

THE SUN AND YOUR SKIN

Dr Tham Siew Nee
Singapore

The sun is a mysterious matter. Some of us worship it, while others avoid it. It is necessary for life as it gives us warmth, and it promotes the synthesis of Vitamin D - a vitamin necessary for strengthening the bones. It generates a healthy tan - a sign of beauty in modern times. and it is used to treat various skin diseases. However, excessive amounts of sunlight can be damaging to the skin.

WHAT IS SUNLIGHT?

Sunlight is composed of 66% of infra-red light (it emits heat), 32% visible light (the light that allows us to see different colours), and 2% ultraviolet light (UVL). UVL is subdivided into ultraviolet A (UVA wavelength 320-400nm) and ultraviolet light B (UVB) which is of a shorter wavelength (290-320nm). UVB is the main cause of sunburn, and UVA can augment or add to the effects of UVB on the skin. In other words, when you sun-tan, you are getting mainly the effects of UVB, and these effects are increased by the concomitant exposure to UVA. To understand why different people get different responses to sunlight. we need to understand about skin types.

SKIN TYPES AND SKIN REACTIVITY

People are divided into different skin types based on the amount of melanin (the pigment that gives us our skin colour) content in our skin, and on the capacity of our skin to darken or tan in response to sunlight.

The following is one type of classification:

- Always burn, ever tan
- Usually burn, tan with difficulty
- Sometimes burn, sometimes tan
- Burn minimally, always tan
- Rarely burn, tan profusely
- Never burn, deeply tanned

People with skin types I (like the Irish) and II (some Caucasians), will tend to have a higher risk for the development of skin changes caused by sunlight exposure.

EFFECTS OF SUNLIGHT ON THE SKIN

Photosynthesis of Vitamin D

The production of Vitamin D occurs on the epidermis or the superficial layer of the skin. The wavelength responsible is mainly UVB. In most countries, sufficient Vitamin D has been added to food to meet the normal daily requirement.

The sunburn reaction

This is an acute response of the skin to excessive UVL exposure and manifests as redness. It may be associated with pain and swelling.

Sunburn is mainly caused by the UVB component. It begins several hours after exposure, and reaches a peak after 12-24 hours. Longer exposures cause a more rapid and persistent response. The redness (burn) fades over several days to be followed by skin peeling and tanning.

Sunburn from the sun is usually an additive effect of UVB and UVA. About 15% of redness caused by the sun is contributed by UVA.

Tanning

UVA in the sun causes tanning in 2 phases via immediate pigment darkening (IPD) and delayed tanning (DT). IPD is a rapid darkening which begins soon after UVA exposure and is maximal immediately afterwards.

It fades within a few minutes if the intensity of the exposure is small or it may last for several days after exposure to larger doses of UVA and blends in with delayed tanning.

DT is induced by UVB and occurs about 3 days after sun exposure.

Changes in skin thickness

Exposure to the sun causes thickening of the outer layer of the skin. This is a protective response of the skin to an adverse stimulus.

EFFECTS ON THE IMMUNE SYSTEM

Animal experiments show UVA exposures can alter the body's immune response to cells damaged by the sun, and perhaps to infectious agents. This change in immune response is the probable explanation for the increase in certain types of skin cancers on sun-damaged skin.

PHOTOAGEING

Repeated exposures to sunlight will, in the long term, cause photoageing to the skin. Photoageing is not simply an acceleration of the inevitable age-dependant intrinsic ageing. The skin becomes coarse, rough, wrinkled, leathery with uneven pigmentation and easy bruising.

Skin with severe photoageing tends to develop skin cancers. Most of these skin cancers can be easily removed by surgery, but sometimes they can erode deep into the tissues or spread to other organs.

ABNORMAL SKIN REACTIONS TO SUNLIGHT

There are certain skin and medical conditions that are made worse or aggravated by sunlight, like lupus erythematosus, old sores or atopic dermatitis. These patients should use sunscreens and avoid sunlight. Sunlight can also, on its own, cause certain abnormal skin reactions. These are called photodermatoses. Some of these are of unknown cause and can occur in any age group. An example is the polymorphous light eruption which is quite common in Europe and the United States. Some abnormal skin reaction to sunlight is due to contact with certain chemicals or due to the ingestion of certain medications. Examples are contact with musk ambrette, a synthetic perfume used in male colognes, or ingestion of certain antibiotics or anti-diabetic medications. Avoidance of the offending agent usually clears the condition.

HOW DOES THE SKIN PROTECT ITSELF FROM SUNLIGHT?

Normally the skin protects itself by increasing the amount of melanin in the skin (tanning), and by increasing the thickness of the skin. To prevent the adverse effects of sunlight, it is wise to tan gradually rather than to get a burn by getting too much at one go. If you need to stay in the sun for a long period of time, it is wise to use a sunscreen.