Diet and Dermatology

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Introduction

- For decades, it was thought that many common dermatological conditions had **no relationship** to **diet**, studies from recent years, however, have made it clear that **diet may influence outcome**.

- In some cases, **dietary interventions may influence the course of the skin disease, as in acne** .

- In others, **dietary change may serve as one aspect of prevention,** such as in **skin cancer and aging of the skin**.

- Good skin is partly down to our **genetics**, but **what we eat** can also impact its condition and appearance.

Historical view

- **Ancient Egyptians** was relying on **natural ingredients** to maintain their beauty like, **ostrich eggs**, **dough**, **sesame**, and **moringa oils**.
- They also used **Olive oil &** clay mixtures to <u>cleanse their skin</u>
- **Milk** masks to <u>moisturize</u>
- **Dead sea salts** to <u>exfoliate</u>

- Like the Ancient Egyptians, the **Ancient Greeks** relied on totally **natural** regiment included lots of **fresh berries**, **milk, olive oils**, and **yogurt** to create items like perfumes, eye shadows, cleanses. and even hair dves.
- Moving towards **China** ,they used

skin lighteners made from **Songyi Mushrooms**

Skin Functions

- Skin is the body's **largest organ**, and along with hair, nails, glands and nerves, is part of the **integumentary system**
- In adults, skin accounts for about

16%of total body weight and covers

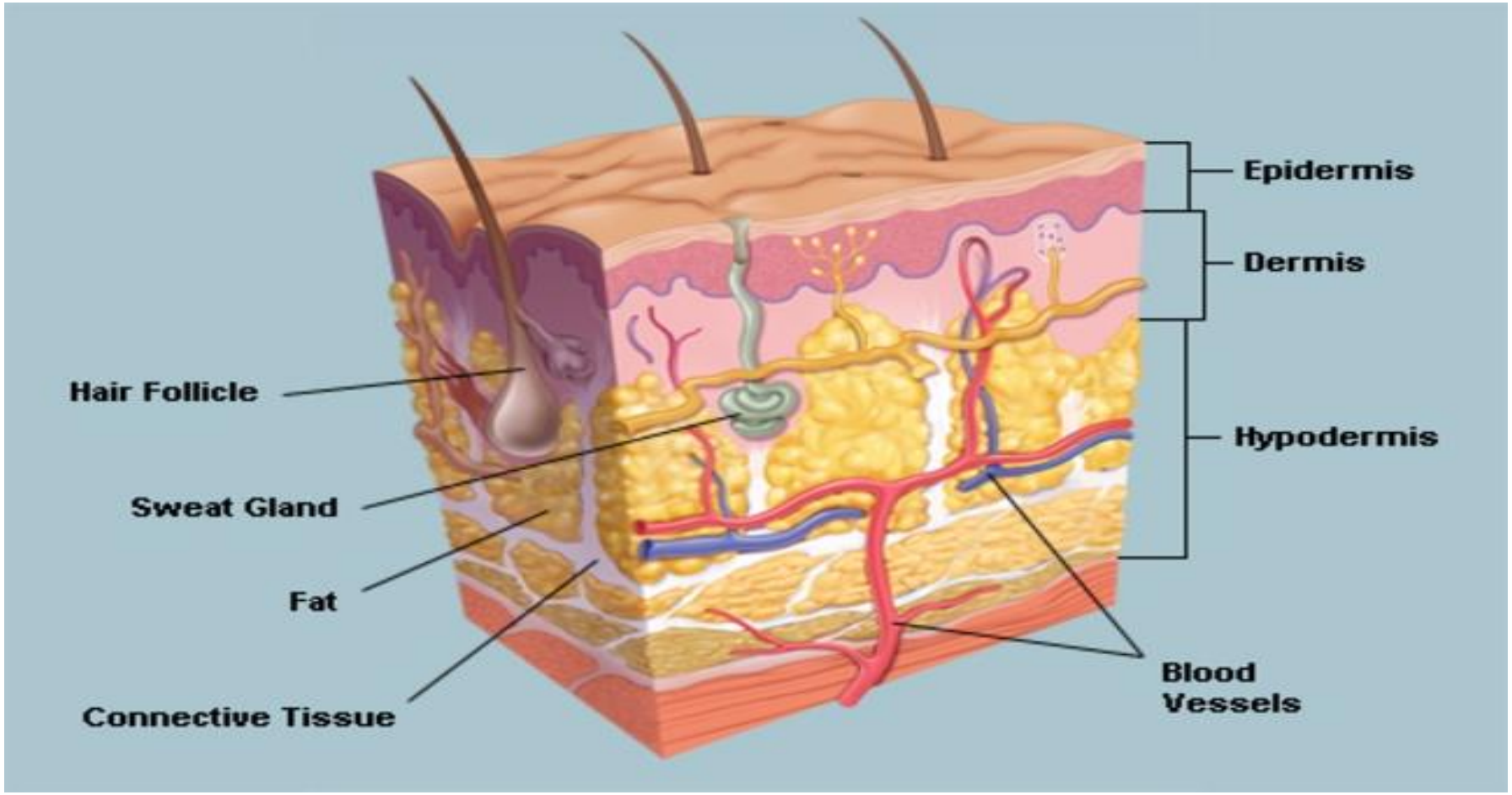
a surface area of approximately

22 square feet (**2 square meters).**

Skin Functions cont.

