

PHARMACOTHERAPY

CONTINUING PHARMACY EDUCATION

Sun Protection Sunscreens

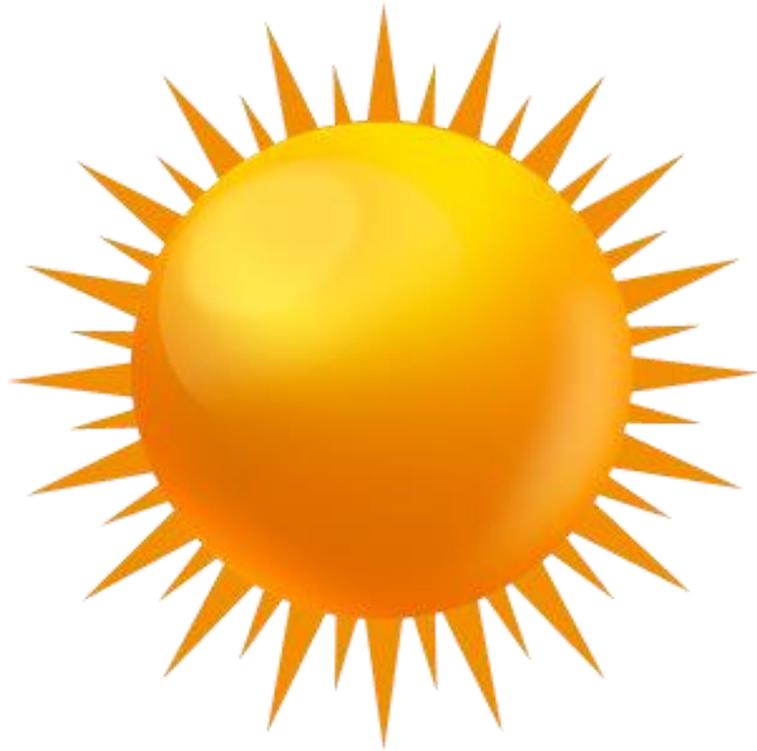
Dr Mohammad Taraz
Clinical Pharmacist
January 2023



Our skin

- Reflects our
 - **Origin**
 - **Age**
 - **Health's state**
 - **Lifestyle**





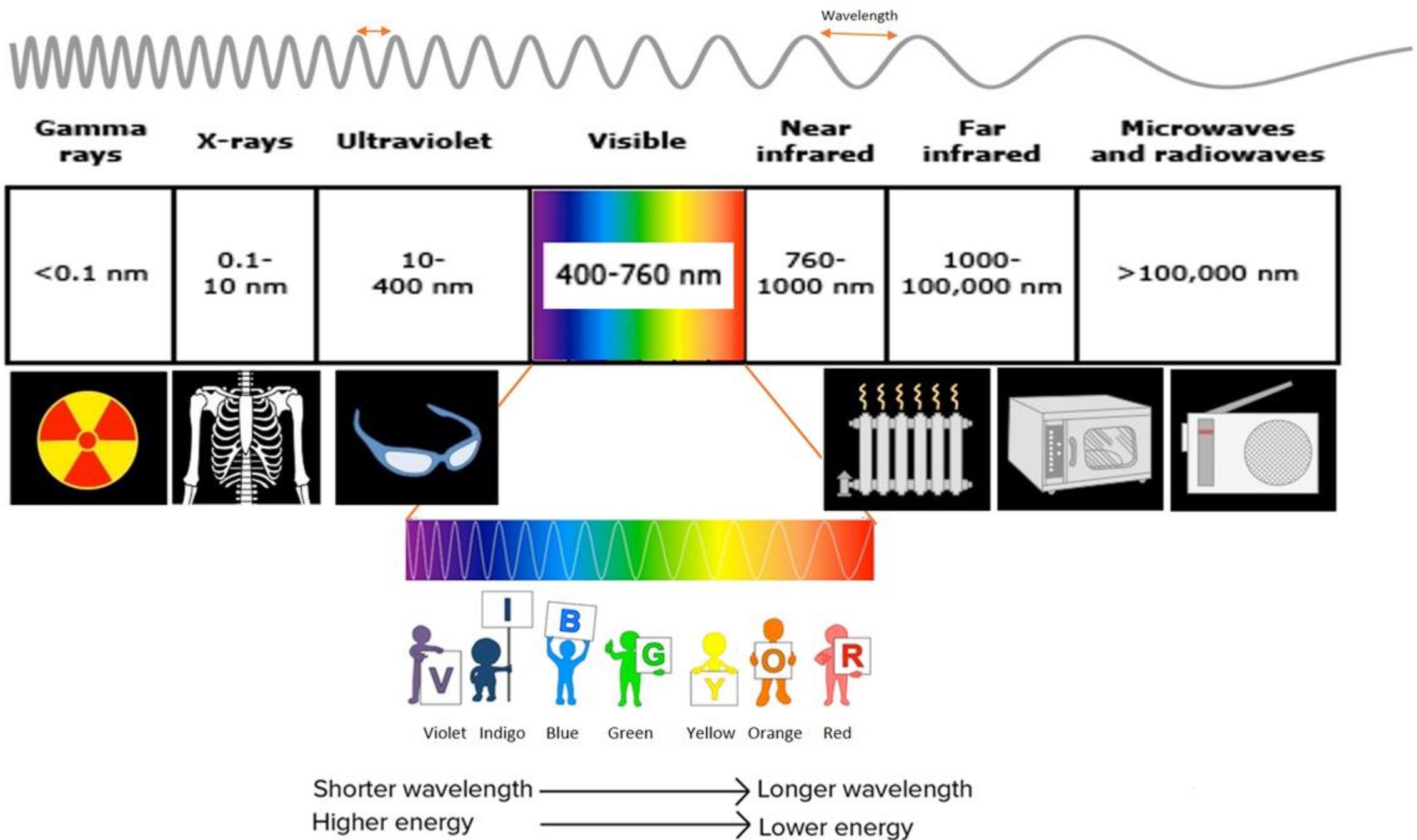
The Good & The Bad

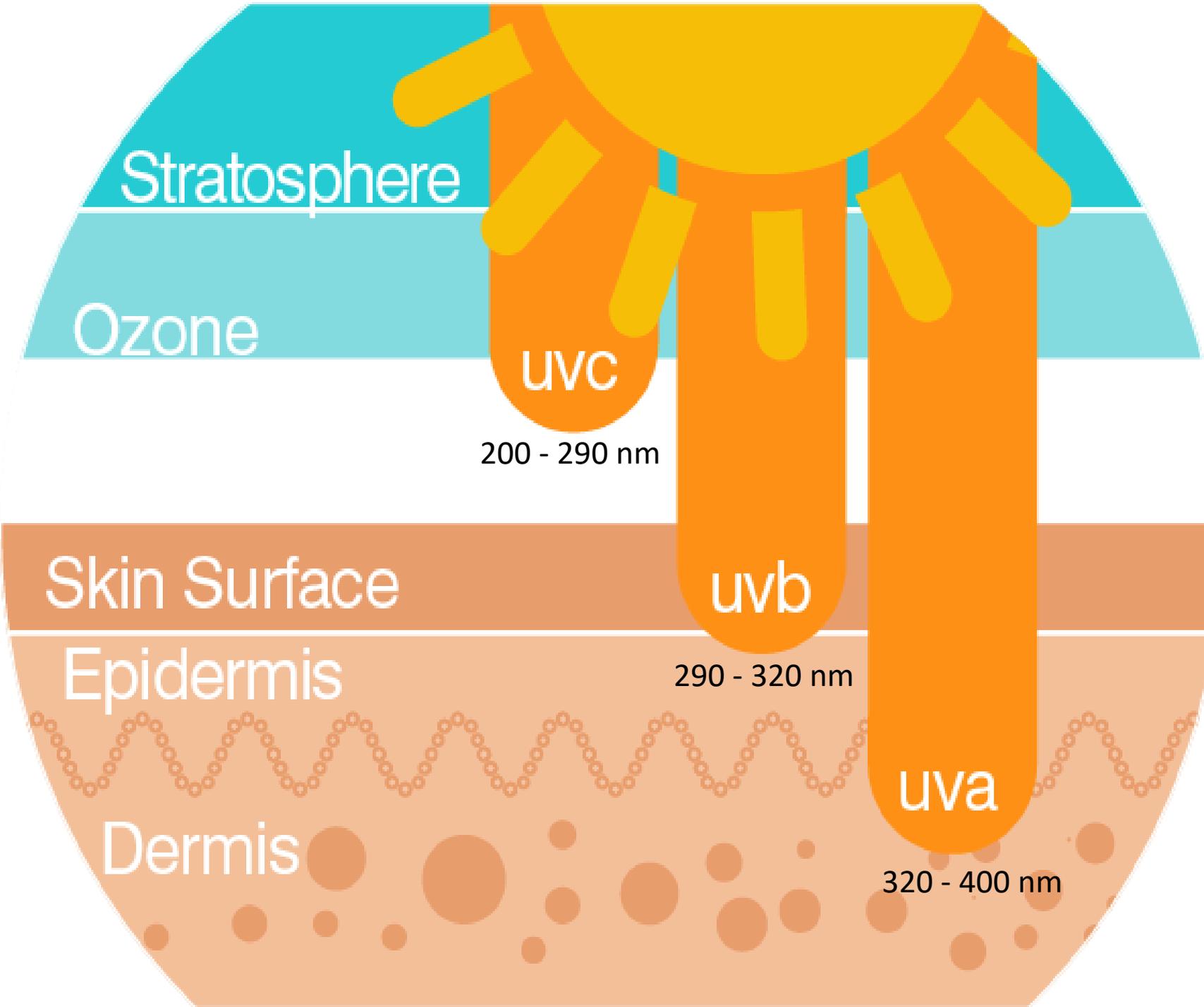


- Sunlight is essential for **synthesis of vitamin D** & has **beneficial effects on mood**.
- **UV** radiation is responsible for **sunburn, photoaging & skin cancer**.



Solar Radiation





Vacuum ultraviolet	10-200
UVC	200-290
UVB	290-320
UVA2	320-340
UVA1	340-400

UV reaching earth surface

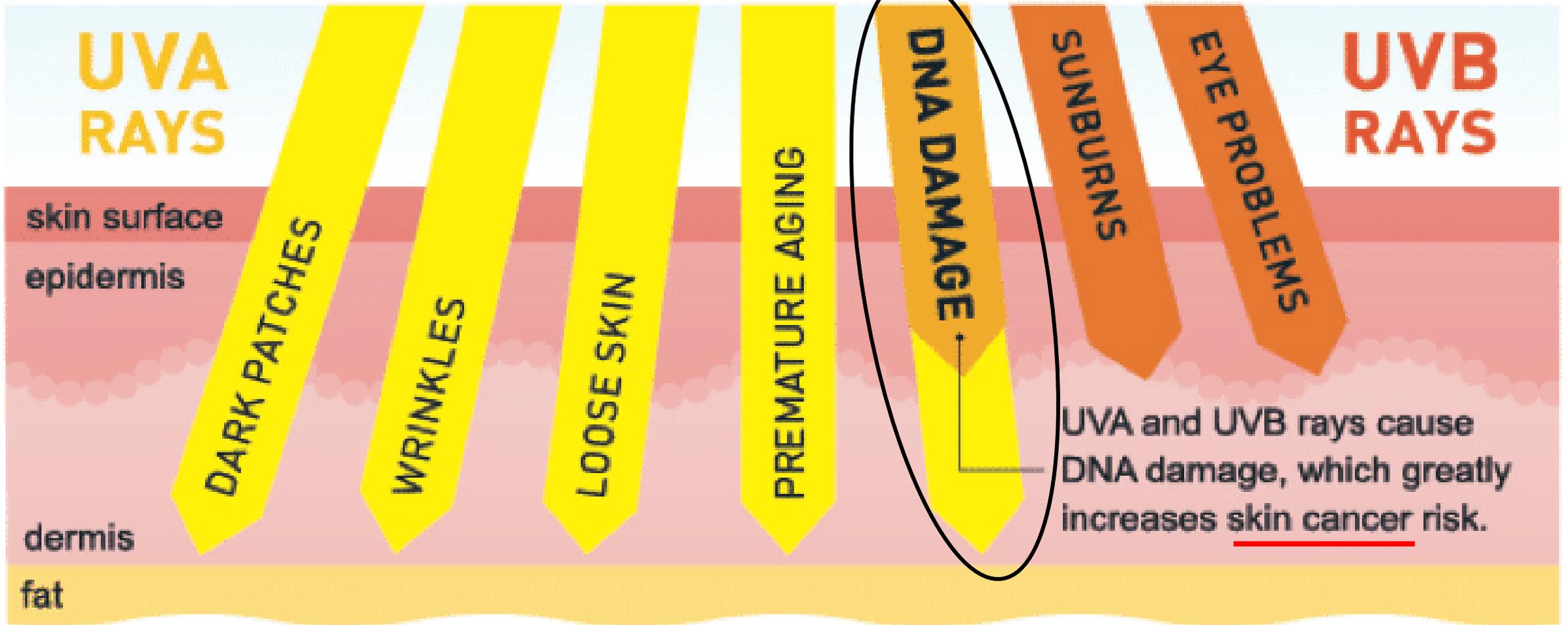
- UVB: 5 %
- UVA: 95%

Difference between UVA & UVB rays



“Aging Rays”

