

Forever young: study uncovers protein that keeps skin youthful

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The new research may hold the key to eventually combating the ageing process

Beauty might only be skin deep, but for those wondering how to keep that skin young, scientists may have found an answer in the form of a protein that encourages cell competition.

The prosaically named COL17A1 might not sound like a fountain of youth, but the new study suggests it does the heavy lifting when it comes to keeping skin intact and unimpaired.

The protein works by encouraging cell competition, a key process to maintain tissue fitness. That effectively "drives out" weaker cells while encouraging replication of stronger ones.

"Damaged or stressed stem cells can be selectively eliminated by intact stem cells every day in our skin," said Emi Nishimura, a professor at the Tokyo Medical and Dental University's Stem Cell Biology department, who led the research.

But ageing results in a depletion of COL17A1, as do familiar enemies of youthful skin, like UV radiation and other stress factors.

And when that happens, weaker cells replicate, leaving the skin thinner, more prone to damage and slower to heal.

The research published Thursday in the journal *Nature* is based on investigations using mice tails, which share many of the same characteristics as human skin.

After confirming the importance of COL17A1, the team decided to investigate whether they could stimulate the protein once it was depleted—effectively looking for compounds that could kickstart the anti-ageing process in skin.

They isolated two chemical compounds—Y27632 and apocynin—and tested both on skin cells, with positive results.

"Application of these drugs to full-thickness skin wounds significantly promoted wound repair," the study said.

The two compounds point to ways of "facilitating skin regeneration and reducing skin ageing," the study added.

In a review of the study commissioned by *Nature*, two professors from the University of Colorado said cell competition had previously only been studied extensively in fruit flies.

The research "provides evidence that healthy cells in mammals can also efficiently repopulate adult tissues, replacing unfit or damaged cells," wrote professors Ganna Bilousova and James DeGregori.

And they said the research offered "proof-of-principle" that the two chemical compounds could combat ageing.

"Future studies are needed to determine the mechanisms of cell competition in other tissues, and to identify compounds capable of reversing ageing in other organs," they said.

Nishimura told AFP that the work could eventually lead to products like creams or tablets that could stop skin deterioration and promote repair.

"We are going to collaborate with pharmaceutical or cosmetic companies for the clinical use of the chemicals," she said.

She said additional research would investigate whether the same process might also be at work in other parts of the body that have so-called epithelial cells like skin does.

"We are working on other epithelial organs as well to find out (whether) similar competition may underlie long-term tissue maintenance as well as organ ageing," she said.

More information: Stem cell competition orchestrates skin

homeostasis and ageing, *Nature* (2019). [DOI: 10.1038/s41586-019-1085-7](https://doi.org/10.1038/s41586-019-1085-7) ,
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