- **Protection** to physical trauma, biological, chemical agents and UV radiation
- **Heat regulation-** as changes occur in outside temperature, the body makes necessary adjustments in the glands of the skin to be cooled by the evaporation of sweat (or warmed by shivering of the muscles)
- **Sensation-** the skin responds to heat, cold, touch, pressure, and pain
- **Excretory function** – sweat
- **Absorption-** some ingredients can be absorbed through the epidermis
- **Expression**
- **Vitamin D synthesis**
- **Main part of external beauty**

Skin Structure



How do I control the damage done to my skin?

- External care

- Internal care

Skin and Nutrition

- Malnutrition alters skin structure and can manifest physically with **depigmentation**, **reduced number** and **atrophy of hair follicles**, **thinning** and importantly, **delayed and complicated wound healing**.
- The outer layer of skin cells (the epidermis) **renew themselves every 28-31 days**. The turnover of skin cells requires adequate dietary **protein, carbohydrate and fats** as well as a variety of **micronutrients(vitamins and minerals)** and **polyphenols** for optimal skin health and appearance.

Skin and Nutrition

- **Macronutrients (carbohydrates, proteins, and lipids)**

Skin and Nutrition cont.

- **Micronutrients**(**vitamins** and nutritionally essential **minerals**)

Skin and Nutrition cont.

- It is generally assumed that **dietary water** might be beneficial for the health, especially in dermatological **(age preventing)** terms

- It is an essential nutrient with unique properties as

a solvent for ionic compounds and solutes and

acts as a carrier with a central role in **cell homeostasis**

Skin and Nutrition cont.

- The "**Dietary Guidelines for Americans 2010**" report establishes as adequate water intake **3.7 and 2.7 L/day** for men and women, respectively, between **19 and 30 years old.**
- while the European Food Safety Authority **(EFSA)** indicates dietary reference values of **2.0 and 2.5 L** of water **per day** for women and men, respectively.

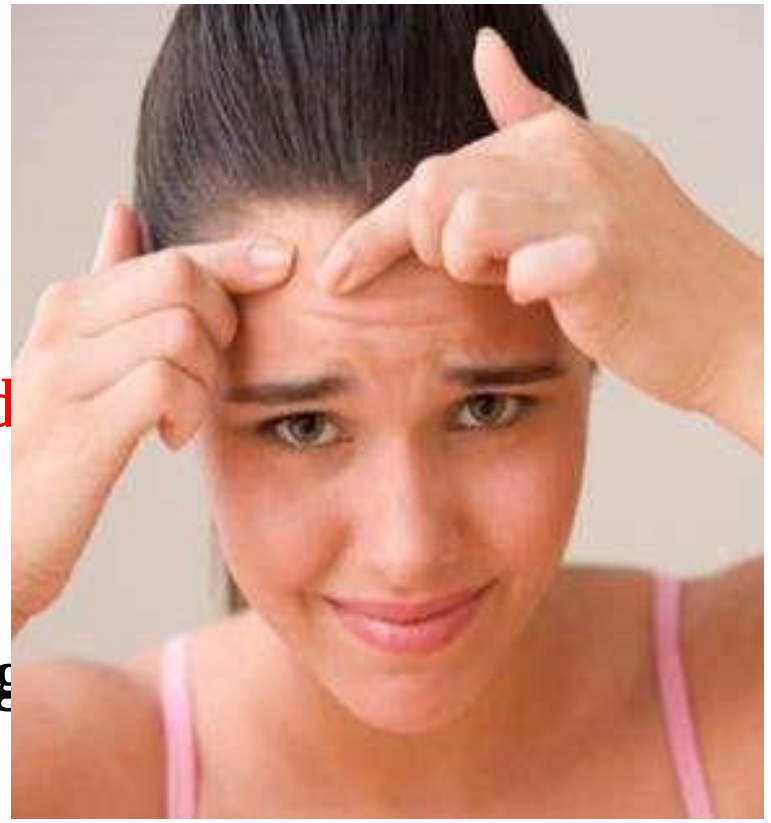
Can Good Nutrition Cure Skin Problems?

- **Diet alone won't** solve skin problems, but research shows that some conditions can be **greatly improved** by **good nutrition**.