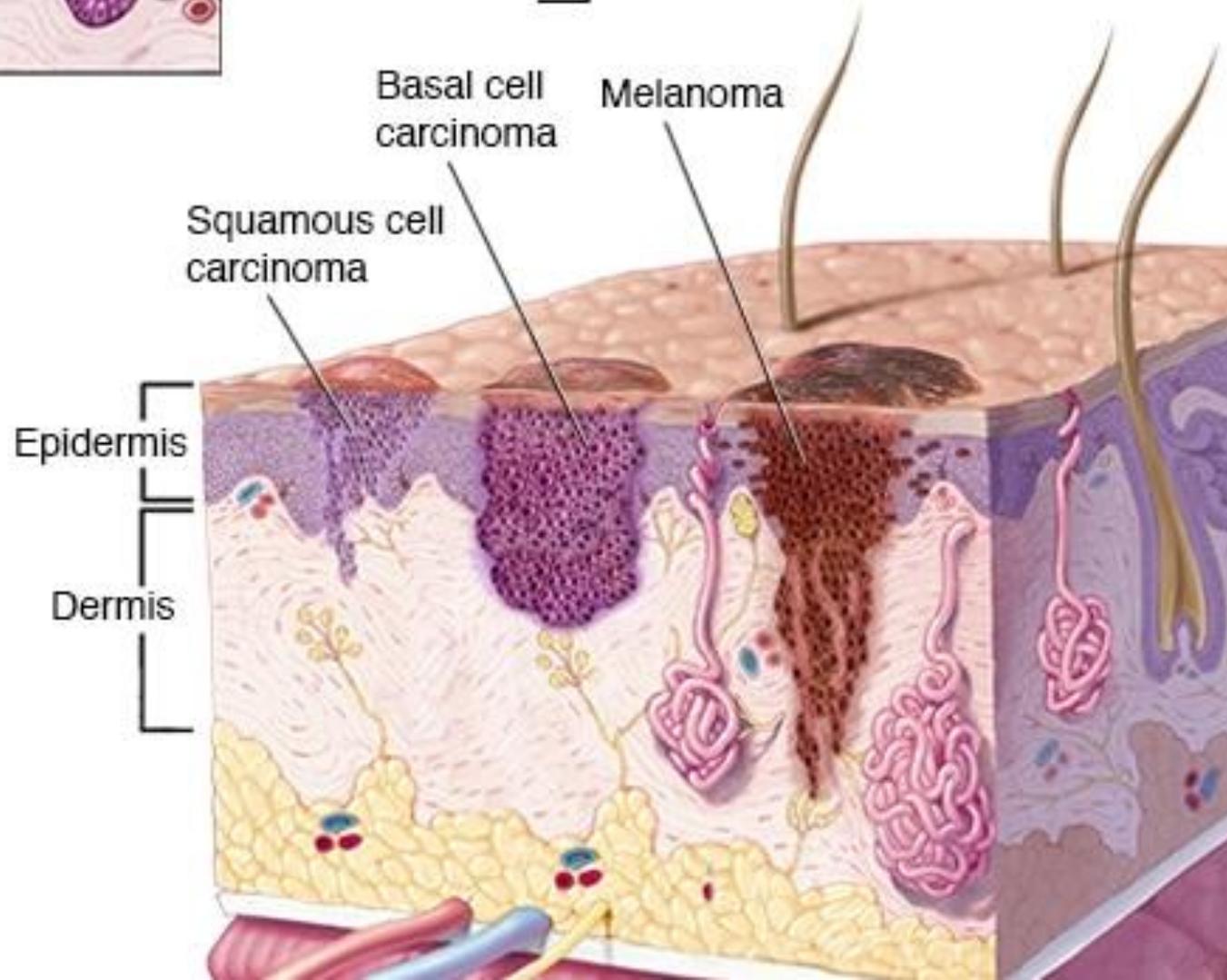
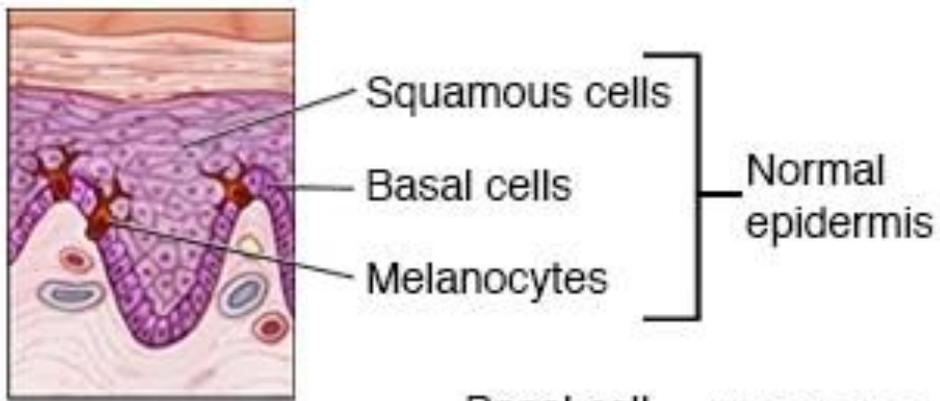
“Burning Rays”



• Blocked by window glass

• Can pass through window glass

UV-B intensity is highest at solar noon, & declines thereafter. UV-A intensity remains relatively constant throughout the day.



Squamous cell carcinoma

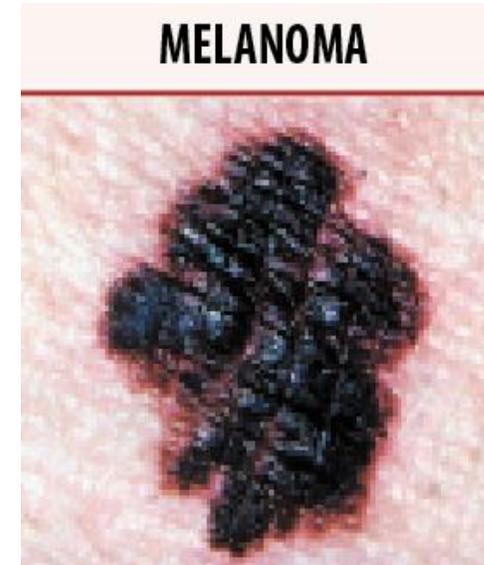


Basal cell carcinoma



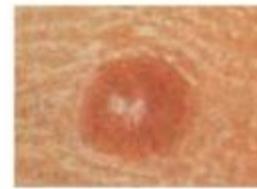
Non-melanoma skin cancer (NMSC)

MELANOMA



A

Asymmetry: Moles that have asymmetrical appearance. If you draw a line through this mole, the two halves will not match.



symmetrical



asymmetrical

B

Border: Uneven, scalloped, jagged, or notched borders



even borders



uneven borders

C

Color: A mole with more than one color.



one color



multi colored

D

Diameter: The diameter of the mole is usually larger than a pencil eraser, (1/4 inch or 6 mm). They can be smaller, though.



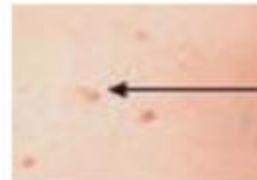
smaller than
1/4 in.



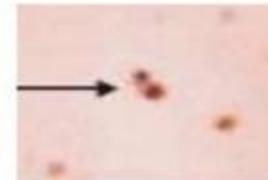
larger than
1/4 in.

E

Evolution: Moles that evolve suddenly in size, shape, color, elevation, crusting, itching, or other traits.



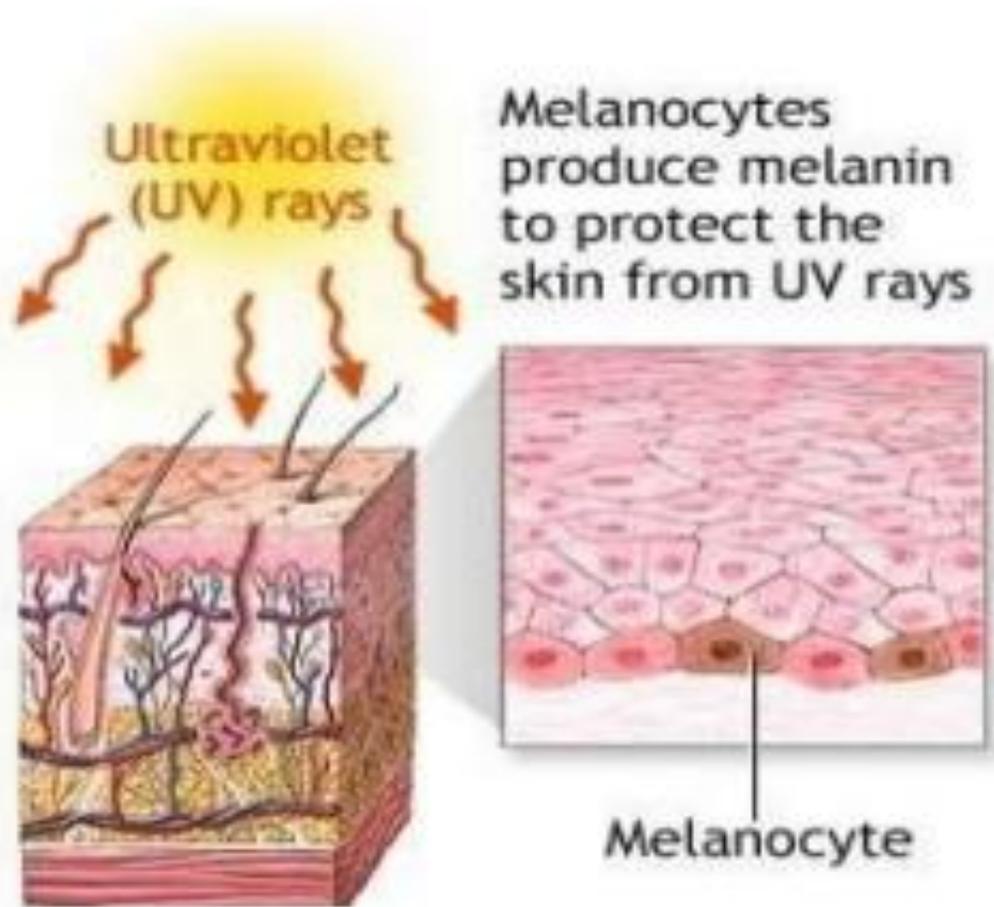
ordinary



evolving



Melanin



If UV rays exceed what can be blocked by your level of melanin, sunburn results



Sunburn

- The affected area will generally be erythematous & painful in proportion to the extent of the sun exposure.
- The full effect of a sunburn on the skin may not manifest until 24 h or longer following sun exposure, with most individuals experiencing **worse pain 6 - 48 h after exposure**.
- The signs & symptoms of sunburn are usually temporary, but the skin-cell DNA can be permanently damaged, with possible long-term sequelae including skin cancer & early aging of the skin.
- Most sunburns are first-degree burns (Superficial burns).

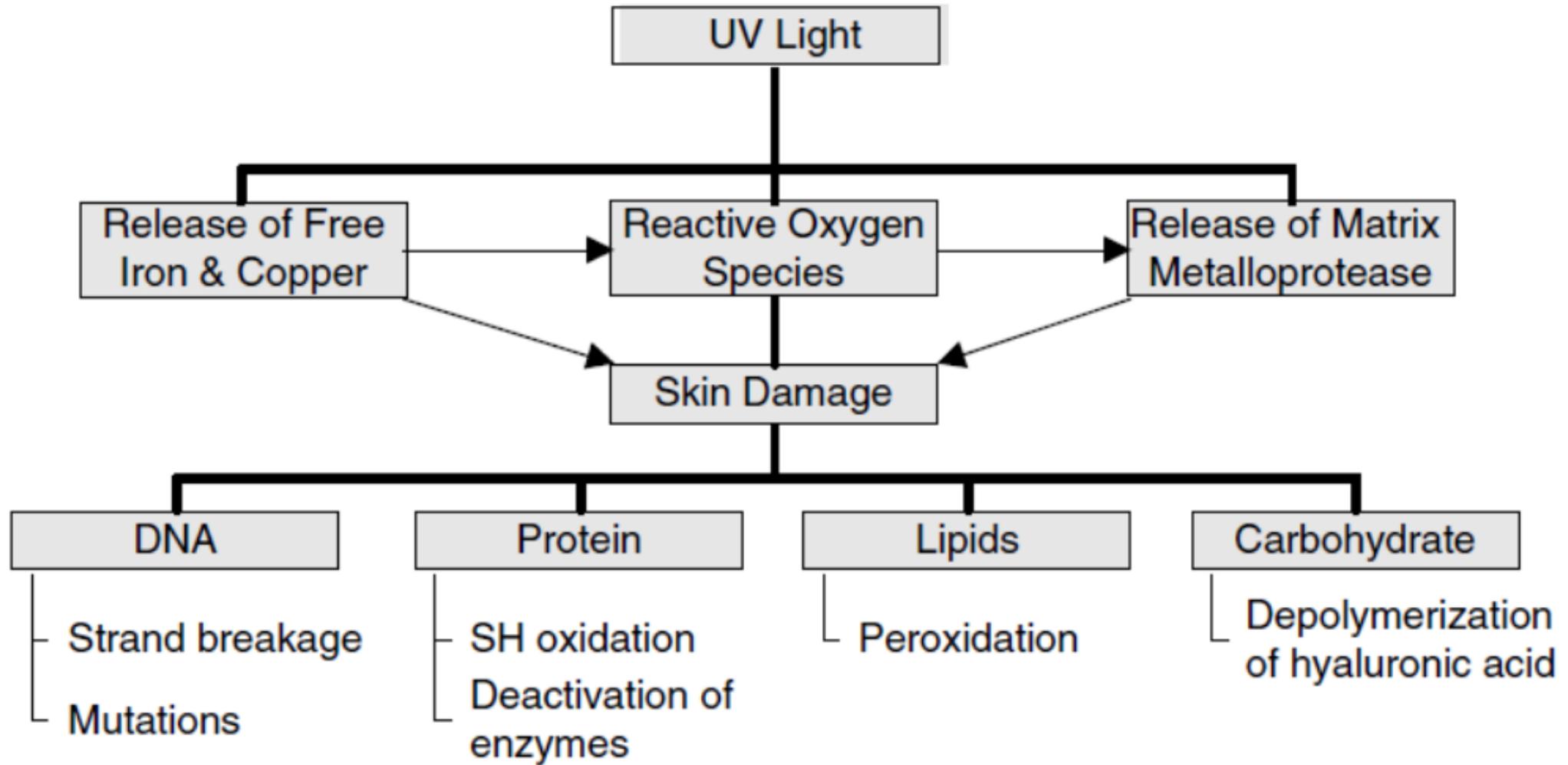


Skin type chart

NATURAL SKIN COLOUR	Very fair, pale white, often freckled	Fair, white skin	Light brown	Moderate brown	Dark brown	Deeply pigmented dark brown to black
UV SENSITIVITY & TENDENCY TO BURN	Highly sensitive Always burns, never tans	Very sensitive Burns easily, tans minimally	Sensitive Burns moderately, usually tans	Less sensitive Burns minimally, tans well	Minimal sensitivity Rarely burns	Minimal sensitivity Never burns
SKIN CANCER RISK	Greatest risk of skin cancer	High risk of skin cancer	High risk of skin cancer	At risk of skin cancer	Skin cancers are relatively rare, but those that occur are often detected at later, more dangerous stage. Increased risk of low vitamin D levels.	Skin cancers are relatively rare, but those that occur are often detected at later, more dangerous stage. Increased risk of low vitamin D levels.



Patients with phototypes I, II, or III are more susceptible to sunburn. These patients need more protection from the sun.



Causes and consequences of UV-induced skin damage.

