the skin hydrated and repair damage. An over-the-counter corticosteroid cream can reduce itching and inflammation. Higher strength ointments, pills, and creams are available by prescription for severe symptoms.

Allergic eczema will often clear up within two to three weeks when treated properly. The condition can return if the skin is re-exposed to the allergen.

## Alopecia

**Alopecia** is a general term for hair loss. Alopecia has three forms:

- Alopecia areata (hair is lost in round patches).
- Alopecia totalis (all hair on the scalp is lost).
- Alopecia universalis (all hair on the body is lost).

Approximately 5 percent of sufferers lose all of the hair on the scalp or body. Hair often grows back but may fall out again. Sometimes the hair loss lasts for many years. Alopecia is not contagious. It is not due to nerves. This condition is caused by the immune system attacking the hair follicles. Alopecia most often occurs in otherwise healthy people.

## Carbuncle

A **carbuncle** is a skin infection that often involves a group of hair follicles. The infected material forms a lump, which occurs deep in the skin and may contain pus.

### Features

A carbuncle is a swollen lump or mass under the skin that ranges from the size of a pea to a golf ball. The carbuncle may be red and irritated and might hurt when touched. A carbuncle may also grow very fast; have a white or yellow centre; and weep, ooze, or crust. Associated features include: fatigue, fever, general discomfort or sick feeling, and itching before development.

## Causes

Most carbuncles are caused by the bacteria *Staphylococcus aureus*. The infection is contagious, being able to spread to other areas of the body or other people.

A carbuncle is made up of several skin boils (furuncles). The infected mass is filled with fluid, pus, and dead tissue. Fluid may drain out of the carbuncle, but sometimes the mass is so deep that it cannot drain on its own. Carbuncles can develop anywhere, but they are most common on the back and the nape of the neck. Men get carbuncles more often than women.

Because the bacteria that causes the condition is contagious, family members may develop carbuncles at the same time. Often, the cause of a carbuncle cannot be determined, but the risk increases with friction from clothing, shaving, poor hygiene, and poor overall health. Persons with diabetes, dermatitis, and a weakened immune system are more likely to develop staph infections that can cause carbuncles.

### Other Names

Staphylococcal, staph skin infection, boils.

## Diagnosis

A medical doctor will look at the affected area. Many diagnoses can be completed visually, but a sample of the pus may be sent to a lab to determine the bacteria causing the infection.

## Treatment

Carbuncles usually must drain before they will heal. This most often occurs on its own in less than 2 weeks. Placing a warm moist cloth on the carbuncle helps it to drain, which speeds healing. Apply a clean, warm moist cloth several times each day. Never squeeze a boil or try to cut it open at home, because this can spread the infection and make it worse. Seek treatment if the carbuncle:

- Lasts longer than 2 weeks.
- Returns frequently.
- Is located on the spine or the middle of the face.
- Occurs with a fever or other systemic symptoms.

Treatments to reduce complications related to an infection include: antibacterial soaps and antibiotics applied to the skin or taken orally.

Deep or large lesions may need to be drained by a medical doctor. Proper hygiene is very important to prevent the spread of infection. Wash hands thoroughly with soap and warm water after touching a carbuncle. Avoid sharing or re-using fomites such as washcloths or towels. All items that contact infected areas should be washed in very hot (preferably boiling) water. Bandages should be changed often and thrown away in a bag that can be tightly closed.

Carbuncles may heal on their own and usually respond well to treatment. A carbuncle can return for months or years following the first infection.

### Possible Complications

Untreated, carbuncles may lead to any of the following:

Sepsis.

Endocarditis.

Osteomyelitis.

Permanent scarring of the skin.

Spread of infection to other areas.

Abscess of the brain, skin, spinal cord, or organs such as the kidneys.

## Cellulitis

**Cellulitis** is a bacterial infection of the skin and tissues beneath the skin. Most commonly, cellulitis develops in a cut, small puncture wound, or insect bite. In some cases, it may be due to microscopic cracks in the skin that are inflamed or irritated. Cellulitis may also appear in the skin near ulcers or surgical wounds. The main bacteria responsible for cellulitis are

*Streptococcus* and *Staphylococcus* ("staph"). MRSA (methicillin-resistant *Staph aureus*) can also cause cellulitis. Cellulitis is common and affects people of all races and ages. Men and women appear to be equally affected. Although cellulitis can occur in people of any age, it is most common in middle-aged and elderly people.



Image courtesy of MedicineNet.com

### Features

Cellulitis usually begins as a small area of tenderness, swelling, and redness that spreads to adjacent skin. The involved skin may feel warm to the touch. As this red

area begins to enlarge, the affected person may develop a fever, sometimes with chills and sweats, tenderness, and swollen lymph nodes near the area of infected skin.

### **Causes**

In some circumstances, cellulitis occurs where there has been no skin break at all, such as with chronic leg swelling (edema). A preexisting skin infection, such as athlete's foot (tinea pedis) or impetigo can predispose to the development of cellulitis. Likewise, inflammatory conditions of the skin like eczema, psoriasis, or skin damage caused by radiation therapy can lead to cellulitis. People who have diabetes or conditions that compromise the function of the immune system are prone to developing cellulitis. Conditions that reduce the circulation of blood in the veins or that reduce circulation of the lymphatic fluid (such as venous insufficiency, obesity, pregnancy, or surgeries) also increase the risk of developing cellulitis.

### **Diagnosis**

A visual inspection, review of client history, a white blood cell count, and a culture for bacteria may all be used in diagnosis.

### **Treatment**

Antibiotics, such as derivatives of penicillin are effective against the responsible bacteria, are used to treat cellulitis. If an abscess is present, surgical drainage is typically required. If the inflammation is thought to be due to an autoimmune disorder, treatment may be with a corticosteroid.

The treatment may require the administration of intravenous antibiotics in a hospital setting, since oral antibiotics may not always provide sufficient penetration of the inflamed tissues to be effective.

### **Prevention**

Cellulitis can be prevented by proper hygiene, treating chronic swelling of tissues (edema), and care of wounds or cuts. In general, cellulitis in a healthy person with an intact immune system is preventable by avoiding skin surface wounds. In people with predisposing conditions and/or weakened immune systems, cellulitis may not always be preventable. If not properly treated, cellulitis can occasionally spread to the bloodstream and cause a serious bacterial infection of the bloodstream that spreads throughout the body (sepsis).



# Chickenpox

Also known as varicella, **chickenpox** is a virus that often affects children. It is characterized by itchy, red blisters that appear all over the body.

Chickenpox was common at one time, but since the chickenpox vaccine was introduced in the mid 1990's, cases have declined. It is very rare to have the chickenpox infection more than once. Most cases occur through contact with an infected person. It is mostly spread through: saliva, coughing, sneezing, and contact with blisters.



Image courtesy of Healthline.com

## Features

The most common feature of the chickenpox is a rash. A person is contagious several days before the rash develops and will experience other symptoms first, such as: fever, headache, and loss of appetite. The rash will develop about two days after the initial symptoms. The rash goes through three different phases before full recovery from the virus. These phases include: red bumps, blisters, and then scabs. The virus remains contagious until all blisters have crusted over.

Exposure to the virus through previous infection, vaccination, or immunity passed from mother to newborn (immunity lasts about three months from birth) reduces risk. Anyone who has not been exposed may contract the virus. Risk increases under any of these conditions:

Those under 12 years of age.

Adults residing with children.

Spending time in a school or childcare facility.

A compromised immune system due to illness or medications.

Recent contact with an infected individual.

## Diagnosis

A medical doctor should be immediately informed if a pregnant woman is exposed to chickenpox. A physical exam of blisters on the body is often enough for a diagnosis. If a diagnosis cannot be made, lab tests will confirm the cause of the blisters.

## **Treatment**

Most people diagnosed with chickenpox will be advised to manage their symptoms while waiting for the virus to pass through the system. The infected will be instructed to stay at home until no longer contagious. Antihistamine medications or topical ointments may be prescribed or purchased over the counter to relieve itching. Itching can be soothed by taking lukewarm baths, applying unscented lotion, and wearing lightweight, soft clothing. Most cases of chickenpox resolve themselves, and patients usually return to normal activities within one to two weeks of diagnosis.

Antiviral drugs may be prescribed to those who experience complications from the virus, or who are at risk for adverse effects. High-risk patients are usually young, elderly, or have underlying medical issues. These antiviral drugs do not cure chickenpox; instead, they reduce the severity of the symptoms and decrease healing time.

Once chickenpox heals, most people become immune to the virus, as varicella-zoster stays dormant in the body. In rare cases, it may re-emerge. It is more common for shingles, a separate disorder triggered by varicella-zoster, to present during adulthood. If the patient's immune system is temporarily weakened (possibly due to advanced age or illness), varicella-zoster may reactivate in the form of shingles. The chickenpox vaccine prevents chickenpox in 90 percent of children who receive it. The shot is usually delivered between 12 and 15 months of age. A booster is given between 4 and 6 years of age. Older children and adults who have not been vaccinated or exposed may receive catch-up doses of the vaccine. As chickenpox tends to be more severe in older patients. Parents who did not previously vaccinate may opt to have the shots given later. People who are unable to receive the vaccine can try to avoid the virus by limiting contact with infected people. This can be difficult, as chickenpox can't be identified by blisters until it has been contagious for days.

## **Complications**

Complications most often occur in infants, the elderly, those with weak immune systems, and pregnant women. Women exposed during pregnancy may bear children with birth defects, including: poor growth, small head size, eye problems, and intellectual disabilities.



# Cold Sores

**Cold sores**, also known as herpetic stomatitis, are small sores, or blister-like lesions that mostly occur on the face, lips, inside the mouth, or inside the nose. They usually cause pain, a burning sensation, or itching before they burst and crust over. There is no cure or prevention for infected people, but steps can be taken to reduce their frequency and duration.



Image courtesy of Medicalnewstoday.com

## Features

In the majority of cases there are no detectable signs or symptoms. When they do occur, usually in very young children, they may be severe, and can include:

- |               |   |
|---------------|---|
| Lip swelling. | Swollen glands.                               |
| Sore throat.  | Mouth or tongue pain.                         |
| Nausea.       | Elevated body temperature.                    |
| Headaches.    | Possible swallowing difficulties.             |
| Dehydration.  | Mouth or tongue lesions, blisters, or ulcers. |

Cold sores may last from one to two weeks, and require as long as three weeks to heal up. Patients say a tingling, itching or burning sensation around the mouth often indicates the onset of a cold sore outbreak. This is followed by fluid-filled sores, typically located on the edges of the lower lip. People with regular recurrences say the cold sores often appear in the same place. As the cold sore grows in size, so does the pain and irritation. They will form, break and ooze (weep). A yellow crust forms and sloughs off to uncover pink skin that heals without scarring.

## Causes

Cold sores are caused by the herpes simplex viruses; the most common cause of sores around the mouth is herpes simplex type 1, or HSV-1. Much less commonly, cold sores may be caused by HSV-2 (herpes simplex type 2), which may result from having oral sex with a person who has genital herpes. The cold sore virus is very contagious. When it enters a human, for most of the time it remains inactive (dormant). Occasionally, however, certain triggers activate the virus, resulting in a cold sore

outbreak. Triggers vary, according to the individual. While one person may have just one outbreak and no recurrence, others may have two or three each year. Some people may carry the virus and never have an outbreak because it remains dormant all the time. Common triggers include:

Mental stress.

Deep sadness or upset.

Menstruation.

An injury to the affected area.

Intense sunlight.

### **Diagnosis**

A medical doctor will usually be able to diagnose just by looking at the cold sore(s). Sometimes a blood test may be ordered. The doctor may take a sample of the fluid scraped from the cold sore to determine the presence of the cold sore virus. Such tests are generally only done on patients with weak immune systems, such as those undergoing chemotherapy, or people with HIV/AIDS.

### **Treatment**

Some ointments, L-lysine, and antiviral medications may slightly shorten the duration of the outbreak and alleviate discomfort and pain. Patients with weakened immune systems may be prescribed antiviral tablets or be referred to a specialist. Some creams which do not contain antivirals and can be bought without a prescription may help alleviate some of the irritation. They do not speed up the healing process, but may help if the cold sores are very dry, itchy or painful. Painkillers such as ibuprofen or Tylenol (paracetamol) may help alleviate pain. Pregnant women who have cold sores should discuss their treatment options with their medical doctor.

### **Complications**

Complications caused by cold sore virus are very rare, and tend to occur with patients who have weakened immune systems - even then, complications are not common.