For instances:

1. Acne:

- Acne has been reported to be **absent** in **non-westernized populations**, the complete absence of this disease in non-westernized populations points **strongly to underlying environmental factors, including diet.**



- There is an association between **acne and high intakes of dairy products** in adolescents,the physiologic mechanisms for the dietary correlation has been researched over the last several decades

- **Milk** will **increase** the level of **IGF-1** in the body, which can lead to **acne** through the **synthesis of IGF-1 & androgen-mediated sebum production** .

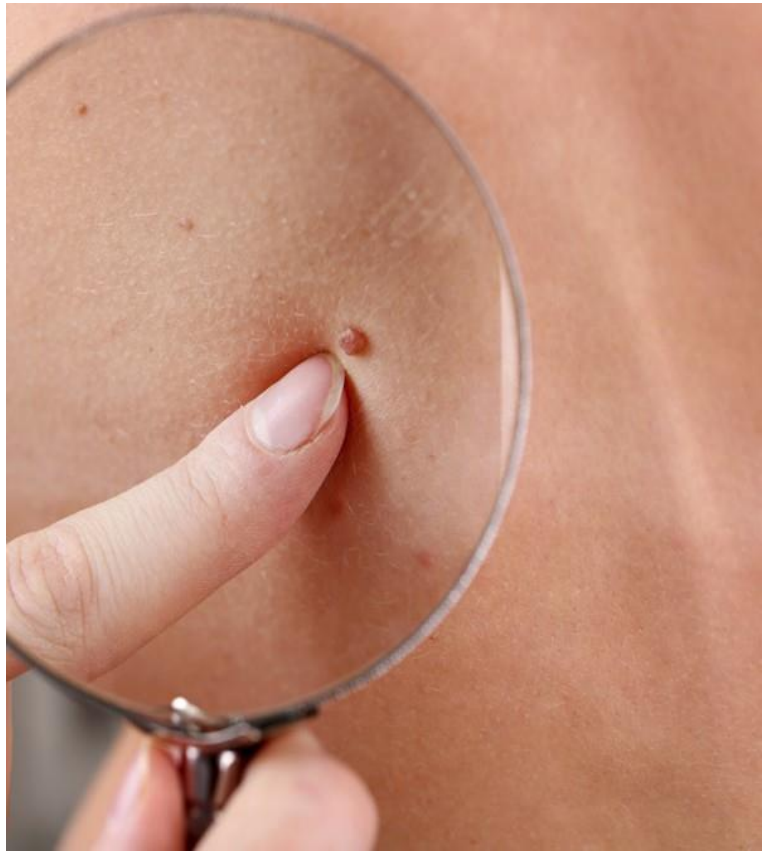

Acne diet-What not to eat
Chocolate
High glycemic foods
Sugar
Cow's milk
Milk
Fast food
dreamstime.com
ID 137195806 © Korsalena

- **Glycemic load** takes into account the **quantity of carbohydrates** consumed as well as the **rate of carbohydrate absorption**. Foods with a high glycemic index, such as **sugar**, **white bread**, **and white rice**, are rapidly absorbed, leading to **higher serum glucose** levels and corresponding elevated levels of insulin. Insulin and IGF-1 have been shown to **augment sebum production**, **stimulate adrenal androgen synthesis**, and **increase androgen bioavailability**, all of which play a role in the **pathogenesis of acne.**

2. Skin cancer

- Numerous studies have found that a **diet** rich in **fruits and vegetables reduces the risk of cancer**

- **Non-melanoma skin cancer (NMSC)** is a multistage process, and UV radiation is known to play a major role, exposure can result in free radicals, which can damage proteins, lipids and (DNA) .



- Dietary factors may impact this process via a number of different mechanisms, **antioxidants may break down free radicals, neutralize them, or upregulate genes that encode neutralizing enzyme**.
- Antioxidants have been shown to reduce UV-associated epidermal damage and **protect against UV-induced apoptosis.**

- **Antioxidants** are present in all kinds of foods, these **anticancer** compounds are mainly found in the **brightly coloured fruit** and **vegetables** that liven up our plates

Good sources of specific antioxidants

1. More precisely, this particular kind of antioxidant is a family of compounds called **carotenoids**, organic pigments produced by plants.

- The **orange** color of **carrots, apricots and sweet potatoes** comes **from beta-carotene**

- The **green** in leafy vegetables (**green cabbage, spinach, peas, avocado**, etc.) comes from **lutein and zeaxanthin.**

- And **lycopene** gives **tomatoes** their **red colour**

2**. Some vitamins**, again largely found in fruit and vegetables, are also antioxidants like **Vitamin E &C**

- Vitamin C, for example, is an antioxidant that isn't produced by the body.
- Citrus fruit like **lemons**, **oranges**, **grapefruits** and **kiwis** are packed with vitamin C.

3.Certain **polyphenols** are antioxidants ,these have complicated-looking names like **quercetin, genistein, catechins and curcumin**, found in **turmeric** .

