# NewScientist

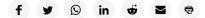**Health**

# Discovery of wrinkle-causing molecules could lead to new cosmetics

Researchers have identified hundreds of potential biomarkers that may be involved in the physical signs of ageing

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A decline in the proteins elastin and collagen over time can lead to wrinkles and skin sagging
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Hundreds of biomarkers that may either drive or protect against the physical signs of ageing have been identified for the first time, a discovery that could help to develop cosmetics that target the cause of wrinkles and age-related skin sagging.

Previously, researchers have looked for epigenetic biomarkers – signs that behaviours and environments change the way genes work – to estimate the biological age of organs, such as skin.

Feeling it was unclear whether these biomarkers may drive the ageing process or be a consequence of it, Raya Khanin at biotechnology company LifeNome in New York and her colleagues looked at two existing sets of data.

The first was based on half a million participants of the UK Biobank study, who were asked if people commonly say they look younger than they are, older or about their age. These results were then linked to the participants' genetic variants to gauge whether these may influence facial ageing. The second data set linked these genetic variants to epigenetic biomarkers in nearly 7000 people.

To ensure they were uncovering how epigenetic biomarkers may cause the physical signs of ageing, rather than just a correlation between the two, the researchers then ran an analysis called Mendelian randomisation, which uses the genetic variation that occurs among people as a stand in for the randomisation of some trials.

From this, they uncovered hundreds of what they suspect are epigenetic biomarkers, around a quarter of which may cause the physical signs of facial ageing. The remaining three-quarters were linked to the acceleration of this ageing, as well as delaying it or protecting against it.

This is the first study to uncover epigenetics biomarkers that cause facial ageing, according to the researchers.

These are thought to affect the proteins involved in skin ageing, such as elastin – which enables skin to stretch – and collagen, which gives structure, strength and further elasticity to skin. They may also affect genes that cause age-related skin pigmentation.

Anti-ageing therapies could one day target these biomarkers, according to the researchers. Other teams could also use the results to gauge whether a therapy that is being developed, or already exists, is effective, says Khanin. "Knowing causal epigenetic markers will be used for developing novel anti-ageing technologies that target the root cases of facial ageing."

The biomarkers the team has identified could be promising targets for interventions that aim to reduce the physical signs of skin ageing, for example by increasing skin's elasticity, says Alexander Tyshkovskiy at Harvard University.

Jesse Poganik, also at Harvard, says the study is based on somewhat subjective data, as the Biobank participants self-reported how people perceive their age. Nevertheless, using Mendelian randomisation to identify biomarkers that may drive the onset of wrinkles and others signs of ageing is an innovative approach that could lead to better interventions, he says.