

# Protection from Photoaging.



## Are you Protected?

Exposure to sunlight causes "photoaging" damage, including wrinkles, mottling and pigmentation of the skin, and skin roughness. While these changes are usually associated with aging, photoaging makes people look older than they really are.

**InsideOut** contains all of the ingredients that have been found to be protective from both the immediate effects of the sun, and the long term photoaging effects.

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# Protecting Yourself Against Sun Damage

Solar radiation stresses human skin, mainly by increasing free radical formation, and is associated with short and long term effects including sunburn, premature skin aging, and skin cancer.<sup>1</sup> It affects both layers of the skin. It makes the top layer of skin, or epidermis appear rough and dull and thin in places, and also more prone to age spots and skin cancers.

Photoaging describes damage to the skin caused by exposure to sunlight including wrinkles, mottling and pigmentation of the skin, and skin roughness. While these changes are usually associated with aging, photoaging makes people look older than they really are.

In the dermis, sun exposure causes damage to the elastic fibers and a slow down in both collagen production and effective repair. The result is that the skin loses elasticity, visible wrinkles and sagging appear, and skin appears much older than it actually is.

The usual methods of using sunscreens, staying in the shade and covering exposed skin are still among the best methods for protecting skin. Additionally, research now indicates that several nutrients and antioxidants can aid in protecting skin from damaging UV rays, healing damaged skin and may contribute to lowering the risk of developing age spots and skin cancer.

## PHOTOPROTECTIVE INGREDIENTS IN INSIDEOUT

InsideOut contains all of the ingredients that have been found to be protective from both the immediate effects of the sun, and the long term photoaging effects.

### Antioxidants

It's been shown that antioxidant levels decrease with age<sup>2,3</sup> and that oral antioxidants can counteract some of the adverse effects of the sun on the skin.<sup>4,5,6,7,8</sup>

In clinical trials, a number of antioxidants, including **carotenoids, vitamins E and C, N-acetylcysteine (NAC)**, and many others contained in **green tea, rosemary extract, and pine bark extract** have been found to be capable of scavenging free radicals generated during photooxidative stress caused by sunlight.

For example one study looked at the photoprotective potential of the dietary antioxidants **vitamin C, vitamin E, lycopene, beta-carotene, and the rosemary polyphenol, carnosic acid.**<sup>9</sup> The authors concluded that all of the substances showed photoprotective potential to varying degrees.

As well many antioxidants have additional effects. For example, besides being an antioxidant, Vitamin C is essential for collagen formation. In the body, beta-carotene is converted into vitamin A, which is essential for proper development of the skin. Research shows that vitamin C, beta-carotene, quercetin and members of the catechin family can protect against skin damage caused by UV rays. Also some antioxidants can have a beneficial effect on hyperpigmentation of the skin.<sup>10</sup>

Furthermore, antioxidants are more effective when more than one is present at the same time. For example, when beta-carotene is combined with vitamin E (another antioxidant), skin protection is enhanced. Other studies show that antioxidant protection increases as the diversity and quantity of antioxidants increases in the diet.

### Green Tea

Green tea contains natural antioxidant polyphenolic compounds known as epicatechins. Researchers have shown that green tea polyphenols -- taken orally or applied topically -- exert photoprotective effects that inhibit ultraviolet radiation-induced skin tumors (tumorigenesis).

Studies have also shown that green tea extract possesses anti-inflammatory activity, protecting against ultraviolet (UV) light-induced skin inflammation (erythema) and photooxidative stress.<sup>11,12</sup> The major polyphenolic chemopreventive constituent in green tea responsible for these biochemical or pharmacological effects is (-)-epigallocatechin-3-gallate (EGCG).

