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REVIEW ARTICLE

ANTIAGING COSMETICS

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*Correspondence Author's mail: bhavesh.joshi8@gmail.com**ABSTRACT:**

Antiaging is emerging class of cosmetics which combine the benefit of anti aging ingredients with the elegance skin feel and delivery system of cosmetics antioxidants, anti cellulites and anti microbial have been use in maintaining and enhancing human beauty. Anti aging ingredients also help to reduce the fine lines, increasing the moisture level and reduces wrinkles and puffness to keep the skin in good condition. New delivery system is a more effective solution for the skin aging resulting from photoaging. New vehicle like liposome and nanoparticles is a new generation for antioxidants with enhanced bioavailability and very stable activity. Our objective is to review present state of the art knowledge pertaining to mechanisms involved in skin aging, factor responsible for aging and various new ingredients use to treat aging defect.

Key words: Skin, Aging and types of Aging, Mechanism of aging, Factor responsible for aging, Role of Ingredients in Antiaging formulation.

INTRODUCTION:

Skin appearance is a primary indicator of age. During the last decade, substantial progress has been made toward understanding underlying mechanisms of human skin aging. This understanding provides the basis for current use and new development of Antiaging treatments. A major feature of aged skin is fragmentation of the dermal collagen matrix. Fragmentation results from actions of specific enzymes (matrix metalloproteinase's) and impairs the structural integrity of the dermis. Fibroblasts that produce and organize the collagen matrix cannot attach to fragmented collagen. Loss of attachment prevents fibroblasts from receiving mechanical information from their support, and they collapse. Stretch is critical for normal balanced production of collagen and collagen-degrading enzymes.

In aged skin, collapsed fibroblasts produce low levels of collagen and high levels of collagen-degrading enzymes. This imbalance advances the aging process in a self-perpetuating, never-ending deleterious cycle.

SKIN:

The skin mainly intends to protect human beings against environmental aggressions.

The skin is the outer covering of the body. The adjective Cutaneous literally means "of the skin" (from Latin cutis, skin). Because it interfaces with the environment, skin plays a key role in protecting (the body) against pathogens and excessive water loss. Skin has mesoderm cells, pigmentation or melanin provided by Melanocytes, which absorb some of the potentially dangerous ultraviolet radiation (UV) in sunlight. It also contains DNA-repair enzymes that help reverse UV damage (Zoe Diana drelas. *et al.*, 2006).

Skin is composed of three primary layers:

1. Epidermis
2. Dermis,
3. Hypodermis (subcutaneous adipose layer).

Sub layers:

Epidermis is divided into the following 5 sub layers

- Stratum corneum
- Stratum lucidum
- Stratum granulosum
- Stratum spinosum
- Stratum germinativum (Nema R.K.*et al.*,2009).

The keratinocytes develop at the bottom and rise to the top, where they are shed from the surface as dead cells. So this layer is constantly renewing itself, the live cells changing into dead, hard, flattened cells. Melanocytes and Langerhans cells are other important cells found in the epidermis which have special functions:

➤ **Melanocytes :**

These cells produce a dark pigment called melanin which contributes to skin color and provides UV protection. They are located at the bottom of the epidermis.

➤ **Dendrite (Langerhans) :**

These cells are involved in the epidermal immune system. They engulf foreign material that invades the epidermis and migrate out of the skin to stimulate an immune response.

2. Dermis :

The dermis consists mostly of connective tissue and is much thicker than the epidermis. It is responsible for the skin's pliability and mechanical resistance and is also involved in the regulation of the body temperature. The structures in the dermis are:

- Blood vessels
- Sebaceous glands
- Sweat Glands

Classification of the skin:

This is classified into generally four types i.e.:

1. Normal skin
2. Dry skin
3. Oily skin
4. Mixed skin.

1. Normal skin:

It is worth noting that there is no definition of normal skin, the latter being qualified in comparison with the other skin types: a normal skin is not a dry skin, not an oily skin, not a mixed skin, and no more a pathological skin. Therefore, considering its structure and its functions, a normal skin should be a smooth skin, pleasant to touch, because of the cohesion of the cells of its more superficial layers; a firm and supple skin because of the existence of a dense supportive tissue and of the presence of numerous elastic fibers of good quality (Schoen Linda Allen, 1976).

