



## Your Skin and MitoQ

Our skin can be divided into three distinct layers: the epidermis, the dermis and subcutaneous tissue. Each one has a particular structure and function but all are subject to oxidative stress. Free radicals produced by environmental toxins such as UV radiation or as a result of normal cellular activity can damage tissue if not kept in check by our body's own supply of antioxidants, such as coenzyme Q10 (CoQ10). Oxidative stress has been associated with numerous skin conditions such as acne, uneven pigmentation, wrinkles, skin cancer and psoriasis. Mito Q is a revolutionary form of CoQ10 that is available as a supplement or a cream. It targets mitochondria, one of the main sources of free radicals, and reduces oxidative stress, improving skin condition.

Our skin is the largest organ in our body. It covers a surface area of 1.5-2 meters in adults and makes up 16% of our body weight (about 11kg in a 70kg person). It varies in thickness depending on location with the skin on our eyelids a mere 0.3mm thick compared with several millimetres lining the soles of our feet.

Our skin does far more than just protect our internal body parts from the outside world. It is responsible for excreting metabolic waste in the form of sweat and sebum. It contains numerous receptors and sensors that detect pain, temperature and pressure. Reactions occur

inside our skin that convert sunlight into vitamin D and stimulate pigment cells to change colour in response to exposure to the sun. But one of the most fascinating functions of the skin is its ability to heal itself without any conscious input from us whatsoever. Try inventing something like that!

Our skin can be divided into three distinctive layers: the epidermis, the dermis, and the subcutaneous tissue.

The epidermis has a complex structure and contains immune cells which recognise small molecules penetrating the skin and an abundance of keratin, a protein that strengthens the skin and helps keep it moist. Dead keratin cells lie on the outermost surface like a border. These dead cells absorb water easily and start to swell after extended periods in water - which explains why the skin on our hands and feet “prune-up” after swimming or bathing. However, living

keratin cells deeper within the epidermis do not absorb water, which makes our body watertight.

Although not technically a layer, the basement membrane sits between the epidermis and dermis and is semi-permeable, which means it allows the passage of some molecules but not others. It is composed of a complicated assembly of proteins and regulates many important processes such as skin development, wound healing, and cancer progression.

The dermis is made up of mainly collagen, elastin, and a blobby gel-like material called ground substance. Blood vessels supply oxygen and nutrients to both the dermis and epidermis. Lymph vessels and nerve fibres criss-cross through the dermis. Hair follicles sit within the dermal layer next to sebaceous, sweat and scent glands.

The final, deepest layer is subcutaneous tissue. Made up of fat cells and connective tissue it provides energy, absorbs shock and keeps us warm.

Our skin is vulnerable to oxidative stress. Environmental free radicals spawned from UV radiation or pollution attack skin tissue, changing its appearance and structure. Free radicals also arise as a by-product of normal cellular activity that occurs in organelles such as mitochondria within our skin cells. In healthy people, free radicals are usually kept in check by our body's own supply of antioxidants, such as CoQ10. However, if our levels of antioxidants become depleted for dietary, disease, or other reasons, free radicals are left to damage surrounding tissue, putting our body in a state of oxidative stress. Many skin conditions such as uneven pigmentation, wrinkles, skin cancer, and psoriasis have been linked with oxidative stress.

Taking an antioxidant supplement or applying antioxidant-containing cream to the skin such as MitoQ can help reduce skin-related oxidative stress. MitoQ is a specially formulated type of CoQ10 that accumulates within mitochondria, one of the major sites of free radical production. Nothing defines youth more than having smooth, wrinkle-free, clear skin.

## **Bibliography**

Bowe WP, Patel N, Logan AC. Acne vulgaris: the role of oxidative stress and the potential therapeutic value of local and systemic antioxidants. *J Drugs Dermatol*. 2012 [http:// www.ncbi.nlm.nih.gov/pubmed/22648222](http://www.ncbi.nlm.nih.gov/pubmed/22648222)

Hashmi S, Marinkovich MP .Molecular organization of the basement membrane zone. *Clin Dermatol*. 2011. <http://www.ncbi.nlm.nih.gov/pubmed/21679867>

Smith R, Hartley R, Cocheme H, Murphy M. Mitochondrial pharmacology. Trends in Pharmacological Sciences 2012;33(6):341-352

Smith R, Murphy M. Animal and human studies with the mitochondria-targeted antioxidant MitoQ. Annals of the New York Academy of Sciences 2010;1201:96-103

Structure of the dermis and subcutis. Dermnet NZ. <http://www.dermnet.org.nz/doctors/principles/dermis.html#bmb>

Structure of the epidermis. Dermnet NZ. <http://www.dermnet.org.nz/doctors/principles/epidermis.html>

Trouba KJ, Hamadeh HK, Amin RP, Germolec DR. Oxidative stress and its role in skin disease. Antioxid Redox Signal. 2002 <http://www.ncbi.nlm.nih.gov/pubmed/12230879>

Why does my skin get wrinkly in water? Discovery health. <http://health.howstuffworks.com/skincare/information/anatomy/skin-wrinkly-in-water.htm>