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Editorial Board

Prof. Ahmed Mohamed Abd-El Moola
Dean of Faculty of Pharmacy

Prof. Tahani Hassan Elfaham
Supervisor of DIC

Dina Abdel Malek (Lecturer Assistant)
Lamiaa Mahmoud Ahmed (Lecturer Assistant)

Tel. 088/2080388 & 088/2411556
E-mail: clinipharm_assiut@yahoo.com
Website: www.aun.edu.eg/clinipharm
FB Page: facebook.com/DIC.pharmacy

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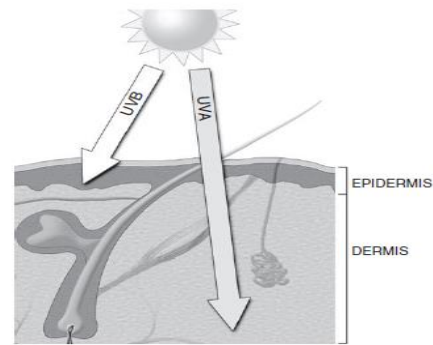
This Bulletin is a free quarterly periodical issued by the Drug Information Center (DIC) located at Faculty of Pharmacy, Assiut University

Summer time: sun protection is a must

Summer is upon us, and it's the perfect time to enjoy the sunny outdoors. But wait! Are you and your family protecting yourselves from sun damage and its detrimental effects on your long term skin health?

1- Introduction

Sun exposure affects the skin in many ways. In the short term, it can lead to reddening, irritation, and eventually tanning, which is the main reason for most people sunbathing. There are, however, long-term effects of UV radiation, which are irreversible and often malignant. Sun exposure is now increasingly recognized as the possible cause of premature wrinkling and various types of skin cancer. For these reasons, sun protection has become a very important issue today. UV filters, ingredients that can effectively protect the skin from UV radiation, are now incorporated not only into sunscreens but also in daily-use cosmetics, such as moisturizing creams, foundations, and lipsticks.



2- UV RAYS

As sunlight passes through the atmosphere, all UVC and approximately 90% of UVB radiation are absorbed by ozone, water vapor, oxygen, and carbon dioxide. UVA radiation is less affected by the atmosphere. Therefore, **the UV radiation reaching the Earth's surface is largely composed of UVA (approximately 95%) with a small UVB component (approximately 5%).**

- **UVB** radiation ranges from 280 to 320 nm. **UVB rays mainly penetrate the superficial skin layers, i.e., epidermis.** UVB radiation is the major cause of sunburn, which is acute skin damage perceived as redness. Additionally, it has been identified as a leading factor in the development of skin cancer. The immediate result of UVB radiation is skin redness and thickening of the stratum corneum, which is a defense reaction of the body to reduce the UVB effect on the epidermis. The redness and potential pain subside in a relatively short amount of time; however, the underlying damage accumulates over time. This leads to the formation of various types of skin cancer. Additionally, UVB contributes to photoaging and tanning and also has immunosuppressive effects. An advantageous effect of the UVB radiation is that it is responsible for the synthesis of vitamin D in the skin. The intensity of UVB varies by season, location, and time of day.
- **UVA** radiation ranges from 320 to 400 nm. Due to their longer wavelength, UVA rays penetrate **deeper into the skin, down to the dermis.** These rays can be further subdivided into UVA II (320–340 nm) and UVA I (340–400 nm). On the short term, UVA radiation leads to skin tanning (i.e., browning), which is often considered a sign of health. It is unfortunate since tanning, whether outdoor or indoor tanning, causes cumulative damage over time, leading to photoaging. UVA has long been identified as a leading factor in photoaging; however, until recently, it was not believed to cause any cancer. Studies over the past decades, however, showed that UVA damages keratinocytes in the basal cell layer where the most of the skin cancers occur. Therefore, on the long term, it can also contribute to and

may even initiate the formation of skin cancer. Additionally, UVA weakens the immune system, which also helps the development of skin cancer. Photosensitivity reactions are also primarily mediated by UVA.