2. Dry Skin:

The term “dry skin” conceals several complementary or opposite points of view it remains completely different from the way it is approached. Therefore, for them it is first of all a feeling of drying along with loss of skin suppleness and elasticity, characterized by a rough appearance. This dysfunction actually depends on a qualitative and quantitative change of enzymes and or on an inadequate change of the pH of the skin (Well F.V. et al., 1964).

3. Oily Skin:

Whereas dry skin reflects a functional change of different skin components, the oily skin results from an over activity of the sebaceous glands, leading to an overproduction of sebum overflowing on the skin, giving it a characteristic oily and shiny appearance (Waugh Anne and Grant allison. 2004).

4. Mixed Skin:

It corresponds to a complex skin where the different types previously described coexist on different areas of body or

face. The characteristic example is the face, where solid and oily skin with well-dilated pores on the medico-facial area can coexist with a fragile skin with fine grains on cheeks (Zoe Diana drelas. et al., 2006).

COSMETICS:

Cosmetics is defined as ‘any substance or preparation intended to be placed in contact with the various parts of the human body (epidermis, hair system, nails, lips and external genital organs) or with the teeth and the mucous membranes of the oral cavity with a view exclusively or mainly to cleaning them, perfuming them, changing their appearance and/or correcting body odors and/or protecting them or keeping them in good condition.

ANTIAGING COSMETICS:

“Antiaging cosmetics is a branch of cosmetics which deal with the remove aging and wrinkle effect on skin.”

AGING AND TYPES OF AGING:

Aging is an accumulation of damage to macromolecules, cells, tissues and organs.

Two distinct types of aging:

1. Intrinsic (internal) aging.
2. Extrinsic (external) aging



Figure no 1: Aging Effect on Skin

Table 1: Factors and Effects of Aging

| S.No. | Cause | Non-Visible Effects | Visible Effects |
|-------|--|--|--|
| 1 | Internal : Genetics Breakdown of cellular structures and processes Reduced bone Density Hormonal changes Other | <ul style="list-style-type: none"> • Reduction of collagen • Reduction of elastin • Reduction of hyaluronic acid • Fat loss and redistribution • Dermal thinning • Bone resorption | <ul style="list-style-type: none"> • Wrinkles and folds • Fine lines • Drooping eyelids • Hollowed cheeks • Jowls • Dry skin |
| 2 | External : Photoaging Smoking Facial expression Sleep position Gravity | | <ul style="list-style-type: none"> • Wrinkles and folds • Rough skin • Blemishes and pigmentation • Freckles |

Table 2: Effect of aging on increasing age

| S.No. | Age | Aging Problem | Visible Effects |
|-------|-------|--|--|
| 1 | 25-40 | Some sun damage Some collagen loss Some fat loss Some Water loss/suppleness Stress | Frown lines begin to appear in upper face Fine lines, wrinkles, and folds begin to appear in mid face |
| 2 | 40-55 | More sun damage More collagen loss More fat loss More water loss/suppleness Stress | More defined frown lines in upper face More defined fine lines, wrinkles, and folds in mid face Some lip thinning Hollowing of eyes and cheeks Jowls |
| 3 | 55+ | Extensive sun damage Extensive collagen loss Extensive fat loss/suppleness Stress | Deep frown lines in upper face Extensive fine lines, wrinkles, and folds in mid face More prominent lip thinning |

MECHANISM OF AGING:

The following factors which show that mechanism of aging i.e;

1. Free radicals
2. DNA damage and repair
3. Glycation and cross-linking
4. Mitochondrial burnout
5. Inflammation.

1. Free Radicals:

Free radicals can react with essentially any structure in the cell. Free radical damage to DNA can lead to mutations, knocking out or disrupting the activity of genes. Mitochondria, the cells power station, are particularly important to the free radical theory of aging.