Possible complications include:

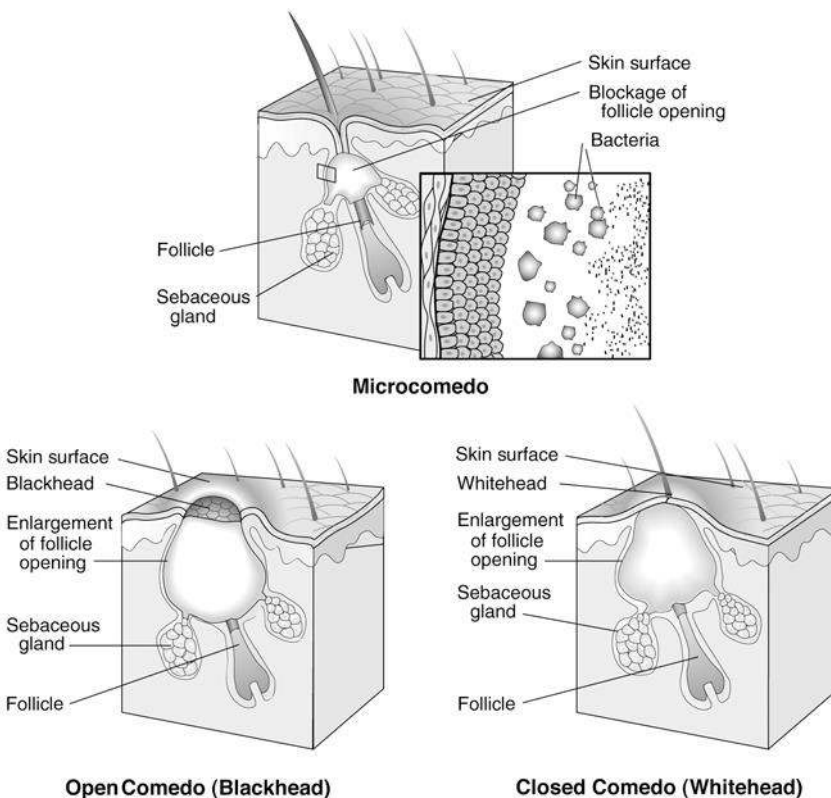
- Dehydration.
- Herpetic whitlow - if the cold sore virus spreads to other parts of the body, for example the hands, the patient may have blisters on their fingers. Most commonly the virus spreads by entering through a cut or graze in the skin. Antiviral medications are generally effective in treating this type of complication.

- Herpetic keratoconjunctivitis - this is a secondary infection in which the eyes are affected. The eye area may become swollen and irritated (inflamed), and sores may develop on the eyelids. If left untreated the cornea may become infected, resulting in possible blindness. This type of complication is usually effectively treated with antiviral medication.
- Encephalitis - the brain becomes swollen and there is a serious risk of brain damage. Encephalitis can be life-threatening. Encephalitis can occur if the cold sore virus spreads to the brain. Fortunately, this type of complication is extremely rare. Antiviral medications are injected straight into the patient's bloodstream. Treatment is usually effective.

## Comedones

**Comedones** are small, skin-coloured, papules (bumps) frequently found on the forehead and chin of those with acne. A single lesion is called a **comedo**. **Open comedones** are referred to as blackheads, and the colouration can be attributed to

surface pigment (melanin), or debris. Blackheads can form when the opening of a hair follicle in the skin becomes blocked. Each follicle contains one hair and a sebaceous gland that produces oil, called sebum, which helps keep skin soft. Dead skin cells and oils collect in the opening to the skin follicle, producing the comedone.



the pore opening. **Macrocomedones** are closed comedones larger than 2–3 mm in diameter. A giant comedo is a type of cyst characterized by a clear blackhead-like

opening in the skin. **Solar comedones** are found on the cheeks and chin of older people, and attributed to sun damage.

### Causes

Sometimes, the cells lining the sebaceous duct proliferate and sebum production increases. If the increase in production occurs in a follicle that is blocked by debris, a comedo will form. Inflammation can occur.

The development of comedones may involve many factors:

- Excessive activity of the male sex hormone 5-testosterone (DHT) within skin cells.
- Reduced linoleate in sebum causing more scale and reduced barrier function (linoleate is the salt of the essential fatty acid, linoleic acid).
- Proinflammatory cytokines (cell signalling proteins), such as Interleukin 1 (IL-1) and IL-8, produced by cells lining the follicle. This occurs when the innate immune system is activated.
- Production of free fatty acids by acne bacteria, made from sebum.
- Overhydrated premenstrual skin, (eg. from moisturisers or humidity).
- Contact with chemicals such as propylene glycol, oily pomades, and some dyes in cosmetics.
- Rupture of the follicle by injury, including laser treatments, squeezing pimples, chemical peels, and abrasive washing.
- Smoking.
- Dietary factors, particularly milk products and high glycemic-index foods (sugars and fats).

### Treatment

Choose oil-free cosmetics, wash twice daily with a mild soap and water, stop smoking, reduce or eliminate sugars, fats, and dairy products from the diet. Apply 'comedolytic' topical medications once or twice daily as a thin smear to the affected area. Improvements may require several weeks or months to be noticed. Some clients may need treatment for many years. Topical agents include:

Glycolic acid.

Azelaic acid.

Benzoyl peroxide.

Salicylic acid +/- sulfur and resorcinol.

Topical agents and oral medications may be prescribed by a medical doctor. Antibiotics can also improve comedonal acne but are usually prescribed for inflammatory acne (acne vulgaris). Surgical treatments are sometimes recommended to remove persistent comedones. These include cryotherapy, electrosurgery (cautery or diathermy), and microdermabrasion.

## Cutaneous Candidiasis

In **cutaneous candidiasis**, the skin is infected with *Candida* fungi. This type of infection is fairly common. It can involve almost any skin on the body, but most often it occurs in warm, moist, creased areas such as the armpits and groin. The fungus that most often causes cutaneous candidiasis is *Candida albicans*.



Image courtesy of Healthline.com

*Candida* infection is particularly common in people with diabetes and in those who are obese. Antibiotics, steroid therapy, and chemotherapy increase the risk of cutaneous candidiasis. *Candida* can also cause infections of the nails, edges of the nails, and corners of the mouth.

Oral thrush, a form of *Candida* infection of the moist lining of the mouth, usually occurs when people take antibiotics. It may also be a sign of an HIV infection or other weakened immune system disorders when it occurs in adults. Individuals with *Candida* infections are not usually contagious, though in some settings people with weakened immune systems may catch the infection.

*Candida* is also the most frequent cause of vaginal yeast infections. These infections are common and often occur with antibiotic use. People with seriously weakened immune systems and cutaneous candidiasis may go on to develop more serious *Candida* infections inside their body.

### Features

A candida infection of the skin can cause intense itching. Symptoms also include:

- Red, growing skin rash.

- Rash on the skin folds, genitals, middle of the body, buttocks, under the breasts, and other areas of skin.
- Infection of the hair follicles that may look like pimples.

### Diagnosis

A medical doctor can usually diagnose this condition by looking at the skin. The skin may be gently scraped off to produce a test sample. Older children and adults with a yeast skin infection should be tested for diabetes. High sugar levels, seen in people with diabetes, act as food for the yeast fungus and help it grow.

### Treatment

Good general health and hygiene are very important for treating candida infections of the skin. Keep the skin dry and exposed to air. Drying powders may help prevent fungal infections. Losing weight may help eliminate the problem if a person is overweight. Proper blood sugar control may also be helpful to those with diabetes. Antifungal skin creams or ointments may be used to treat a yeast infection of the skin, mouth, or vagina. A person may need to take antifungal medicine by mouth for severe candida infections. Cutaneous candidiasis sometimes goes away with treatment. Repeat infections are common.

### Complications

These complications may occur:

- Infection of the nails may cause the nails to become oddly shaped and may cause an infection around the nail.
- Widespread candidiasis may occur in people with weakened immune systems.

## Decubitus Ulcer

A **decubitus ulcer** is a pressure sore, an area of the skin that has broken down because it was rubbed excessively or was pressed against for a long period. Excessive pressure reduces blood flow to the area. Without enough blood, the skin can die and a sore may form.

#### Other Names

Pressure ulcer, pressure sore, bedsore.



## Features

Decubitus ulcers are grouped by the severity of symptoms.

**Stage I:** A reddened, painful area on the skin that does not turn white when pressed. This is a sign that a pressure ulcer is forming. The skin may be warm or cool, firm or soft.

**Stage II:** The skin blisters or forms an open sore. The area around the sore may be red and irritated.

**Stage III:** The skin now develops an open, sunken hole called a crater. The tissue below the skin is damaged. You may be able to see body fat in the crater.

**Stage IV:** The pressure ulcer has become so deep that there is damage to the muscle and bone, and sometimes to tendons and joints.

Some pressure sores develop in the tissue deep below the skin. These are called a deep tissue injury. The area may be dark purple or maroon. There may be a blood-filled blister under the skin. This type of skin injury can quickly become a stage III or IV pressure sore.

Decubitus ulcers tend to form where skin covers bone, such as the: buttocks, elbow, hips, heels, ankles, shoulders, back, and back of the head.

## Causes

Decubitus ulcers are likely to occur on individuals who:

- Use a wheelchair or stay in bed for a long time.
- Are an older adult.
- Cannot move certain parts of the body without help,
- Have a disease that affects blood flow, including diabetes or vascular disease.
- Have Alzheimer disease or another condition that affects the mental state.
- Have fragile skin.
- Cannot control the bladder or bowels.
- Have poor nutrition.

## Treatment

Do not use hydrogen peroxide or iodine cleansers, as they can damage skin. **Stage I or II** sores will heal if cared for carefully. **Stage III and IV** sores are harder to treat and may take a long time to heal. Relieve the pressure on the area by using special pillows, foam cushions, booties, or mattress pads.

Change positions often. If the sufferer is in a wheelchair, try to change position every 15 minutes. If they are in bed, they should be moved about every 2 hours. Care for the sore as directed by a medical doctor. Keep the wound clean to prevent infection. Clean the sore every time the dressing is changed. Keep the sore covered with a special dressing as specified by a medical doctor. This protects against infection and helps keep the sore moist so it can heal. Depending on the size and stage of the sore, the dressing may be a film, gauze, gel, foam, or other type of dressing.

For a **Stage I** sore, wash the area gently with mild soap and water. If needed, use a moisture barrier to protect the area from bodily fluids.

**Stage II** pressure sores should be cleaned with a salt water (saline) rinse to remove loose, dead tissue.

Most **Stage III** and **IV** sores will be treated by a health care professional. Avoid further injury or friction. Powder sheets lightly so skin doesn't rub on them in bed. Avoid slipping or sliding while changing positions. Try to avoid positions that put pressure on the sore.

Check skin for pressure sores every day. Ask a health care professional to check areas that cannot be seen. If the pressure sore changes or a new one forms, inform the medical doctor.

- Eat healthy foods.
- Lose excess weight.
- Get plenty of sleep.
- Ask a medical doctor if it's OK to do gentle stretches or light exercises. This can help improve circulation.
- DO NOT massage the skin near or on the ulcer. This can cause more damage.
- DO NOT use donut-shaped or ring-shaped cushions. They reduce blood flow to the area, which may cause sores.

Call a medical doctor if blisters or open sores develop, and if there are signs of infection, such as:

- A foul odor from the sore.
- Pus coming out of the sore.
- Redness and tenderness around the sore.



- Skin close to the sore is warm and/or swollen.
- Fever.

## Dermatomyositis

**Dermatomyositis** is an uncommon inflammatory disease marked by muscle weakness and a distinctive red or violet skin rash on the face, chest, nails, or elbows. Muscle weakness starts in the neck, arms, or hips. Dermatomyositis affects adults and children alike. In adults, dermatomyositis usually occurs from the late 40s to early 60s. In children, the disease most often appears between 5 and 15 years of age. Dermatomyositis affects more females than males.

There's no cure for dermatomyositis, but periods of remission may occur. Treatment can clear the skin rash and help regain muscle strength and function.

The exact cause of dermatomyositis is unknown, but the disease shares many characteristics with autoimmune disorders. Small blood vessels in muscular tissue are particularly affected in dermatomyositis. Inflammatory cells surround the blood vessels and eventually lead to degeneration of muscle fibers.

### Complications

Possible complications of dermatomyositis include:

- Difficulty swallowing if the muscles in the esophagus are affected, which in turn may cause weight loss and malnutrition.
- Aspiration pneumonia.
- Breathing problems. If the chest muscles are affected by the disease.
- Calcium deposits in the muscles, skin, and connective tissues as the disease progresses.

## Dermatophytes

**Dermatophytes** are fungi that require keratin for growth. These fungi can cause superficial infections of the skin, hair, and nails. Dermatophytes are spread by direct

**Endothrix** refers to dermatophyte infections of the hair that invade the hair shaft and internalize into the hair cell. This is in contrast to **ectothrix**, where a dermatophyte infection remains confined to the hair surface.

contact with other people, animals, and soil, as well as indirectly from objects such as clothes, utensils, and furniture. **Dermatophytosis** is also known as **dermatomycosis** and refers to fungal infections of the skin, including tinea favosa (dermatophyte infection of the scalp); tinea corporis (ringworm of glabrous skin: skin that does not have hair, usually in areas that never had it); tinea cruris (ringworm of the groin); tinea barbae (ringworm of the beard), and tinea manuum (ringworm of the hand).