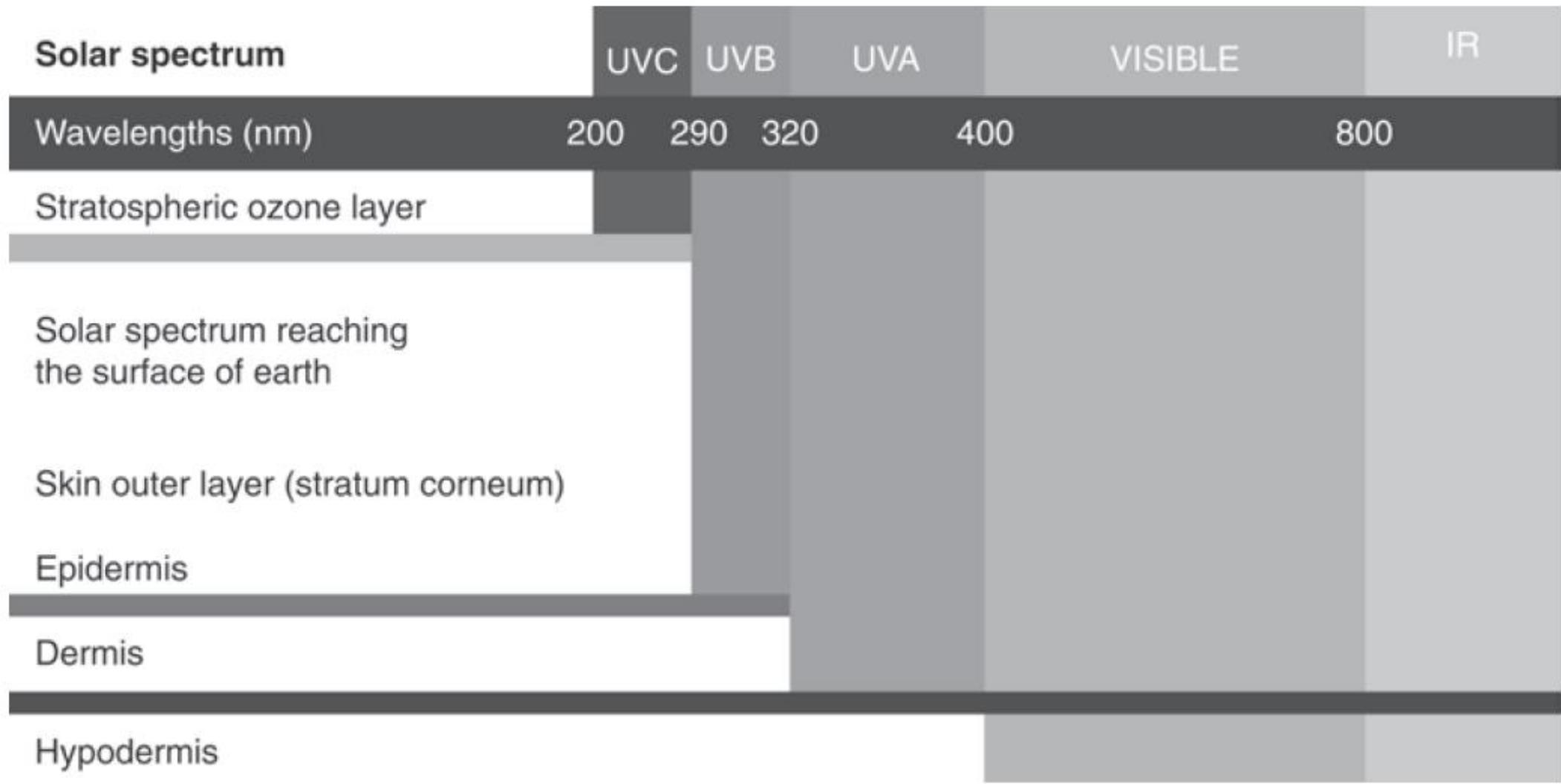


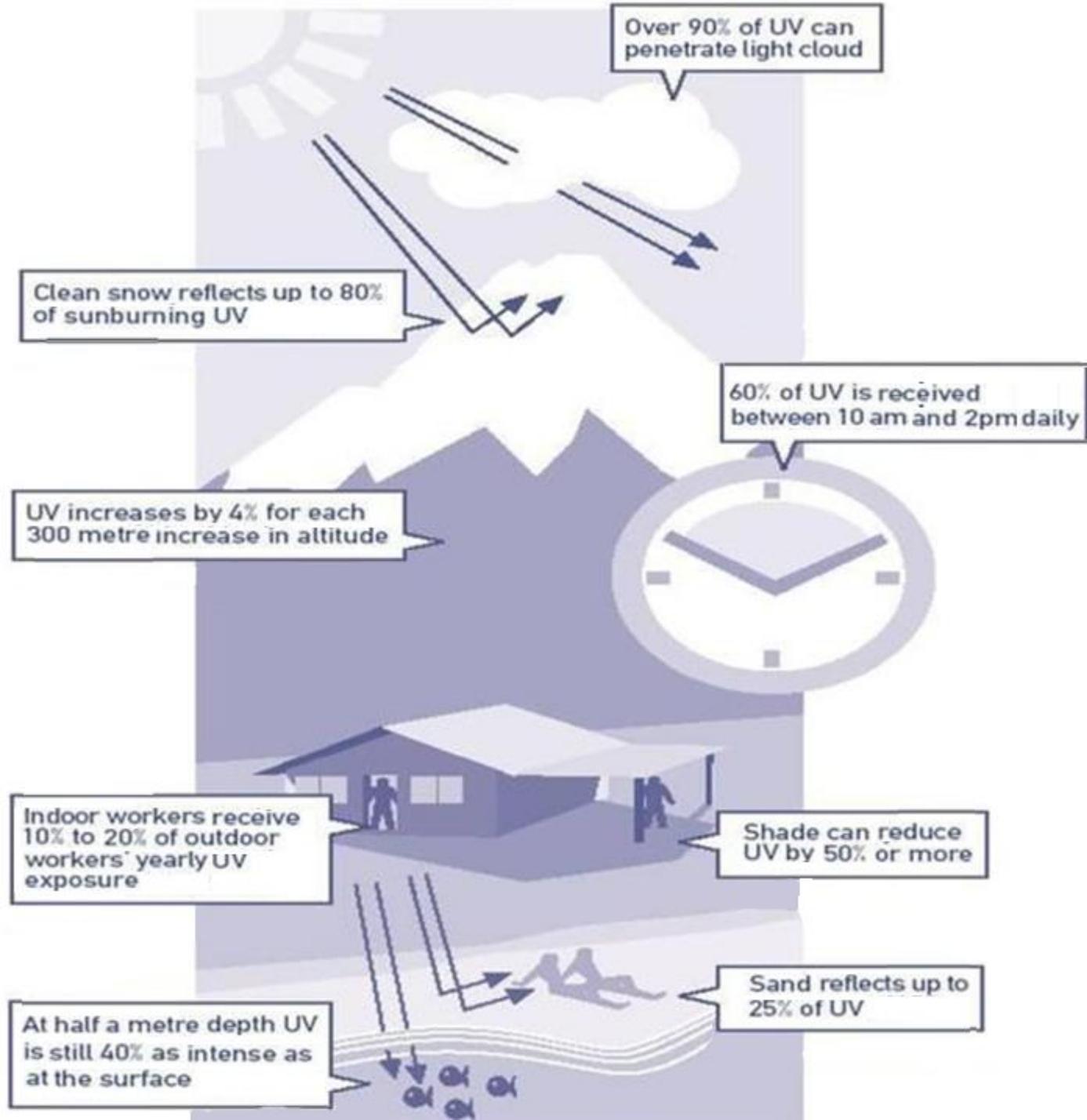
Figure 2 Penetration of UV into the skin.

- Defense against UV radiation only, though, may not be enough since UV rays make up a small proportion of sunlight compared to infrared & visible light.
 - Recent studies have shown that **infrared & visible light may be harmful to skin.**
 - IR light has been linked to skin aging by **upregulation of matrix metalloproteinase**, a collagen-degrading enzyme.
 - High-energy visible (HEV) light, also known as **blue light**, may cause **hyperpigmentation, skin aging, & the production of free radicals.**
 - Thus, newer sunscreens have incorporated protection against infrared & HEV light.
- 

Strategies to Block UV Light

- **Sun Exposure Avoidance**
- **Sun Protective Clothing**
- **Sunscreens**





UV PROTECTION CHART UV Index



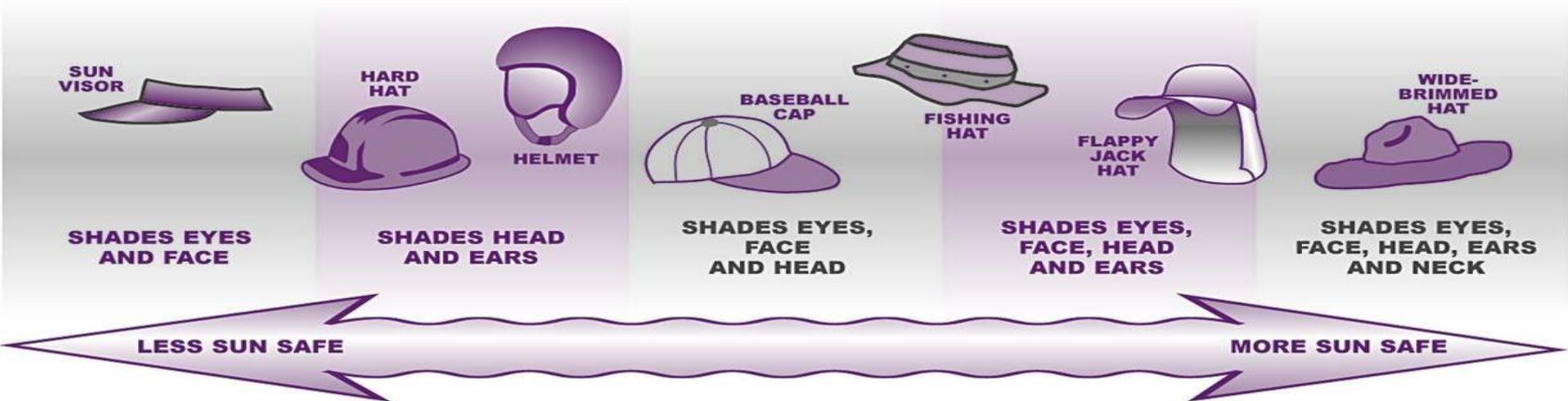
Low (0-2)	Medium (3-5)	High (6-7)	Very High (7-10)	Extremely High (11+)
Sunscreen	Sunscreen	Sunscreen	Sunscreen	Sunscreen
Sunglasses	Sunglasses	Sunglasses	Sunglasses	Sunglasses
	Hat	Hat	Hat	Hat
		Shade	Shade	Shade
				Staying indoors between 10am-4pm

Photoprotective Clothing

- The degree of protection provided by clothes is defined by the **ultraviolet protection factor (UPF)**, which indicates how effective a fabric is at blocking out solar UV radiation.
- Factors that contribute to the UPF rating of a fabric:
 - Composition of the yarns (cotton, polyester, etc)
 - Tightness of the weave or knit (**tighter improves the rating**)
 - Color (**darker colors are generally better**)
 - Stretch (**more stretch lowers the rating**)
 - Moisture (**many fabrics have lower ratings when wet**)
 - Condition (worn & faded garments may have reduced ratings)
 - Finishing (some fabrics are treated with UV-absorbing chemicals)
- A UPF rating of 30 means that only one-thirtieth of UV radiation passes through the fabric.

Classification	UPF	Approximate % UV blocked
Good UV protection	15-24	93.3%-95.8%
Very good UV protection	25-39	96%-97.4%
Excellent UV protection	40-50	97.5%-98%

The Sun Safety of Hats



- ❑ Choose wide-brimmed hats.
- ❑ But, any hat is better than NO hat!

Sitting under an umbrella

- **Sitting under an umbrella vs applying sunscreen**
 - While an umbrella may block direct UV rays, it does not protect you from UV rays that are **reflected** from the ground.
 - In a recent study comparing SPF100 sunscreen to umbrella use, the individuals who only used umbrellas had significantly higher sunburn scores for all areas of the bodies studied.
 - Individuals who only applied sunscreen had **no** significantly higher sunburn scores for all areas of the bodies except the face.
 - This suggests seeking shade alone does not provide enough protection from UV rays.



Eyes Protection from UV rays

- Protecting your eyes from UV rays is just as important as protecting your skin.
- A common eye problem related to UV exposure is cataracts.
- Sunglasses have labels that indicate how much UV they block. Look for:
 - **Blocks 99-100% UV**
 - **UV absorption up to 400 nm**
 - **Meets ANSI Z80.3-2001**
- **When to Wear Sunglasses**
 - ✓ During summer
 - ✓ Around noon
 - ✓ On the beach or boating
 - ✓ Skiing at high altitude



Who needs sunscreen?



All people older than 6 months of age

- Anyone can get skin cancer, regardless of age, gender or race.
- It is estimated that **1 in 5 Americans** will develop skin cancer by age 70 years.
 - Approximately 9,500 Americans are diagnosed with skin cancer each day.



Photoprotection for Skin of Color

- **Darker skin** has a higher content of melanin, which does provide some protection against UV radiation.
 - In terms of SPF, based on protection against **UVB radiation**, black epidermis was estimated to have an **SPF of 13.4**, nearly **4 times greater than** that of white epidermis.
- Since UV radiation is a risk factor for skin cancer, it recommend all individuals regardless of skin type practice sun safety methods.



Will using sunscreen limit the amount of vitamin D I get?





Conflicting data

- Using sunscreen may **decrease** your skin's production of vitamin D.
- You can get the vitamin D from **foods &/or vitamin supplements.**

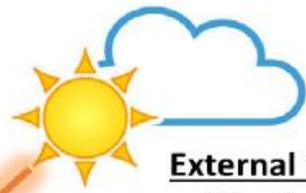


Personal factors

- Age
- Sex
- Genetics
- Skin type
- Health
- Clothing
- BSA exposed
- Sun behaviour

External factors

- Weather
- Pollution
- Height of sun dependent on:
 - Latitude
 - Season
 - Time of day



Skin

7-dehydrocholesterol (7-DHC)

Pre-vitamin D₃

Cholecalciferol (Vitamin D₃)

Calcidiol (25-hydroxyvitamin D₃)

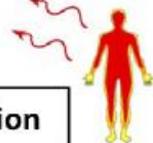
Calcitriol (1,25-dihydroxyvitamin D₃)



VDRE

Into circulation via vitamin D binding protein (DBP)

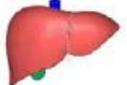
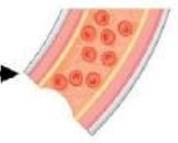
Thermal isomerization



Liver
Vitamin D₃-25-hydroxylase
(CYP2R1)

Kidney
25(OH)-D₃-1 α -hydroxylase
(CYP27B1)

Transcription

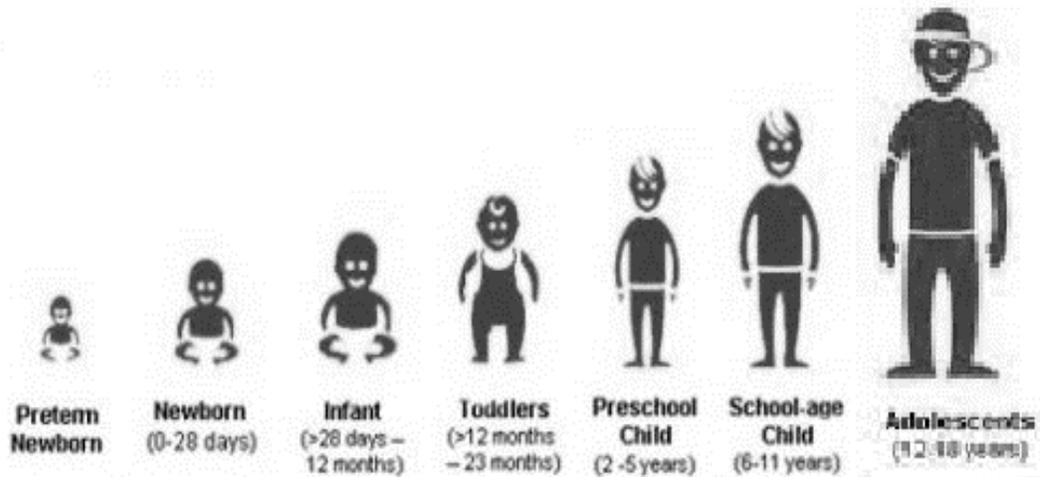


How long to spend in the sun?

- ❖ From April to October, short **daily** periods (**10 to 15 min**) of sun exposure without sunscreen are sufficient for most people to make enough vitamin D.
 - **10,000-20,000 IU** of vitamin D are produced **within 30 min of exposure to sunlight in summer.**
- ❖ The larger the area of skin that is exposed to sunlight, the more chance there is of making vitamin D before starting to burn.
- ❖ People with darker skin will need to spend longer in sun to produce the same amount of vitamin D.
- ❖ In the winter months, vitamin D is obtained from body stores & food sources.