- And the tannins found in **lentils**, **green tea** & **grapes**

- The flavonoids in **dark chocolate**

4.Certain trace elements like **Zinc** (oysters, beef,) and **Selenium** (meat, eggs, seafood) can also be considered **antioxidants.**

3. Aging of skin

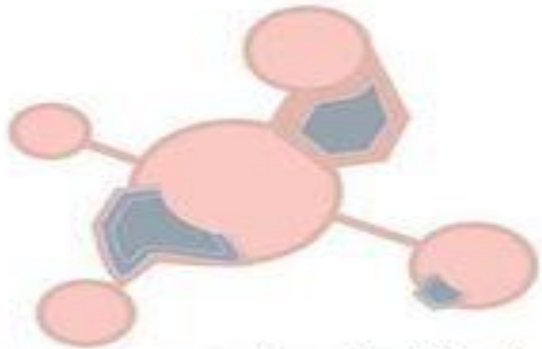
- Rhytides, sagging of skin, and loss of elasticity are all related to **changes in the collagen and elastic fibers of the skin**, which are **impacted by diet.**

- **External factors** that mainly contribute to skin aging include **sunlight**, **UV radiation**, **chemicals, pollutants, and smoking.**
- Besides external stimuli, **endogenous processes** that trigger aging process include :**excessive free radical production**, **reduced cell proliferation**, and **impaired immune functioning**. In recent years, many scientific studies have revealed that **advanced glycation end products (AGEs)** are also among **the crucial contributory factors of skin aging**.

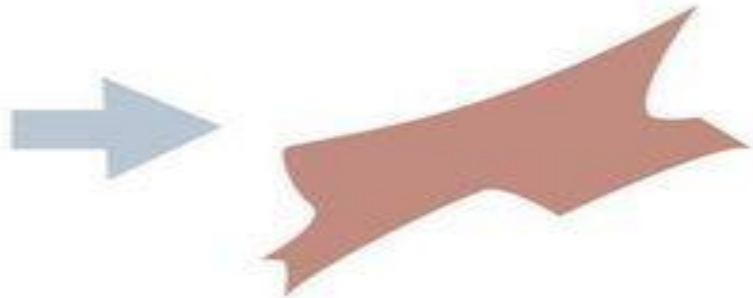
Advanced Glycation End Products

- **Ingestion of sugar** in particular, can accelerate the signs of aging, as it promotes cross-linking of collagen fibers.
- Cross-linking occurs through a process known as **glycation**, in this process, a **covalent bond** is established between the amino acids in the collagen and elastin present in the dermis. These amino acids are linked by glucose and fructose, leading to the production of advanced glycation end products (AGEs)

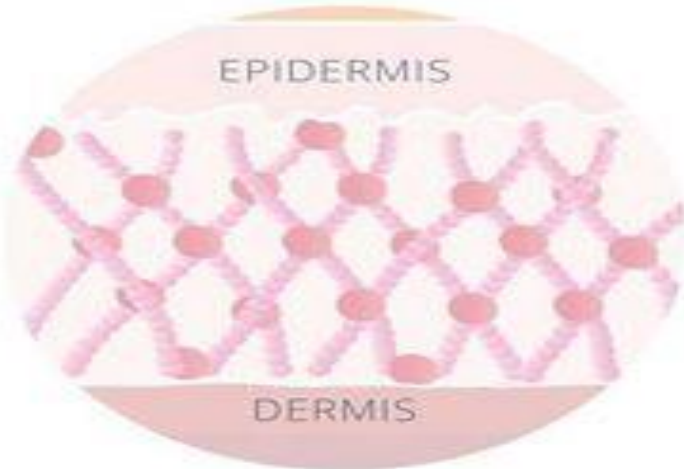
How does ***sugar*** **AGE** your skin?



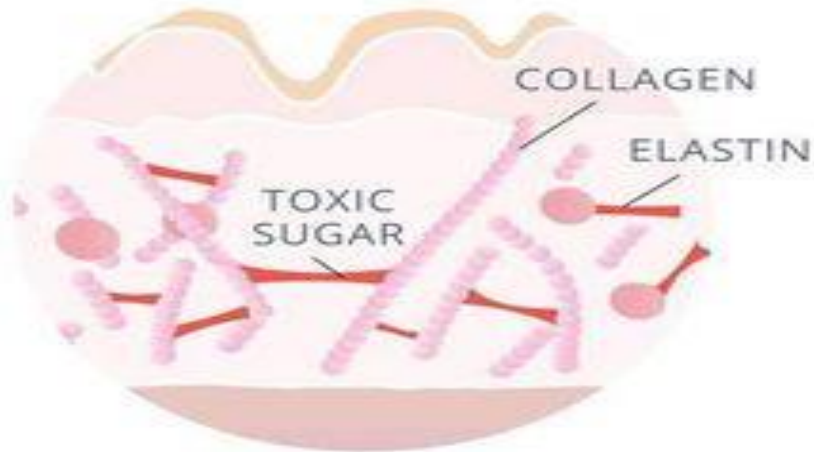
Excess sugar molecules bind to proteins such as skin collagen and elastin