## Diabetes

Many people with diabetes experience a skin problem as a result of their condition. Some of these skin disorders only affect people with diabetes, while others occur more frequently in people with diabetes because the disease increases the risk for infection and blood circulation problems. Diabetes-related skin conditions include: bacterial infections such as boils and styes, fungal infections such as athlete's foot, and diabetic blisters. See *EST 22* for more information.

## Dyshidrotic Eczema

**Dyshidrotic Eczema** is a common form of eczema that produces small, itchy blisters on the edges of the fingers, toes, palms, and soles of the feet. Dyshidrotic eczema blisters are often difficult to see because of thick skin on the palms and fingers. This condition usually causes small, clear fluid-filled blisters on the sides of the fingers. It is twice as common in women as it is in men.

### Causes

Stress, allergies (such as hay fever), moist hands and feet, and contact with nickel (in metal-plated jewelry), cobalt (found in metal-plated objects and in pigments used in paints and enamels), or chromium salts (used in the manufacturing of cement, mortar, leather, paints and anti-corrosives) may be triggers of dyshidrotic eczema.

There is no cure for dyshidrotic eczema, but in many cases it is manageable. It is not contagious. Additional features include:

- Itching and redness.
- Flaking, scaly, cracked skin.
- Pain

Other Names  
Dyshidrosis, foot-and-hand eczema, vesicular eczema, palmoplantar eczema.

## Management

There is no guaranteed way to prevent dyshidrotic eczema; however, daily bathing and moisturizing can help strengthen the skin against irritation, so that it does not flare up or get worse. The most important thing to remember is consistency.

Some basic things that can help control dyshidrotic eczema include:

- Learn and avoid triggers.
- Moisturize every day.
- Wear soft, loose-clothing (like cotton) and avoid rough, scratchy fibers (like wool).
- Take lukewarm baths and showers, using mild soap or non-soap cleansers.
- Gently pat skin dry (don't rub) with a soft towel.
- Apply a moisturizer within three minutes after bathing to 'lock in' moisture.
- When possible, avoid rapid changes of temperature and activities that produce sweat.
- Use a humidifier in cold, dry weather.
- Keep fingernails short to help prevent scratching from breaking the skin.
- To combat known allergic triggers, remove carpets house and give pets dander treatments.

# Objective Six Self-Test

1) What are the features of Acrodermatitis?

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2) How is allergic eczema diagnosed?

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3) What causes alopecia?

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4) What can be done to help carbuncles drain and heal faster?

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5) Must the skin be cut for a person to develop cellulitis?

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6) In what form can the chickenpox virus, varicella-zoster, recur during adulthood?

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7) How can a person contract herpes simplex type 2?

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8) Identify four possible causes of comedones:

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9) Which fungus most often causes cutaneous candidiasis?

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10) What should **not** be used to clean a decubitus ulcer?

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11) What is dermatomyositis?

---

12) How are dermatophytes are spread?

---

13) What are the skin conditions related to diabetes?

---

14) What can be done on a daily basis to strengthen the skin against irritation caused by dyshidrotic eczema?

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# Objective Six Self-Test Answers

- 1) The features of acrodermatitis are: an asymmetrical rash of dull red spots the thighs and buttocks, then on the outer aspects of the arms, and finally on the face. The individual spots are 5–10 mm in diameter and are a deep red colour, but can look purple on the legs.
- 2) Allergic eczema is diagnosed with a patch test on the back. The patches remain in place for 48 hours, then are inspected by a medical doctor, and then re-inspected after two more days.
- 3) Alopecia is caused by the immune system attacking the hair follicles
- 4) Placing a warm moist cloth on the carbuncle several times each day helps it to drain, which speeds healing.
- 5) No. A person can get cellulitis from microscopic cracks in the skin.
- 6) The varicella-zoster can cause shingles in adulthood.
- 7) A person contract herpes simplex type 2 from having oral sex with a person who has genital herpes.
- 8) Any four of the following:
  - Excessive activity of the male sex hormone 5-testosterone (DHT) within skin cells.
  - Reduced linoleate in sebum causing more scale and reduced barrier function (linoleate is the salt of the essential fatty acid, linoleic acid).
  - Proinflammatory cytokines (cell signalling proteins), such as Interleukin 1 (IL-1) and IL-8, produced by cells lining the follicle. This occurs when the innate immune system is activated.
  - Production of free fatty acids by acne bacteria, made from sebum.
  - Overhydrated premenstrual skin, (eg. from moisturisers or humidity).

- Contact with chemicals such as propylene glycol, oily pomades, and some dyes in cosmetics.
- Rupture of the follicle by injury, including laser treatments, squeezing pimples, chemical peels, and abrasive washing.
- Smoking.
- Dietary factors, particularly milk products and high glycemic-index foods (sugars and fats).

- 9) Cutaneous candidiasis is most often caused by the fungus *Candida albicans*.
- 10) Do not use hydrogen peroxide or iodine cleansers to clean a decubitus ulcer.
- 11) Dermatomyositis is an uncommon inflammatory disease marked by muscle weakness and a distinctive red or violet skin rash on the face, chest, nails, or elbows.
- 12) Dermatophytes are spread by contact with other people, animals, and soil, as well as indirectly from objects such as clothes, utensils, and furniture.
- 13) Diabetes-related skin conditions include: bacterial infections such as boils and styes, fungal infections such as athlete's foot, and diabetic blisters.
- 14) Daily bathing and moisturizing can help strengthen the skin against irritation caused by dyshidrotic eczema.

# Objective Seven

*When you have completed this objective, you will be able to:*

Describe skin conditions E - L.

## Eczema

See EST 22.

## Epidermoid Cyst

**Epidermoid cysts** are noncancerous small bumps beneath the skin. Epidermoid cysts can appear anywhere on the skin, but are most common on the face, neck and trunk. Slow growing and often painless, they rarely cause problems or need treatment. A cyst may be removed by a doctor if its appearance is unsightly, or if it is painful, ruptured, or infected.

Many people refer to epidermoid cysts as **sebaceous cysts**, but they are different. True sebaceous cysts are less common. They arise from the sebaceous glands.

### Features

- A small, round bump under the skin, usually on the face, trunk or neck.
- A tiny blackhead plugging the central opening of the cyst.
- A thick, yellow, foul-smelling material that sometimes drains from the cyst.
- Redness, swelling and tenderness in the area, if inflamed or infected.

Most epidermoid cysts don't cause problems or need treatment. Consult with a medical doctor if one:

Grows rapidly.

Is cosmetically unappealing.

Ruptures or becomes painful or infected.

Occurs in a spot that's constantly irritated.

### Causes

The epidermis is made up of a thin, protective layer of cells that the body continuously sheds. Most epidermoid cysts form when these cells move deeper into the skin and multiply rather than slough off. The epidermal cells form the walls of the cyst and



then secrete the protein keratin into the interior. The keratin is the thick, yellow substance that sometimes drains from the cyst. This abnormal growth of cells may be due to a damaged hair follicle or oil gland in the skin.

Potential complications of epidermoid cysts include:

Rupture.

Infection.

Inflammation.

Genital discomfort.

Skin cancer in very rare cases.

## Erysipelas

**Erysipelas** is a bacterial skin infection involving the upper dermis that characteristically extends into the skin's lymphatic vessels. The skin becomes tender, intensely red, and hardened with a sharply demarcated border. Its well-defined margin can help differentiate it from other skin infections such as cellulitis.

### Causes

Cases most often involve the legs. The group A streptococcal bacterium *Streptococcus pyogenes* causes most of the facial infections and some cases of erysipelas on the legs. In erysipelas, the infection rapidly invades and spreads through the lymphatic vessels. This can produce overlying skin 'streaking' and regional lymph node swelling and tenderness. A sufferer cannot develop immunity to this condition.



Image courtesy of Medscape.com

Erysipelas is usually diagnosed by the characteristic rash.

### Treatment

The prognosis for patients with erysipelas is excellent. Complications of the infection usually are not life threatening, and most cases resolve after antibiotic therapy. The condition may also resolve spontaneously, without treatment. Sufferers should rest,

elevate the affected area, and use cold compresses 4 times daily for 48 hours. They should return or see a medical doctor if they are experiencing an increase in pain, fever and chills, redness, or other new symptoms. Other treatments include:

- Cold packs and analgesics to relieve local discomfort.
- Elevation of an infected limb to reduce local swelling.
- Compression stockings.
- Wound care with saline dressings that are frequently changed.
- Antibiotics.

The most common complications of erysipelas include abscess, gangrene, and thrombophlebitis (inflammation of a vein that is caused by a blood clot, typically occurring in the legs).

## Hemangioma of Skin

A **hemangioma** is a benign tumor formed by a collection of excess blood vessels. A hemangioma may be visible through the skin as a birthmark, known colloquially as a 'strawberry mark.' Most hemangiomas that occur at birth disappear after a few months or years.

### Causes

Hemangiomas are caused by many tiny blood vessels bunched together and vary in severity. Typically, this birthmark can be just that, a mark, or it can grow larger and larger until treated. Hemangiomas can grow very rapidly through the first year of a child's life. Most hemangiomas will go away on their own; roughly 50% resolve by age five, 70% by age seven and 90% by age nine.

### Treatment

Reasons to treat hemangioma include problems with functions (such as sight, eating, hearing or defecation), ulceration or pain. Hemangiomas can be treated in different ways. Corticosteroid medication, which can be injected or taken orally, is one option for treating hemangiomas. Certain hemangiomas can also be treated with lasers to prevent growth. In some cases, a hemangioma can also be removed with surgery. Other times, a combination of these approaches is the most beneficial treatment.

# Hives

**Hives** are also known as urticarial. Hives usually start as an itchy patch of skin that turns into swollen, pale or red welts, bumps, or plaques (wheals). Itching may be mild to severe. Hives can be a result of the body's reaction to certain allergens. Sometimes, hives appear for unknown



Image courtesy of Healthline.com

reasons. Hives usually cause itching, but may also burn or sting. Hives affects about 20 percent of people at some time during their lives. Scratching, alcoholic beverages, exercise and emotional stress may worsen the itching. A characteristic of hives is 'blanching'. When pressed, the center of a red hive turns white.

## Features

Symptoms of hives can last from minutes to years. Hives can appear on any area of the body; they may change shape, move around, disappear and reappear over short periods of time. The bumps - red or skin-colored "wheals" with clear edges - usually appear suddenly and go away just as quickly.

There are two types of hives - short-lived (acute) and long-term (chronic). Neither is typically life-threatening, though any swelling in the throat or any other symptom that restricts breathing requires immediate emergency care.

Chronic hives occur almost daily for more than six weeks and are typically itchy. Each hive lasts less than 24 hours. They do not bruise nor leave any scar. If hives last more than a month or if they recur over time, consult an allergist.

## Causes

- Some foods (especially peanuts, eggs, nuts and shellfish).
- Medications, such as antibiotics (especially penicillin and sulfa), aspirin, and ibuprofen.
- Insect stings or bites.
- Physical stimuli, such as pressure, cold, heat, exercise, or sun exposure.
- Latex.
- Blood transfusions.

- Bacterial infections, including urinary tract infections and strep throat.
- Viral infections, including the common cold, infectious mononucleosis and hepatitis.
- Pet dander, pollen, and some plants, such as poison oak and poison ivy.

### Diagnosis

An allergist can diagnose and treat hives. They will record a client history, perform a thorough physical exam, try to identify triggers, and may recommend medications to prevent the hives or reduce the severity of symptoms. Skin tests, prick tests, blood tests, a skin biopsy, and urine tests may be employed. A skin test and challenge test may also be needed to identify triggers. In some cases, the trigger is made clear by a short temporal connection between cause and event.

A single episode of hives does not usually call for extensive testing. Chronic hives may also be associated with thyroid disease, other hormonal problems or, in very rare instances, cancer.

### Treatment

Therapies range from cool compresses to relieve itching to prescription antihistamines and other drugs, such as anti-inflammatory medications and medications that may modify your immune system.

**Angioedema** is a condition similar to hives. Angioedema is a swelling of tissue beneath the surface of the skin. It can be caused by allergic reactions, medications, or a hereditary deficiency of some enzymes. The following symptoms may indicate angioedema:

- Swelling in the eyes or mouth.
- Swelling of the hands, feet or throat.
- Difficulty breathing, stomach cramps or chemosis (swelling of the lining of the eyes).

# Hyperpigmentation

**Hyperpigmentation** is a common, usually benign condition, in which patches of skin become darker in colour than the normal surrounding skin. This darkening is caused by an excess of melanin that forms deposits in the skin. Hyperpigmentation can affect the skin color of people of any race. Age or "liver" spots are a common form of hyperpigmentation. When occurring due to sun damage, the darkened spots are referred to as solar lentigines.

