Small Molecule Technologies, Inc.

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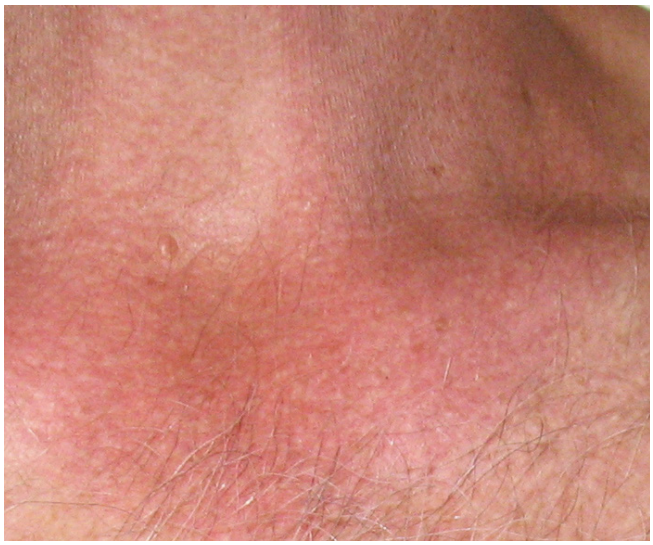
Managing Radiation Dermatitis



Radiation dermatitis is an acute skin reaction to radiation therapy that ranges from a mild rash to skin ulceration. Nearly two-thirds of all cancer patients receive radiation therapy. Although many technological advances have resulted in improved treatment protocols, skin damage is still a common side effect of radiation therapy. Radiation dermatitis, induced by ionizing radiation, affects a large proportion (up to 95%) of patients receiving this type of cancer therapy.

The severity of radiation dermatitis is dependent upon treatment factors including the total radiation dose, the schedule of dosing, the type and quality of beam utilized, and the volume and surface area of the irradiated tissue, as well as patient physical factors such as nutritional status, skin quality and integrity, or physical condition including obesity with skin folds.

Health conditions and immune status or genetics can also increase the severity of radiation dermatitis such as immunosuppression due to diabetes or chemotherapy, or autoimmune diseases including lupus erythematosus (SLE). In addition, certain medications known as "radiosensitizers" can increase skin reactions due to radiation therapy. Furthermore, skin changes and symptoms due to radiation therapy including inflammation, pain, itching and burning can result in alterations or cessation of therapy leading to significant health consequences.

Decreasing Inflammation

Small Molecule Technologies skin and wound care products include ingredients that help decrease inflammation (and the itching that is associated with inflammation) including the beneficial 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 glycyrrhizate from licorice, avenanthramides in oats, aloe vera and shea butter have also been shown to possess anti-inflammatory activities.

Radiation exposure interferes with normal skin maturation, proliferation and renewal by damaging skin cell DNA as well as epidermal stem cells. In addition,

inflammation amplifies the skin response to radiation by inducing endothelial dysfunction in vasculature and by increasing cytokine and growth factor production including transforming factor beta (TGF-beta) resulting in delayed epithelialization. TGF-beta is also the main cytokine involved in the development of chronic radiation dermatitis and skin fibrosis.

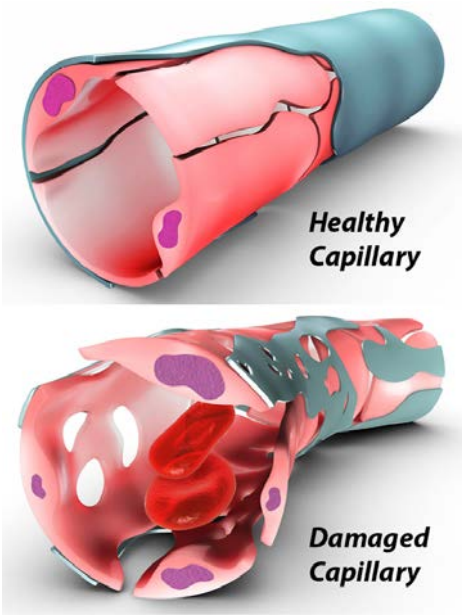
Moreover, endothelial dysfunction resulting from radiation exposure contributes to compromised epidermis, impaired skin repair and wound healing.

Counteracting Oxidative Stress and Endothelial Dysfunction

In an important study, oleuropein was found to restore endothelial progenitor cell function. In other studies, resveratrol and EGCG have been shown to inhibit endothelial dysfunction and enhance wound healing. In addition, many other ingredients found in Small Molecule Technologies skin and wound care products are helpful for individuals managing radiation dermatitis, including L-glutathione, asiaticoside and aloe vera that help improve skin repair and wound healing.

During radiation exposure, skin damage occurs instantaneously, due to a burst of generated free radicals known as reactive oxygen species (ROS) that can cause oxidative stress. In response to radiation and oxidative stress, oxidative defense enzymes are activated including superoxide dismutase (SOD). Radiation also damages skin vasculature (including capillaries) and induces vascular permeability and vasodilation leading to erythema and edema. Direct affects of radiation and ROS on endothelial cells result in endothelial dysfunction, activation of the coagulation system, inflammation and tissue remodeling.

Many of the ingredients found in Small Molecule Technologies skin and wound care products counteract oxidative stress typically found with radiation dermatitis including oleuropein, resveratrol and EGCG, as well as melatonin and L-glutathione. Some of the beneficial ingredients found in Small Molecule Technologies skincare products activate natural antioxidant enzymes that promote skin healing including SOD. In fact, in a study where manganese SOD (MnSOD) was deactivated, oleuropein was able to induce MnSOD activity. Furthermore, resveratrol has been shown to increase SOD in human skin fibroblasts.



Protecting Sensitive Skin

Skin that has been exposed to radiation treatment is very sensitive and should be protected from sun exposure. Sunscreens, chlorine and other potentially irritating substances and treatments should be avoided including artificial fragrances, deodorants, hot water baths, soaps and harsh cleansers. Small Molecule Technologies Clean N Moist is a specialized non-soap cleanser that is very gentle. Clean N Moist is perfectly pH balanced to ensure the most fragile skin is gently cleansed without causing irritation.

Small Molecule Technologies skin and wound care products include ingredients that also help improve the barrier function of skin to strengthen and protect skin. Oleuropein has been shown to increase barrier function and melatonin has been shown to have a stimulatory role in building and maintaining the epidermal barrier. Moreover, the sophisticated silicone complex in Small Molecule Technologies Silicone Barrier and Clean N Moist provides a breathable barrier to protect skin and promote skin repair. In fact, Silicone Barrier is an advanced 34% silicone cream that provides a “second skin” for patients that have compromised epidermis.

A consistent care regimen is essential in the management of radiation dermatitis. Small Molecule Technologies skin care products contain vital skin nutrients to help reduce inflammation, normalize the skin barrier function and promote cell renewal. Cer-

tified organic and pharmaceutical-grade ingredients ensure that pesticides and contaminants are excluded. In fact, Small Molecule Technologies skin and wound care products are non-sensitizing and non-irritating, and help protect sensitive skin.

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