

RETIN-LESS TECHNOLOGY

Aging is the progressive decline in the ability of an organism to resist stress, damage, and disease. Naturally aged skin is smooth, pale, and finely wrinkled whereas photo-aged skin is coarsely wrinkled and associated with uneven pigmentation. Alterations in collagen and elastin, the major structural components of skin are the major cause of skin wrinkling and the loss of elasticity. As we get older, collagen synthesis decreases and matrix metalloprotease (MMP) levels get elevated in human skin.

Extended life-span, more spare time and excessive exposure to UV radiation from sunlight or tanning devices, has resulted in an ever increasing demand to protect human skin against the detrimental effects of UV-exposure. It is well-known that UV light acts directly on nucleic acids or indirectly via reactive oxygen species, resulting in altered redox balance, activation of repair processes, and altered gene expression in skin.

Photo-aging skin changes result in wrinkling, scaling, dryness, and uneven pigmentation. Photo-aging dysregulation in melanin synthesis and distribution is generally linked with an increase in the inflammatory status of the skin which leads to the appearance of brown spots and an increase in skin redness.

For a superior anti-aging strategy, one needs to rejuvenate skin cells at both the epidermal and the dermal layers, increase the levels of proteins in the dermal-epidermal junction, up-regulate cell adhesion molecules, protect the rejuvenated cells and cellular activity, stimulate production of skin matrix proteins in addition to collagen and elastin, down-regulate transcription factors responsible for adverse effects to skin cells and detect and repair DNA damage and last but not least, improve the water and barrier homeostasis. This requires a complex modulation of the biological functions not only within the thin, superficial epidermis, but also in the deeper, dermal layer of the skin.

Retinoids are a group of substances comprising vitamin A and its natural and synthetic derivatives. Retinoids have been utilized in the management and treatment of various skin conditions, including photo-aging. Although retinoids' benefits are undeniable, they have numerous shortcomings restricting their universal use in cosmetic products. To name a few: their instability due to accelerated degradation in the presence of air and sunlight or its skin irritating profile. However, retinoids address major skin care issues – reversing aging, protecting skin from further damage and improving problem skin – so it's fully necessary to discover a functional analog of retinoids able to activate the retinoid receptors without triggering their negative effects.

With **Sepai's retin-less technology** we have found a small molecule that **safely mimics the properties of retinoids** in reversing signs of aging, providing skin protection from sun-induced damage, providing solutions to problem skin, and modulating pigmentation control. The functional analog of retinoids is a potent broad-spectrum antioxidant, is an effective inhibitor of a wide range of pro-inflammatory genes and enzymes and has a matrix-degrading metalloprotease inhibitory activity.

Key skin care important physiological and biological properties to slow down the aging process by Sepai's retin-less technology:

- **Preventative & restorative anti-aging**

- antioxidant protection to limit direct oxidative damage to the cells, proteins, and DNA
- controlling inflammation to minimize inflammation-induced skin damage
- promote collagen and inhibit matrix metalloproteinases in order to postpone skin aging.

- **Skin lightening/even toning**

- inhibit melanin production in a dose-dependent manner
- controlling inflammation to minimize inflammation-induced dysregulation in melanin synthesis and distribution.