## Causes

Hormonal changes can cause melisma--or chloasma--spots that appear similar to age spots but are larger. Taking birth control pills and being pregnant can trigger an overproduction of melanin. Injuries to the skin and skin conditions such as acne may leave dark spots after the condition clears. Freckles are small brown spots that can appear anywhere on the body, but are most common on the face and arms. Freckles are an inherited characteristic.

Freckles, age spots, and other darkened skin patches can darken when exposed to the sun. The darkening occurs because melanin absorbs the energy of the sun's ultraviolet rays in order to protect the skin from overexposure. Tanning tends to darken areas that are already hyperpigmented.

## Treatment

The best way to reduce the chances of hyperpigmentation is to avoid the sun's direct contact with the skin. When the skin is exposed to the sun, it should be protected by a 'broad spectrum' (blocks both UVA and UVB) sunscreen.

Hydroquinone is a chemical contained in most prescription creams used to lighten the skin. Darkened skin patches can be bleached. The bleaching slows the production of melanin, allowing the skin to fade and match the surrounding skin. Prescription bleaches contain twice the amount of hydroquinone as over-the-counter skin bleaches. Laser treatments can also be effective for this condition.

# Hypohidrosis

**Hypohidrosis** is the inability to sweat normally (lack of perspiration). Hypohidrosis can be difficult to diagnose; as a result, mild hypohidrosis often goes unnoticed. The condition has many causes.

## Features

The features of hypohidrosis include:

Dizziness.

Feeling overly hot.

Muscle cramps or weakness.

A flushed appearance or rash instead of sweating.

## Causes

As a person ages, it is normal for the ability to sweat to diminish. Conditions that damage the autonomic nerves, such as diabetes, also make problems with sweat glands more likely. Skin damage from severe burns can permanently damage sweat glands. Other possible sources of damage include: radiation, trauma, infection, and inflammation.

Other causes include:

- Alcoholism.
- Parkinson's disease,
- Multiple system atrophy.
- Amyloidosis, which occurs when a protein called an amyloid builds up in the organs and affects your nervous system.
- Small cell lung cancer.
- Fabry disease, which is a genetic disorder that causes fat to build up in cells.
- Horner syndrome, which is a form of nerve damage that occurs in the face and eyes.

Skin disorders that inflame the skin can also affect your sweat glands. These include:

Psoriasis.

Ichthyosis.

Heat rash.

Scleroderma.

Exfoliative dermatitis.



Taking certain medications, particularly those known as anticholinergics, can result in reduced sweating. These medications have side effects that include a sore throat, dry mouth, and reduction in perspiration.

Some people may inherit a damaged gene that causes their sweat glands to malfunction. An inherited condition called “hypohidrotic ectodermal dysplasia” causes people to be born with either very few or no sweat glands.

### Diagnosis

A thorough medical history is needed to diagnose this condition. The following tests can be used to confirm a diagnosis:

- During the axon reflex test, small electrodes are used to stimulate sweat glands.
- The silastic sweat imprint test.
- The thermoregulatory sweat test, (The body is coated with a powder that changes color in areas of sweat).
- A skin biopsy.

### Treatment

Hypohidrosis that affects only a small part of the body usually will not cause problems and may not require treatment. If an underlying medical condition is causing hypohidrosis, that condition will be addressed. If medications are causing the condition, other medications may be tried or dosages reduced. If left untreated, hypohidrosis can cause your body to overheat.

## Ichthyosis Vulgaris

**Ichthyosis vulgaris** is characterized by excessive dry, scaly skin which may appear as polygon-shaped brown, gray, or white scales. This condition may be inherited or acquired. This information focuses on the more common inherited form.

### Features

Features vary in severity and tend to be less severe in a warm, humid climates.



Image courtesy of Dermnetnz.org

Ichthyosis vulgaris is usually not present at birth. Most often it appears after about 2 months and in most cases before the age of 5. Symptoms may worsen up to puberty, and sometimes improve with age. Dry scaly skin affects the extensor aspect of the limbs, scalp, central face and trunk. Skin folds are usually spared (neck, armpits, elbow and knee creases). There may be painful fissuring of palms and soles.

Ichthyosis vulgaris is associated with keratosis pilaris (follicular hyperkeratosis) and hyperlinearity (pronounced skin lines) of palms and soles. Hyperkeratosis results from compensatory repair mechanisms increasing cell proliferation.

Eczema is present in 50% of people with ichthyosis vulgaris (and 8% of those with atopic eczema have the features of ichthyosis vulgaris).

### **Causes**

Ichthyosis vulgaris results from loss-of-function mutations in the gene encoding the protein filaggrin (FLG). The mutations lead to defective production of filaggrin. Filaggrin is a filament-associated epidermal protein required for the binding of keratin fibres in epidermal cells, to form an effective skin barrier. It helps maintain the skin pH, retain moisture in the stratum corneum, and reduce trans-epidermal water loss (TEWL).

Dryness results from the reduced skin hydration associated with defective filaggrin. Excessive scale results from the inability of the skin cells to remain hydrated as they move upward through the stratum corneum.

Ichthyosis vulgaris affects 1 in every 250 people. Filaggrin mutations have been reported most commonly in Europeans.

### **Diagnosis**

Ichthyosis vulgaris is usually a clinical diagnosis. Mild ichthyosis is often just called 'dry skin'. Filaggrin mutations can be detected by research laboratories from a buccal smear, saliva sample, electron microscopy, or skin biopsy.

### **Treatment**

Treatment aims to reduce dryness, scaling, splitting and thickening of the skin. This is achieved with exfoliation and moisturizing on a regular, daily basis. Apply emollients



with high lipid content, such as lanolin cream (a sebum-like substance derived from wool-bearing animals). To reduce scale: bathe in salt water; apply creams or lotions containing salicylic acid, glycolic acid, lactic acid, or urea to exfoliate and moisturize skin (these may irritate active eczema); oral retinoids can be prescribed in severe cases.

### General Tips

- Apply lotions and creams to damp skin to trap in the moisture (within 3 minutes of showering/bathing).
- Lotion and creams can be kept under occlusion for 1 or 2 hours with a cling-film wrap to enhance skin hydration.
- Gently rub a pumice stone on wet skin to help remove thickened crusty skin.
- Brush washed hair to remove scales from scalp.

## Impetigo

**Impetigo** is a condition characterized by red sores that quickly rupture, ooze for a few days, and then form a yellowish-brown crust. Impetigo is usually found around the nose and mouth. It can spread to other areas of the body by contact. Itching and soreness are generally mild.

**Ecthyma** is a serious form of impetigo that penetrates deeper into the skin, causing painful sores that are filled with pus or fluid. The sores turn into deep ulcers.



Image courtesy of the Mayo Foundation

### Causes

Impetigo is caused by bacteria, and it spreads by contact. This condition is most common amongst children aged 2 to 5, but adults and people with diabetes or a weakened immune system are also likely to contract it. Impetigo spreads rapidly in crowded settings, warm and humid weather, and contact sports such as wrestling. Broken skin increases the chance of the bacteria entering the body.

Impetigo usually is not dangerous, and the sores generally heal without scarring. This condition can cause cellulitis or spread to the lymph nodes and bloodstream, becoming life-threatening.

## Diagnosis

Medical doctors mostly diagnose impetigo with a visual examination. It can be treated with an antibiotic ointment or cream applied directly to the sores. Pre-soaking the affected area in warm water may help remove the scabs so the antibiotic can penetrate the skin. Antibiotics may be prescribed for some cases.

To avoid impetigo, keep skin clean and wash insect bites, cuts, and scrapes, immediately. To help prevent the spread of impetigo, gently wash the affected areas with mild soap and warm running water, and then cover with gauze. Wash all clothes and linens every day, and do not share them. Wear gloves when applying antibiotic ointment and wash hands thoroughly afterward. Wash hands frequently and stay home until advised by a medical doctor.

## Inflammatory Bowel Disease

**Inflammatory bowel disease** is a term for a group of intestinal disorders that cause prolonged inflammation of the digestive tract. These diseases include:

- Ulcerative proctitis.
- Proctosigmoiditis.
- Left-sided colitis.
- Pancolitis.
- Acute severe ulcerative colitis.

These bowel-related disorders and/or the drugs used in treatment may cause skin problems.

## Keloid

A **keloid**, sometimes referred to as a keloid scar, is a tough, heaped-up scar that rises abruptly above the surrounding the skin. It usually has a smooth top and a pink or purple colour. Keloids are irregularly shaped and tend to enlarge progressively. Unlike scars, keloids do not regress over time. They often occur at the site of a previous injury.



Image courtesy of Healthline.com

## Causes

Doctors do not understand exactly why keloids form. Alterations in the cellular signals that control proliferation and inflammation may be related to the process of keloid formation, but these changes have not yet been characterized sufficiently to explain this defect in wound healing.

## Risk Factors

Keloids can appear in people of all skin types, but individuals with darkly pigmented skin are more likely to develop them. Keloids are equally common in women and men. They are less common in children and the elderly. In some cases, the tendency to form keloids seems to run in families.

Keloids develop most often on the chest, back, shoulders, and earlobes. They seldom develop on the face (with the exception of the jawline).

Cortisone injections can be used to treat the inflammation of small areas of the body (local injections), or they can be used to treat inflammation that is widespread throughout the body (systemic injections).

After the skin is injured, the healing process usually leaves a flat scar. Sometimes the scar is hypertrophic, or thickened, but confined to the margin of the original wound. **Hypertrophic scars** tend to be redder and often regress spontaneously (a process which can take one year or more). Keloids, by contrast, may start sometime after a cutaneous injury and extend beyond the wound site. This tendency to migrate into surrounding areas that were not injured originally distinguishes keloids from hypertrophic scars. Keloids typically appear following surgery or injury, but they can also occur as a result of minor inflammation such as an acne pimple on the chest (even one that wasn't scratched or otherwise irritated). A keloid has a characteristic microscopic appearance and may be distinguished from a hypertrophic scar

## Keratosis pilaris

**Keratosis pilaris** is a minor condition that causes small, rough bumps on the skin. These bumps usually form on the thighs, upper arms, or cheeks. They are typically

red or white and don't hurt or itch. Treatment is not necessary, but medicated creams can improve skin appearance.

## Lichen Planus

**Lichen planus** can develop on one or several parts of the body. It can appear on the skin—including the genitals and scalp—or inside the mouth, and sometimes in both places. Lichen planus can also change the way a person's fingernails or toenails look. Lichen planus is not contagious.



Image courtesy of Healthline.com

### Features

The features of this condition depend on where it appears on the body. On the skin, **lichen planus** often causes bumps that are shiny, firm, and reddish purple. Sometimes the bumps have tiny white lines running through them. The most common places for these bumps to appear are the wrists, lower back, and ankles. On the legs, the bumps tend to be darker. New bumps may appear as older bumps clear.

When lichen planus develops on the skin, a person can have the following:

- Thick patches of rough, scaly skin. These patches develop with time and are most common on the shins and around the ankles.
- Sometimes the bumps and patches itch.
- Blisters are rare.
- Pain, especially on the genitals. The skin can be bright red and raw. Open sores can appear. These can make sex painful or impossible.



Image courtesy of the American Academy of Dermatology

When lichen planus appears on the nails, it often appears on just a few nails. Sometimes it appears on all of the nails on a hand or foot. It may present as: ridges or grooves on the nails, splitting or thinning, and loss of nails (temporary or permanent).

It is rare, but this disease can develop on the scalp, causing redness and irritation, tiny

bumps, thinning hair or patches of hair loss, and scars.

Anyone can contract lichen planus; it is most common in middle-aged adults. Women contract lichen planus in their mouths more often than men do.

### **Causes**

The cause of most lichen planus cases remains unclear; it may be an autoimmune disease.

- A metal filling may cause this condition within the mouth. Removing the filling will get rid of the lichen planus.
- A rare type of lichen planus runs in families, but other forms of lichen planus do not seem to run in families.
- There may be a link between lichen planus and infection with the hepatitis C virus.

### **Diagnosis**

A dermatologist often can often diagnose lichen planus by looking at the skin, nails, and mouth. A biopsy or blood tests may be necessary. Dentists often find lichen planus in the mouth during a checkup.

### **Treatment**

There is no cure for lichen planus. It often goes away on its own. Treatment for the skin may include:

- Antihistamines.
- Topical corticosteroid.
- Corticosteroid pills.
- PUVA therapy: a type of light treatment that can help clear the skin.
- Retinoic acid applied to the skin or taken orally.

Many cases of skin lichen planus go away within 2 years. About 1 in 5 people will have a second outbreak. In some people, this condition may come and go for years.

As lichen planus heals, it often leaves dark brown spots on the skin. Like the bumps, these spots may fade without treatment. If they do not go away, dermatologists can lighten the spots with creams, lasers, or other treatments.



The effects of lichen planus of the skin can be remediated by doing the following:

- Limit stress.
- Avoid scratching, skin abrasion, and injury.
- Apply a cool cloth or use an oatmeal bath treatment.

