

Collagen Light Therapy

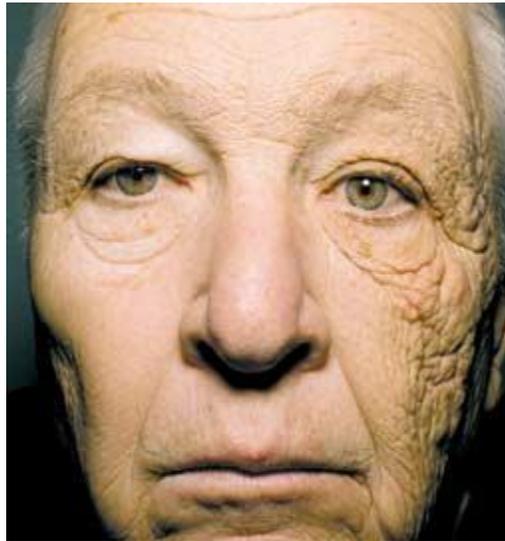
Red and infrared light affects energy production in all cells of the body, but is most effective on the skin.

As the surface of the body is surrounded by skin, it is the most readily accessible area for light therapy, and this is good news for balancing collagen production and reducing wrinkles.

Why do we get wrinkles and aged skin?

Wrinkles and sagging skin seem like a normal and inevitable part of aging, but there are well understood reasons why they happen. Various diet and lifestyle factors will either speed up or slow down their prevalence in the skin. For example:

- Cold weather – or being cold in general, causes vasoconstriction in the body, which is a narrowing of the blood vessels and takes blood away from the skin (for the purpose of reducing heat loss). This leads to reduced moisture, heat and metabolism in the skin, which over time leads to wrinkle formation. This can be seen by the increased formation of wrinkles in winter months, the increased formation of wrinkles in colder climates and increased formation in people with low metabolic rates.
- Heat – Not necessarily hot weather, but just heat in general can contribute to skin aging. This can be from household heaters, open fires, furnaces, cookers and even sunlight. Once the skin (and eyes) is warmed about 10 degrees above normal body, the cells no longer function properly. If the skin is heated to a noticeably warm temperature repeatedly, photoaging will occur rapidly.



Truck driver with photoaging on window side of face

- UV light exposure – (aka photoaging) Long term exposure to UV light, mainly from sunlight, is also known to lead to wrinkles. While important for vitamin D formation in the skin, UV light penetrates deeply enough that it can cause DNA damage, destruction of collagen, immunosuppression and reduced cell energy output. The vasodilation effect seen in sunburn would usually be protective against wrinkles if not coupled

with the inflammatory damage. Photoaging can be seen in long term sunbathers, or when comparing facial skin to skin elsewhere on the body.

- Diet – The proportion of saturated and unsaturated fats in the diet has a big effect on wrinkle formation. Both human and rabbit studies have demonstrated that diets high in polyunsaturated oils greatly increase the rate of wrinkle formation, while saturated fats are protective. In some studies, shaved rabbits that were fed coconut oil (saturated fat) as the only fat in their diet, and then exposed to UV light, barely formed any wrinkles, whereas the polyunsaturated oil fed group wrinkled quickly. This is because ultraviolet light powerfully induces peroxidation in unsaturated fats and so catalyses the aging and carcinogenic effects of ultraviolet light. This can be seen in the youthful appearance of people in tropical cultures.

These 3 reasons are the major causes of wrinkles, and while other dietary and lifestyle factors such as smoking, alcohol, cosmetics with toxic ingredients, food quality, etc., do contribute, they are less significant than these big 3.

Collagen and elastin in skin

Collagen is the main type of protein found in the mammalian body, and is primarily a structural protein found between cells and in joints. Skin, tendons and ligaments make up the majority of collagen deposits in the body.

When skin cells are stressed (from cold weather, bad diet, general ageing etc.) they tend to overproduce collagen, similar to the process of scar formation and fibrosis, which leads to an inflammatory response characterized by excess collagen framework and thus a reduction in active healthy cells. The overproduction of collagen, combined with a stressed/inflamed state ultimately results in tough and wrinkly skin. This slow, ageing process can be seen more clearly in animals; older animals typically have thicker, harder hides and meat from older animals is typically tougher (due to more collagen framework in the muscle meat).

Collagen exists in a balance within the skin, with an equilibrium between the production and break down of the protein (to allow for tissue growth, remodeling, etc.). Too much collagen production and you get wrinkly, tough skin and eventually fibrosis. Too much collagen break down (such as from various invasive cancers) and you destroy the extracellular matrix which is needed for normal cell function.

Healthy cells however, produce and break down the right amount of collagen. Producing just the right amount helps joints stay strong and skin to be flexible and wrinkle-free. Breaking down the right amount allows efficient wound healing and even inhibits cancer formation.

How does red light improve the skin?

It has long been shown that red light, particularly 620nm and 680nm, when applied to wounds and cuts, speeds up healing and reduces the likelihood of a scar.

Wrinkles and aged skin are formed slower than scar tissue, but by the same essential process – an overproduction of the collagen framework and so a lack of metabolically active cells. How does red light prevent this?

- Red light floods the skin cells with ATP (energy), leading to cell proliferation, better survival/regeneration and tissue repair.
- Red light photodissociates nitric oxide from mitochondria which helps improve blood flow to the area and provide the resources (glucose, etc.) for healthy repair.
- Red light reduces inflammation in the area it is applied. Inflammation being a significant inhibitor of healthy repair.
- Red light improves surface tension in cells and helps to prevent mitochondrial enzymes from leaking out into the cytoplasm, thereby protecting the cell's energy metabolism.

Essentially, an inefficient metabolism is what leads to wrinkles over time. Increasing energy metabolism using red light has been shown to help with a variety of skin issues, including the hardening of our skin that occurs with aging and leads to wrinkles. Strong sources of 620nm, 680nm, 760nm and 825nm red light are the most effective.

Other ways to promote healthy collagen production

Dietary gelatin – Pork rinds, ox tail, bone broth, beef cheeks, gelatin powder, chicharrones, etc., are all important sources of the amino acids glycine, alanine, and proline, which are the primary building blocks of collagen in the body. In addition, these amino acids have broad anti-inflammatory effects.

Progesterone – A key regulator of collagen production in the body. Progesterone exists in a balance with the stress hormones cortisol and oestrogen. When this balance gets disrupted via environmental and dietary factors (leading to oestrogen dominance) current collagen in the skin hardens and shrinks – reducing skin elasticity and leading to wrinkles. Natural progesterone cream can be applied directly to the skin.

Avoid unsaturated fats – Polyunsaturated fats have similar pro-fibrotic effects to oestrogen, by dysregulating collagen production. Collagen also gets deposited in arteries and contributes to tumours because of polyunsaturated fats. Avoiding liquid oils, seeds, nuts and fish fat can help to reduce this.

*Article provided by Red Light Man website