

# *FACE:* THE MAIN CAUSES OF *AGEING*

Wrinkles are folds on the surface of the skin, **a breakdown of the skin due to a sagging of the dermal structures observed during ageing**, linked to a rarification and disorganisation of two proteins: collagen and elastin. These molecules, produced by fibroblasts, form a framework in which the other components of the skin are integrated. Multiple internal and external factors influence the biological processes responsible for skin ageing and wrinkle formation.



# THE INTERNAL CAUSES

Like all other organs, the skin is subject to the passage of time and each individual's genetic programming. **With age, its functions deteriorate** with variations specific to each individual. This is intrinsic or chronological ageing.

The most noticeable changes occur in the layer of cells that separates the dermis from the epidermis. They become fewer in number, the epidermis becomes

thinner, and the contact surface between the dermis and the epidermis decreases, which results in a smaller exchange surface for the nutritional supply to the epidermis. This process of reduction in the proliferative capacity of the basal layer cells, and also of the keratinocytes, fibroblasts and melanocytes, is called cellular senescence. Older skin therefore contains more senescent cells. At the same time, type I collagen fibres and elastin fibres become scarcer. Oligosaccharides—such as hyaluronic acid—become degraded, which influences the skin's ability to retain water.

**Intrinsic ageing is thought to account for only 3% of the causes of ageing.** This is an inevitable physiological process that **leads to thin, dry skin, wrinkles and decreased volume.**

# THE EXTERNAL CAUSES

At the same time, the skin is subjected to external factors which, over time, amplify the phenomenon of chronological ageing. **Ultraviolet (UV) rays, air pollution, tobacco consumption and poor nutrition have damaging effects on the skin** by adversely affecting its balance. This is extrinsic ageing or ageing caused by external environmental factors **resulting in wrinkles, loss of elasticity and roughness.**

**Solar radiation is the main factor in extrinsic skin ageing** and is called photoageing. It is responsible for 80% of facial ageing. Keratinocyte proliferation is impaired. In addition, they produce less type VII collagen, a protein that anchors fibrils at the dermal-epidermal junction. This decreased production contributes to wrinkles due to a weakening of the connection between the dermis and the epidermis.

**Collagen and elastic fibres become degraded** under the effect of specific enzymes: MMPs (Matrix Metalloproteinases) and elastases. A striking feature of photoaged skin is the accumulation of abnormal elastic tissue called solar elastosis. In addition, microvascularisation decreases, and the skin is not properly nourished.

# THINGS TO REMEMBER...

Skin ageing is characterised by wrinkles, loss of elasticity and a rough appearance. It is the result of chronological ageing and extrinsic ageing caused by external factors, mainly the sun. These two types of ageing involve different mechanisms and add up to damaging effects on all skin structures.



The ageing of sun-protected areas, like the inner arm, is mainly intrinsic, and the ageing of exposed areas, like the face, neck, chest and hands, is mainly extrinsic.

The activity of fibroblasts and keratinocytes decreases, and the activity of destructive enzymes increases. An imbalance progressively sets in, and the support structure becomes fragile, which leads to the formation of wrinkles.

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## **SOURCE:**

Zhang S, Duan E. Fighting against Skin Aging: The Way from Bench to Bedside. Cell Transplant. 2018; 27(5): 729-738.

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