25(OH)D levels (children & adolescents)

< 18 years



20-100 ng/ml (50-250 nmol/L)

Sufficiency

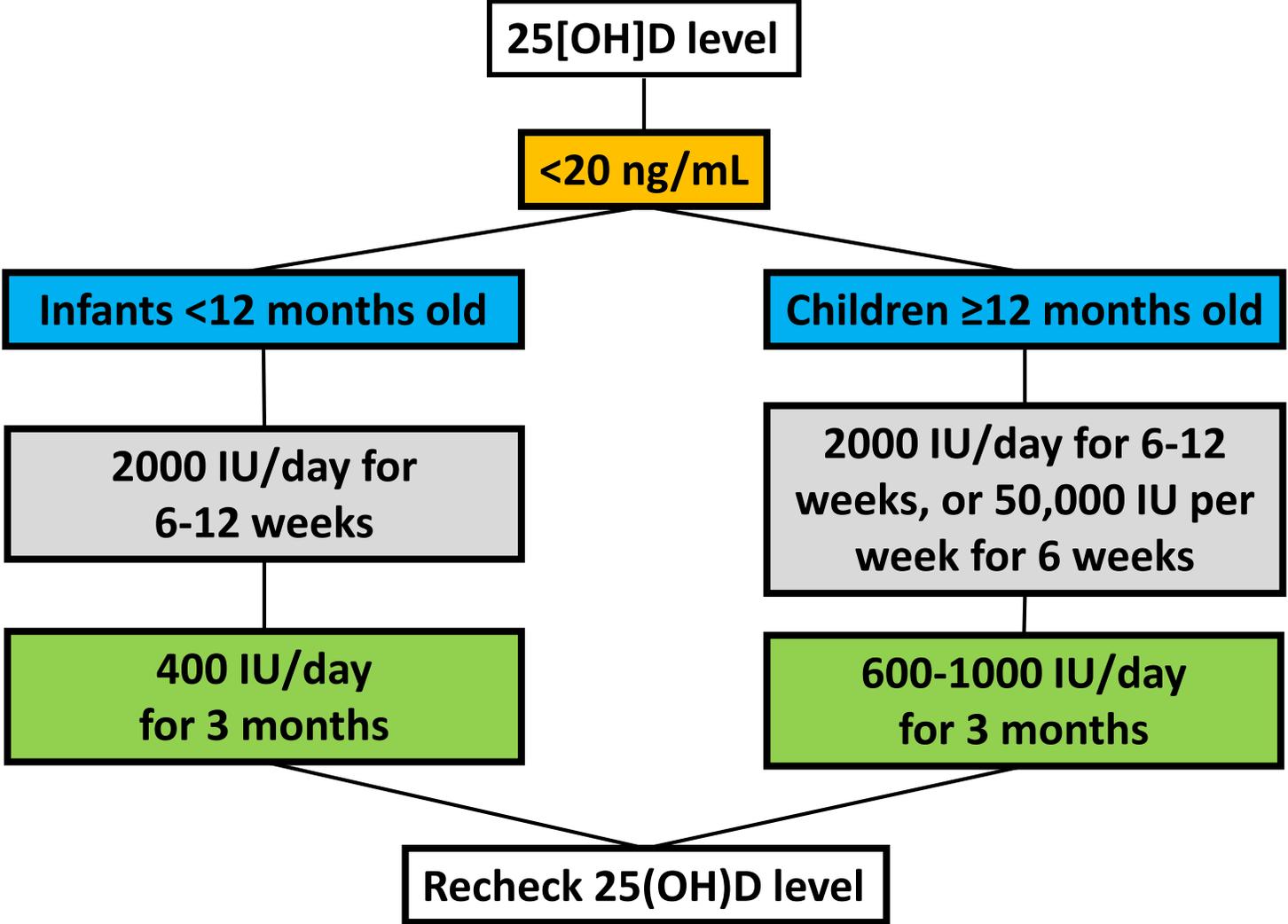
12-20 ng/ml (30-50 nmol/L)

Insufficiency

<12 ng/ml (<30 nmol/L)

Deficiency

Vitamin D Repletion (children & adolescents)



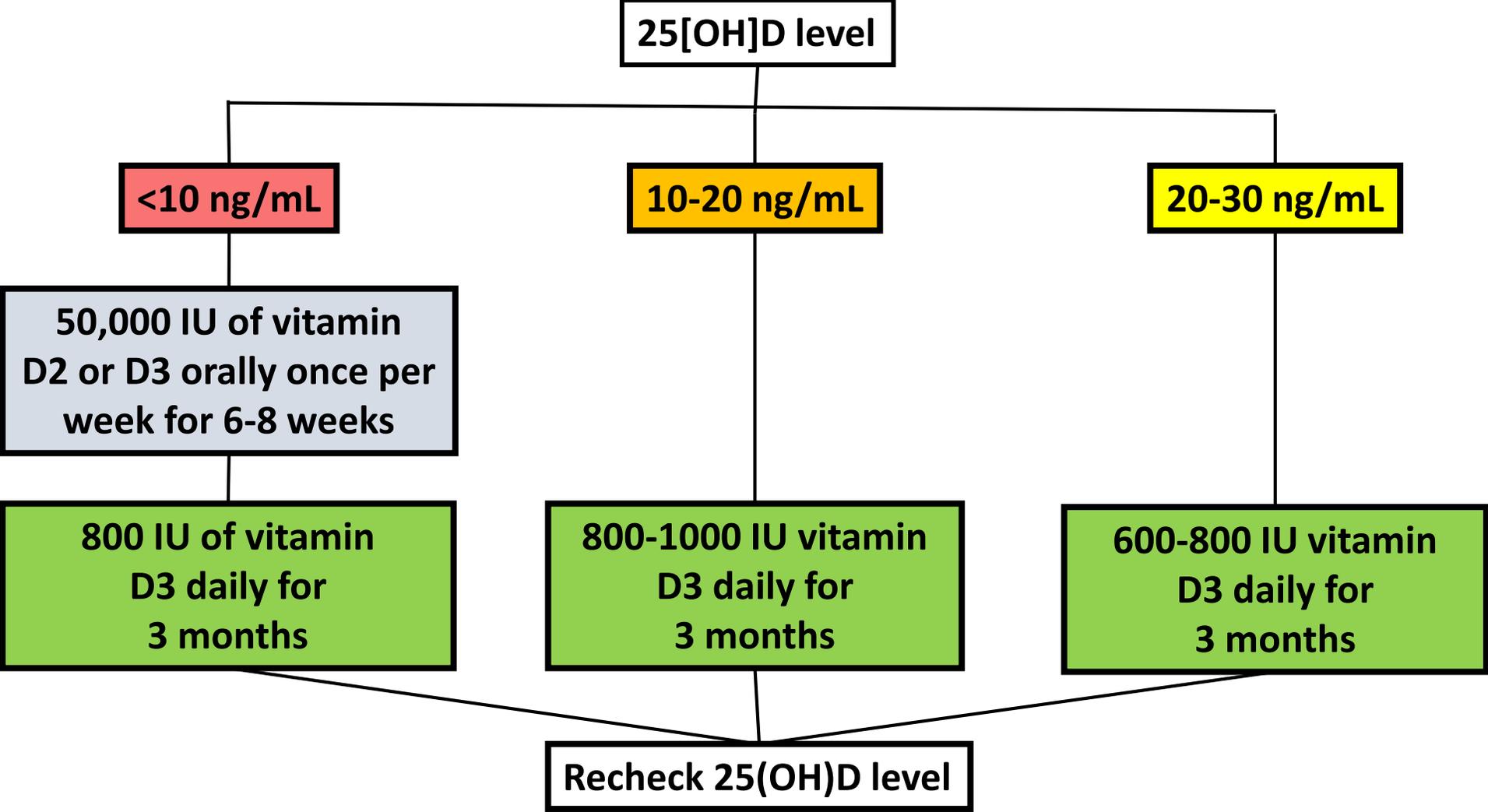
25(OH)D levels (Adult)

> 18 years



> 100 ng/ml (>250 nmol/L)	Toxicity
50-100 ng/ml (75-125 nmol/L)	Overdose
30-50 ng/ml (75-125 nmol/L)	Sufficiency
10-30 ng/ml (25-75 nmol/L)	Insufficiency
<10 ng/ml (<25nmol/L)	Deficiency

Vitamin D Repletion (Adult)



AAD recommended sunscreen?





- The American Academy of Dermatology recommends **everyone** use sunscreen that offers the following:

- **Broad-spectrum protection**
- **Water resistance**
- **SPF 30 or higher**

The American Academy of Dermatology recommends consumers choose a sunscreen which states on the label:

- **SPF 30 OR HIGHER**
- **BROAD SPECTRUM**
Means a sunscreen protects the skin from ultraviolet A (UVA) and ultraviolet B (UVB) rays, both of which can cause cancer.
- **WATER RESISTANT**
For up to 40 or 80 minutes. Sunscreen can no longer claim to be waterproof or sweatproof.

“Water Resistant” sunscreen



- **FDA meaning:** How long the sunscreen will stay on **wet skin**.

- **Water resistant:**

- The sunscreen stays effective for **40 minutes** in the water. At that time, you'll need to reapply.

- **Very water resistant:**

- The sunscreen stays effective for **80 minutes** in the water. At that time, you'll need to reapply.



“Organic *vs.* Inorganic” sunscreens



- **Organic sunscreens**

- Work like a **sponge**, absorbing the sun's rays.
- Oxybenzone, Avobenzone, Octisalate, Octocrylene, Homosalate, Octinoxate.
- These formulations tend to be **easier to rub** into the skin **without leaving a white residue**.

- **Inorganic sunscreens**

- Work like a **shield**, sitting sit on the surface of your skin & deflecting the sun's rays.
- Zinc oxide and/or Titanium dioxide.
- Opt for this sunscreen if you have **sensitive skin**.

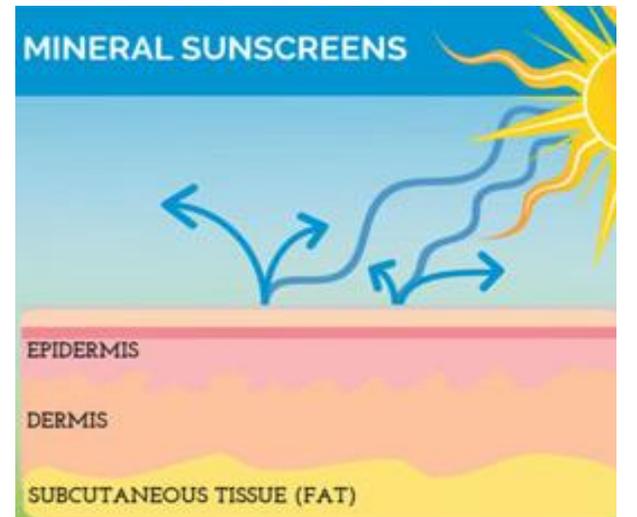
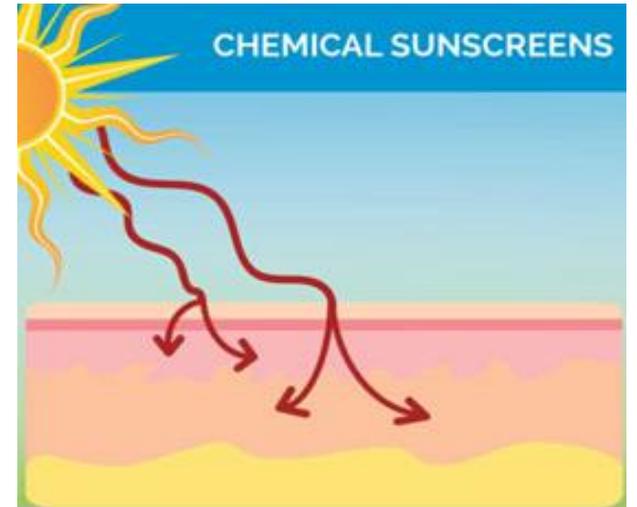
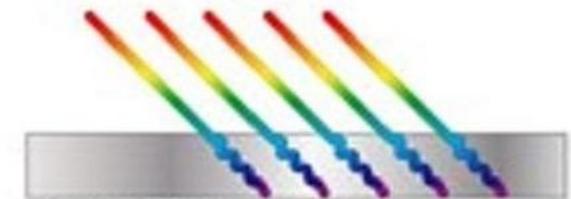


Table 13.1 FDA-OTC Panel Category I Sunscreens

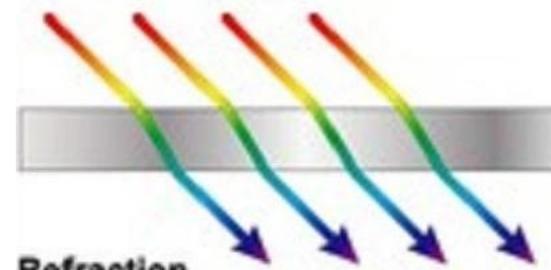
Sunscreen	Approved %	λ_{\max} (ethanol) (nm)
A. Organic absorbers		
UV-A absorbers		
Avobenzene	3	357
Oxybenzone	6	325
Sulisobenzene	10	324
Dioxybenzone	3	327
Meradimate	5	336
UV-B absorbers		
✗ PABA	15	290
Cinoxate	3	305
Octocrylene	10	303
Ocinoxate	7.5	310
Octisalate	5	307
Homosalate	15	306
Padimate-O	8	307
Ensulizole	4	310
✗ Trolamine salicylate	12	298
B. Inorganic particulates		
Zinc oxide	25	Broad spectrum
Titanium dioxide	25	Broad spectrum



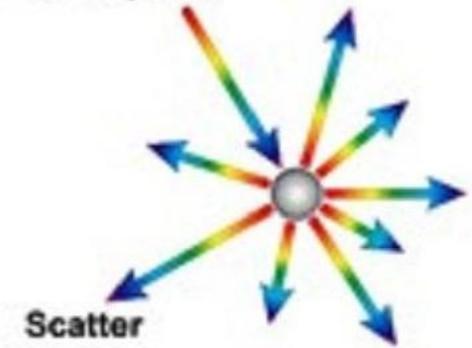
Reflection



Absorption



Refraction



Scatter

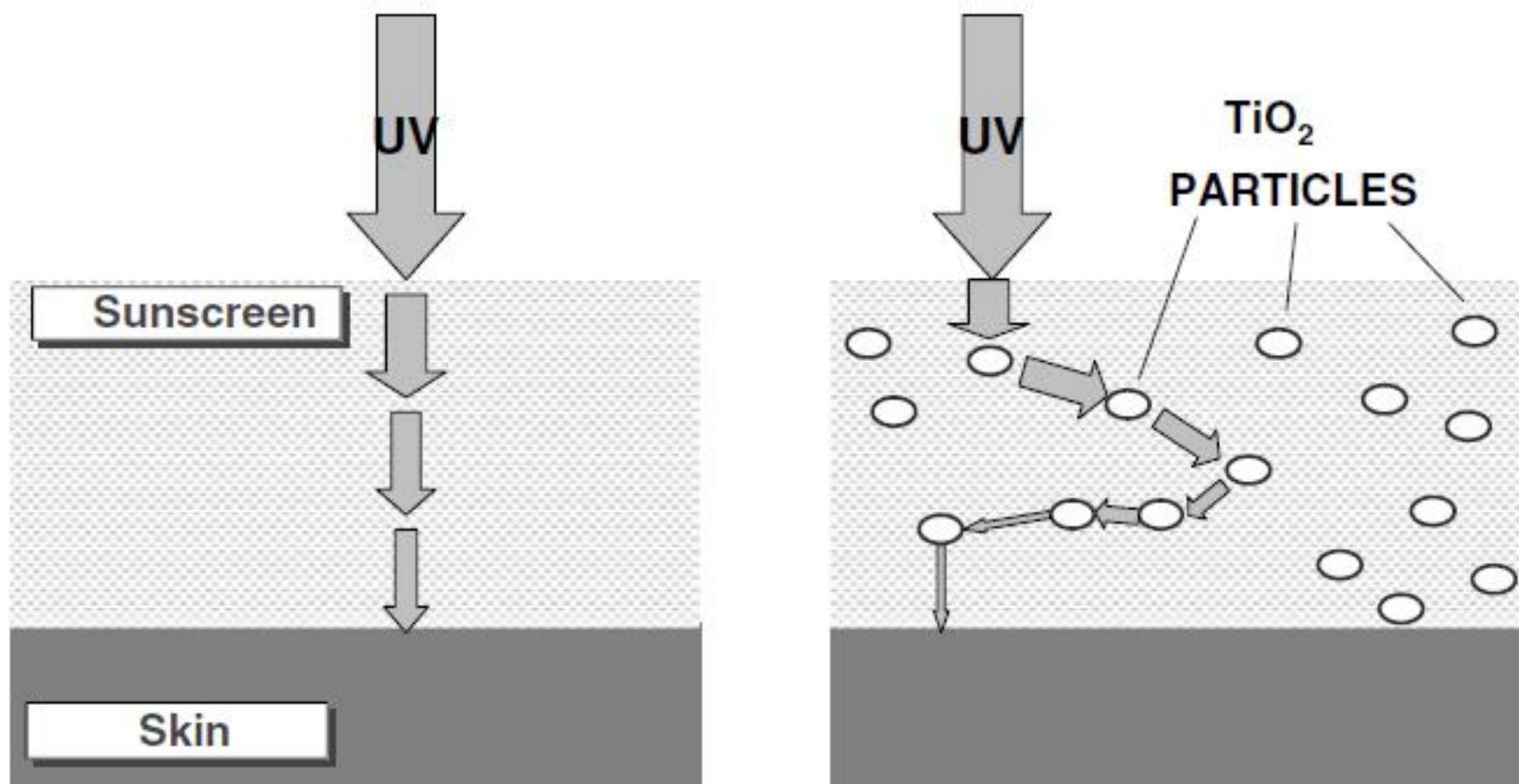


Figure 19.9 Increase of optical path length due to scattering by TiO₂ particles.

