



SMALL MOLECULE TECHNOLOGIES, INC.

# MOLECULES & HEALTH

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## Air Pollution & Damage to Skin

Air pollution is becoming an increasing health problem worldwide. It's an environmental threat to which millions of people are exposed, and is currently the world's largest single environmental health risk. It's well known that air pollution is bad for lungs, but scientists are just beginning to discover how damaging air pollution is to the skin. Small Molecule Technologies skin and wound care products were designed to protect skin from irritants, and help restore skin cells naturally back to health.

Not only is outdoor air pollution a risk to skin health, but indoor air pollution can also be harmful. Indoor risks include exposure to volatile organic compounds (VOC) from organic solvents, protective coatings on furniture, paints, dry cleaning products or cigarette smoke. In fact, atopic dermatitis or eczema has been linked with exposure to air pollution including tobacco smoke. Outdoor air pollution containing VOC includes exhaust from automobiles. Polycyclic aromatic hydrocarbons (PAHs) including dioxins, particulate matter (PM), ozone and smog are some other outdoor pollutants that can be harmful to skin. Many of these air pollutants have been linked with oxidative stress in exposed skin.

Oxidative stress results from the inability of skin cells to eliminate free radicals that damage important cellular molecules including DNA, protein and lipids. The potent small

molecule polyphenols, oleuropein, resveratrol and epigallocatechin-3-gallate (EGCG) from olives, grapes and green tea respectively, as well as the important small molecules melatonin and L-glutathione, are all powerful antioxidants found in Small Molecule Technologies skin and wound care products that have the ability to counteract oxidative stress, particularly in skin cells.

Small Molecule Technologies Skin Shield contains an advanced 37% silicone shield to provide a barrier or "second skin" to help protect skin from irritants and help skin stay hydrated. The shield in Small Molecule Technologies Skin Shield is composed of a sophisticated silicone complex that will keep protecting the skin even after the skin is cleansed several times. Along with all the Small Molecule Technologies skin and wound care products, Small Molecule Technologies Skin Shield includes powerful antioxidants, beneficial amino acids and important vitamins found exclusively in Small Molecule Technologies

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Ozone, typically a component of smog, results in damage to the epidermis and reduction of antioxidants in skin leading to skin barrier disruption, oxidative stress and



inflammation. Ozone has been associated with urticarial (hives), eczema, contact dermatitis, rashes, and skin disease. Ozone exposure has also resulted in increased expression of matrix metalloproteinases, suggesting a role in skin matrix remodeling and skin aging.

Polycyclic aromatic hydrocarbons (PAHs) are found in smoke and fumes from wood burning and cigarettes as well as automobile exhaust. PAHs have been shown to cause melanocyte proliferation, skin pigmentation, acneiform eruptions and potential skin cancer. PM includes dust and particles from power plants, incinerators, automobiles, and fires. PAHs adsorbed on the surface of PM may lead to long-term skin exposure through hair follicle or transepidermal absorption that can result in oxidative stress and skin aging.

Outdoor VOCs, in the presence of nitrogen oxides from combustion sources and sunlight, produce smog. Air-to-skin transdermal uptake of



many semi-VOCs may actually be comparable to or greater than lung inhalation of these substances. Scientific evidence indicates that VOCs may cause inflammatory reactions. In one study, exposure of skin cells (keratinocytes) in vitro to VOCs increased the release of chemical messengers (cytokines) that favor the development of inflammatory or allergic reactions. Small Molecule Technologies skin and wound care products contain beneficial small molecule ingredients with powerful anti-inflammatory

activities including oleuropein, resveratrol, EGCG, L-gutathione, melatonin, dipotassium glycyrrhizinate, and methylsulfonylmethane.

Finally, cigarette smoke may contain more than 100 trillion free radicals that can cause substantial oxidative

stress. Cigarette smoke is composed of thousands of chemical substances including many that activate transepidermal water loss and degeneration of connective tissues. Smoking correlates with skin wrinkling and aging, and is associated with skin conditions including psoriasis and acne. Furthermore, smoking is associated with decreased blood circulation and aberrant wound healing. Resveratrol has been shown to protect skin cells (keratinocytes) from cigarette smoke-induced

damage by increasing the expression of an enzyme involved in cellular defense against oxidative protein damage. Resveratrol has also been shown to promote healing of chronic wounds. In addition, many other ingredients found in Small Molecule Technologies skin and wound care products promote wound healing including oleuropein, EGCG, L-carnosine, L-glutathione, and TECA.

It's good to know that Small Molecule Technologies skin and wound care products can help protect against irritants and the damage that can result from air pollution. Fortunately, Small Molecule Technologies Skin Shield provides a protective barrier against irritants that remains effective after several washings. In addition, Small Molecule Technologies Skin Shield, along with all of the Small Molecule Technologies skin and wound care products, includes potent antioxidants as well as powerful anti-inflammatory ingredients to help protect skin from oxidative stress and inflammation.

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