3- Sun Protection Factor (SPF)

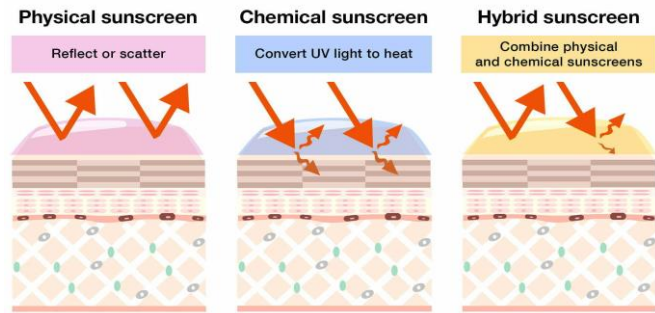
The term “sun protection factor” was adopted by the FDA to describe the effectiveness of sunscreens. SPF is a measure that indicates how long it takes for UV rays to redden protected skin (i.e., skin with a sunscreen) compared to unprotected skin (i.e., skin without a sunscreen). As the SPF value increases, sunburn protection increases. The effectiveness of a given SPF is measured in terms of redness (medically termed “erythema”) that appears on the skin after sun exposure. The amount of UV energy required to produce the first visible redness on the skin is referred to as the minimal erythema dose (referred to as “MED”). As SPF values are determined from the test that measures protection against sunburn caused by UVB radiation, SPF values only indicate a sunscreen’s UVB protection. In the Federal Register, SPF is defined as the UV radiation required to produce 1 MED on protected skin after application of 2 mg/cm² of product divided by the UVR to produce 1 MED on unprotected skin. The number you see associated with SPF represents the length of time (in minutes) you can theoretically stay out in the sun without burning, multiplied by the corresponding number. For example, a person who would normally start to burn in 10 min could theoretically have 150 min of sun protection with a sunscreen that has an SPF of 15. This is only true in theory, though since SPF is not directly related to the time of solar exposure, but to the amount of solar exposure. Historically, SPF values have ranged from 2 to greater than 100. This led to the assumption that higher SPF provides significantly better sun protection (i.e., SPF 30 being twice as protective as SPF 15). This is not true, however. It has been shown in *in vitro* tests that SPF 15 sunscreens filter out 93% of UVB rays, while SPF 30 protects against 97% and SPF 50, 98%. The higher the number, the smaller the difference in terms of UVB protection. Again, keep it in mind that the SPF value refers to the amount of solar exposure against which the sunscreen provides protection and not the length of solar exposure you can have without getting sunburn.

Common Q & A

1. Sunscreens Vs sunblocks, What is the difference?

Sunscreens: otherwise known as **chemical sunscreens** or organic UV filters, are generally aromatic compounds. Their molecular structure is responsible for absorbing UV energy. Organic filters absorb UV rays, which produce excitation of the sunscreen chemical to a higher energy state. Then, they return to the ground state and convert the absorbed energy into longer, lower energy wavelengths (heat). Currently, there are 15 organic sunscreen ingredients approved in the US. Examples for organic UVB absorbing filters include octinoxate, octisalate, and padimate O. Examples for UVA filters include avobenzene, oxybenzone, and meradimate. Organic filters are often combined with one another to achieve the desired broad-spectrum protection. According to the OTC monograph

for sunscreens, a sunscreen product must have a minimum SPF of not less than the number of active sunscreen ingredients used in combination multiplied by 2. Organic sunscreens can penetrate the skin due to their lipophilic nature, which may cause safety concerns. An issue with many of the organic sunscreens is their photostability. Upon exposure to UV radiation, the structure of a UV filters may be negatively affected and/or destroyed. As a result, instead of returning to the ground state, they lose their absorption capacity.