When researchers tested green tea extracts in animal models they found that these polyphenolic compounds afforded protection against chemical carcinogenesis and photocarcinogenesis in mouse skin. In similar experimental studies with human skin, green tea polyphenols again demonstrated anti-inflammatory and anticarcinogenic properties.<sup>13</sup>

### Vitamin C and E

In one study, a group of 40 healthy volunteers were given vitamin E or vitamin C or both. The researchers found that the combination of C and E together protected the skin and suppressed the sunburn reaction.<sup>14</sup>

In another study the authors concluded that the combination of vitamins C and E could be exploited for the prevention of solar radiation-induced skin cancer in an antioxidant intervention study.<sup>15</sup> These and other studies suggest that vitamin E has a synergistic effect with ascorbic acid, due to vitamin C's ability to recycle vitamin E.<sup>16</sup>

### Carotenoids

Studies have shown the protective effects of oral carotenoids on skin exposed to UV radiation.<sup>17</sup> One study found that sunburn was suppressed significantly with a **combination of carotenoids** (such as **beta-carotene**) and **vitamin E**. The researchers concluded that the antioxidants provided protection against erythema in humans and were effective in diminishing sensitivity to ultraviolet light.<sup>18</sup>

### Selenium

There is evidence to show that selenium can inhibit sun damage and skin cancer and thus may be useful as a photoprotectant.<sup>19,20</sup>

One of the reasons for selenium's effects is that the sensitivity of human dermal fibroblasts to UVA radiation has been linked to a decrease in intracellular glutathione levels. The results of one study found that that compounds capable of inducing glutathione synthesis can act with selenium to protect cells against UVA damage.<sup>21</sup>

Another study found that a combination of **vitamins E and C, carotenoids, selenium** and proanthocyanidins (such as **pycnogenol**) offered photoprotection to UV irradiated skin.<sup>22</sup> In this study the authors postulated that since endogenous antioxidants are decreased in skin and blood during UV exposure a combination containing both lipid and water-soluble compounds including: carotenoids (beta-carotene and lycopene), vitamins C and E, selenium and proanthocyanidins, might be useful. They found that this combination slowed down the time of the development and grade of UVB-induced erythema and concluded that protection of the skin against irradiation can be achieved by the use of exogenous antioxidants.

## Zinc

Zinc, the important trace mineral for DNA protection against oxidative stress, has been shown to decrease UVA1-induced early and delayed apoptosis in human fibroblasts.<sup>207</sup> Zinc supplementation protects against UVA-induced DNA damage in human skin fibroblasts.<sup>23,24</sup>

A combination of selenium and zinc has also been found to have protective effects against UV-A damage.<sup>25</sup>

## Omega 3 Fatty Acids

Fish oil, which is rich in omega-3 polyunsaturated fatty acid, has been shown to have photoprotection effect. In clinical trial, there was decreased UVB-induced sunburn cell formation and inflammation after 3 months of fish oil ingestion. Furthermore, ingestion of fish oil was shown to reduce UVA provocation response.<sup>26</sup>

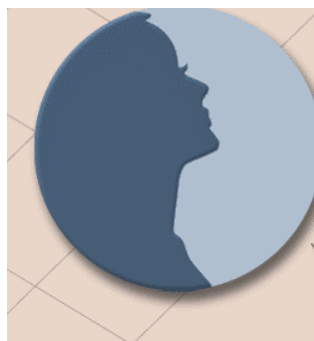
A recent study looked at the potential for oral agents for incidence of skin cancers and photo-ageing and concluded that the **omega 3 fatty acids** have the potential to reduce the ultraviolet induced release of cytokines and thus protect skin from ultraviolet exposure.<sup>27</sup> More specifically a recent study found that **EPA** offered some protection against ultraviolet induced skin damage and may reduce skin cancer in humans.<sup>28</sup>

## Creatine Monohydrate

A recent study found that topical creatine has beneficial effects on skin damage because of its ability to recharge the energy mechanisms in these cells that deal with the protection and repair of skin damaged by free radicals.<sup>29</sup>

## CONCLUSION

When you go out into the sun, take along sunscreen, protective clothing, and InsideOut for added protection against the damaging rays of the sun.



<http://www.mdinsideout.com>

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## Did you know?

Though most people think of aging as one of the most immutable and inescapable facts of life there is increasing scientific evidence and theoretical support for the idea that aging will eventually be much more medically treatable than previously thought.

## Can Aging be Prevented?

Fortunately, with a daily program that includes sun protection along with replenishing and renewing the skin with certain key agents, it is possible to quickly and dramatically improve the appearance of aging skin. Dr. Mauro Di Pasquale's InsideOut was designed as a complete system that will work fast to reduce the appearance of environmental aging while protecting the skin from future damage. With daily use, most people will achieve younger-looking, better-feeling skin within just a few short weeks. And, with continued use, visible results can be maintained and extended.



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