Systemic Effects of Topically Applied Sunscreen Ingredients



- There is **no evidence** that the **inorganic UV filters**, **titanium dioxide & zinc oxide**, penetrate beyond the stratum corneum of normal, undamaged skin **regardless of particle size**.
 - Whereas **organic sunscreens** have been found to penetrate skin & have been measured in the blood & urine of human subjects, the **systemic exposure is limited**.
 - A **favorable human safety profile** exists for commonly used organic & inorganic UV filters.
- 

Generally Recognized As Safe & Effective (GRASE)

Table 1 US FDA-approved ultraviolet filters

Ultraviolet filters	Category ^a	Maximum concentration (%)	Peak absorption (nm)	Protection against
Inorganic filters				
Titanium dioxide	GRASE (I)	25	Dependent on particle size	UVB, UVA2, UVA1, visible light
Zinc oxide	GRASE (I)	25	Dependent on particle size	UVB, UVA2, UVA1, visible light
Organic filters				
<u>Benzophenones</u>				
Dioxybenzone (benzophenone-8)	Non GRASE (III)	3	352	UVB, UVA2
Oxybenzone (benzophenone-3)	Non GRASE (III)	6	288, 325	UVB, UVA2
Sulisobenzene (benzophenone-4)	Non GRASE (III)	10	366	UVB, UVA2
<u>Cinnamates</u>				
Cinoxate	Non GRASE (III)	3	289	UVB
Octinoxate (octyl methoxycinnamate, Parsol MCX)	Non GRASE (III)	8	311	UVB, UVA2
<u>Others</u>				
Butyl methoxydibenzoyl methane (avobenzone, Parsol 1789)	Non GRASE (III)	3	360	UVA1
Ecamsule (terephthalylidene dicamphor sulfonic acid)	No GRASE rating ^b	3	NA	UVA1, UVA2
Ensulizole (phenylbenzimidazole sulfonic acid)	Non GRASE (III)	4	310	UVB, UVA2
Meradimate (menthyl anthranilate)	Non GRASE (III)	5	340	UVA1, UVA2
Octocrylene	Non GRASE (III)	10	303	UVB, UVA2
<u>PABA derivatives</u>				
Padimate O (octyl dimethyl PABA)	Non GRASE (III)	8	311	UVB
Para-aminobenzoic acid (PABA)	Non GRASE (II)	15	283	UVB
<u>Salicylates</u>				
Homosalate (homomethyl salicylate)	Non GRASE (III)	15	306	UVB, UVA2
Octisalate (octyl salicylate)	Non GRASE (III)	5	307	UVB, UVA2
Trolamine salicylate (TEA salicylate)	Non GRASE (II)	12	260–355	UVB

GRASE generally recognized as safe and effective, NA not applicable, PABA para-aminobenzoic acid, UV ultraviolet

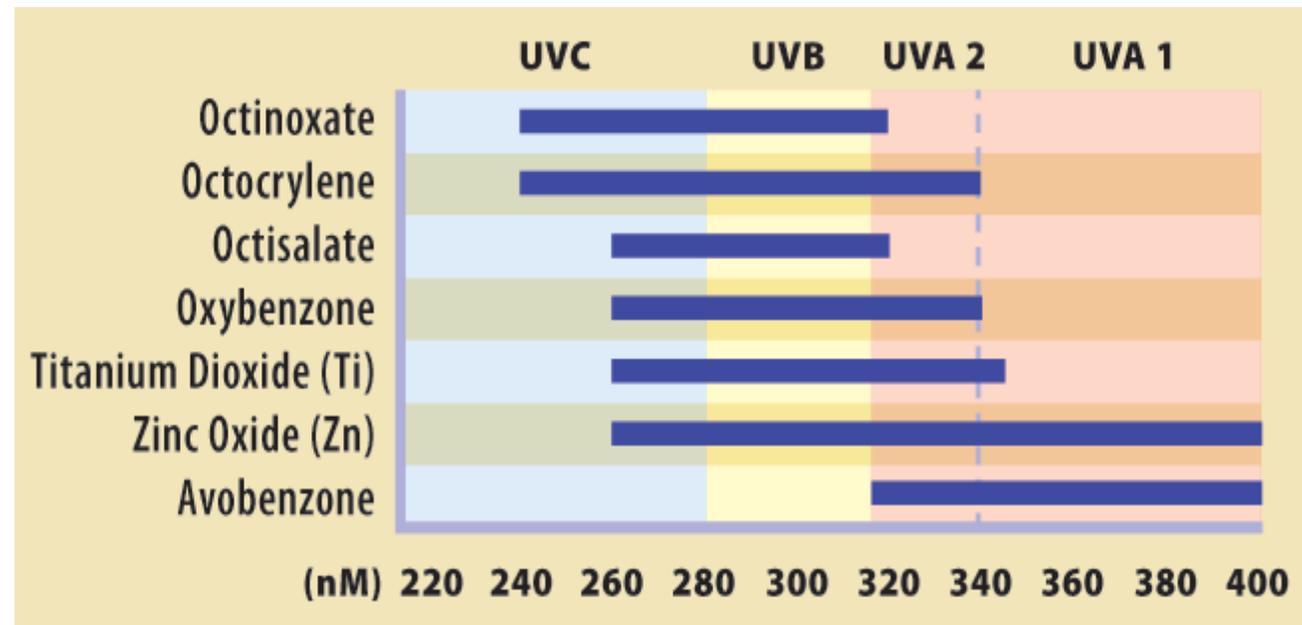
^a2019 FDA Proposed Rule has suggested three categories: I—GRASE; II—non GRASE; III—insufficient safety data to make a positive GRASE determination

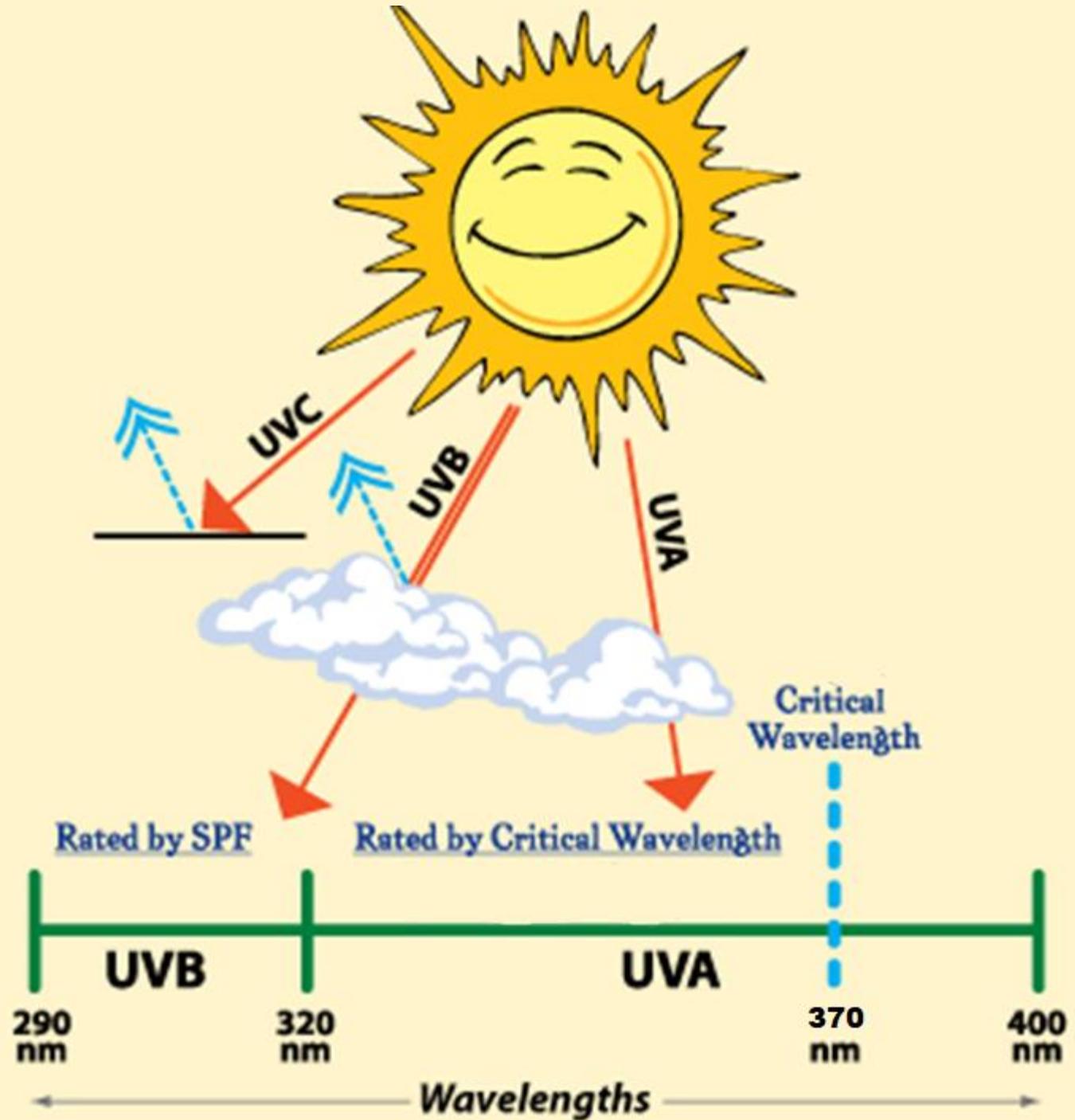
^bApproved through new drug application process

“Broad Spectrum” sunscreen



- **Broad spectrum** refers to sunscreens that protect the skin from both UVB & UVA rays.
 - **UVB Protection Index**
 - **UVA Protection Index**





UVB Protection Index



“Sun Protection Factor (SPF)”

- FDA meaning: How well a sunscreen protects you from Sunburn.
- The SPF number tells you how much **UVB** light (the burning rays) a sunscreen can filter out.



Recommended amount of sunscreen



- **Amount:**

- **2mg/cm²**

- Most people only apply **25-50%** of the recommended amount of sunscreen.



- **SPF is based on the use of a sunscreen layer of $2\text{mg}/\text{cm}^2$; however, about **one-quarter to one-half** of this amount (**$0.5 - 1\text{mg}/\text{cm}^2$**) is most commonly applied in real life.**
- 