Sunblocks: otherwise known as physical sunscreens or inorganic UV filters, reflect and scatter UV radiation. There are two approved physical filters, namely titanium dioxide (TiO₂) and zinc oxide (ZnO). Both of these ingredients are white powders that are insoluble in the sunscreen product base. Therefore, they are suspended in such products. Inorganic sunscreens can only penetrate the outer layer of the skin. Therefore, they have an excellent safety profile. Additionally, inorganic filters are photostable, independent of the sunscreen base and other ingredients. Inorganic filters provide a broad-spectrum protection since they reflect and scatter both UVA and UVB radiations (TiO₂ offers UVB and UVA II protection, while ZnO provides protection against UVB, UVA II, and UVA I radiations). The main disadvantage of inorganic filters with regular particle size is that they reflect and scatter UV radiation into the visible spectrum (>400 nm), which provides a white appearance on the skin after application. This can make sunscreens cosmetically less appealing and can lead to reduced application by consumers.

2. Which is better: sunscreen or sunblock?

Sunblock uses zinc oxide and titanium dioxide, which protects (or blocks) the skin from UVA and UVB rays. Sunscreen absorbs the sun's harmful rays before they penetrate the skin. They work in different ways but serve the same purpose. Some products contain a combination of both physical and chemical sunscreens. However, for people with sensitive skin, sunblocks with zinc oxide and titanium dioxide are better tolerated. These ingredients are also typically found in products for children, who have different sun protection needs. People with skin conditions, such as rosacea or allergy-prone skin, should avoid products that contain fragrances, preservatives, and oxybenzone or PABA, which are often found in sunscreens. Many doctors recommend sun protectants that offer: **SPF 30 or greater, broad spectrum protection and water resistance**

3. How long does sunprotection last after application of sunscreen?

Sunprotection lasts an average of two hours. That means you should plan to reapply every two hours. If you sweat a lot, notice your skin burning, or spend time in the water, you'll want to reapply more frequently. Also remember to :

- Avoid the sun from 10 a.m. to 3 p.m., when the UV rays are the strongest.
- Wear sunglasses that filter UV light.
- Wear protective clothing, such as long pants, long-sleeved shirts, and a wide-brimmed hat.

The infographic 'Sun protection' from healthdirect outlines five key strategies:

- Slip**: on protective clothing
- Stop**: on SPF30+ or higher sunscreen
- Slap**: on a hat
- Seek**: shade
- Slide**: on sunglasses

 A red banner at the bottom contains a warning icon and text: 'Concerned about a sunburn? Use healthdirect's Symptom Checker to get advice on when to seek medical attention.'

4. What is a sunburn and what should I do if I get one?

Sunburn is an acute inflammatory skin reaction for excessive exposure to UV radiation, which can come from a variety of sources, including sun, tanning beds, and phototherapy lamps. Sunburn is generally classified as a superficial or a first-degree burn. It can cause various signs and symptoms, such as tenderness, mild pain upon touch, itching, and redness, which may be followed by scaling. More severe cases may proceed to edema or even blistering. Studies have shown that repeated severe burns at an early age increase the risk for melanoma and other types of skin cancers later in the life.

Try these self-care tips for sunburn relief:

- **Take a pain reliever.** For pain relief, take a nonprescription pain reliever as soon as possible after getting too much sun. Examples include ibuprofen or acetaminophen. Or try a gel pain reliever that you rub on the skin.
- **Cool the skin.** Apply to the affected skin a clean towel dampened with cool tap water. Or take a cool bath. Cool the skin for about 10 minutes several times a day.
- **Apply a moisturizer, lotion or gel.** An aloe vera lotion or gel or calamine lotion can be soothing. Try cooling the product in the refrigerator before applying. Avoid products made with alcohol.
- **Drink extra water for a day.** This helps prevent dehydration.
- **Leave blisters alone.** An intact blister can help the skin heal. If a blister does break, trim off the dead skin with a clean, small scissors. Gently clean the area with mild soap and water. Then apply an antibiotic ointment to the wound and cover it with a nonstick bandage.
- **Treat peeling skin gently.** Within a few days, the affected area may begin to peel. This is your body's way of getting rid of the top layer of damaged skin. While your skin is peeling, keep using moisturizer.
- **Take an anti-itch drug.** An oral antihistamine such as diphenhydramine might help relieve itching as the skin begins to peel and heal underneath.
- **Apply a soothing medicated cream.** For mild to moderate sunburn, apply nonprescription 1% hydrocortisone cream to the affected area three times a day for three days. Try cooling the product in the refrigerator before applying.
- **Protect yourself from further sun exposure.** While your sunburn heals, stay out of the sun or use other sun-protection measures. You might try a product that has moisturizers and sunscreen.
- **Avoid applying '-caine' products, such as benzocaine.** Such creams can irritate the skin or cause an allergic reaction. Benzocaine has been linked to a rare but potentially deadly condition that decreases the amount of oxygen that the blood can carry (methemoglobinemia).