Forming Advanced Glycation End Products (A.G.E.s), inflammation and dryness



HEALTHY SKIN



GLYCATED SKIN

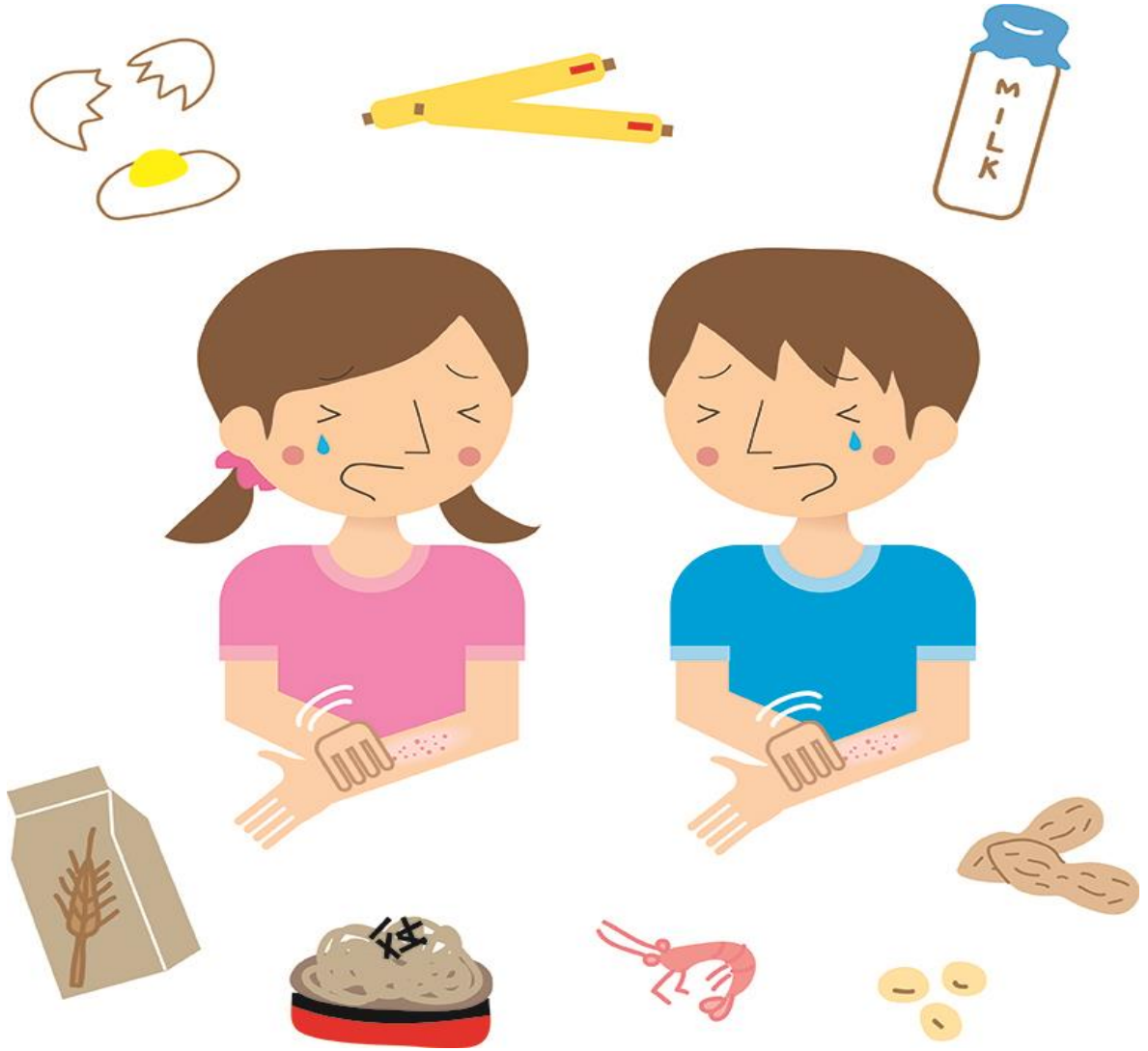
- Research has also focused **on foods** that may be able to **inhibit** the **production of AGEs**. These include herbs and spices, such as **oregano**, **cinnamon**, **cloves**, **ginger**, and **garlic,**

4. Eczema

• Eczema can make life a misery for children as well as adults with **red, dry, thick and scaly skin** that is constantly itching. For many people, eczema is **triggered off** by an **allergic reaction** to specific foods and avoiding these foods can relieve the symptoms

The Most Common Foods Linked To Eczema Include:

- eggs
- dairy (particularly cow’s milk)
- shellfish
- peanuts
- gluten



Best foods to consume if you have eczema

1. Fish and certain seafood naturally rich with omega-3
2. **Foods containing quercetin** .**Quercetin** is a flavonoid found in plants. Its powerful antioxidant and antihistamine properties fight inflammation and histamine in the body, helping to preventing eczema flare-ups.