1. Free radicals are produced mainly in the mitochondria because that's where the cell burns its fuel.
2. More free radicals inside mitochondria than elsewhere in the cell. Mitochondria are actually far less protected from free radical damage than the rest of the cell.

The free radical damage is one of the key mechanisms of aging then taking antioxidant supplements must have a major impact on longevity (Fischer AA, 1973).

2. DNA Damage and Repair:

The substances that can damage DNA and cause mutation are called mutagens. Free radicals are the most common mutagen other example are N-nitroso compounds, aldehydes, asbestos and coal tar. Most mutagens are also carcinogen (Cancer causing substances). There are ways to reduce DNA damage and improve DNA repair the first step is to try to avoid environmental damage, such as cigarette smoking and over exposure to sun. DNA repair enzyme needs to use special DNA precursor called Deoxyribonucleotides (Zoe diana drelas and Lauran A. Thaman, 2006).

3. Glycation and Cross-linking:

Glucose is the most common substances for Glycation reaction. The level of glucose in the bloodstream is one of the most important physiological parameters because glucose is the primary fuel for the central nervous system. If the blood level of glucose drops below a certain point for a long enough time, a person will lose consciousness, fall into coma and die. High blood glucose seen in diabetes is also harmful.

Glycation is cross-linking, which is the formation of chemical bridges between proteins or other large molecules. A material that undergoes cross-linking usually becomes harder, less elastic and has a tendency to tear or crack. Cross-linking is responsible for hardening of a rubber mat or a garden hose left in the sun. In the aging body, cross-linking contributes to hardening of arteries, wrinkling of the skin and stiffening of joints (Zoe Diana drelas and Lauran A. Thaman, 2006).

The principle clinical feature of diabetes is a high level of glucose in the blood. Since the rate of chemical reactions is proportionate to the concentration of the reagents, the higher the glucose level and the greater the rate of Glycation and cross-linking. When cross-linked, arterial walls become hard, brittle and less able to pulsate, and capillaries become less permeable to nutrients and oxygen. The net result is the loss of proper blood supply to the tissues, which leads to poor wound healing, nerve damage, and ulcer formation. Most tissues, such as muscle or lungs, require insulin to be able to absorb glucose from the blood. In some tissues, however, namely the nerves, kidneys and retina.

Glucose is not the only possible cause of cross-linking. Cigarette smoke, UV-radiation, heavy metals, peroxides, acetaldehyde (a product of alcohol metabolism) is all potent cross-linkers (Knowlton John and Steven Pearce, 1993).

4. Mitochondrial Burnout:

The mitochondria are cellular power stations responsible for producing the majority of energy in the cell. All key processes in the cell depend on mitochondria feeding energy to the rest of the system. Unfortunately, the mitochondria are also responsible for the majority of free radical damage in the cells because most free radicals are by-products of mitochondrial fuel cycle. Since free radical damage and decreased energy production are the

hallmarks of aging, mitochondria are believed to play one of the key roles in the aging process.

Stress appears to be a major accelerator of the burnout of mitochondria. Stress increases energy demands, making mitochondria work harder, and leading to more oxidative by products more free radicals. In a prolonged or intensive stress, mitochondrial membranes get so damaged by free radicals that they begin to leak, which disrupts the cells entire energy and chemical balance. The resulting disproportionately severe oxidative damage accelerates aging and promotes disease (Luboew Irwin J, 1964).

Several important nutrients were shown to be active in mitochondria and improve mitochondrial function: acetyl-L-carnitine (ALC), coenzyme Q10 (CoQ10) and R-alpha lipoic acid (R-ALA).

5. Inflammation:

Inflammation is a vital defense mechanism essential for our survival and yet it seems to contribute to our aging and degenerative disease. Inflammation is the first response of the immune system to infection or irritation (Harry RG, 1962).

B. Aging and Stress:

Stress has a very close relationship to the development of age-related diseases and to the aging process itself. Stress or, more accurately, stress response is essentially a complex adaptive reaction of the body. Stress response is vital for survival, especially during emergencies, such as injury, infection or immediate danger. Stress response was especially important in the early days of mankind when life was tough, and danger, infections and struggle were a part of the daily routine (Wilkinson JB, 1985).