The effects of lichen planus of the skin can be remediated by doing the following:

- Stop smoking, chewing tobacco, and drinking alcohol.
- Brush and floss regularly.
- Visit the dentist twice a year for a checkup and cleaning.
- Stop consuming foods and beverages such as spicy foods, citrus fruits and juices, tomatoes, snacks that are crispy and salty, drinks that contain caffeine.

## Lupus

**Systemic lupus erythematosus (SLE)** is the most common and serious form of lupus. SLE (or simply 'lupus') is a treatable, chronic, autoimmune, inflammatory disease that can affect any organ in the body and in a pattern that varies greatly from person to person. Lupus is characterized by autoantibodies (antibodies directed against one's self). Most persons with SLE will not be continuously sick for the rest of their lives. If severe or untreated, this inflammation may cause organ damage and loss of function.



Image courtesy of Healthline.com

### Features

Common skin problems that occur from lupus include:

- Round lesions on the face and head.
- Thick, red, scaly lesions.
- Red, ring-shaped lesions on body parts exposed to sunlight.
- Flat rash on the face and body that looks like a sunburn.
- Red, purple, or black spots on fingers and toes.
- Sores inside the mouth and nose.
- Tiny red spots on the legs.

## Causes

The cause of lupus is not known. In lupus, a dysfunction in the immune system so that it also makes antibodies that attack the person's own tissues. The result is an autoimmune reaction which causes the inflammation that affects the specific tissues or organs in SLE.

**Discoid lupus erythematosus (DLE)** and **subacute cutaneous lupus (SCLE)** are diseases where skin rashes and sun sensitivity are the main problems; involvement of the internal parts of the body does not occur and life is not threatened. However, both DLE and SCLE may, at times, occur along with the systemic form of lupus.

**Neonatal lupus** is an uncommon form of lupus that affects the newborn child. This most often occurs in the children of women with SCLE or systemic lupus who also have a particular antibody (molecule that recognizes other molecules that are foreign to the body) in their bloodstream.

**Drug-induced lupus** is triggered by certain drugs. Only a small number of people taking these drugs develop this form of lupus which has many of the symptoms of systemic lupus. The most important feature of drug-induced lupus is that it goes away when the offending drug is stopped.

Women of child-bearing age (15 to 45) are most often affected; however, the disease does occur in men, children, and the elderly. In Canada, estimates of the number of lupus patients range from 15,000 to 50,000.

## Treatment

Lupus is not contagious; it is not unusual for a lupus patient to have in his or her family a relative with an autoimmune disease (including lupus). In fact, SLE studies have shown that between 0.4 to 5% of the relatives of lupus patients may themselves develop lupus. There is no cure for lupus.

## Treatment

Lupus is treatable and much can be done to control it. In fact, with proper treatment it is the rule, not the exception, for physicians (and patients) to succeed in bringing lupus under control. Many patients undergo cycles in which the disease becomes quiet after

it is brought under control. This symptom-free period is called remission and may last several years.

DRAFT



# Objective Seven Self-Test

1) What process in the epidermis causes epidermoid cysts to form?

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2) What is a distinguishing feature of erysipelas?

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3) What is a hemangioma?

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4) How are hives diagnosed?

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5) What is the difference between prescription and non-prescription bleaches used to treat hyperpigmentation?

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6) What are the features of hypohidrosis?

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7) Describe the appearance of ichthyosis vulgaris:

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8) In what way can impetigo become life-threatening?

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9) How are keloids differentiated from hypertrophic scars?

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10) What is Keratosis pilaris?

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11) Is lichen planus contagious?

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12) Identify four common skin problems that occur from lupus:

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# Objective Seven Self-Test Answers

- 1) Most epidermoid cysts form when cells in the epidermis move deeper into the skin and multiply rather than slough off. The epidermal cells form the walls of the cyst and then secrete the protein keratin into the interior.
- 2) A distinguishing feature of erysipelas is tender skin that is intensely red, and hardened with a sharply demarcated border.
- 3) A hemangioma is a benign tumor formed by a collection of excess blood vessels.
- 4) An allergist can diagnose hives by making a client history, performing a thorough physical exam, identifying triggers with several tests including skin tests, prick tests, blood tests, a skin biopsy, and urine tests.
- 5) Prescription bleaches contain twice the amount of hydroquinone as over-the-counter skin bleaches.
- 6) The features of hypohidrosis are:  

Dizziness.	Muscle cramps or weakness.
Feeling overly hot.	A flushed appearance or rash instead of sweating.
- 7) Ichthyosis vulgaris appears as excessive dry, scaly skin which may appear as polygon-shaped brown, gray, or white scales.
- 8) Impetigo can become life-threatening if it spreads to the lymph nodes.
- 9) Keloids are differentiated from hypertrophic scars because keloids may extend beyond the wound site, while hypertrophic scars do not.
- 10) Keratosis pilaris is a minor condition that causes small, rough bumps on the skin.

11) No, lichen planus is not contagious.

12) Any of the four following:

- Round lesions on the face and head.
- Thick, red, scaly lesions.
- Red, ring-shaped lesions on body parts exposed to sunlight.
- Flat rash on the face and body that looks like a sunburn.
- Red, purple, or black spots on fingers and toes.
- Sores inside the mouth and nose.
- Tiny red spots on the legs.

# Objective Eight

*When you have completed this objective, you will be able to:*

Describe skin conditions M - S.

## Melasma

**Melasma** is a common skin condition characterized by dark, discoloured patches on the skin. It is referred to as chloasma, or the 'mask of pregnancy,' when it occurs on pregnant women. Melasma is more common in women than men. The patches are darker than the typical skin colour, often occurring on the face in symmetrical patterns. Melasma can develop on other areas of your body that are often exposed to sun. Brownish colored patches usually appear on the cheeks, forehead, bridge of the nose, and chin, but can also occur on the neck and forearms. This condition causes no physical discomfort.

### Causes

The causes of melasma are not clear. Darker skinned individuals are more at risk than fairer skinned individuals. Estrogen and progesterone sensitivity are also associated with the condition. This means that birth control pills, pregnancy, and hormone therapy can trigger melasma. Stress and thyroid disease have also been suspected to cause this condition.

### Diagnosis

A visual exam of the affected area with a Wood's lamp is often enough to diagnose melasma. Using a Wood's lamp can help a medical doctor determine how many layers of skin are affected. Other tests may be performed to rule out specific causes. A biopsy may be performed to check for serious skin conditions.

### Treatment

Melasma may disappear on its own, especially when caused by pregnancy or birth control pills. Prescription creams can lighten the skin, or a medical doctor might prescribe topical steroids to help lighten the affected areas. Chemical peels, dermabrasion, and microdermabrasion may also be employed to strip away the top layers of skin and help lighten the dark patches.

Melasma may return, and in some cases, the skin cannot be completely lightened. A safe practice is to minimize sun exposure and wear sunscreen. Makeup can be used to camouflage melasma.

## Molluscum Contagiosum

**Molluscum contagiosum** is an infection caused by a poxvirus (molluscum contagiosum virus). The result of the infection is usually a benign, mild skin condition characterized by lesions (growths) that may appear anywhere on the body. Molluscum contagiosum typically resolves within 6-12 months without scarring but may take as long as 4 years.

### Features

The lesions, known as Mollusca, are small, raised, and usually white, pink, or flesh-colored with a dimple or pit in the center. They often have a pearly appearance. They're usually smooth and firm. In most people, the lesions range from about the size of a pinhead to as large as a pencil eraser (2 to 5 millimeters in diameter). They may become itchy, sore, red, and/or swollen.



Image courtesy of Centers for Disease Control and Prevention

Mollusca may occur anywhere on the body including the face, neck, arms, legs, abdomen, and genital area, alone or in groups. The lesions are rarely found on the palms of the hands or the soles of the feet.

### Transmission

The virus that causes molluscum spreads from direct person-to-person physical contact and through contaminated fomites including linens, bathing sponges, pool equipment, and toys. Although the virus might be spread by sharing swimming pools, baths, saunas, or other wet and warm environments, this has not been proven. Someone with molluscum can spread it to other parts of their body by touching or scratching a lesion and then touching their body somewhere else. This is called

autoinoculation. Shaving and electrolysis can also spread mollusca to other parts of the body.

Conflicting reports make it unclear whether the disease may be spread by simple contact with seemingly intact lesions or if the breaking of a lesion and the subsequent transferring of core material is necessary to spread the virus.

The molluscum contagiosum virus remains in the epidermis and does not circulate throughout the body; therefore, it cannot spread through coughing or sneezing. Since the virus lives only in the top layer of skin, once the lesions are gone the virus is gone and it cannot spread to others. Molluscum contagiosum does not remain dormant in the body for long periods and then reappear.

Molluscum contagiosum is most common in children 1 to 10 years of age.

People at increased risk for getting the disease include:

- People with weakened immune systems.
- Atopic dermatitis may also be a risk factor due to frequent breaks in the skin. People with this condition also may be more likely to spread molluscum contagiosum to other parts of their body for the same reason.
- People who live in warm, humid climates where living conditions are crowded.

### **Treatment**

Because molluscum contagiosum is self-limited in healthy individuals, treatment may be unnecessary; nonetheless, issues such as lesion visibility, underlying atopic disease, and the desire to prevent transmission may prompt therapy. Treatment for molluscum is usually recommended if lesions are in the genital or anal areas.

Physical removal of lesions may include cryotherapy (freezing the lesion with liquid nitrogen), curettage (the piercing of the core and scraping of caseous material), and laser therapy. These options are rapid and require a trained health care provider, may require local anesthesia, and can result in post-procedural pain, irritation, and scarring.

Gradual removal of lesions may be achieved by oral therapy. This technique is often desirable for pediatric patients because it is generally less painful and may be performed by parents at home.

Each lesion can be treated individually with a topical cream.

### **Prevention**

The best way to avoid getting molluscum is by following good hygiene habits. Keeping hands clean is the best way to avoid this infection. Hand washing removes germs that may have been picked up from other people or from surfaces that have germs on them. It is important not to touch, pick, or scratch lesions.

Keep the area with molluscum lesions clean and covered with clothing or a bandage so that others do not touch the lesions and become infected. Keep the affected skin clean and dry. Do not share towels, clothing, or other personal items. People with molluscum should not take part in contact sports like wrestling, basketball, and football unless all lesions can be covered by clothing or bandages. Activities that use shared gear like helmets, baseball gloves and balls should also be avoided unless all lesions can be covered. Swimming should also be avoided unless all lesions can be covered by watertight bandages.

### **Long Term Effects**

Recovery from one molluscum infection does not prevent future infections. If new molluscum contagiosum lesions develop after a person is cured, it means renewed contact with an infected person or object.

### **Complications**

The lesions caused by molluscum are usually benign and resolve without scarring; however, scratching at the lesion, or using scraping and scooping to remove the lesion, can cause scarring.

The most common complication is a secondary infection caused by bacteria. Secondary infections may be a significant problem in immunocompromised patients, such as those with HIV/AIDS or those taking immunosuppressing drug therapies. In these cases, treatment to prevent further spread of the infection is recommended.



## Moles

**Moles** are collections of melanocytes that reside towards the top layer of the skin. Moles can be flesh-coloured, brown, blue, or black. The majority of moles on skin are flat, but raised moles are common. Moles are a natural part of skin development and are influenced by genetics and sun exposure. Some moles are present at birth. The majority of moles, however, develop during childhood and young adulthood. New moles continue to develop into the 30's and 40's.

Moles are comprised of melanocytes that may respond to sunlight and UV exposure by producing more melanin, making them darker with sun exposure. They can also respond to hormonal changes in puberty, pregnancy, and sometimes hormonal therapy. However these small changes generally apply to all nearby moles at the same time, and are uniform and self-limiting. Seek immediate medical advice if any mole shows individual changes.

A cancerous mole is also known as a **melanoma**, one of the most aggressive forms of skin cancers. A cancerous mole can arise from a previously 'normal' mole or as a new growth on the skin. The more moles a person has, the higher their risk of melanoma. A high number of moles indicates that a person's genetics encourage growth, and can mean that the skin has been exposed to excessive sunlight during the early years. Avoid excessive sun exposure and in particular sunburn.

## Necrotizing Fasciitis

**Necrotizing fasciitis** is a serious bacterial skin infection that spreads quickly and kills the body's soft tissue.

### Features

The symptoms often start within hours after an injury and may seem like another illness or injury. Some people infected with necrotizing fasciitis may complain of pain or soreness, similar to that of a 'pulled muscle.' The skin may be warm with red or purplish areas of swelling that spread rapidly. There may be ulcers, blisters, or black spots on the skin. Fever, chills, fatigue (tiredness), or vomiting may follow the initial wound or soreness.