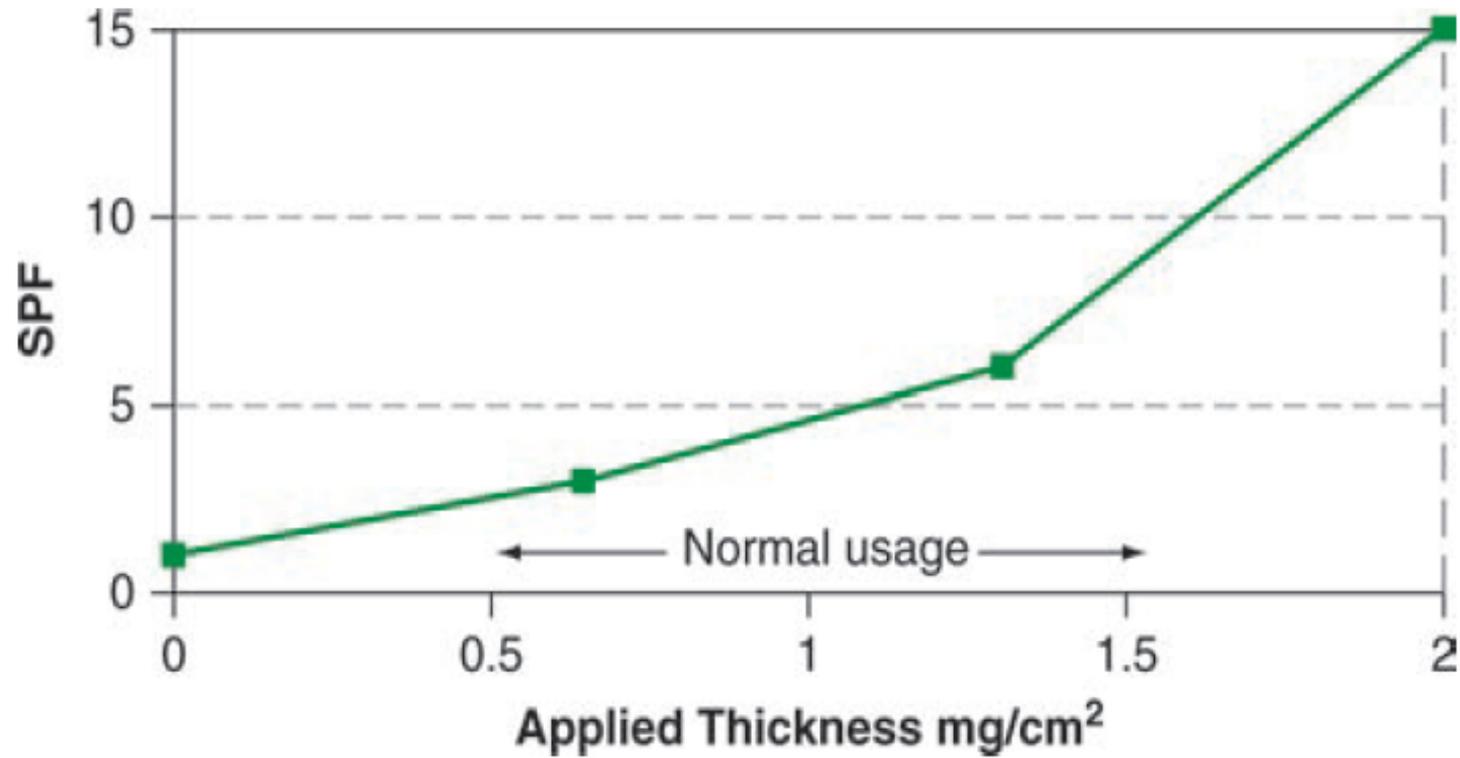
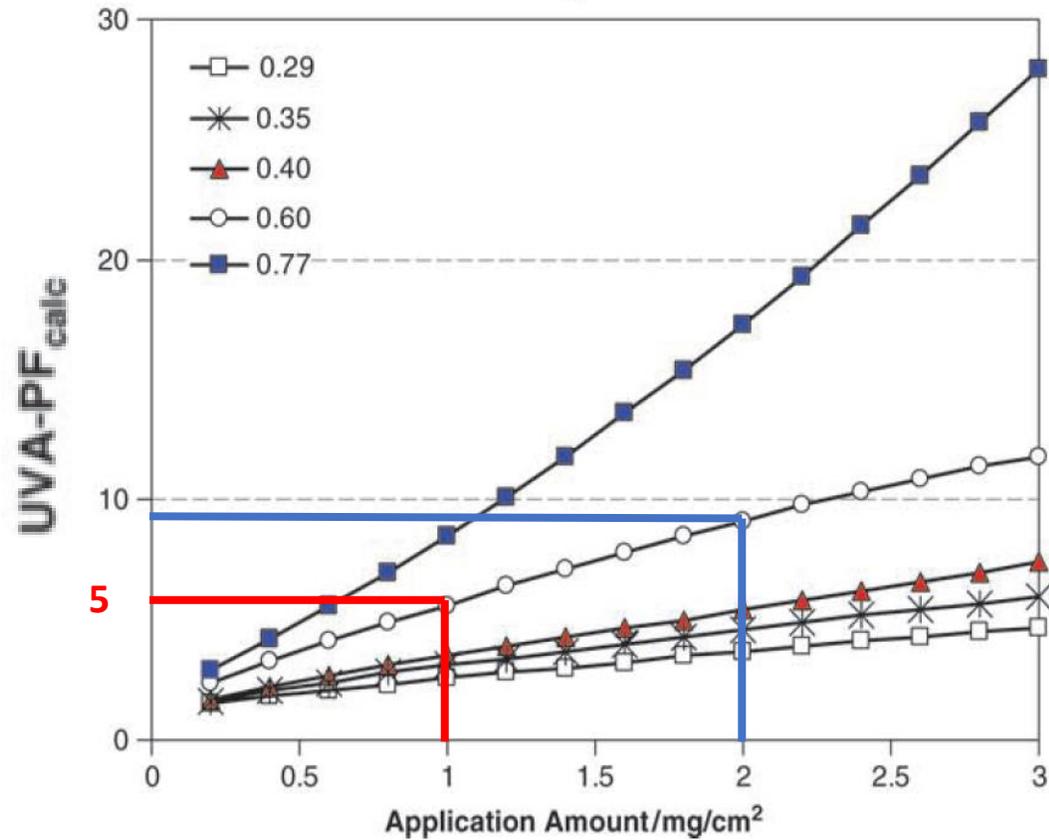
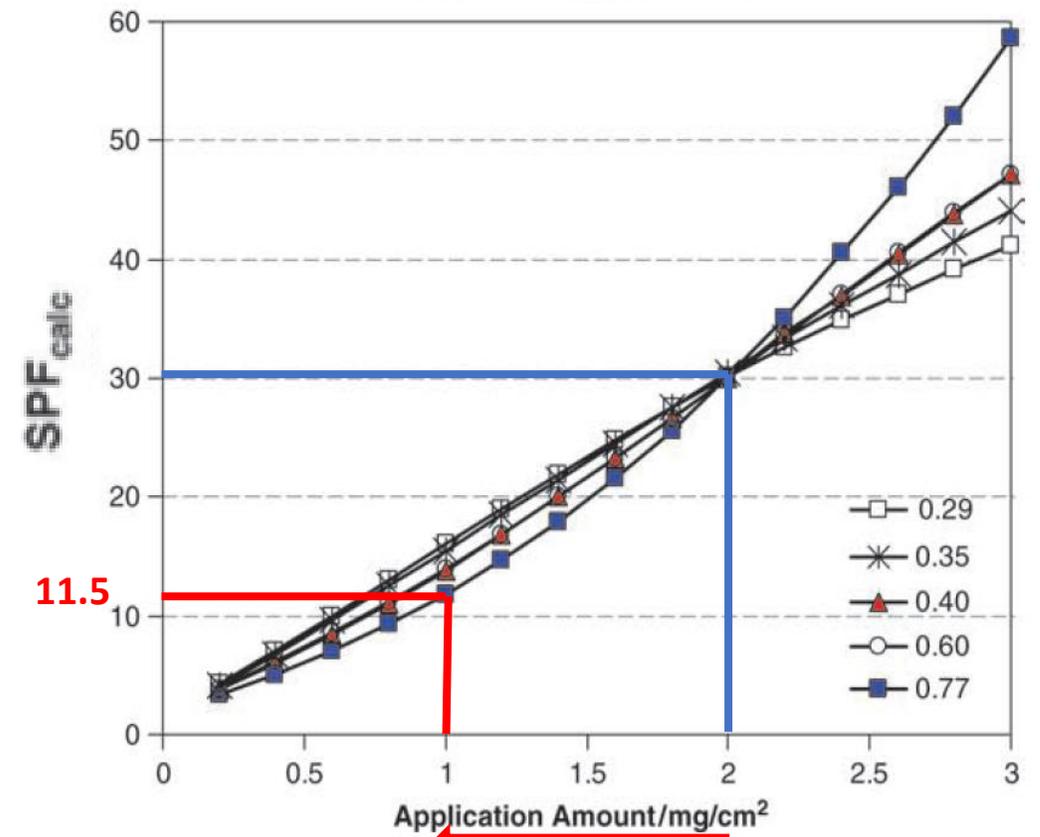


Figure 2 The variation of delivered SPF with application thickness for a sunscreen of nominal SPF 15 (41). *Abbreviation:* SPF, sun protection factor.

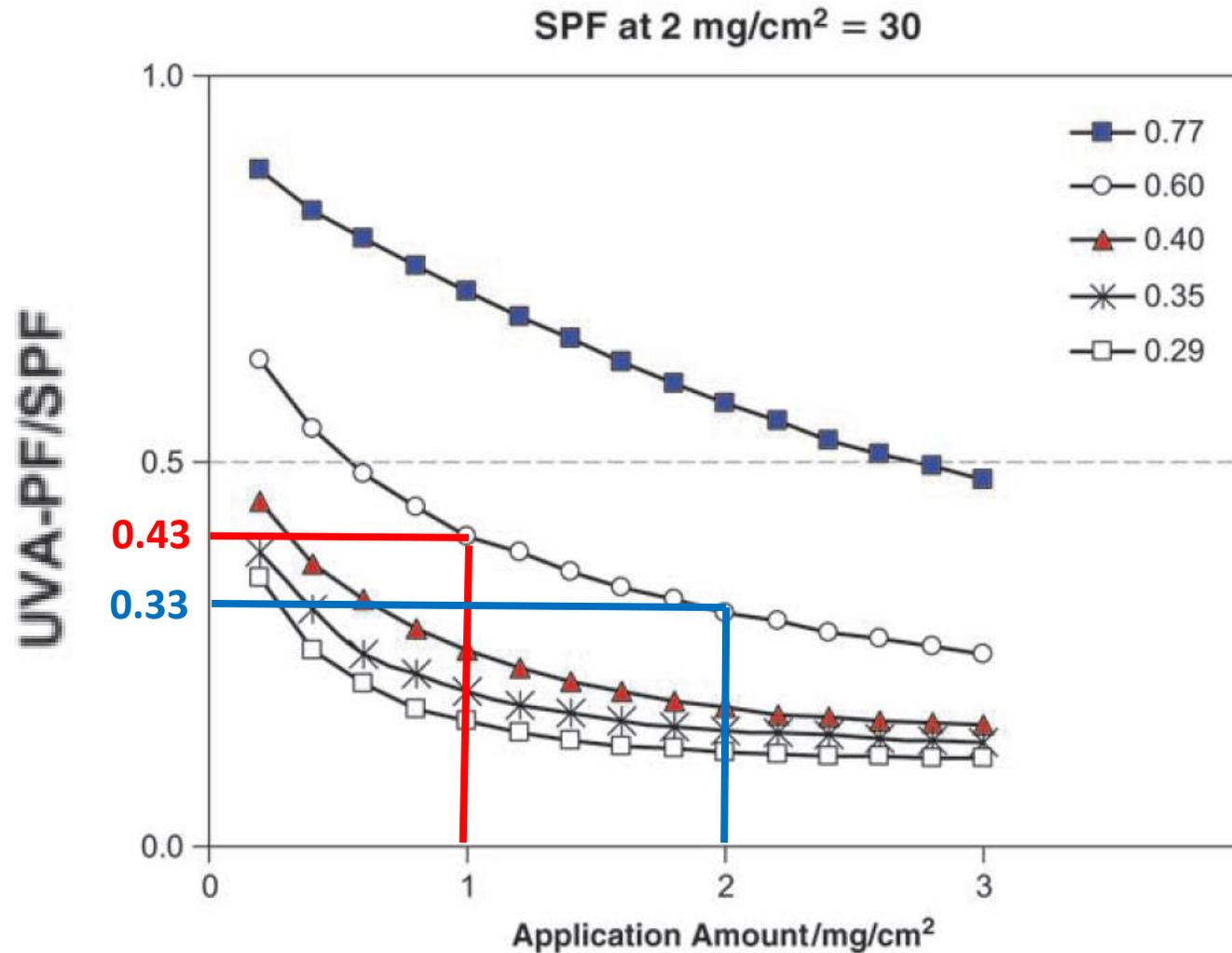
SPF at 2 mg/cm² = 30



← 50%



← 61%

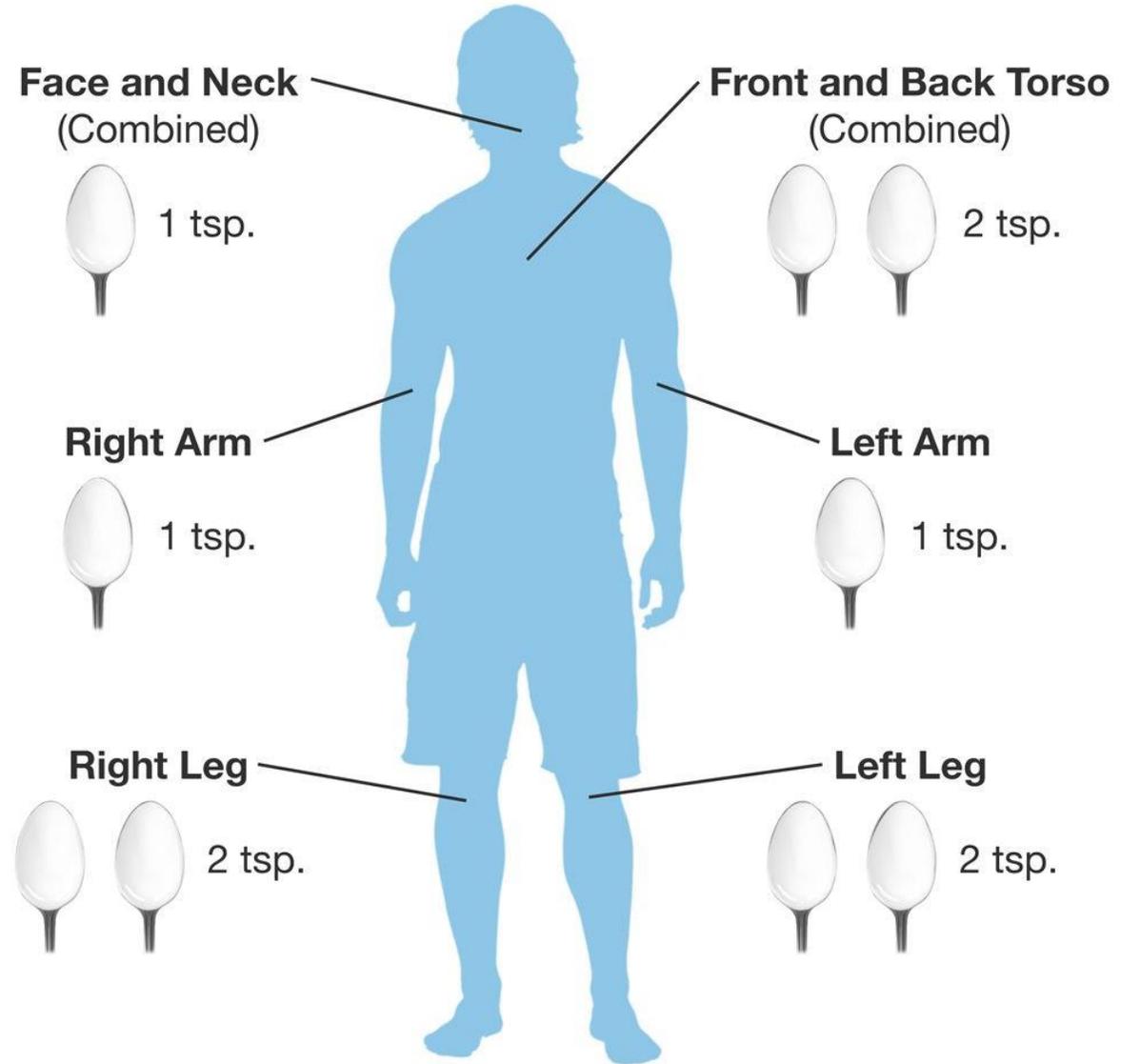


In Europe, sunscreens must have a minimum ratio of 1/3 according to the European Commission (EC) recommendation.

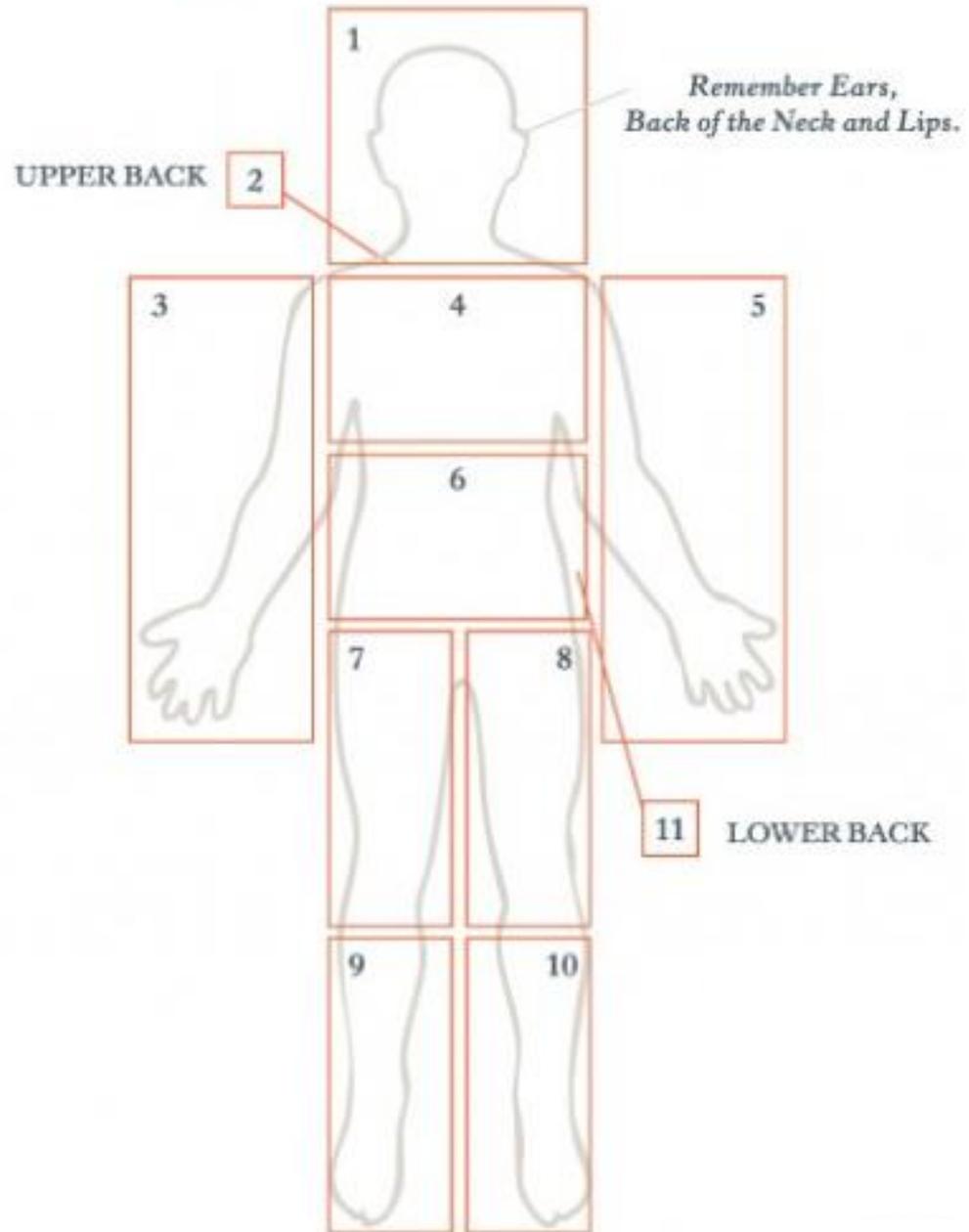
The figures show that if a sunscreen fulfills this criterion (at the standard 2 mg/cm²), **lower application amount will always lead to a relatively better UVA protection than sunburn protection**. This is a very important conclusion. **It means that while we need to be concerned about the decline of SPF with lower application amount, the UVA-PF will always decline less.**