5.PSORIASIS

While susceptibility to psoriasis **is inherited**, the disease is influenced by **environmental factors such as infections and stress, and possibly diet.**

The dietary factors that may play a role in psoriasis are as follows:

1.ENERGY INTAKE

- **The prevalence and severity of psoriasis have been reported to be lower in periods of insecure food supply.**

- The pathophysiology of **both psoriasis and obesity show many shared cytokines, which lead to a state of systemic inflammation**

2.ALCOHOL

Alcohol **stimulates histamine release** and may thereby ***aggravate skin lesions.***

3.FISH OIL

The basis for the anti-inflammatory effect of fish oil supplementation is **the replacement of proinflammatory arachidonic acid in membrane phospholipids by anti-inflammatory ω-3 PUFAs (EPA and DHA)**

4.GLUTIN

Patients with psoriasis have been found to have an **increased incidence of IgG/IgA anti-gliadin antibodies**

GFD for a period of 3 months improved disease severity in psoriatic patients with anti-gliadin antibodies.

IMPORTANCE OF KEY MICRONUTRIENTS IN MAINTAINING SKIN HEALTH

1.Vitamin A Role:

- **Prevents UV irradiation-mediated skin damage .**
- **Useful for the prevention and treatment of psoriasis,skin cancer ,acne.**

_Vitamin A Deficiency : Atopic dermatitis

2. Vitamin C Role

- **Attenuates UV irradiation-mediated damages in the skin;**
- **Promotes cutaneous wound healing**
- **Increases epidermal moisture content, improving skin hydration**

-Vitamin C Deficiency : subcutaneous bleedin and delayed wound healing in scurvy

3.Vitamin D Role

- Improve innate immunity (through stimulation of antimicrobial peptide production)
- Modulates inflammation, angiogenesis, wound healing

Vitamin D Deficiency : Atopic dermatitis

4. Vitamin E Role:

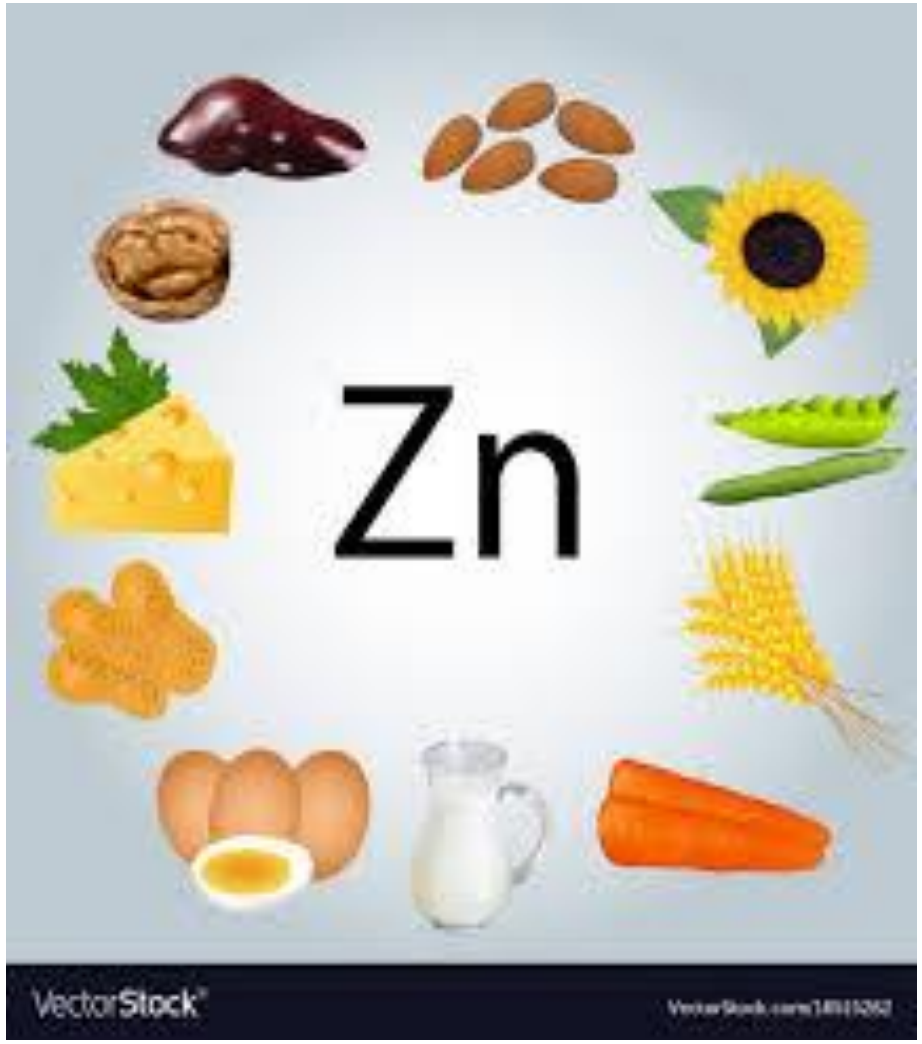
- Suppresses lipid peroxidation
- Modulates photoaging and photocarcinogenesis
- Exhibits anti-inflammatory roles

