

A step away from radiant skin: The power of Antioxidants

Today, we are here to gain some knowledge about how free radicals in our skin cells attack our bodies and the defensive mechanisms that we can follow to protect ourselves from these dangers by making the right choice with antioxidant ingredients.

In order to evaluate the effects, let's first examine what free radicals are.

Free radicals are highly chemically reactive molecules due to the presence of an uneven amount of negatively charged subatomic particles or, simply, electrons. When a molecule loses an electron, making uneven amounts of electrons, we refer to it as an "unpaired" electron. It makes that electron unstable, and an unstable electron can be pictured as an angry electron which is ready to steal another electron from the surrounding molecule to stabilize itself. This causes a domino-like chain reaction of unstable chemical compounds. *Yes, I hear you, all of this is basic science, but isn't skin care all about that 'science'?*

Free radicals are simply a consequence of numerical chemical interactions in our bodies, which results in low levels of intercellular oxidative stress. Due to this oxidative stress in the domino reaction, more free radicals are produced frequently and quicker than the body can eliminate them. In fact, free radicals are generated during the domino reaction through oxidative stress.

What do free radicals do to our body?

The oxidative stress caused by various chemical reactions can damage the skin's vital components, resulting in accelerating signs of aging, wrinkles or age spots, dark under eyes, dull skin, dry skin, and a decrease in elasticity. Cigarette smoking, UV exposure, pollutants, and foreign substances can trigger the increase in oxidative stress. Moreover, when intrinsic antioxidant capacities are reduced, such as during aging, an imbalance between pro- and antioxidant systems further accentuates these hallmarks of cellular aging.

Inflammaging

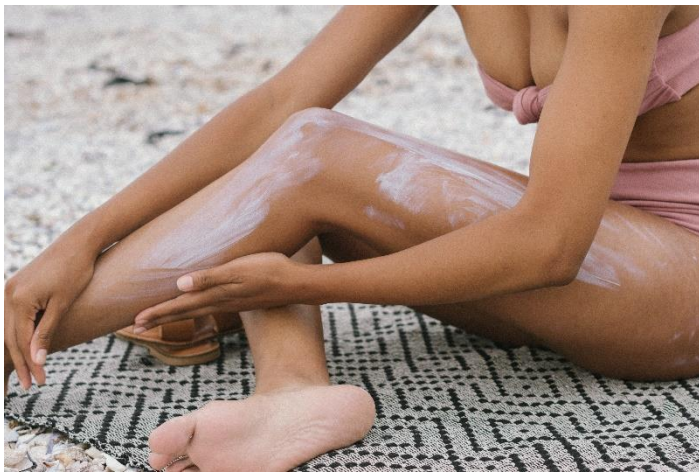
The idea of the inflammaging theory is very prominent and was developed in 2000 by Claudio Franceschi who described this condition as 'our body slowly accumulating damaged cells and molecules over time as we age,



and eventually the accumulation can lead to unwanted inflammation in the body.' So, in this case, free radicals are both the cause and result of inflammation. This inflammation is the reason for our aging and age-related concerns. The vicious cycle of damage from free radicals causing inflammation, and inflammation resulting in more free radicals, causing more inflammation, is very difficult on our skin.

Effective solutions

Now, since there is an ongoing buzz around free radicals and their effects on our body, there is constant need to measure the result on the biological processes. This need has opened ways for many techniques to harness



biological functions for use in the fight against premature skin aging and promotion of healthy and youthful skin. Current industry is focused on developing active ingredients that can provide increased cell protection, longer cellular lifespan, and improved barrier function.

There are few topical solutions that work their magic by triggering cellular detoxification processes, which can help reduce the reactive oxygen species (ROS) and lipid peroxidation. These terms may sound a little

overwhelming, so without any further delay, let's look into each of these solutions in detail to find out how they could help us maintain the beauty of our skin.

Cellular detoxification

Have you heard of autophagy before? It sounds fancy, right? This word is given for the biological process that does some cleaning within the cells by identifying toxins and damaged bits and then gets rid of them. This damage is regulated for proper survival and functioning of our skin cells. Well, an unhealthy autophagy is the result of UV radiation exposure, stress, pollution, free radicals and inflammation.

An unhealthy autophagy state means accelerated dermal inflammation, spiked aging, reduced dermal integrity, degraded collagen levels, and a rise in melanin production.

A reduction in autophagy results in piling up of cellular damage, increase in inflammation, degrading cellular metabolism, and aging at cellular level. But there is still a hack: cellular detoxification can be manipulated, thanks to the topical application of certain ingredients, which have demonstrated to trigger autophagy in dermal fibroblasts. The activation of a biological detoxification process can help counteract age-related decline in skin cell function and maintain skin homeostasis, that results in healthier and stronger skin.

Attenuate excessive ROS

Reactive Oxygen Species (ROS) are a group of free radicals and reactive molecules. Now, why are ROS harmful? Well, these oxygen free radicals attack biological molecules such as proteins, cascade lipid peroxidation and DNA causing an irreversible damage. Amongst all free radicals, the ones containing oxygen are considered to be the most destructive because of the presence of numerous unpaired and high energy electrons.

A combination of both internal and external factors can disrupt skin homeostasis, which stimulates high levels of ROS that amplifies DNA mutation, protein oxidation, and collagen degradation. ROS produced by mitochondria can be quite risky and play an important role in triggering the aging process, compared to environmental factors.

But, there's good news. By reducing excessive ROS levels, we can help maintain a balance within the skin cells to combat age-related decline in our skin cell function. Research suggests that certain ingredients have the ability to scavenge unnecessary ROS levels.

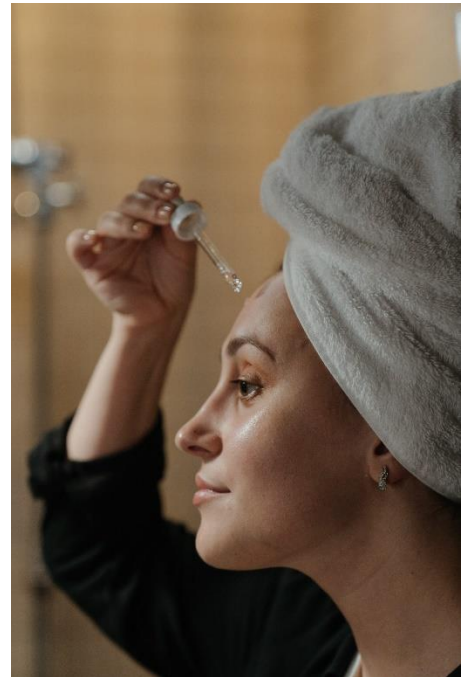
Reducing lipid peroxidation

MDA Lipid Peroxidation Assay is a tool used to help us measure quantitatively and determine the oxidative stress. MDA, an abbreviation of malondialdehyde, is used as a biomarker to indicate oxidative stress and lipid peroxidation (breaking down of lipids).

When MDA levels increase, it signals a rise in lipid peroxidation and oxidative stress within the cell. It is like a red flag telling us that cellular damage is on the rise. But, through these MDA assays, we can certainly understand and assess some raw materials to attenuate lipid peroxidation in cultured epidermal keratinocytes.

When MDA levels decrease, it indicates a decrease in lipid peroxidation, resulting in reduced cellular damage. It is basically acting like a shield against oxidative stress and cellular damage to mitigate the signs of cellular aging.

This concludes our understanding of free radicals, and the negative impact they cause on our skin can help us establish and incorporate effective skin care regimens that are rich in antioxidant features. Tune in to our social media channels for more information!



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