

Expression of certain genes may be key to more youthful looking skin

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Human skin structure. Credit: Wikipedia

Some individuals' skin appears more youthful than their chronologic age. Although many people try to achieve this with creams, lotions, injections, and surgeries, new research published in the *Journal of the American Academy of Dermatology* indicates that increased expression of certain genes may be the key to intrinsically younger looking—and

younger behaving—skin.

"It's not just the [genes](#) you are born with, but which ones turn on and off over time," said lead author Alexa B. Kimball, MD, MPH, a dermatologist and President and CEO of Harvard Medical Faculty Physicians at Beth Israel Deaconess Medical Center, who conducted research for the study while previously at Massachusetts General Hospital. "We found a wide range of processes in the [skin](#) affected by aging, and we discovered specific [gene expression patterns](#) in [women](#) who appear younger than their chronologic age."

To produce a comprehensive model of aging skin, Kimball and her colleagues collected and integrated data at the molecular, cellular, and tissue levels from the sun-exposed skin (face and forearm) and sun-protected skin (buttocks) of 158 white women ages 20 to 74 years. As part of the study, the team looked for gene expression patterns common in women who appeared years younger than their chronologic age.

The physical appearance of facial skin was captured through digital images and analysis. Skin samples were processed for analysis and saliva samples were collected for genotyping.

The analyses revealed progressive changes from the 20s to the 70s in pathways related to [oxidative stress](#), energy metabolism, senescence (aging) and skin barrier. These changes were accelerated in the 60s and 70s. Comparing sun-exposed and sun-protected skin samples revealed that certain genetic changes are likely due to photoaging.

The gene expression patterns from the women in the study who were younger appearing were similar to those in women who were actually younger in age. These women had increased activity in genes associated with basic biologic processes, including DNA repair, cell replication, response to oxidative stress, and protein metabolism. Women with

exceptionally youthful-appearing facial skin in older age groups also had higher expression of genes associated with mitochondrial structure and metabolism, overall epidermal structure, and barrier function in their facial epidermal samples, as well as dermal matrix production.

A better understanding of the genes associated with youthful-appearing skin may point to new strategies to enhance factors that slow the skin's aging process. This work also confirmed that ultraviolet (UV) exposure is a main driver and accelerator of skin aging.

"We were particularly surprised by the identification of a group of women who not only displayed a much more youthful skin appearance than would be expected based on their chronological age, but who also presented a specific [gene expression profile](#) mimicking the biology of much younger skin. It seems that their skin looked younger because it behaved younger," Kimball noted.

"Improving our understanding of which choices and factors led to this specific profile is likely to be of great interest across the ages."

Provided by Beth Israel Deaconess Medical Center

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