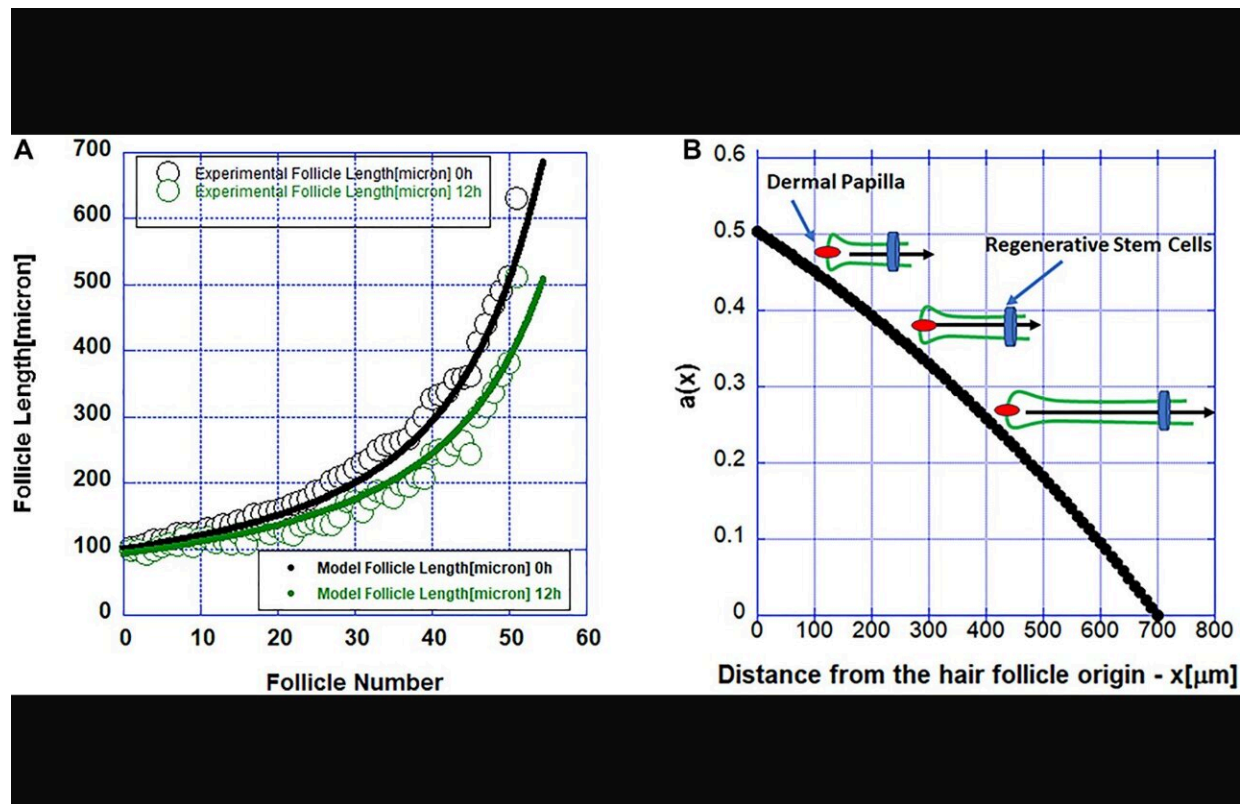


Apoptotic cells may drive cell death in hair follicles during regression cycle

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(A) Simulations of the reaction-diffusion model (solid lines) and measured follicle length (solid circles). (B) The function $a(x)$ describing the pro-survival factor released by the regenerative stem cell pool. The inset shows a schematic of a hair follicle regressing slower as it gets shorter and closer to higher values of the pro-survival factor modeled with the function $a(x)$ and released by the regenerative stem cells. Credit: *Oncotarget* (2023). DOI: 10.18632/oncotarget.28529

A new research paper titled "[Apoptotic cells may drive cell death in hair follicles during their regression cycle](#)" has been published in *Oncotarget*.

Intravital microscopy in live mice has shown that the elimination of epithelial cells during hair follicle regression involves supra-basal cell differentiation and basal cell apoptosis through synergistic action of TGF- β (transforming [growth factor](#)) and mesenchymal-epithelial interactions.

In this process, the basal epithelial cells are not internally committed to death, and the mesenchymal dermal papilla (DP) plays an essential role in death induction. Given that DP cells are not necessary for completion of the cycle, only for its initiation, it is still an open question as to the mechanism that leads to the propagation of apoptosis towards the regenerative stem cell population.

In their new study, researchers Bradley D. Keister, Kailin R. Mesa and Krastan B. Blagoev from the National Science Foundation, The Jane Coffin Childs Memorial Fund for Medical Research, Yale School of Medicine, Johns Hopkins University, Bulgarian Academy of Sciences, and Sorbonne Université performed a quantitative analysis of the length of hair follicles to investigate their regression cycle.

"In this paper we introduced a mathematical model of the hair follicle regression cycle that postulates that the regression is initiated by the dermal papilla, but that this signal affects only the cells adjacent to it," the researchers explain.

The data are consistent with a propagation mechanism driven by [apoptotic cells](#) inducing apoptosis in their neighboring cells. The observation that the apoptosis slows down as the apoptotic front approaches the [stem cells](#) at the end of the follicle is consistent with a gradient of a pro-survival signal sent by these stem cells. An experiment

that can falsify this mechanism is proposed.

"In conclusion, hair follicle regression may be governed by cell-cell induced programmed [cell death](#), which slows down as the stem cell compartment is approached and does not affect the stem cell compartment from which the growth phase is initiated. The class of models introduced here can be used to describe the renewal kinetics of other stem cell niches like the intestinal stem cell niche," the researchers add.

More information: Bradley D. Keister et al, Apoptotic cells may drive cell death in hair follicles during their regression cycle, *Oncotarget* (2023). [DOI: 10.18632/oncotarget.28529](https://doi.org/10.18632/oncotarget.28529)

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