Sources:

1. Baki, Gabriella. *Introduction to cosmetic formulation and technology*. John Wiley & Sons, 2022.
2. <https://www.mayoclinic.org/diseases-conditions/sunburn/diagnosis-treatment/drc-20355928>
3. <https://www.healthline.com/health/sunscreen-vs-sunblock#importance-of-using-sun-protection>

Animal products and cosmetics

Contrary to popular belief, not all natural beauty products are vegan-friendly. Just because they don't contain synthetics doesn't mean they don't use animal-derived ingredients, which is considered "natural". **Here** are some ingredients that are commonly found in everything from make-up to facial creams that are actually derived from animal sources and are not suitable for vegans.

1. Collagen:

Collagen is prized for its anti-aging properties, so is widely used in beauty products that are aimed at improving the skin's elasticity or reducing the appearance of fine lines and wrinkles. The fibrous protein comes from the tissues and bones of animals, as well as animal skins, ligaments and tendons. Most of the collagen used in the industry comes from beef or fish.

2. Carmine:

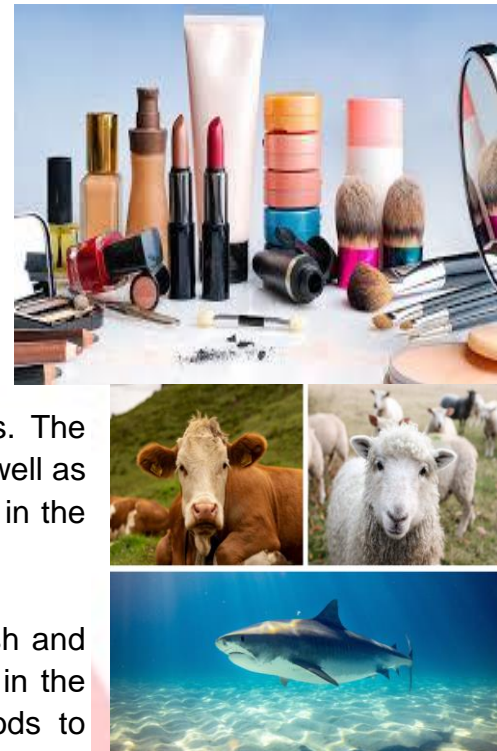
Carmine, a red colourant, is commonly found in blush, nail varnish and lipsticks in the cosmetics industry. It's also widely used as a dye in the food industry, colouring everything from sweets and baked goods to seasonings and jams. It comes from cochineal insects, which are crushed to extract their crimson colour to make this dye. On ingredient lists, carmine can also be hidden under the names natural red 4, E120 and CI 75470.

3. Lanolin:

Lanolin comes from sheep's wool and acts as an emollient in beauty products, meaning it softens and soothes the skin. Lanolin is most often found in lip balms and glosses, hair products like conditioners and face and body creams or moisturisers. There are some plant-based lanolin alternatives, which brands will specify if they are derived from plant fats such as olive oil, coconut oil or shea butter.

