- Skin

SCIENCE

WHAT IS SUNBURN?

How solar rays can leave us red, sore and irritated



WORDS SCOTT DUTFIELD

periodicalqcpubliclibrary@gmail.com

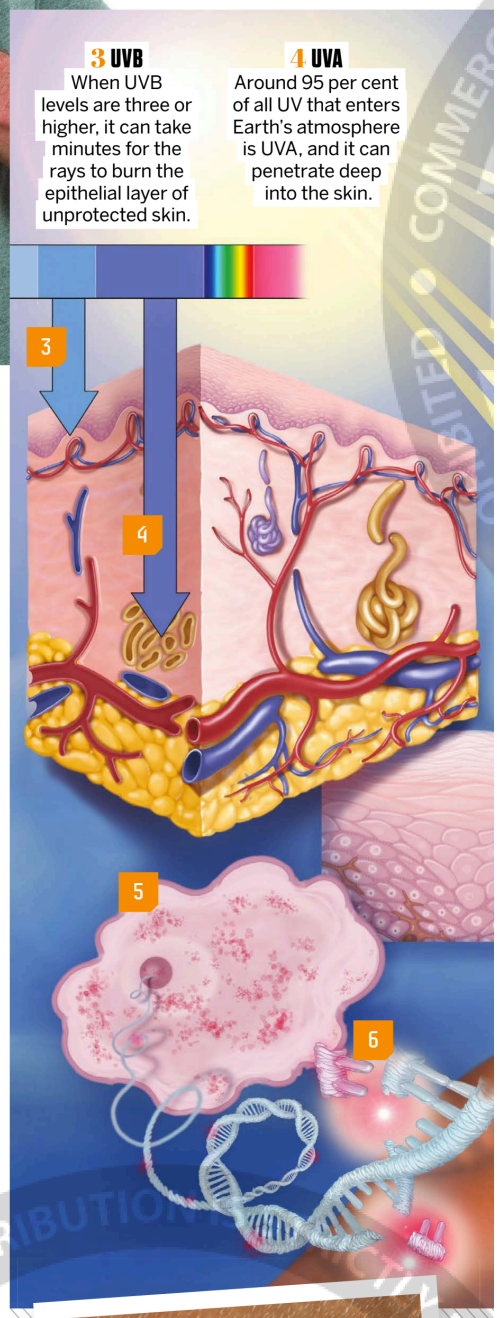
Sunlight is made up of different wavelengths of light, such as the visible light that we see as colours in the electromagnetic spectrum. Within that spectrum are two wavelengths of invisible ultraviolet light, called ultraviolet A and B. Ultraviolet B (UVB) is a high-energy wavelength and the main culprit when it comes to getting sunburned.

Overexposure to UVB rays can cause cell death in the upper layers of the skin and lead to the red, itchy and hot feeling of a sunburn. It's not all bad, though. UVB is also responsible for synthesising vitamin D within the skin. When the skin experiences damage from UVB, the immune system kicks into gear and increases blood flow to the burnt area. Immune cells within the blood cause inflammation and swelling while they help restore the skin. One of the common side effects of a sunburn is a sudden shedding of skin cells, commonly referred to as peeling. It's the body's way of ditching the dead skin cells and replacing them with new, healthy alternatives.

Ultraviolet A (UVA), on the other hand, has less energy than UVB but can penetrate deeper into the skin. One of the main concerns around exposure to UVA is its contribution to skin cancer. As a form of radiation, UVA can penetrate cells and damage their DNA. If a cell receives enough UV damage, it may rapidly grow and mutate, leading to a skin cancer called melanoma. To keep tabs on the UV levels around you, check the UV index, which indicates the strength of the day's exposure risk.

Leading cancer charity Cancer Research UK advises that when the index is three or higher, people should consider using protection such as sunscreen. Sunscreen and sunblock are photoprotective lotions, sprays and creams which can absorb or reflect harmful UV rays before they can cause any damage to skin.

