



SMALL MOLECULE TECHNOLOGIES, INC.

# MOLECULES & HEALTH

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## Taking Care of Aging Skin



The average age of our population is still rising. Because individuals are living longer, the need for optimal care of aging skin is increasingly recognized. Aging results in visible consequences that become obvious with time including wrinkling and sagging skin. Aging skin

is generally more fragile and can also be associated with undesirable skin issues including fragile skin bruising (senile purpura), skin tears, xerosis (abnormally dry skin), and pruritus (itching) that can have a significant impact on an individual's quality of life. In addition, vascular changes in the skin, such as thinning capillaries and slowing microcirculation is evident in aging skin.

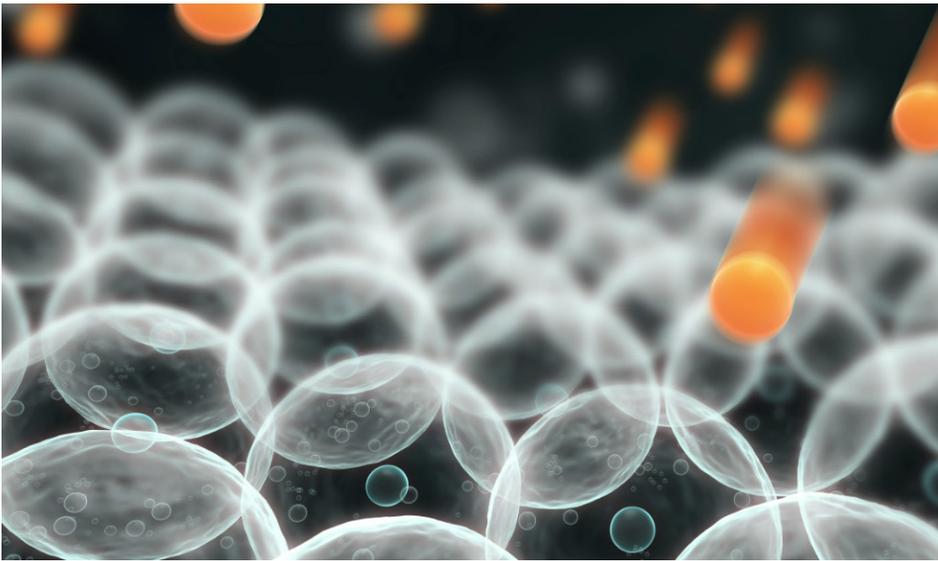
Slowing microcirculation that occurs with aging, results in a decrease in nutrients accessing the skin from the blood. Small Molecule Technologies skin and wound care products include potent small molecule ingredients that can penetrate skin to provide nutrition. The beneficial small molecule nutrients contained in Small Molecule Technologies products include antioxidants, amino acids and vitamins that help hydrate and strengthen fragile skin. Many of the nutrients are also anti-inflammatory and help decrease pruritus.

Two types of skin aging exist, intrinsic and extrinsic aging that typically overlap. Intrinsic aging occurs naturally and is affected by intrinsic factors such as indi-

vidual genetics and changes in cell signaling, whereas extrinsic aging occurs due to environmental stressors such as UV radiation (UVR), pollution or smoking. Skin that is extrinsically aged by UVR (photoaged) is "leathery" in appearance with decreased elasticity, deep wrinkles, uneven pigmentation and rough texture. Intrinsically aged skin is transparent and characterized by fine wrinkles. Typical intrinsically aged skin also has decreased subcutaneous fat tissue that normally cushions skin and blood vessels. Intrinsic and extrinsic aging are both characterized by drier, thinner skin with spots.

### Helping Counteract Oxidative Stress and Inflammation

Evidence indicates that aging is associated with damage from free radicals known as reactive oxygen species (ROS). ROS are continuously produced as side products of metabolism in the mitochondria, and keratinocytes and fibroblasts in the skin are the main producers of mitochondrial ROS. During skin aging the effectiveness of the skin's natural antioxidant system is diminished. Oxidative stress



occurs when antioxidants and the skin's natural antioxidant defense enzymes like manganese superoxide dismutase (MnSOD) are overwhelmed, resulting in DNA, protein, and overall cellular damage, as well as inflammation.

Many of the small molecule ingredients found in Small Molecule Technologies skin and wound care products have potent anti-inflammatory activities that help decrease skin inflammation, including the 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. In addition, dipotassium glycyrrhizinate from licorice, avenanthramides in oats, aloe vera and shea butter possess anti-inflammatory activities. Various ingredients also counteract oxidative stress including oleuropein, resveratrol, and EGCG, as well as melatonin, and L-glutathione. In fact, in a model where MnSOD was deactivated, oleuropein induced MnSOD activity; EGCG has been found to induce MnSOD expression, and resveratrol and

melatonin have been shown to upregulate MnSOD activity.

Another important process associated with aging is cellular senescence or the loss of a cell's capability for replication. Oxidative stress is an important cause of cellular senescence. Senescent keratinocytes and fibroblasts accumulate in the skin with age and express specific degradative enzymes, known as matrix metalloproteinases (MMPs), as well as growth factors and inflammatory cytokines. Increased expression of MMPs during aging can de-

crease the amount of collagen in the skin and reduce mechanical tension resulting in skin wrinkling. Extrinsic factors including X-rays, UVR and cigarette smoke can also induce cellular senescence and age-related changes in the skin.

## Protecting and Increasing Collagen

Shea butter included in Small Molecule Technologies Renewal Moisturizer and the gentle cleanser, Clean N Moist, protects dermal collagen. In fact, the bioactive form of shea butter found in Small Molecule Technologies skin care products does more than help reduce visible changes in skin, it improves the structural integrity of the skin for lasting protection against the effects of environmental aggression and skin aging, and the resulting loss of skin elasticity and firmness. Another important ingredient found in Small Molecule Technologies Renewal Moisturizer and Clean N Moist is aloe vera, which increases the collagen content in skin. Furthermore,



shea butter and aloe vera are both moisturizing and anti-inflammatory.

It's good to know that Small Molecule Technologies skin care products are designed for the optimal care of fragile and sensitive skin. Small Molecule Technologies Renewal Moisturizer and Clean N Moist are non-sensitizing and non-irritating, and can help moisturize, strengthen and protect aging skin. Renewal Moisturizer and Clean N Moist provide many beneficial nutrients, including antioxidants, to aging skin typically suffering from oxidative stress and decreased nutrition resulting from slowing microcirculation.

In addition, Renewal Moisturizer and Clean N Moist help provide protection against inflammation and pruritus that is associated with aging.

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