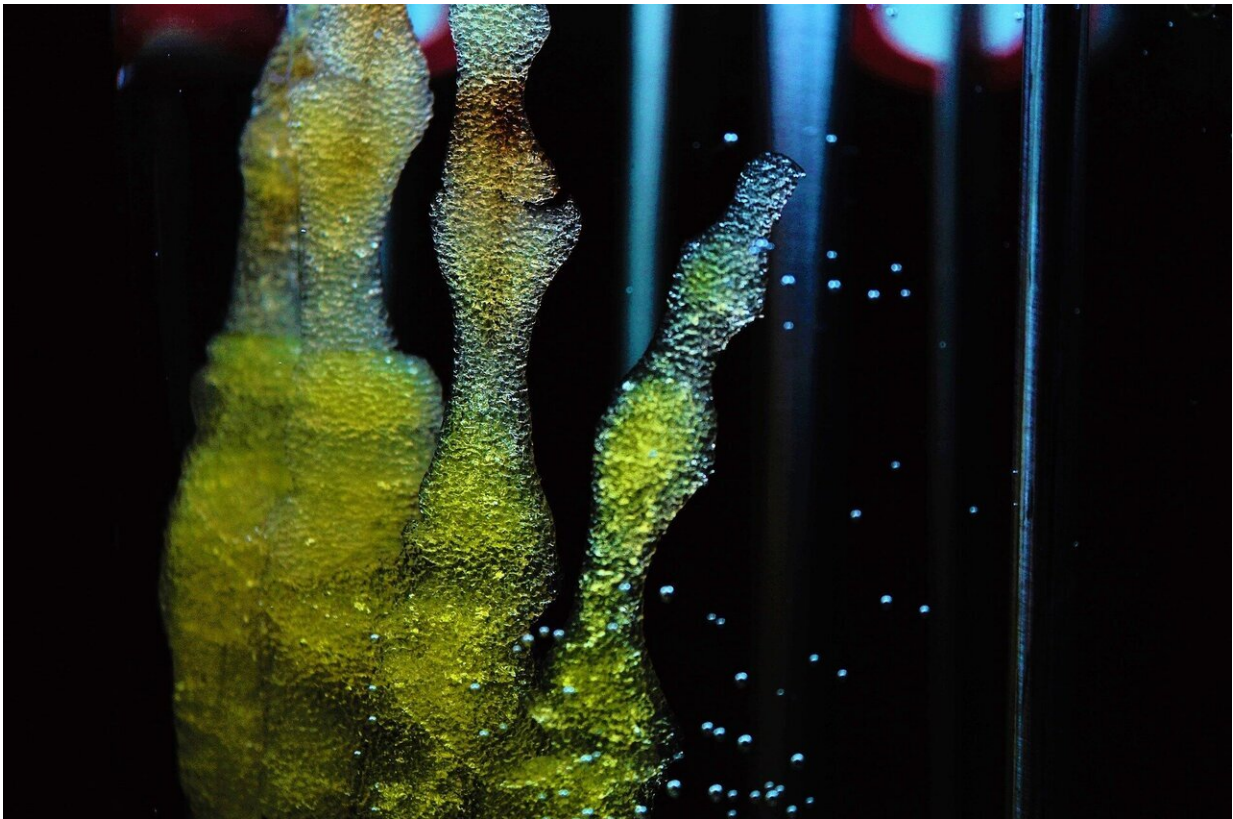


Softening stiff hair follicle stem cells with a microRNA regrows hair

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Just as people's joints can get stiff as they age and make it harder for them to move around, hair follicle stem cells also get stiff, making it harder for them to grow hair, reports a new Northwestern Medicine

study.

But if the hair follicle's [stem cells](#) are softened, they are more likely to produce hair, the scientists found.

Northwestern scientists discovered how to soften up those stem cells to enable them to grow hair again. In a study in mice published this week in *PNAS*, the investigators report that they can soften the stem cells by boosting the production of a tiny RNA, miR-205, that relaxes the hardness of the cells. When scientists genetically manipulated the stem cells to produce more miR-205, it promoted hair growth in young and old mice.

"They started to grow hair in 10 days," said corresponding author Rui Yi, the Paul E. Steiner Research Professor of Pathology and professor of dermatology at Northwestern University Feinberg School of Medicine. "These are not new stem cells being generated. We are stimulating the existing stem cells to grow hair. A lot of times we still have stem cells, but they may not be able to generate the hair.

"Our study demonstrates the possibility of stimulating hair growth by regulating cell mechanics. Because of the potential to deliver microRNA by nanoparticles directly into the skin, next we will test whether topically delivered miR-205 can stimulate hair growth first in mice. If successful, we will design experiments to test whether this microRNA can promote [hair growth](#) potentially in humans."

This study was conducted in genetically engineered mouse models. The scientists used advanced microscopy tools, including [atomic force microscopy](#), to measure the stiffness and two-photon microscopy to monitor cell behaviors in [live animals](#).

Other Northwestern authors include Jingjing Wang, Yuheng Fu and

Kathleen Green.

The article is titled "MicroRNA-205 promotes hair regeneration by modulating mechanical properties of [hair](#) follicle stem cells."

More information: Jingjing Wang et al, MicroRNA-205 promotes hair regeneration by modulating mechanical properties of hair follicle stem cells, *Proceedings of the National Academy of Sciences* (2023).

[DOI: 10.1073/pnas.2220635120](https://doi.org/10.1073/pnas.2220635120)

Provided by Northwestern University

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