Teaspoon rule (5ml)

- 30-45 ml for all body coverage



1 Divide Body into 11 zones.



2 Apply 2 fingers of Sunscreen per zone.



Distribution Over Skin

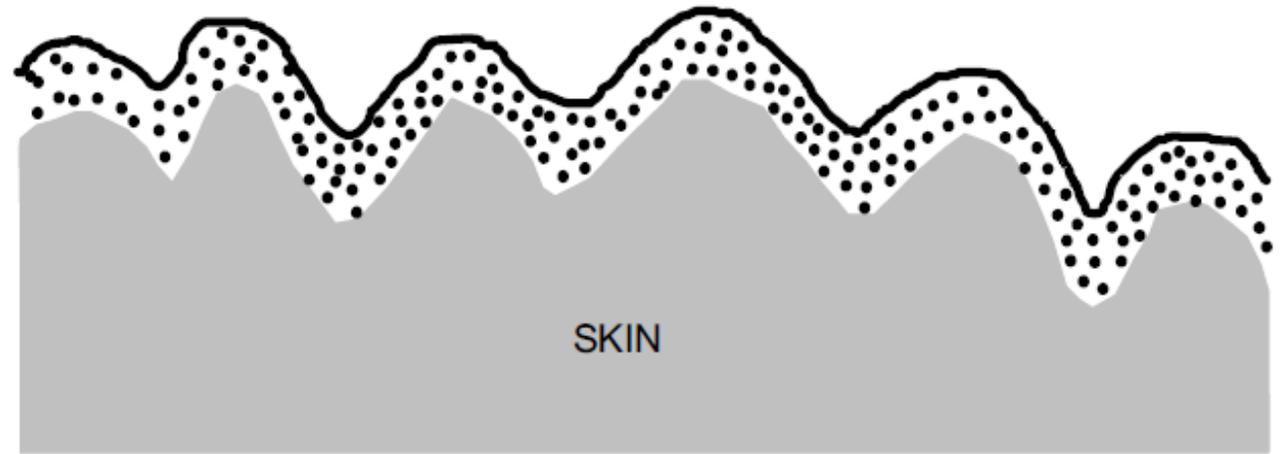


Figure 19.1 Idealized distribution of sunscreen on skin.

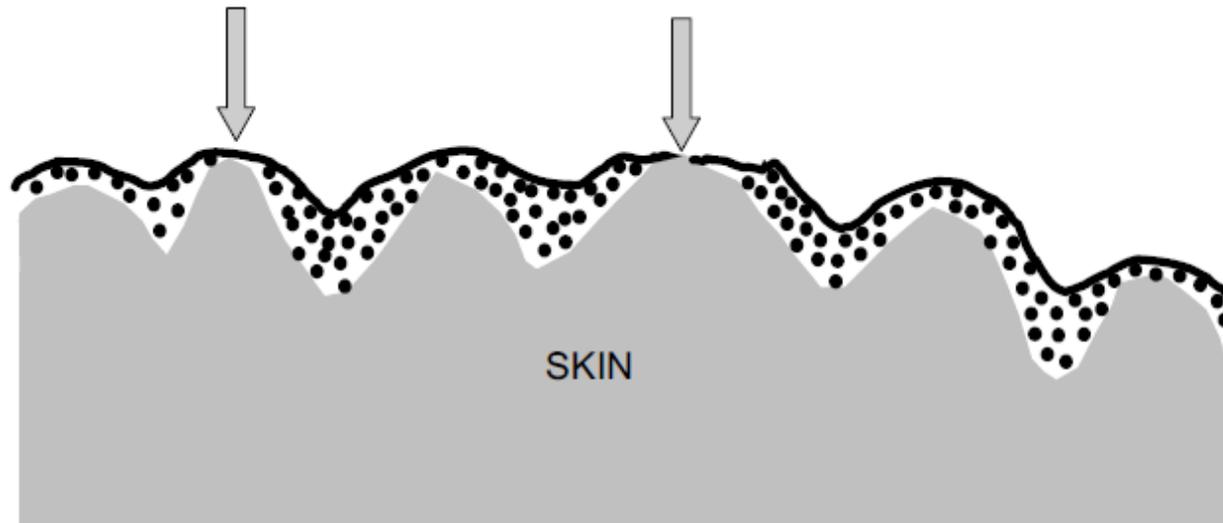
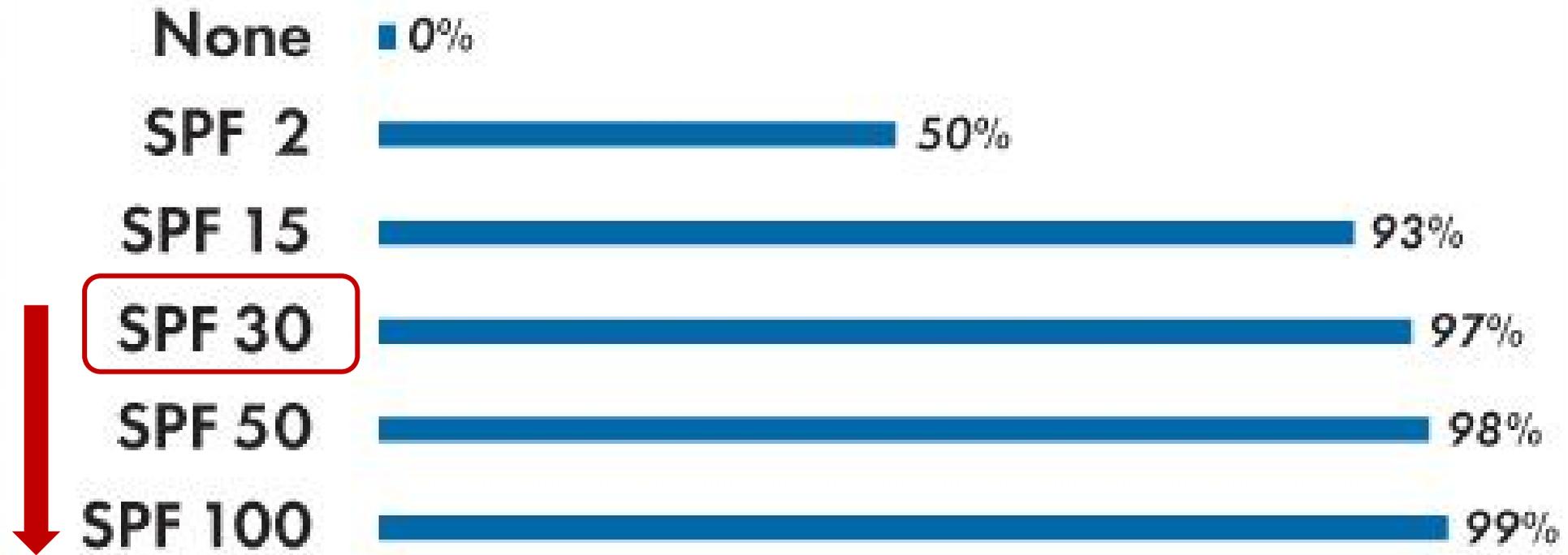


Figure 19.2 Uneven distribution of sunscreen on skin; arrows indicate where film is thin or broken and UV light is most likely to penetrate through to skin.

High-number vs Low-number SPF?



SPF Rating = UVB Protection

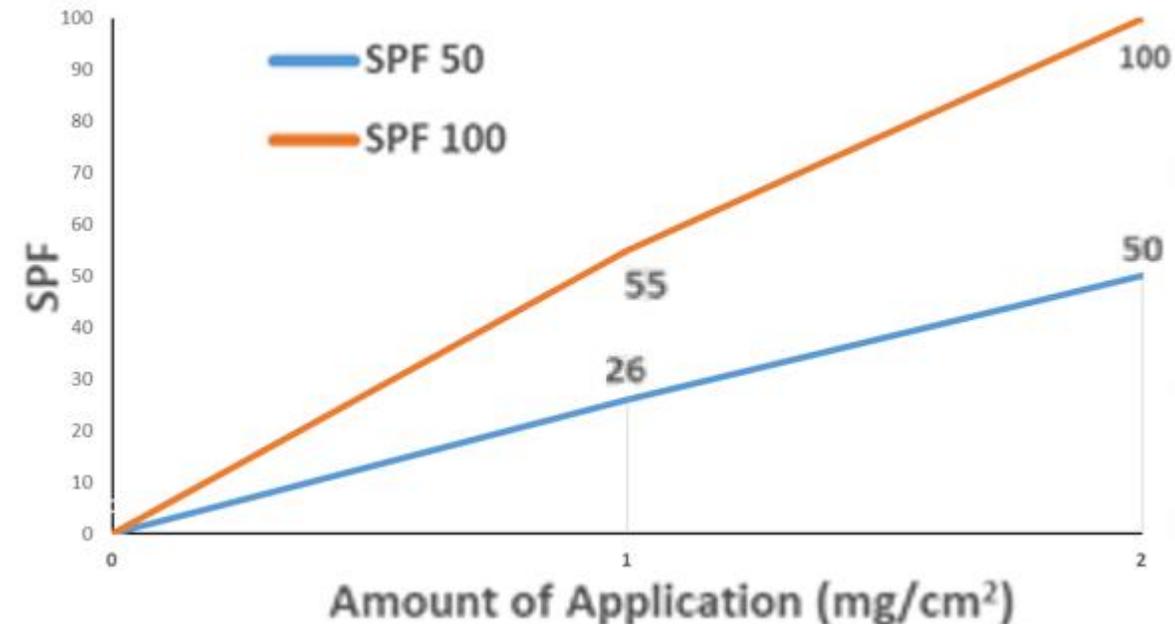


- Dermatologists recommend using a sunscreen with an **SPF of at least 30**, which blocks 97% of the sun's UVB rays.
- Higher-number SPF's block **slightly more** of the sun's UVB rays, but **no sunscreen can block 100%** of the sun's UVB rays.

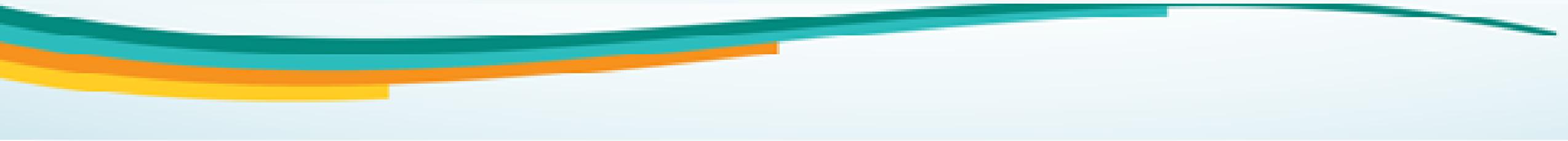


SPF50 vs SPF100 sunscreen

- SPF50 & SPF100 filter out 98% & 99% of UVB rays respectively.
- Several studies have shown that consumers do not apply 2 mg/cm² thickness in practice, using anywhere from **half to a quarter** of the recommended thickness.
- Lower sunscreen thickness leads to decreased SPF values & thus decreased protection against UV radiation.
- For example, using **SPF50** sunscreen at 1 mg/cm² decreases the SPF to **26**, & when using **SPF100** sunscreen at 1 mg/cm², the SPF decreases to **55**.



- This finding is also supported by an **actual use study** in which snowboarders & skiers covered **one arm in SPF100 & the other in SPF50**. **The arms with SPF50 on average were more sunburnt & had greater change in erythema scores compared to baseline.**
 - **Therefore, higher SPF sunscreen may be beneficial given certain consumer application practices.**
 - Using sunscreens with greater than SPF50 may be necessary to reach the recommended minimum SPF levels necessary to provide adequate photoprotection.
- 

- It is also important to remember that **high-number SPFs last the same amount of time as low-number SPF**s.
 - A high-number SPF **does not** allow you to spend additional time outdoors without reapplication.
 - **Stickiness of the product is greater with higher SPF**; a common reason for **noncompliance**.
- 

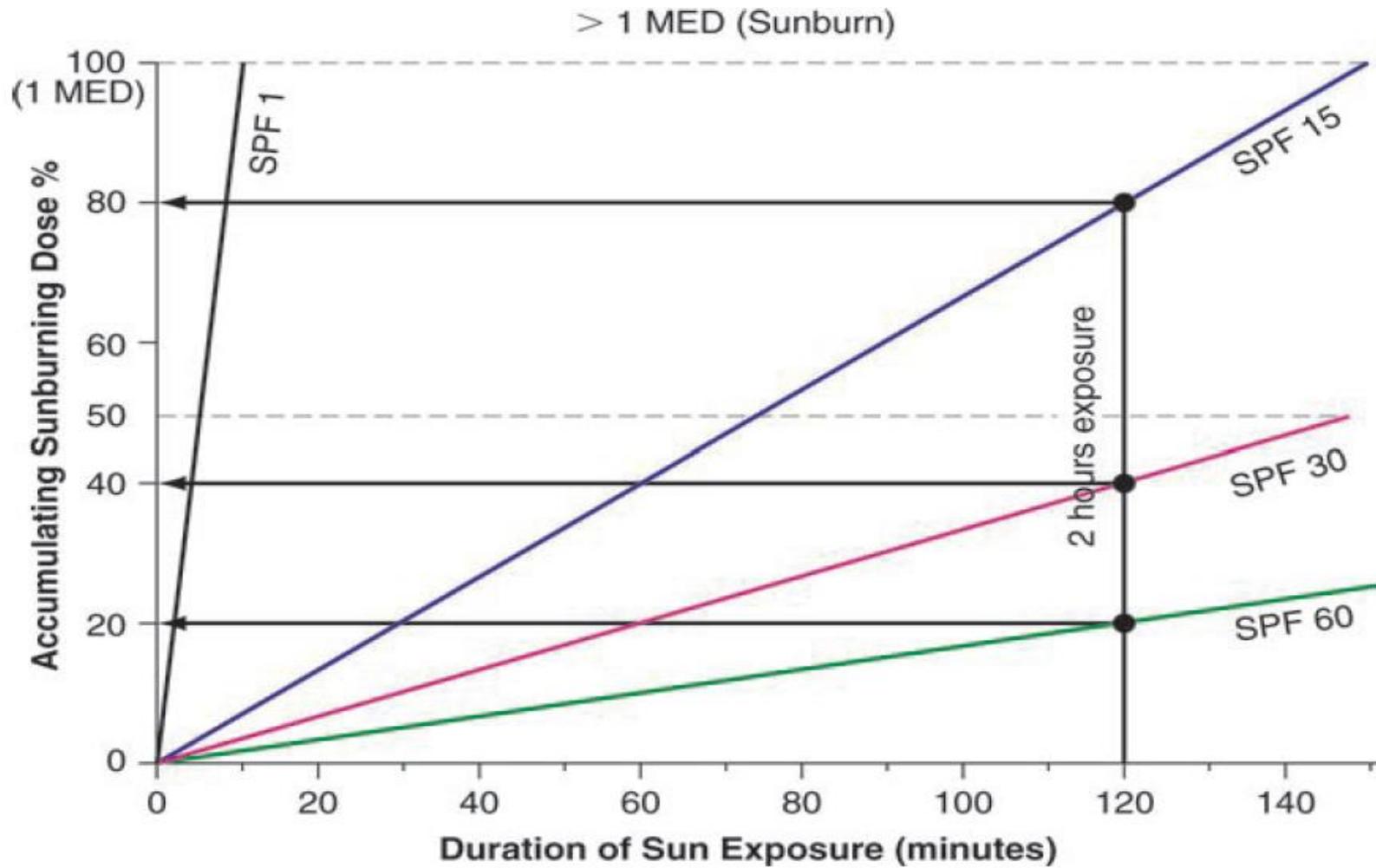


Figure 14 Performance of sunscreens of SPF 15, 30, and 60 in dose versus time diagram; dynamics of the UV dose reaching the skin through sunscreens over time. The example shows the minimal erythema dose received by skin phototype I or II. *Abbreviations:* MED, minimal erythema dose; SPF, sun protection factor.