Did you know?
The Sun's UV rays are strongest between 10:00 and 16:00



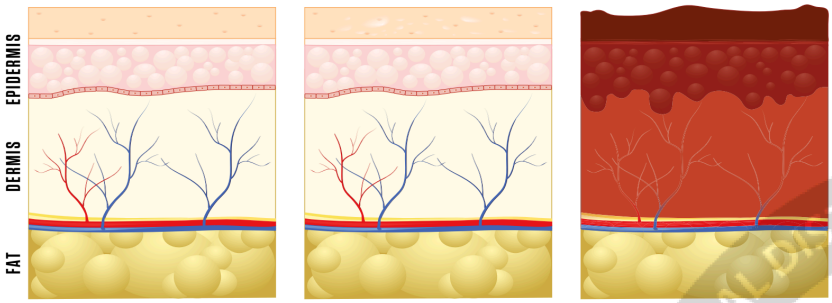
3 UVB
When UVB levels are three or higher, it can take minutes for the rays to burn the epithelial layer of unprotected skin.

4 UVA
Around 95 per cent of all UV that enters Earth's atmosphere is UVA, and it can penetrate deep into the skin.



UVA exposure can contribute to the development of cancers such as melanoma

TYPES OF SUNBURN



FIRST-DEGREE
Also known as a superficial burn, the most common type of sunburn affects the outer layer of skin, the epidermis. This type exhibits red, dry and painful skin and lasts for up to 72 hours before the skin heals itself, often with the help of aloe vera-based products to soothe the pain.

SECOND-DEGREE
When the middle layer of the skin, called the dermis, is damaged by UV rays, a second-degree sunburn may occur. Along with the same symptoms as a first-degree burn, blisters will develop, which can take weeks to heal and may have to be medically treated.

THIRD-DEGREE
Although rare, a third-degree sunburn is possible, destroying not only skin cells but also the nerve endings to the skin. These types of burns can only be treated with medical intervention, such as surgery to replace the skin with skin from another part of the body, called grafting.

NOT FOR SALE

DID YOU KNOW? You'd have to dive 4.5 metres below the ocean's surface to avoid the Sun's UV radiation

GETTING UNDER YOUR SKIN

Why UV rays wreak havoc on a cellular level, and how to stop them

1 ABSORPTION
Chemical sunscreens absorb and transform UV rays into heat and release the energy away from the body.

2 REFLECTION
Mineral sunscreens contain titanium dioxide and zinc oxide to act like a mirror and reflect UV rays away from the body.

5 FREE RADICALS
UVA creates unstable atoms in cells called free radicals. In the cell, free radicals can cause damage to structures such as membranes and proteins.

6 DNA DAMAGE
Free radicals, also known as oxygen species, can damage the bases within the structure of DNA, causing it to mutate and change.

7 PROTECTION
The Sun Protection Factor (SPF) of sunscreen indicates how much longer it takes for your skin to burn. For example, it would take 30 times longer for your skin to burn after applying factor 30 sunscreen than it would without it.

8 STAR RATING
SPF refers to UVB, whereas UVA protection is indicated by a five-star system. The more stars, the better the protection.


Peeling is the bodies' way of shedding old, dead and damaged skin



DO ANIMALS BURN?

Humans aren't alone in our enjoyment of basking in the sunlight – many species find themselves catching some rays. However, without topical protection, how do animals ward off sunburn? For feathered, furry and scaled animals, their bodies have a built-in barrier to help block sunlight from touching their skin. Some amphibians have even found a way to secrete a chemical sunscreen called gadusol to save their skin. However, hairless creatures roaming in nature, like elephants, pigs and rhinos, must find natural sunscreen, otherwise they will get sunburned. Rolling and bathing in mud pits and puddles offers the protection they need. UV radiation can't penetrate this mud mask, leaving the skin beneath protected.


Although hair helps block out sunlight, some short-haired animals like dogs and pigs can get sunburn

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