## Causes

Commonly called a 'flesh-eating infection' by the media, this rare disease can be caused by more than one type of bacteria. Group A *Streptococcus* (group A strep) is considered the most common cause of necrotizing fasciitis. Most cases of necrotizing fasciitis occur randomly and are not linked to similar infections in others. The most common way of getting necrotizing fasciitis is when the bacteria enter the body through a break in the skin, like a cut, scrape, burn, insect bite, or puncture wound.

Usually, infections from group A strep bacteria are mild and are easily treated, but in cases of necrotizing fasciitis, bacteria spread rapidly once they enter the body. They infect flat layers of a membrane known as the *fascia*, which are connective bands of tissue that surround muscles, nerves, fat, and blood vessels. The infection also damages the tissues next to the fascia. Sometimes toxins (poisons) made by these bacteria destroy the tissue they infect, causing it to die. When this happens, the infection is very serious and can result in loss of limbs or death.

Common sense and good wound care are the best ways to prevent a bacterial skin infection.

- Keep draining or open wounds covered with clean, dry bandages until healed.
- Don't delay first aid of even minor, non-infected wounds like blisters, scrapes, or any break in the skin.
- If you have an open wound or active infection, avoid spending time in whirlpools, hot tubs, swimming pools, and natural bodies of water (e.g., lakes, rivers, oceans) until infections are healed.
- Wash hands often with soap and water or use an alcohol-based hand rub if washing is not possible.

Most people who get necrotizing fasciitis have other health problems that may lower their body's ability to fight infection. Some of these conditions include diabetes, kidney disease, cancer, or other chronic health conditions that weaken the body's immune system. A healthy person with a strong immune system, good hygiene, and proper wound care has an extremely low chance of getting necrotizing fasciitis.

## Treatment

The first line of defense against this disease is strong antibiotics given through a needle into a vein. Because the bacterial toxins can destroy soft tissue and reduce blood flow,

antibiotics may not reach all of the infected and dying areas. This is why rapid surgical exploration and removal of dead tissue—in addition to antibiotics—is often critical to stopping the infection.

## Pemphigoid

**Pemphigoid** is a rare autoimmune disorder that can develop at any age, but most often affects the elderly. Pemphigoid is caused by a malfunction of the immune system and results in skin rashes and blistering on the legs, arms, and abdomen.

Pemphigoid can also cause blistering on the mucous membranes of the eyes, nose, mouth, and genitals. There is no cure for pemphigoid, but there are various treatment options.



Image courtesy of Healthline.com

The types of pemphigoid differ in terms of where on the body the blistering occurs and when it occurs. **Bullous Pemphigoid** is the most common of the three types. The skin blistering happens most commonly on the arms and legs where movement occurs. This includes the areas around the joints and on the lower abdomen. **Cicatricial pemphigoid** refers to blisters that form on the mucous membranes. When blistering occurs during or shortly after pregnancy, it is called **pemphigoid gestationis**. It is also called **herpes gestationis**, although it is not related to the herpes virus. The blistering typically develops during the second or third trimester, but may occur at any time during pregnancy or up to six weeks after delivery. Blisters tend to form on the arms, legs, and abdomen.

### Causes

This disorder causes the immune system to create antibodies that attack the tissue just below the outer layer of skin. This causes the layers of skin to separate and results in painful blistering. In many cases, there is no specific trigger for pemphigoid. In some instances, however, it may be caused by certain medications, radiation therapy, or ultraviolet light therapy. People with other autoimmune disorders are found to be at a higher risk for developing pemphigoid.

## **Features**

The most common feature of pemphigoid is blistering that occurs on the arms, legs, abdomen, and mucous membranes. Hives and itching are also common. The blisters have certain characteristics, regardless of where on the body they form:

- A red rash develops before the blisters.
- The blisters are large and filled with fluid that is usually clear, but may contain some blood.
- The blisters are thick and do not rupture easily.
- The skin around the blisters may appear normal or slightly red or dark.
- Ruptured blisters are usually sensitive and painful.

## **Diagnosis**

A dermatologist will be able to make a fairly firm diagnosis simply by examining the blisters. Further testing will be needed to prescribe the right treatment. A medical doctor may want to perform a biopsy. Lab technicians will test these samples for the immune system antibodies characteristic of pemphigoid. These antibodies can also be detected with a blood sample.

## **Treatment**

Pemphigoid cannot be cured, but treatments are usually very successful at relieving symptoms. Corticosteroids, either in pill or topical form, will likely be the first treatment a doctor prescribes. These medications reduce inflammation and can help to heal the blisters and relieve itching. Another treatment option is to take medication that suppresses the immune system, often in conjunction with the corticosteroids. Immuno-suppressants help, but they put a person at risk for other infections. Certain antibiotics, such as tetracycline, may also be prescribed to reduce inflammation and infection.

## **Long-Term Outlook**

With comprehensive treatment, the outlook for pemphigoid is good. Most people respond well to medication. The disease will often go away after a few years of treatment. Pemphigoid may return at any time, even with proper treatment.

## Pilonidal Sinus

A **pilonidal sinus** is a hole or tunnel in the skin. It usually develops in the cleft of the buttocks where they separate. More than one hole may develop, and often these are linked by tunnels under the skin.

A pilonidal sinus will not usually cause any noticeable symptoms unless it becomes infected. This can cause a pus-filled abscess to develop. Symptoms of an infection include pain, redness, and swelling in the affected area.

### Causes

The exact cause of a pilonidal sinus is unclear, although it's thought to be caused by loose hair piercing the skin. Certain things can increase the chances of developing a pilonidal sinus, such as being obese, having a large amount of body hair, and having a job that involves a great deal of sitting or driving.

A medical doctor should be able to diagnose a pilonidal sinus after looking at the affected area of skin. Further testing is not usually required.

### Treatment

Keep the area clean and dry. It may also help to remove any hair near the sinus. These steps can reduce the risk of infection. Showering at the end of the day to remove stray hairs from the cleft between the buttocks may also help. If a pilonidal sinus becomes infected, it should be treated as soon as possible, as it is likely to get worse. Treatment usually involves taking antibiotics and having the pus drained from the abscess during a minor operation called incision and drainage. If the sinus keeps becoming infected, it may have to be surgically removed.

Pilonidal sinuses are rare, affecting twice as many men as women. The average age for a pilonidal sinus is 21 in men and 19 in women.

## Pityriasis Versicolour

**Pityriasis versicolor** is a common yeast infection of the skin, characterized by flaky discoloured patches on the chest and back.

## Features

The term pityriasis is used to describe skin conditions in which the scale appears similar to bran. The multiple colours of pityriasis versicolor give rise to the second part of the name, versicolor. Pityriasis versicolor is sometimes incorrectly called tinea versicolor. The term *tinea* should strictly be used for dermatophyte fungus infections.

Pityriasis versicolor is more common in hot, humid climates than in cool, dry climates. It may clear in the winter months and recur each summer. It often affects people that perspire heavily. Although not considered infectious, pityriasis versicolor sometimes affects more than one member of a family.

Pityriasis versicolor affects the trunk, neck, and/or arms, and is uncommon on other parts of the body. The patches may be coppery brown, paler than surrounding skin, or pink. Pale patches may be more common in darker skin. Sometimes the patches start scaly and brown, and then resolve through a non-scaly and white stage. This condition is usually asymptomatic, but in some people it is mildly itchy. In general, pale or dark patches due to pityriasis versicolor do not tend to be more or less prone to sunburn than surrounding skin.



Images courtesy of Dermnetnz.org

## Causes

Pityriasis versicolor is caused by mycelial (the vegetative part of a fungus) growth of fungi of the genus *Malassezia*. *Malassezia* are part of the microorganisms found on normal skin. They are dependent on lipid for survival. Usually *malassezia* grow sparsely in the seborrhoeic areas (scalp, face, and chest) without causing a rash.

The yeasts induce enlarged melanosomes (pigment granules) within basal melanocytes in the brown type of pityriasis versicolor. The white or hypopigmented type of pityriasis versicolor is thought to be due to a chemical produced by *malassezia* that diffuses into the epidermis and impairs the function of the melanocytes. The pink type of pityriasis versicolor is mildly inflamed, due to dermatitis induced by *malassezia* or its metabolites. Hyperpigmented, hypopigmented and inflamed pityriasis versicolor are usually seen as distinct variants but may sometimes co-exist.



## Diagnosis

A medical doctor can use a Wood's lamp to diagnose this condition. A microscopy using potassium hydroxide (KOH) to remove skin cells, a fungal culture, and a skin biopsy can also be used.

## Treatment

Mild pityriasis versicolor is treated with topical and oral antifungal agents. Vigorous exercise an hour after taking the medication may help sweat it onto the skin surface, where it can effectively eradicate the fungus. Bathing should be avoided for a few hours. A few days' treatment will clear many cases of pityriasis long term, or at least for several months.

Pityriasis versicolor generally clears satisfactorily with treatment but often recurs when conditions are right for malassezia to proliferate. In those who have frequent recurrences, antifungal shampoo or oral antifungal treatment may be prescribed for one to three days each month. Occasionally white marks persist long after the scaling and yeasts have gone and despite exposure to the sun. In such cases, further antifungal treatment is unhelpful.

## Psoriasis

Psoriasis can have many different symptoms. They range from:

- Thick red patches of skin.
- Small red spots on the torso, limbs, face, and scalp.
- A red, shiny, smooth rash in skin folds.
- White pustules surrounded by red skin.



Image courtesy of Healthline.com

For more information, see EST 22.

# Rosacea

*All information is provided by the National Rosacea Society.* **Rosacea** is a chronic and potentially life-disruptive disorder primarily of the facial skin, often characterized by flare-ups and remissions.

## Features

Rosacea often begins any time after age 30 as a redness on the cheeks, nose, chin, or forehead that may come and go. In some cases, rosacea may also occur on the neck, chest, scalp, or ears. Over time, the redness tends to become ruddier and more persistent, and visible blood vessels may appear. Left untreated, bumps and pimples often develop, and in severe cases the nose may grow swollen and bumpy from excess tissue. In many rosacea patients, the eyes are also affected, feeling irritated and appearing watery or bloodshot. The disease is more frequently diagnosed in women, but more severe symptoms tend to be seen in men.

While there is no cure for rosacea and the cause is unknown, medical therapy is available to control or reverse its signs and symptoms. Individuals who suspect they may have rosacea are urged to see a dermatologist or other knowledgeable physician for diagnosis and appropriate treatment.

Rosacea can vary substantially from one individual to another, and in most cases some rather than all of the potential signs and symptoms appear. Rosacea always includes at least one of the following primary signs, and various secondary signs and symptoms may also develop. Primary signs of Rosacea:

- Frequent flushing of blushing. This facial redness may come and go, and is often the earliest sign of the disorder.
- Persistent facial redness. May resemble a blush or sunburn that does not go away.
- Bumps and Pimples. Small red solid bumps or pus-filled pimples. While these may resemble acne, blackheads are absent and burning or stinging may occur.
- Visible Blood Vessels. Small blood vessels become visible on the skin.

Other Potential Signs and Symptoms:

- Eye Irritation. The eyes may be irritated and appear watery or bloodshot, a condition known as ocular rosacea. The eyelids also may become red and



swollen, and styes are common. Severe cases can result in corneal damage and vision loss without medical help.

- Burning or Stinging. Often felt on the face. Itching or a feeling of tightness may also develop.
- Dry Appearance. The central facial skin may be rough, and thus appear to be very dry.
- Plaques. Raised red patches, known as plaques, may develop without changes in the surrounding skin.
- Skin Thickening. The skin may thicken and enlarge from excess tissue, most commonly on the nose. This condition, known as rhinophyma, affects more men than women.
- Facial swelling. Known as edema, this condition may accompany other signs of rosacea or occur independently.

### Subtypes

Four subtypes of rosacea have been identified, according to common patterns or groupings of signs and symptoms.

Subtype	Symptoms
1	Flushing and persistent redness, may also include visible blood vessels.
2	Persistent redness with transient bumps and pimples.
3	Skin thickening, often resulting in an enlargement of the nose from excess tissue.
4	Ocular manifestations such as dry eye, tearing and burning, swollen eyelids, recurrent styes and potential vision loss from corneal damage.

Many patients experience characteristics of more than one subtype at the same time, and those often may develop in succession. While rosacea may or may not evolve from one subtype to another, each individual sign or symptom may progress from mild to moderate to severe. Early diagnosis and treatment are therefore recommended.

## **Treatment**

Because the signs and symptoms of rosacea vary from one patient to another, treatment must be tailored by a physician for each individual case. Various oral and topical medications may be prescribed to treat the bumps and pimples often associated with the disorder, and a topical therapy to reduce facial redness is now available. Dermatologists often prescribe initial treatment with oral and topical therapy to bring the condition under immediate control, followed by long-term use of topical therapy to maintain remission. A version of an oral therapy with less risk of microbial resistance has also been developed specifically for rosacea and has been shown to be safe for long-term use. When appropriate, treatments with lasers, intense pulsed light sources or other medical and surgical devices may be used to remove visible blood vessels, reduce extensive redness or correct disfigurement of the nose. Ocular rosacea may be treated with oral antibiotics and other therapy.