UVA Protection Index



“UVA star system”

- In 1992, the UVA star rating system was created by The Boots Company in the UK but was not widely implemented.
 - The star system indicates the **percentage of UVA radiation absorbed by the sunscreen in comparison with UVB**.
 - It is important to choose a sunscreen with **high SPF & a high star rating** to be protect against UVA & UVB.



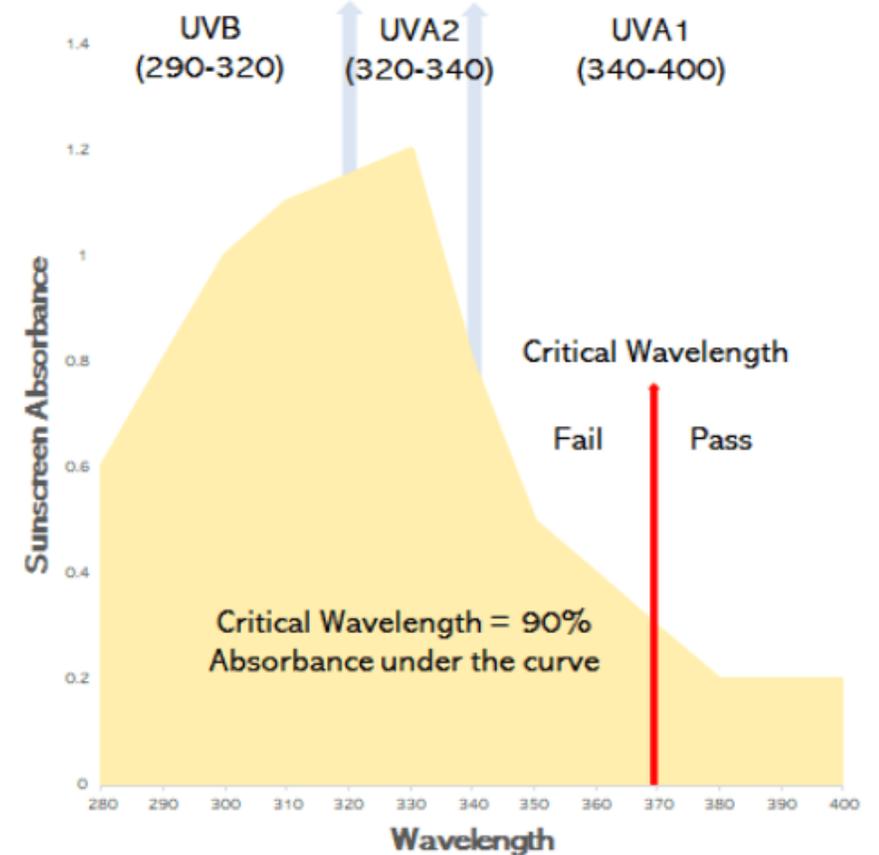
“Ratio of UVA protection factor to SPF ”

- **In Europe**, the International Organization for Standardization [\(ISO\) 24443 guidelines](#) use a **minimum ratio of UVA protection factor to SPF of 1:3** for all marketed sunscreens.



“Critical Wavelength (CW)”

- FDA currently uses CW determination.
- Sunscreen products whose 90% UV absorbance occurs at ≥ 370 nm are allowed to be labeled as “**broad spectrum**”.



When should I use sunscreen?



Every day if you will be outside.

- The sun emits harmful UV rays year-round.
 - Even on cloudy days, up to 80% of the sun's harmful UV rays can penetrate your skin.
 - Snow, sand, & water increase the need for sunscreen because they reflect the sun's rays.
- 

Working indoors

- **Even while working indoors, you may be exposed to UV radiation.**
 - This exposure primarily results from unfiltered UV radiation that comes in **through windows in buildings & cars.**
 - Commercial & residential window glass generally filters out UVB rays, but not UVA rays.
 - Depending on the type of glass & its thickness, anywhere from 0.1% to 72% of UV radiation may be transmitted.
 - Studies have shown that drivers have increased prevalence of photodamage, actinic keratoses, nonmelanoma skin cancers & melanoma-in-situ **on the side exposed to UV radiation from the automobile window.**
 - **Given these findings, we recommend all individuals to apply sunscreen as part of their daily morning routine.**
- 

**How often should I apply
sunscreen?**



- The sun's rays **break down** some sunscreens. Others **clump & lose their effectiveness.**
- Therefore when outdoors, we must **reapply** sunscreen:
 - **Every 2 hours**
 - **After toweling off**
 - **When sweating***
 - **After being in water***



*When using water resistant sunscreen, you'll need to reapply **every 40 to 80 min.**

- Apply sunscreen to dry skin **15-30 minutes** before going outdoors.

Vehicles of sunscreen?



- The best type of sunscreen is the one **you will use again & again.**
 - The kind of sunscreen you use is a matter of **personal choice**, & may vary depending on the **area of the body** to be protected.
 - Available sunscreen options include **lotions, creams, gels, ointments, wax sticks & sprays.**
- 

- **Creams** are best for **dry skin & the face**.
 - **Gels** are good for **hairy areas**, such as the scalp or male chest.
 - **Sticks** are good to use around the eyes.
 - **Sprays** **are generally not recommended, especially in children, due to the risk of inhalation & potential for toxicity.**
- 

Protection of “baby” or toddler from the sun



- Ideally, parents should **avoid exposing babies younger than 6 months to the sun's rays.**
 - The best way to protect infants from the sun is to keep them in the shade, dressing them in long sleeves, pants, a wide-brimmed hat & sunglasses.
- **Sunscreen use should be avoided if possible in babies younger than 6 months.**



• **For infants & toddlers 6 months & older**

- Apply a **broad-spectrum, water-resistant sunscreen with an SPF of 30 or higher.**
 - When outdoors, sunscreen should be reapplied **every 2 hours.**
 - Sunscreens that use the ingredients **zinc oxide or titanium dioxide**, or special sunscreens made for infants or toddlers may cause **less irritation to their sensitive skin.**
- 

**The term “Sensitive Skin” on
sunscreen?**



- **The FDA does not define this term for sunscreen.**
 - In general, if a sunscreen label says "sensitive skin," it often means that the sunscreen:
 - Contains one or both of these active ingredients — **titanium dioxide & zinc oxide**
 - Does **NOT** contain **fragrance, oils, PABA**, or active ingredients found in chemical sunscreens, which can irritate sensitive skin
 - **Is hypoallergenic**
- 

**The word “sports” on
sunscreen?**



- **The FDA has NOT defined this term for sunscreen.**
 - When you see the word “sports” on sunscreen, it usually means that the sunscreen **will stay on wet skin for either 40 or 80 min.**
 - You may also see the words **“water resistant” or “very water resistant.”**
- 

Protection of lips?



- Skin cancer also can form **on the lips**.
- To protect your lips, apply a **lip balm** **or lipstick** that contains sunscreen with an **SPF of 30 or higher**.



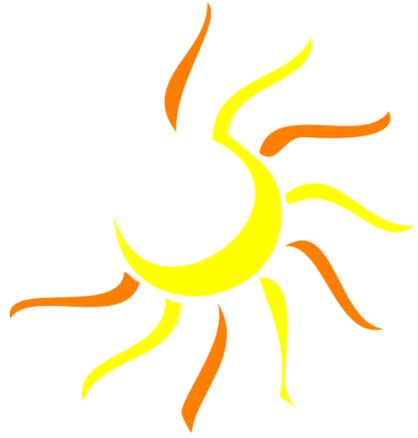
Antioxidants in sunscreen?



- When sunscreen is applied as recommended, it tends to **reduce only 55% of the free radical formation**. However, antioxidants in sunscreen are capable of reducing greater amount of free radicals than the use of sunscreen alone.
 - Formulation of sunscreen containing antioxidant faces **certain challenges such as ensuring the stability of antioxidants in the final formulation.**
 - A challenging task in the formulation of these products is that the **antioxidant needs to penetrate into the epidermis whereas the UV filters need to remain on the surface of the skin to exert its effect.** Hence, a careful modulation of the formulation is essential to maintain a balance between both the properties of the product.
 - Even though our body has an internal antioxidant defense mechanism to neutralize reactive oxygen species, this defense mechanism might get depleted during excessive oxidative stress. Here the topical administration of the antioxidants might help to reduce the reactive oxygen species. **So these antioxidants provide additional benefits to the sunscreen formulations & skin care products.**
- 

Which Sunscreen?





Sunscreen Classification

1

Oil content



2

Color



• Natural skin color differences
• They all have SPF 30
• Best choice for skin
• Different color swatches
• Available for some areas
• SPF 30 (minimum)

3

Skin type



4

Age & gender



5

Water resistancy



Tinted sunscreens

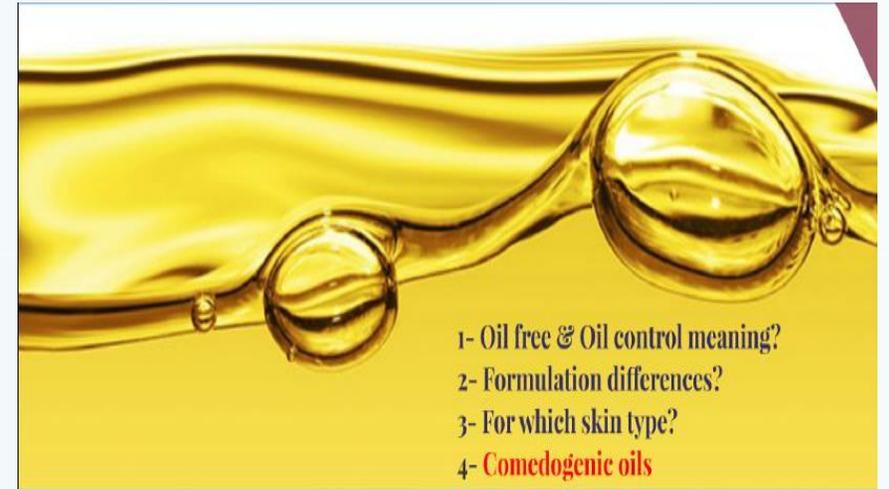
- **Visible light** induce pigment darkening
 - **Visible light** induce reactive oxygen species
 - Currently the only topical production that can prevent the effects of visible light is **tinted sunscreens** which may not to acceptable to many individuals.
- 

- In recent years, tinted sunscreens have become more prevalent as a means of protection against VL.
 - Most FDA approved compounds for UV protection do not adequately protect against VL because compounds must be opaque to filter VL.
 - **Zinc oxide & titanium dioxide can protect against VL but only when they are pigmentary grade & not micronized.**
 - Tinted sunscreens incorporate combinations of iron oxides & pigmentary titanium dioxide to offer VL protection & utilize the different colors of iron oxides & pigmentary titanium dioxide to improve color match on people of all Fitzpatrick skin types.
 - It should be noted that iron oxides are not considered to be UV filters so are listed under “inactive ingredients” on sunscreen product packages, whereas pigmentary-grade titanium dioxide & zinc oxide are FDA-approved inorganic filters.
 - **However, the exact efficacy of specific tinted sunscreens for VL protection has been largely unregulated as no standards or guidelines for VL protection yet exist.**
- 

Oil content

Sunscreen ingredients are oil-soluble.

Gels & sprays are preferred by patients with **acne** or by individuals who work or perform sports activities outdoors in hot weather.



Skin Type

1 hour after washing your face:



پوست صورت

پوست خشک و حساس

پوست خشک

پوست چرب

پوست چرب و مستعد آکنه

پوست تحت درمان لک

همه انواع پوست

- No preservatives or fragrances
- No PABA or oxybenzone
- Physical sunscreens are good choice**
- Avoid sunscreens containing alcohol**
- Moisturizing sunscreens

- Gel formulas, which contain alcohol is good choice**
- Avoid greasy sunscreens
- Rigorous daily sun protection is especially important

- SPF of 30+
- Frequent reapplication
- Lightening agents

Sunburn Treatment

Type of Burn	Treatment	Comments
<p>1st-degree burn</p> <ul style="list-style-type: none"> • Most sunburns fall into this category • For a mild burn (no blisters), patient can expect significant healing within 7 days 	Cool and cleanse with water and mild soap	Manages pain and edema. Avoid ice, which is damaging
	Use a short-term analgesic	Recommended during initial 24 hours for pain control. NSAIDs are preferred for edema and erythema
	Apply soothing lotions or steroids	Relieves discomfort. Examples include moisturizers with aloe, hydrocortisone cream
	Stay hydrated	In sunburns, fluid may be drawn to the surface
	Protect affected area	When outdoors, wear protective clothing that covers the skin
<p>2nd-degree burn</p> <ul style="list-style-type: none"> • Sunburns can progress to this category if sun exposure is extensive • These steps may be taken in addition to the steps listed above for 1st-degree burns. If infection is suspected or healing has not occurred after 7 days of self-treatment, contact a physician 	Apply a nonadherent hypoallergenic dressing	Promotes healing and protects the wound against bacteria. Change the dressing twice daily for larger burns (daily for smaller burns)
	If the skin is broken, apply OTC first-aid cream	Examples include bacitracin, Polysporin, Neosporin. Apply the cream with a tissue (not the fingertips) to reduce the risk of infection
<p>3rd-degree burn</p> <ul style="list-style-type: none"> • Sunburns rarely progress to this category • These burns should be referred to a burn center 	Consider application of a thin layer of silver sulfadiazine cream twice daily	Wounds must be cleansed and debrided beforehand by an HCP <i>healthcare provider</i> .
	Administer fluids; Lactated Ringer's is preferred	Patients may require a higher level of care and admission to a facility. Among other treatment modalities, IV fluids may be administered depending on the patient's fluid status

Thanks



Dr_Taraz_Drugstore