Vitamin E Deficiency : Skin ulcerations

5. Zinc Role:

- **Protects from photodamage.**
- **Exhibits antimicrobial activity.**

Zinc Deficiency: Atopic dermatitis



Foods For

GLUTATHIONE

SULFUR-RICH FOODS

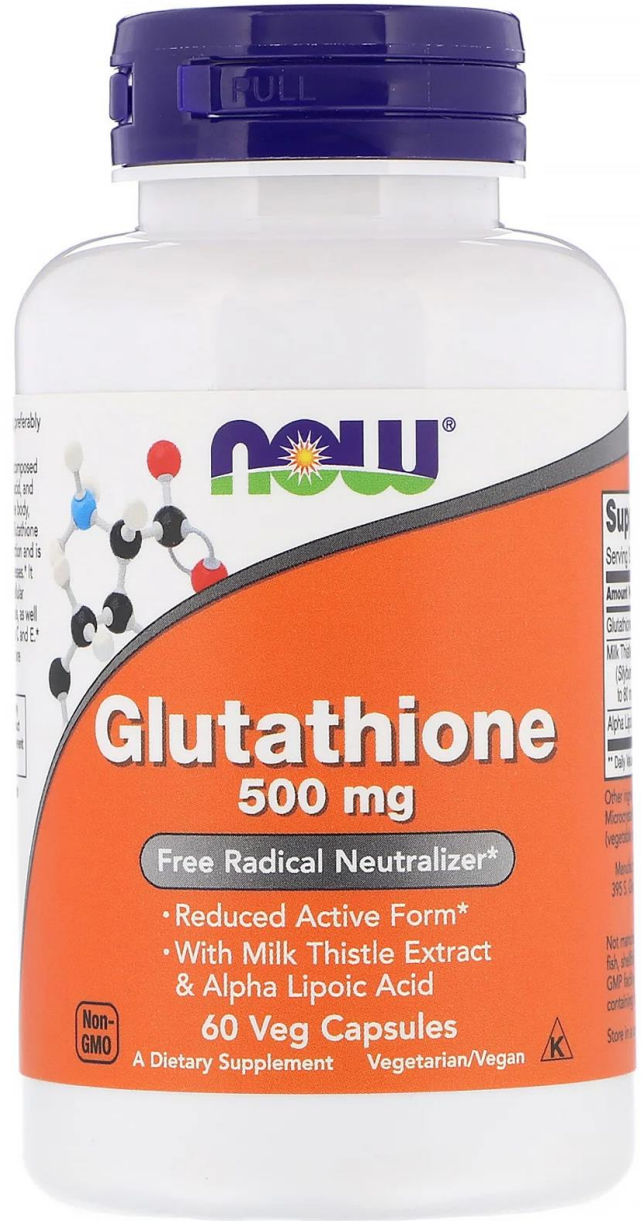
INCREASE VITAMIN C

SELENIUM-RICH FOODS

FOODS RICH IN GLUTATHIONE

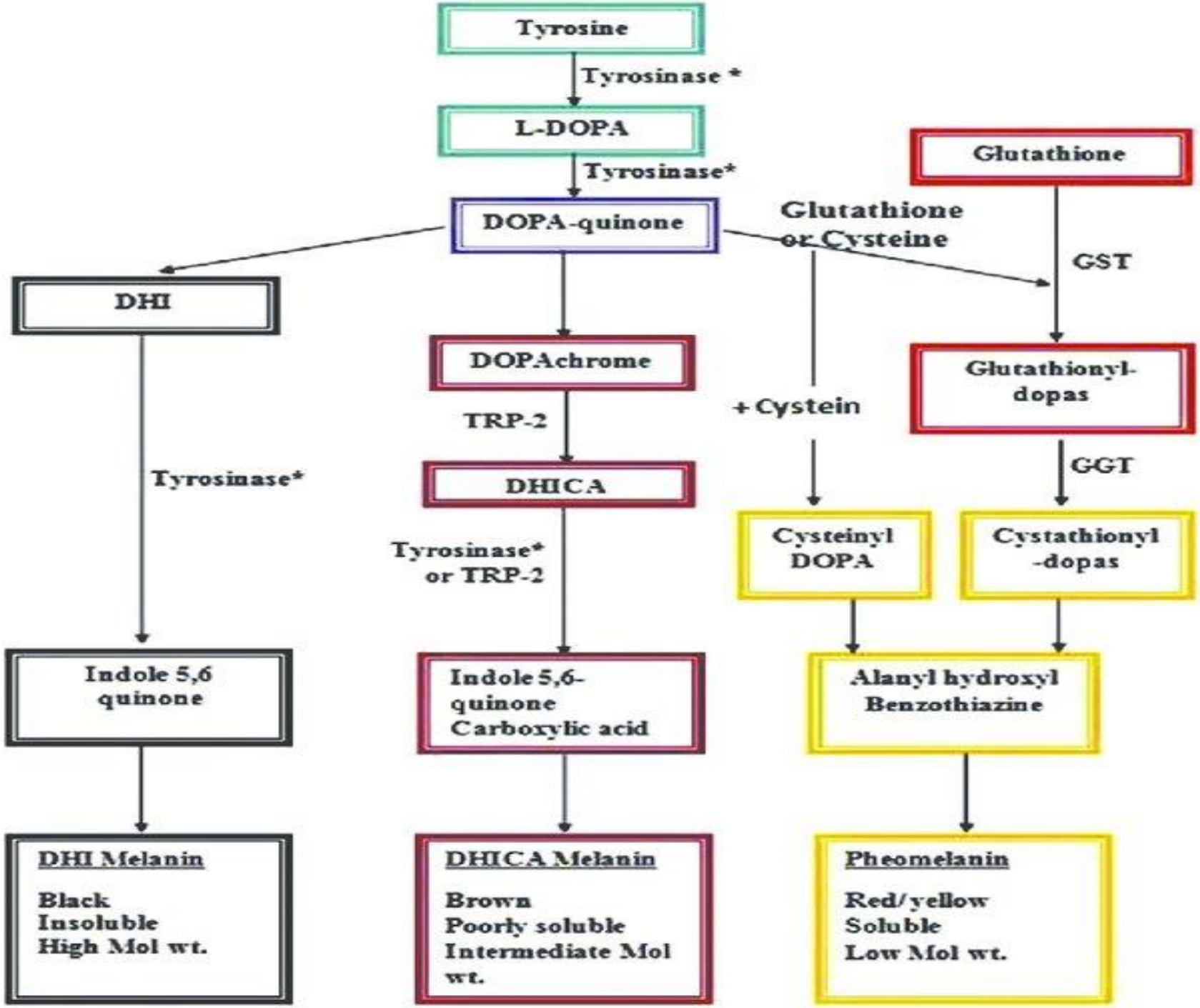
MILK THISTLE

TURMERIC EXTRACT



Glutathione

- While most antioxidants are found in the foods, glutathione is produced by human body. It is primarily made up of three amino acids: glutamine, glycine and cysteine
- **In addition to its remarkable antioxidant properties, the discovery of its antimelanogenic properties has led to its promotion as a skin-lightening agent.**


Tyrosine
Tyrosinase *
L-DOPA
Tyrosinase*
DOPA-quinone
Glutathione
Glutathione or Cysteine
GST
DHI
DOPAchrome
TRP-2
DHICA
Tyrosinase* or TRP-2
+ Cystein
Glutathionyl-dopas
GGT
Tyrosinase*
Cysteinyl DOPA
Cystathionyl -dopas
Indole 5,6 quinone
Indole 5,6-quinone Carboxylic acid
Alanyl hydroxyl Benzothiazine
DHI Melanin
Black
Insoluble
High Mol wt.
DHICA Melanin
Brown
Poorly soluble
Intermediate Mol wt.
Pheomelanin
Red/yellow
Soluble
Low Mol wt.

- The ratio of the two different types of melanin found in skin, black-brown colored eumelanin and yellow-red pheomelanin, determines the skin colour. An increased proportion of pheomelanin is associated with lighter skin colour

- **the presence of glutathione/cysteine can induce a switch towards higher pheomelanin production as compared to eumelanin**

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Box 2: Summary of proposed mechanisms of action of glutathione (GSH) in disorders of hyperpigmentation

Direct inactivation of tyrosinase (the key enzyme of melanogenesis) by binding with the copper-containing active site of the enzyme

Indirect inactivation of tyrosinase via antioxidant effect which leads to quenching of free radicals and peroxides

Switching production of eumelanin to phaeomelanin

Modulation of the depigmenting abilities of other melanocytotoxic agents

Exposure to ultraviolet radiation is the most important factor that causes hyperpigmentation.

enhanced tyrosinase activity

Glutathione Product

Topical glutathione: Glutathione is commercially available as face washes and creams.

The reduction of the melanin index with glutathione was statistically significant when compared to placebo

Glutathione mesotherapy

Despite the lack of published literature on the efficacy and methodology of using glutathione solution as mesotherapy , Although **the results are claimed to be very good,** use of glutathione as mesotherapy needs more evidence and published data.

Oral glutathione

"Generally recognized as safe"

- the evidence for the clinically efficacious bioavailability of oral glutathione in humans remains scarce and controversial

Intravenous Glutathione

There is no available data on the efficacy of intravenous glutathione for skin lightening. The data on safety are available, but scarce


Thank
you