## **Skin Care**

Patients should check with their physicians to ensure their skin care routine is compatible with their rosacea. A gentle skin care routine can also help control rosacea. Patients are advised to clean their face with a mild and non-abrasive cleanser, then rinse with lukewarm water and blot the face dry with a thick cotton towel. Never pull, tug, or use a rough washcloth.

Patients may apply non-irritating skin care products as needed, and are advised to protect the skin from sun exposure using a sunscreen with an SPF of 15 or higher. Cosmetics may be used to conceal the effects of rosacea. Green makeup or green-tinted foundations can be used to counter redness. This can be followed by a skin-tone foundation with natural yellow tones, avoiding those with pink or orange hues.

In addition to medical treatment, rosacea sufferers can improve their chances of maintaining remission by identifying and avoiding lifestyle and environmental factors that trigger rosacea flare-ups or aggravate their individual conditions. The top ten triggers are: sun exposure, emotional stress, hot weather, wind, heavy exercise, alcohol, hot baths, cold weather, spicy foods, and humidity.

# Rubeola (Measles)

**Rubeola** is a viral illness that results in a viral exanthem (a rash or skin eruption). Measles is spread from one child to another through direct contact with discharge from the nose and throat. Sometimes, it is spread through airborne droplets from an infected child. This is a very contagious disease that usually consists of a fever, and cough, followed by a generalized rash.

## Other Names

10-day measles, red measles, or measles.

## Features

It may take between seven to 14 days for a child to develop symptoms of rubeola after being exposed to the disease. A child is contagious four days before the onset of signs and symptoms and four days after the rash develops. During the early phase of the disease (which lasts between one and four days), symptoms usually resemble those of an upper respiratory infection. Symptoms may include: runny nose, hacking cough, conjunctivitis (pink eye), fever, severe diarrhea, small spots with white centers (Koplik's spots) on the inside of the cheek, and a deep, red, flat rash that starts on the face and spreads down to the trunk, arms, legs and feet. The rash starts as small distinct lesions, which then combines as one big rash. After three to seven days, the rash will begin to clear leaving a brownish discoloration and peeling skin.

The most serious complications from rubeola include ear infections, pneumonia, croup, encephalitis (inflammation of the brain), and blindness.

## Cause

Measles virus, the cause of measles, is classified as a *Morbillivirus*. It is mostly seen in the winter and spring. Rubeola is preventable by proper immunization with the measles vaccine.

## Diagnosis

Rubeola is usually diagnosed based on a complete medical history and physical examination of the child. The lesions of rubeola are unique and usually allow for a diagnosis simply on physical examination; in addition, a medical doctor may order blood or urine tests to confirm the diagnosis.

## Treatment

The goal of treatment for rubeola is to help decrease the severity of the symptoms. Since it is a viral infection, antibiotics are ineffective. Treatment may include: increased fluid intake, acetaminophen for fever, and vitamin A.

## Prevention

Since the use of the rubeola (or measles) vaccine, the incidence of measles has decreased substantially. A small percentage of measles are due to vaccine failure. The measles vaccine is usually given in combination with the mumps and rubella vaccine. It is called the MMR. It is usually given when a child is age 12 months to 15 months and then again between age 4 and 6.

## Seborrheic Dermatitis

The information for this condition comes from Mayoclinic.org. **Seborrheic dermatitis** is a common skin condition that mainly affects the scalp. It causes scaly patches, red skin, and stubborn dandruff. Seborrheic dermatitis can also affect oily areas of the body, such as the face, upper chest and back. Seborrheic dermatitis doesn't affect overall health, but it can be uncomfortable. It is not contagious, and it is not a sign of poor personal hygiene.

### Other Names

Dandruff, seborrheic eczema, cradle cap, or seborrheic psoriasis

## Features

Seborrheic dermatitis features include:

- Skin flakes (dandruff) on the scalp, hair, eyebrows, beard or mustache.
- Patches of greasy skin covered with flaky white or yellow scales or crust on the scalp, ears, face, chest, armpits, scrotum or other parts of the body.
- Red skin.
- Redness or crusting of the eyelids (blepharitis).
- Itching or stinging.



## **Causes**

Doctors do not yet know the exact cause of seborrheic dermatitis. It may be related to:

- A yeast (fungus) called malassezia that is in the oil secretion on the skin.
- An inflammatory response related to psoriasis.
- The season, with episodes tending to be worse in winter and early spring.

A number of factors increase the risk of developing seborrheic dermatitis, including:

- Neurological and psychiatric conditions, such as Parkinson's disease and depression.
- A weakened immune system, alcoholic pancreatitis, and some cancers.
- Congestive heart failure.
- Endocrine disease that leads to obesity, such as diabetes.
- Some medications.
- Scratching or otherwise damaging the skin on your face.

## **Treatment**

Medicated shampoos, creams, and lotions are the main treatments for seborrheic dermatitis. Prescription remedies such as corticosteroids are also available.

Antifungal shampoos and antifungal oral medications are options, as are creams and gels that fight bacteria. Some medications can be followed by exposure to ultraviolet light. Ultraviolet light may be effective for people with thick hair.

## **Homecare**

To soften and remove scales from hair, apply mineral oil or olive oil to the scalp. Leave it in for an hour or so, then comb or brush hair and wash it. Wash skin regularly and rinse the soap completely off the body and scalp. Avoid harsh soaps and use a moisturizer. Apply a mild corticosteroid cream; if that does not work, apply an antifungal cream. Products that contain alcohol should be avoided.

Smooth-textured cotton clothing will help keep air circulating around the skin and reduce irritation. Consider shaving all areas that are affected. Avoid scratching. Scratching can increase irritation and your risk of infection. A hydrocortisone cream or calamine lotion can temporarily relieve itching. Gently clean the eyelids. If they show signs of redness or scaling, wash them each night with baby shampoo and wipe away scales with a cotton swab. Warm or hot compresses also may help.

# Seborrheic Keratosis

**Seborrheic keratosis** is a common skin growth. It may look worrisome, but it is benign (not cancer). These growths often appear in middle-aged and older adults. Some people get just one. It is, however, more common to have many. They are not contagious.



Image courtesy of the American Academy of Dermatology

## Features

Seborrheic keratoses often start as small, rough bumps. They slowly thicken and develop a warty surface. They range in color from white to black. Most are tan or brown. They can appear almost anywhere on the skin. Seborrheic keratoses can look like warts, moles, actinic keratoses, and skin cancer. They differ, though, from these other skin growths. Seborrheic keratoses have a waxy, 'pasted-on-the-skin' look. Some look like a dab of warm, brown candle wax on the skin, while others may resemble a barnacle. Seborrheic keratoses range in size from a few mm to a couple of centimetres. They commonly form on the chest, back, stomach, scalp, face, neck, or other parts of the body (but not on the palms and soles). These growths cause no pain, but some itch.

In most people, seborrheic keratoses first appear in middle age or later. People who are most likely to get these growths have family members with seborrheic keratoses. Sometimes the growths appear during pregnancy or after estrogen replacement therapy. Children rarely have these growths.

## Causes

The cause of seborrheic keratoses is unknown, but they seem to run in families and some studies suggest that sun exposure may play a role.

## Diagnosis

In most cases, a dermatologist can diagnose this condition. If a growth looks like skin cancer, the dermatologist will remove the growth so that it can be looked at under a microscope.



## Treatment

Because seborrheic keratoses are harmless, they most often do not need treatment. A dermatologist may remove a seborrheic keratosis when it is:

- Hard to distinguish from skin cancer.
- Large or gets easily irritated when clothes or jewelry rub against it.
- Unsightly.

## Treatment

Treatments for seborrheic keratoses include cryosurgery and electrosurgery with curettage. After removal of a seborrheic keratosis, the skin may be lighter than the surrounding skin. This usually fades with time. Sometimes it is permanent. Most removed seborrheic keratoses do not return.

## Skin Cancer

An **actinic keratosis** (AK), also known as a solar keratosis, is a crusty, scaly growth caused by damage from exposure to ultraviolet (UV) radiation. The plural, “keratoses,” is often used because there is seldom just one. AK is considered a pre-cancer because if left alone, it could develop into a skin cancer. The most common type of precancerous skin lesion, AKs appear on skin that has been frequently exposed to the sun or to artificial sources of UV light, such as tanning machines. In rare instances, extensive exposure to X-rays can cause them. Above all, they appear on sun-exposed areas such as the face, bald scalp, ears, shoulders, neck and the back of the hands and forearms. They can also appear on the shins and other parts of the legs. They are often elevated, rough in texture and resemble warts. Most become red, but some are light or dark tan, white, pink and/or flesh-toned. They can also be a combination of these colours.



Image courtesy of skincancer.org

In the beginning, AKs are frequently so small that they are recognized by touch rather than sight. They feel much like sandpaper. Patients may have many times more invisible (subclinical) lesions than those appearing on the surface.

Most often, actinic keratoses develop slowly and reach a size from a 3 mm to 6 mm. Early on, they may disappear only to reappear later. Occasionally they itch or produce a pricking or tender sensation. They can also become inflamed and surrounded by redness. In rare instances, AKs can even bleed.

**Basal cell carcinoma** (BCC) is abnormal, uncontrolled growths or lesions that arise in the skin's basal cells, which line the deepest layer of the epidermis. BCCs often look like open sores, red patches, pink growths, shiny bumps, or scars and are usually caused by a combination of cumulative and intense, occasional sun exposure. BCC almost never spreads (metastasizes) beyond the original tumor site. Only in exceedingly rare cases can it spread to other parts of the body and become life-threatening. It should be taken seriously, as it can be disfiguring if not promptly treated. BCC is the most frequently occurring form of all cancers. More than one out of every three new cancers is a skin cancer, and the vast majority are BCCs.



Image courtesy of skincancer.org

**Squamous cell carcinoma** (SCC) is an uncontrolled growth of abnormal cells arising in the squamous cells, which compose most of epidermis. SCCs often look like scaly red patches, open sores, elevated growths with a central depression, or warts; they may crust or bleed. They can become disfiguring and sometimes deadly if allowed to grow. SCC is mainly caused by cumulative ultraviolet (UV) exposure over the course of a lifetime; daily year-round exposure to the sun's UV light, intense exposure in the summer months, and the UV produced by tanning beds all add to the damage that can lead to SCC. SCCs may occur on all areas of the body including the mucous membranes and genitals, but are most common in areas frequently exposed to the sun, such as the rim of the ear, lower lip, face, balding scalp, neck, hands, arms and legs. Often the skin in these areas reveals telltale signs of sun damage, including wrinkles, pigment changes, freckles, 'age spots,' loss of elasticity, and broken blood vessels.



Image courtesy of skincancer.org



Melanoma is usually, but not always, a cancer of the skin. It begins in melanocytes. Melanocytes also form moles, where melanoma often develops. Often the first sign of melanoma is a change in the shape, colour, size, or feel of an existing mole. However, melanoma may also appear as a new mole. The only way to diagnose melanoma is to remove tissue and check it for cancer cells. Thinking of 'ABCDE' can help determine what to look for:

- Asymmetry: the shape of one half does not match the other half.
- Border that is irregular: The edges are often ragged, notched, or blurred in outline. The pigment may spread into the surrounding skin.
- Colour that is uneven: shades of black, brown, and tan may be present. Areas of white, gray, red, pink, or blue may also be seen.
- Diameter: there is a change in size, usually an increase. Melanomas can be tiny, but most are larger than the size of a pea (larger than 6 mm).
- Evolving: the mole has changed over the past few weeks or months.

In more advanced melanoma, the texture of the mole may change. The skin on the surface may break down and look scraped. It may become hard or lumpy. The surface may ooze or bleed. Sometimes the melanoma is itchy, tender, or painful. Three different cases of melanoma are shown below. Images below are courtesy of Cancer.gov



Having moles can be a risk factor for melanoma, but it's important to remember that most moles do not become melanoma. Unlike other cancers, melanoma can often be seen on the skin, making it easier to detect in its early stages. If left undetected, however, melanoma can spread to distant sites or distant organs. Once melanoma has spread to other parts of the body (known as stage IV), it is referred to as metastatic melanoma, and is very difficult to treat. In its later stages, melanoma most commonly spreads to the liver, lungs, bones and brain; at this point, the prognosis is very poor.

Current research points to a combination of UV exposure, family history, genetics and environmental factors as causes of melanoma.

## Skin Tags

**Skin tags** are common, small, soft skin growths. They are harmless but can be annoying. Skin tags often occur on the eyelids, armpits, neck, groin folds, and under breasts. Most people will develop a skin tag at some point in their lives.

