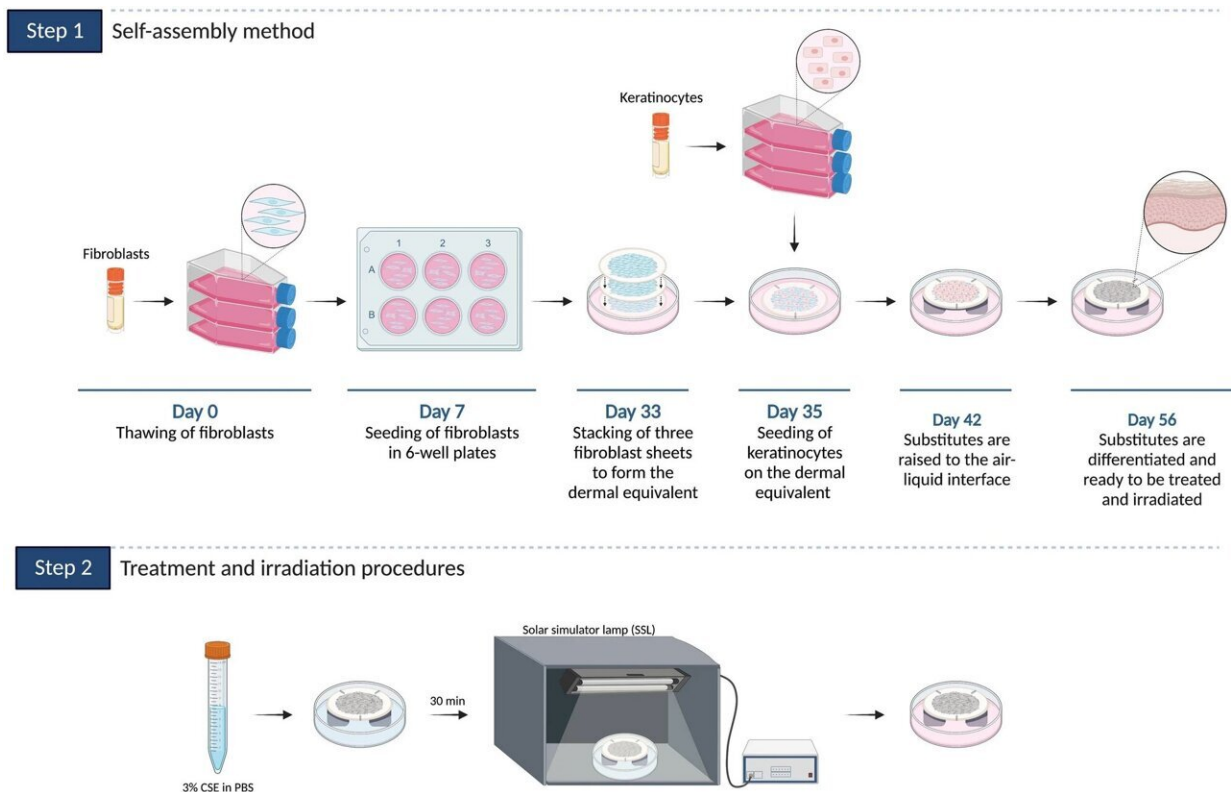


Skin aging: A synergy between cigarette smoke and sunlight

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Self-assembly method (step 1) and treatment and SSL irradiation procedures (step 2). Credit: *Scientific Reports* (2023). DOI: 10.1038/s41598-023-44868-z

Combined exposure of the skin to cigarette smoke and UV rays could lead to faster premature aging, according to a study by Université Laval

and the Centre de recherche du CHU de Québec-Université Laval.

Research has already shown the consequences of [cigarette smoke](#) and sunlight separately. Since humans are rarely exposed to a single environmental factor, the team was interested in the harmful interaction of cigarette smoke and UV rays.

Led by Roxane Pouliot, professor in the Faculty of Pharmacy, and Patrick J. Rochette, professor in the Faculty of Medicine, the scientists tested several combinations and levels of exposure on skin substitutes. "Our model is reconstructed from human cells without adding collagen. It seems to be the most relevant model so far for this type of research," says Roxane Pouliot.

By imitating real-life exposure conditions, the research team discovered a harmful synergy at the structural and molecular levels of the skin.

"By studying the skin's layers, we noticed that cigarette smoke combined with UV rays led to a more rapid reduction in types 3 and 4 collagen, responsible for the skin's plumpness and [youthful appearance](#), and a sagging of the dermis," says Professor Pouliot.

Doctoral student Alexe Grenier, the study's first author, adds that the combined factors increase the amount of metalloproteinase, an enzyme that degrades collagen when in excess. In addition, a decrease in collagen precursor was observed, which could lead to reduced [collagen](#) production.

To further understand the consequences of cigarette smoke on the skin, the team will continue their research by analyzing the effects of its many compounds. "We could identify the most harmful products for the skin and, if possible, use compounds to counter their consequences. This is particularly relevant regarding young smokers," says Roxane Pouliot.

"We could also test creams or other [cosmetic products](#) capable of counteracting the effects."

In addition to cigarette smoke, wood smoke from [forest fires](#), for example, could also be tested. Patrick J. Rochette's laboratory has adapted a cigarette smoke capture technique that could also capture wood smoke.

The study was published in [Scientific Reports](#).

More information: Alexe Grenier et al, The combination of cigarette smoke and solar rays causes effects similar to skin aging in a bilayer skin model, *Scientific Reports* (2023). [DOI: 10.1038/s41598-023-44868-z](#)

Provided by Laval University

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