Medical Xpress

Researchers identify 'signal' crucial to stem cell function in hair follicles

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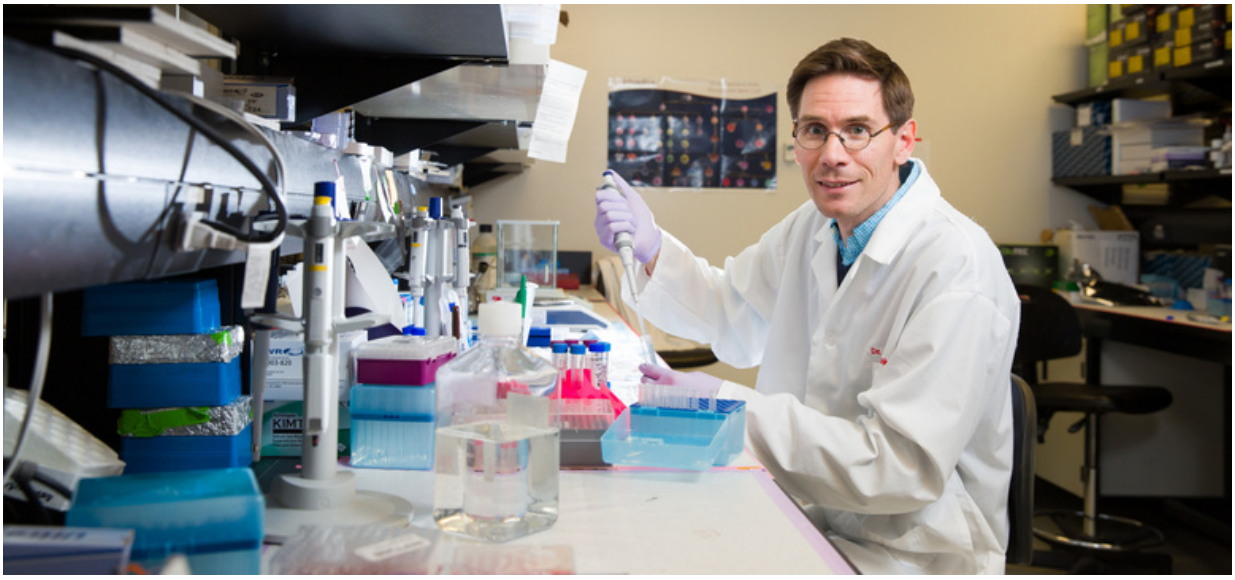

Jeff Biernaskie's research identifies a factor essential for dermal stem cells to continuously divide during tissue regeneration. Credit: Riley Brandt, University of Calgary

Stem cell researchers at the University of Calgary have found another piece of the puzzle behind what may contribute to hair loss and prevent wounds from healing normally.

Jeff Biernaskie's research, published recently in the scientific journal *npj Regenerative Medicine* identifies a key signalling protein called platelet-

derived growth factor (PDGF). This protein is critical for driving self-renewal and proliferation of dermal stem cells that live in hair follicles and enable their unique ability to continuously regenerate and produce new hair.

"This is the first study to identify the signals that influence hair follicle dermal stem cell function in your skin," says Biernaskie, an associate professor in comparative biology and experimental medicine at the University of Calgary's Faculty of Veterinary Medicine, and Calgary Firefighters Burn Treatment Society Chair in Skin Regeneration and Wound Healing. Biernaskie is also a member of the Alberta Children's Hospital Research Institute.

"What we show is that in the absence of PDGF signalling hair follicle dermal stem cells are rapidly diminished because of their inability to generate new stem cells and produce sufficient numbers of mature dermal cells within the hair follicle."

Biernaskie and his team of researchers study dermal stem cells located within hair follicles. They are looking to better understand dermal stem cell function and find ways to use these cells to develop novel therapies for improved wound healing after injury, burns, disease or aging.

This study, co-authored by Raquel Gonzalez and Garrett Moffatt, shows that PDGF is key to maintaining a well-functioning stem cell population in skin. And in normal skin, if you don't have enough of it the stem cell pools start to shrink, meaning eventually the hair will no longer grow and wounds will not heal as well.

"It's an important start in terms of how we might modulate these cells towards developing future therapies that could regenerate new dermal tissue or maintain hair growth" says Biernaskie.

Biernaskie's lab is looking at the potential role of stem cells in wound healing and the potential to stimulate these cells to improve skin regeneration, as opposed to forming scars.

More information: Raquel González et al. Platelet-derived growth factor signaling modulates adult hair follicle dermal stem cell maintenance and self-renewal, *npj Regenerative Medicine* (2017). DOI: 10.1038/s41536-017-0013-4

Provided by University of Calgary