## Stasis Dermatitis

**Stasis dermatitis** is sometimes called **venous stasis dermatitis** because it happens when there is a problem with the veins, generally in the lower legs. These problem veins cause pressure to build up as the blood tries to flow through the body and heart. This pressure makes fluid leak out of the veins and into the skin, which then causes:

- Swelling.
- Redness.
- Scaling.
- Itching or pain.



Image courtesy of [nationaleczema.org](http://nationaleczema.org)

In severe cases of stasis dermatitis, there can be:

- Oozing.
- Open areas (cracking or larger ulcers).
- Infection.

Over time, recurrent stasis dermatitis can result in more permanent changes in the skin including:

- Scar-like changes in the fat and other soft tissues.
- White scars surrounded by tiny capillaries.
- Thickened skin due to chronic scratching or rubbing.

## **Treatment**

Because this condition starts with poor circulation, a medical doctor may recommend treating the damaged veins in the legs. Sometimes, surgery for the veins is not possible, or is not able to repair the veins completely. Pressure stockings or wraps can be used to help mechanically move the fluid out of the skin and soft tissues. Elevating the feet when possible can also help.

A topical corticosteroid medication can help calm the inflammation and itch. Sometimes covering the corticosteroid with wet or dry wrap can greatly assist in severe cases. In cases where corticosteroids are not appropriate, or when they have been used for a prolonged period, a non-corticosteroid topical medication may be prescribed. Stasis dermatitis tends to come back until the underlying cause (damaged veins) is remediated.

# Objective Eight Self-Test Answers

1) When diagnosing melisma, what is done to check for additional, serious skin conditions?

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2) How does the virus that causes molluscum spread?

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3) What can be done to reduce the chance of developing moles?

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4) Identify four features of necrotizing fasciitis:

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5) What is the long-term outlook for people with pemphigoid?

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6) What can increase the chances of developing a pilonidal sinus?

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7) How does pityriasis versicolor vary with the seasons?

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8) Identify four symptoms of psoriasis:

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9) How many subtypes of rosacea exist?

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10) For how long is a child contagious with rubeola before the signs and symptoms develop?

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11) What are the suspected causes of seborrheic dermatitis?

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12) What is seborrheic keratosis, and is it dangerous?

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13) How does an actinic keratosis feel to the touch?

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14) How frequent are skin tags?

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15) Over time what permanent changes can occur as a result of recurring stasis dermatitis?

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# Objective Eight Self-Test Answers

- 1) A visual exam of the affected area with a Wood's lamp is often enough to diagnose melasma. Using a Wood's lamp can help a medical doctor determine how many layers of skin are affected. Other tests may be performed to rule out specific causes. A biopsy may be performed to check for serious skin conditions.
- 2) The virus that causes molluscum spreads from direct person-to-person physical contact and through contaminated fomites.
- 3) Reducing sun exposure can reduce the chances of developing moles.
- 4) Any of the following: pain or soreness similar to that of a 'pulled muscle'; skin may be warm with red or purplish areas of swelling that spread rapidly; ulcers; blisters; or black spots on the skin; fever; chills; fatigue or vomiting.
- 5) The long-term outlook for pemphigoid is good. Most people respond well to medication. The disease will often go away after a few years of treatment, but may return.
- 6) Being obese, having a large amount of body hair, and having a job that involves a great deal of sitting or driving an increase the chances of developing a pilonidal sinus.
- 7) Pityriasis versicolor may clear in the winter months and recur each summer.
- 8) Any of the following:
  - Thick red patches of skin.
  - Small red spots on the torso, limbs, face, and scalp.
  - A red, shiny, smooth rash in skin folds.
  - White pustules surrounded by red skin.
- 9) 4 subtypes of rosacea exist.
- 10) A child is contagious four days before the signs and symptoms develop.

- 11) The suspected causes of seborrheic dermatitis are:
- A malassezia yeast that is in the oil secretion on the skin.
  - An inflammatory response related to psoriasis.
  - The season, with episodes tending to be worse in winter and early spring.
- 12) Seborrheic keratosis is a common skin growth that is not dangerous.
- 13) An actinic keratosis feels like sandpaper.
- 14) Skin tags are very frequent, most people will develop one.
- 15) Over time, recurrent stasis dermatitis can result in:
- Scar-like changes in the fat and other soft tissues.
  - White scars surrounded by tiny capillaries.
  - Thickened skin due to chronic scratching or rubbing.

# Objective Nine

*When you have completed this objective, you will be able to:*

Describe skin conditions T - W.

## Tinea Capitis

**Tinea capitis** is a disease caused by a superficial fungal infection of the skin of the scalp, eyelashes, and eyebrows, with a tendency for attacking hair shafts and follicles. In one version, hairs in the involved area become greyish, dull, and discoloured. In all cases, infected hairs are broken and shorter. Papular lesions around hair shafts spread and form typical patches in the form of rings.



Image courtesy of Medscape.com

### Symptoms

Tinea capitis may involve part or all of the scalp. The affected areas may be very itchy, and can appear:

- Bald with small black dots, due to hair that has broken off.
- With round, scaly areas of skin that are red or swollen.
- With pus-filled sores called kerions.

#### Other Names

Ringworm of the scalp,  
tinea tonsurans.

Other symptoms may include a low-grade fever of around 37.8°C to 38.3°C or swollen lymph nodes in the neck. In the long term, tinea capitis may cause hair loss and lasting scars.

### Diagnosis

A medical doctor can use a Wood's lamp to diagnose a fungal scalp infection. The area may be swabbed for a culture. In rare cases, a skin biopsy of the scalp will be performed.



## Treatment

A prescription oral medication is used to treat ringworm on the scalp. The medication requires 4 to 8 weeks to cure the condition. At home, keep the scalp clean and wash with a medicated shampoo. Shampooing may slow or stop the spread of infection, but it does not get rid of ringworm.

Other family members and pets should be examined and treated if necessary.

- Other children in the home may want to use the shampoo 2 to 3 times a week for about 6 weeks.
- Adults only need to wash with the shampoo if they have signs of tinea capitis.

Once the shampoo has been started:

- Wash towels in warm, soapy water and dry them on the highest temperature setting each time they are used by someone who is infected.
- Soak combs and brushes for 1 hour a day in a mixture of one part bleach to 10 parts water. Do this for 3 days in a row.

No one in the home should share combs, hairbrushes, hats, towels, pillowcases, or helmets with other people. Tinea capitis may be difficult to eradicate, and it may return after the treatment regimen is over. Sometimes, tinea capitis improves on its own after puberty.

## Vasculitis

**Vasculitis** is an inflammation of the blood vessels, causing changes in the walls of blood vessels, including scarring, thickening, narrowing, and weakening. Organ and tissue damage may result from a reduction of blood flow. There are many types of vasculitis, and most are rare. Vasculitis might affect just one organ, such as the skin, or it may involve several. The condition can be short term (acute) or long term (chronic). Some forms of vasculitis may improve without treatment, while others require medications to control inflammation and prevent flare-ups.

## Vitiligo

**Vitiligo** is a disorder in which the melanocytes (pigment cells of the skin) are destroyed in certain areas. Vitiligo can be localized to one area, or it may affect several different areas on the body. Symptoms of vitiligo include loss of skin color in the form

of white, or depigmented, patches of skin. It can also affect the mucous membranes found in the mouth, nose, and eyes.



Image courtesy of Healthline.com

The exact cause of vitiligo is unclear. Many experts believe that it is an autoimmune condition in which the body's immune system attacks and destroys melanocytes. Most cases of vitiligo develop prior to age 40; about 50% of the cases develop prior to age 20. Because vitiligo tends to run in families, it may have a genetic component. It is sometimes associated with other medical conditions, including thyroid dysfunction.

The expansion of vitiligo cannot be determined. In some cases, it remains localized, in other cases, it spreads. This condition is not painful and causes no health consequences. The severity of vitiligo can be reduced by some medical interventions, but it can be difficult to cure. There is no known prevention. Makeup and dyes can be used to improve the skin's appearance.

## Warts

See EST 22.



# Objective Five Self-Test

1) What happens to the hair and area around the hair when a person has tinea capitis?

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2) What is vasculitis?

---

3) How does vitiligo result in a loss of skin colour?

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# Objective Five Self-Test Answers

- 1) Infected hairs are broken and shorter, and papular lesions form around hair shafts.
- 2) Vasculitis is an inflammation of the blood vessels, causing changes in the walls of blood vessels, including scarring, thickening, narrowing, and weakening.
- 3) Vitiligo result in a loss of skin colour when melanocytes are destroyed.

# Objective Ten

*When you have completed this objective, you will be able to:*

Demonstrate analyzing skin for the common features of disorders and diseases.

Instructions: working with a partner, select an area of your partner's skin as if they were coming into a salon for a service. Check the service area for the following common features of a skin condition.

Service provider:	Date:
Client:	Time:

Common Features	Notes
Peeling skin.	
Dry, cracked skin.	
Scaly or rough skin.	
Ulcers, open sores, and lesions.	
Raised bumps that are red or white.	
Changes in mole colour or size.	
Rashes which can be painful or itchy.	
Fleshy bumps, warts, or other skin growths.	
Discoloured patches of skin.	

Loss of pigment.	
Excessive flushing.	

1) Has your partner recently had a skin disorder that has gone away? Is the condition gone permanently? Is it in remission?

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2) Has your partner noticed any recent developments and/or changes in a skin condition? For example, has a mole increased or decreased in size?

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3) Discuss your findings with your instructor.

Instructor verification: \_\_\_\_\_

# Module Summary Self-Test

1) What is cytoplasm, and what are its functions?

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2) What are ribosomes?

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3) In how many phases does eukaryotic cell division take place? What is the main occurrence during each phase?

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4) What are the 3 types of cells that make up the epidermis?

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5) What is one function of the blood vessels located in the dermis?

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6) Identify four things that fibroblasts can make or become:

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7) What is the operating principle of a Wood's lamp, and how does it show irregularities of the skin?

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8) What is photoaging and what is its effect on skin?

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9) How do the Rubin classification and the Golgau classification scales differ?

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10) What is TNF-alpha and what key role does it play in skin disorders?

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*The purpose of the following questions is to connect various skin conditions with general characteristics. Reinforcing the general characteristics will aid apprentices in identifying conditions when at work. Use the information on pages 41 and 42 to answer the following questions.*

11) Does acrodermatitis exhibit the general feature of a red rash?

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12) Does the preventative practice of using a moisturizer reduce the chances of developing alopecia?

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13) Can chickenpox be cured with the general treatment of steroids?

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14) Does the preventative practice of cleaning things in public spaces before using them reduce the chances of contracting dermatophytes?

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15) Does cutaneous candidiasis exhibit the general feature of a rash?

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16) Does the common cause of a weakened immune system contribute to developing hyperpigmentation?

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17) Does erysipelas respond to the general treatment of antibiotics?

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18) Does the common cause of exposure to allergens and irritants contribute to developing hives?

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19) Does the preventative practice of avoiding contact with the skin of an affected individual reduce the chances of developing lupus?

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20) Does melasma exhibit the general feature of scaly or rough skin?

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21) Does pemphigoid respond to the general treatment of steroids?

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22) Does the common cause of not eating a nutritious diet contribute to developing moles?

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23) Does rosacea exhibit the general feature of raised bumps?

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24) Does the common cause of poor personal hygiene contribute to developing seborrheic dermatitis?

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25) Does the common cause of fungi contribute to contracting tinea capitis?

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26) Does vitiligo respond to the general treatment of antihistamines?

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# Module Summary Self-Test Answers

- 1) Cytoplasm is a solution made up of mostly water and salt that fills a cell. It 'holds' all of the other components inside the cell, it breaks down waste, assists in metabolic activity, and allows materials to pass from one organelle to another.
- 2) Ribosomes are organelles that construct proteins.
- 3) Eukaryotic cells divide in two major phases: 1) interphase and 2) the mitotic (M) phase. During interphase, the cell grows and produces a copy of its DNA. During the mitotic (M) phase, the cell separates its DNA into two sets and divides its cytoplasm, forming two new cells.
- 4) The epidermis is made up of squamous cells, basal cells, and melanocytes.
- 5) One function of the blood vessels located in the dermis is to regulate the body's temperature.
- 6) Fibroblasts can make or become collagen, elastin, reticulin, cartilage, muscle, or bone.
- 7) A Wood's lamp operates by emitting ultraviolet light. The lamp is held over the skin in a darkened room, and certain bacteria or fungi changes in the skin's pigmentation, and the depth of pigment damage will cause the affected area to appear differently.
- 8) Photoaging is skin damaged by exposure to ultraviolet light. It appears mostly as discolouration and wrinkles.
- 9) The Golgou incorporates information regarding makeup and acne, while the Rubin does not.
- 10) TNF-alpha is an inflammatory cytokine that plays a key role in immune cell recruitment and activation.

11) Yes.

12) No.

13) No.

14) Yes.

15) Yes.

16) No.

17) Yes.

18) Yes.

19) No.

20) No.

21) Yes.

22) No.

23) Yes.

24) No.

25) Yes.

26) No.