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Activating pathway could restart hair growth in dormant hair follicles

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A pathway known for its role in regulating adult stem cells has been shown to be important for hair follicle proliferation, but contrary to previous studies, is not required within hair follicle stem cells for their survival, according to researchers with the Perelman School of Medicine at the University of Pennsylvania. A new study, published in *Cell Stem Cell*, identifies a molecular pathway that can be activated to prompt hair growth of dormant hair follicles, or blocked to prevent growth of unwanted hair.

The team examined the functions of Wnt proteins, which are small molecular messengers that convey information between cells and activate signaling via the intracellular molecule β-catenin. By disrupting Wnt signaling in an animal model with an inhibitor Dkk1, the team found that hair growth was prevented. However, stem cells were still maintained within the dormant hair follicles. When Dkk1 was removed, the Wnt/β-catenin pathway resumed normal function, the stem cells were activated, and hair growth was restored.

The team also unexpectedly found that the Wnt/β-catenin pathway is normally active in non-hairy regions, such as on the palms of hands, soles of feet and the tongue, as well as between hair follicles on the surface of the skin. This finding is consistent with previous results showing that removing β-catenin prevents growth of skin tumors.

"While more research is needed to improve our understanding of this pathway, our results suggest that therapeutics capable of decreasing

levels of Wnt/β-catenin signaling in the skin could potentially be used to block growth of unwanted hair, and/or to treat certain skin tumors. Conversely, if delivered in a limited, safe and controlled way, agents that activate Wnt signaling might be used to promote hair growth in dormant hair follicles in conditions such as male pattern baldness," said senior author Sarah Millar, PhD, professor in the departments of Dermatology and of Cell and Developmental Biology.

Researchers aim to better understand the key components and functions of the Wnt/β-catenin pathway. Important areas of focus for future work will include developing effective means of safely targeting therapeutics to the skin for clinical and cosmetic applications.

Provided by University of Pennsylvania School of Medicine