4. Urea and carbamide:

Urea and carbamide are often made synthetically or with animal urine, but the packaging does not indicate which one the company used. Urea is found in Lotion & moisturizer, facial cleansers, foundation, hair care products, lipstick & lip balm, mascara, antiperspirant & deodorant, nail products. Alternative can be used as synthetic urea, shea butter, jojoba oil, coconut oil, almond oil, argan oil, avocado oil, and other plant-based skin conditioning products that contain vitamin E.



5.Keratin:

Keratin, hydrolyzed animal protein is also obtained from crushed bones, hooves, and feathers of animals. Keratin has become a widely popular treatment in beauty salons that leaves our hair silky smooth. Many shampoos and conditioners boast this ingredient as a way for you to get that silky hair look at home. Likewise, it is a popular way to strengthen nails.

Alternatives; vegekeratin, KeraVeg18, wheat amino acid, soy amino acid, arginine, serine, threonine.



6.Guanine:

Guanine is derived from the scales of fish and is used for its shiny, shimmery qualities. The crystalline compound made from crushed fish scales is mostly used in nail varnishes, lipsticks, eyeshadows, highlighters, bronzers and some mascaras too.

“It takes nothing away from a human to be kind to an animal.”

Sources

- <https://www.greenqueen.com.hk/animal-ingredients-beauty-products/>

- <https://www.shoplikeyougiveadamn.com/blogs/25-common-animal-ingredients-in-cosmetics/bl-350>.

Real Enquiries

At the “ Drug Information Center” we respond to enquiries from the professional health team as well as from others. Here’s one of the enquiries received at the center

Enquiry received from : M.N.- Assiut

Enquiry: Is the flu vaccine safe for pregnant women?

Summary of the answer:

Influenza vaccination in the influenza season before planning a pregnancy is preferred, but there are no indications of an adverse effect of vaccination during pregnancy for the mother, or on the fetal outcome.

CDC (Centers for Disease Control and Prevention) recommends that pregnant women get a flu shot during any trimester of their pregnancy to protect themselves and their newborn babies from flu. There is a lot of evidence that flu vaccines can be given safely during pregnancy, through these data are limited for the first trimester. The nasal spray vaccine is not recommended for use in pregnant women.

Sources:

1) Schaefer C, Peters P, and Miller R.(2007), Drugs During Pregnancy and Lactation . Treatment options and risk assessment. 2nd ed. London:Elsevir P.1821

2) Briggs G.G., Freeman R.K.(2011). Drugs in Pregnancy and Lactation. 9th ed. Philadelphia: Lippincot Williams& Wilkins p.1511

3) https://www.cdc.gov/flu/protect/vaccine/qa_vacpregnant.htm

Test Your Knowledge



1. Vitamin B6 is also known as:

- a) Thiamine.
- b) Riboflavin.
- c) Niacin
- d) pyridoxine

2. Side effects of anticholinergic therapy include

- a) Diarrhea.
- b) Increased salivation.
- c) urinary retention.
- d) improved memory.

3. Citalpram is a (an):

- a) diuretic.
- b) cardiotoxic.
- c) antidepressant.
- d) antiinflammatory.

4. Which of the following is a polysaccharide:

- a) Saccharin.
- b) Starch.
- c) lactose.
- d) sodium cyclamine.

Answers:

1. (d) 2. (c) 3. (c) 4. (b)

Ask the expert

Question: What should I do if I get bitten or scratched by a street animal?

Wash the bitten area with soap and water for 10-15 min. Unknown pets could be carrying rabies. If you have been bitten or scratched or licked by a wild or stray animal or an animal with unknown vaccination history, seek medical care right away. **Rabies post-exposure vaccine** is available in many public hospitals for free. It is administered intramuscularly in the deltoid region. One dose of the vaccine should be administered on days 0, 3, 7, 14 and 28 from the exposure. It is also important seek medical attention within 24 hours for any bite that breaks the skin because it might need stitches or you might need to get a tetanus shot if you had not taken one within the past 5 years.