Among other things, stress involves quick mobilization of energy reserves, increased supply of fuel and stimulation of the brain, muscles, heart and other organs essential for immediate survival. In essence, stress response is a biological overdrive mode which helps escape from a tight spot, but at a high cost of wearing down the body. We do need to have a good overdrive mode in our arsenal. If stress response in emergency is too weak, the organism either dies or suffers additional damage, which manifests itself in diseases and accelerated aging. However, if stress response is excessive or prolonged it becomes a damaging force itself, and also causes disease and accelerated aging. In particular, excessive or prolonged stress response increases levels of free radicals, accelerates breakdown of proteins in many organs (including the skin), suppress the immune system, promotes the burnout of neurons and so forth. In fact, directly or indirectly, stress augments most of the known mechanism of aging (Andre O.barel. *et al.*, 2009).

Role of Ingredients in Antiaging cosmetics:

Some Common Types of Cosmeceuticals Ingredients:

- 1) Antioxidants
- 2) Botanicals
- 3) Depigmenting Agents
- 4) Retinoides

- 5) Sunscreens
- 6) Others (Flick Ernest W., 1992).

1) Antioxidants :

These substances which can prevent the occurrence of oxidative rancidity are known as antioxidants.

Antioxidants reduce free-radical damage, thereby preventing impairment at the cellular level. They inhibit inflammation, which leads to collagen depletion, and they offer protection against photo damage and skin cancer.

Common antioxidants include:

- α -lipoic acid (ALA)
- L-ascorbic acid (vitamin C),
- Niacinamide (vitamin B3),
- N-acetyl-glucosamine (NAG),
- α -tocopherol,
- Ubiquinone (COQ10)

2) Depigmenting Agents :

Skin-lightening agents added to product formulations have become increasingly popular. Common Depigmenting ingredients include:

- Hydroquinone,
- Kojic acid,
- Licorice extracts (glabridin)
- Aloe Gel (Luboew Irwin J., 1964).

4) Retinoides:

Retinoides are among the most common ingredients found in cosmeceuticals. In fact, they are the most studied and have the most data behind them. They consist of natural and synthetic derivatives of vitamin A that reduce hyper pigmentation and inhibit enzymes from breaking down collagen. Many of their cosmeceuticals claims are based on data derived from studies on retinoin and other classes of retinoid drugs. Some key retinoid include retinoic acid (retinoin), retinol, and Retinaldehyde (D. DeOrsi. *et al.*, 2008).

3) Sunscreens :

Sunscreens are the single most important cosmeceuticals, because they protect skin against solar radiation, which is the most important damaging environmental agent. As a result, they help to prevent the signs of aging. To be effective, sunscreens should provide broad spectrum coverage that includes both UVA and UVB blocking agents to inhibit photoaging and be part of a daily skin care regimen. Sunscreens contain active ingredients that act as ultraviolet filters (Thomsson EG., 1947).

4) Others :

Ellagic Acid

Anti oxidant rich Ellagic acid found in raspberries, cranberries pomegranates etc

GreenTea

whiles this antioxidant and anti-inflammatory ingredient

needs more research, studies have shown that green tea has some ability to provide sun protection.

Hyaluronic Acid

This natural ingredient is very important for helping our skin hold more water and some studies show it may help to stimulate the growth of healthy skin cells. Hydrated skin is smoother, softer and plumper looking (Talal Aburjai and Feda M. Natsheh, 2006).

Sea Buckthorn

A popular ingredient used throughout the world for healing the skin such as that affected by Rosacea but has also been found to be very beneficial for anti aging. It is loaded with vitamins and nutrients to help feed dry or aging skin.

SUMMARY AND CONCLUSION:

We have studied the Antiaging preparation enhance person's appearance. Gentle massage of the skin with the essential oil helps improve blood circulation and straight lines connective tissue. There by reducing wrinkles to keep the skin in good condition. Avoid excessive exposure to sun; salt, cold weather. anti aging ingredients also helps to reduce the fine lines and increasing the moisture level of the skin. Main function of anti aging preparation is the reduces wrinkles and puffiness.

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