Abstract Template

Abstract Title: Extracellular vesicles secreted by stimulated dermal fibroblasts enhance hair follicle growth via regenerative activation of dermal papilla cells

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Abstract (not more than 300 words)

Dermal papilla (DP) displays a pivotal role in hair follicle (HF) morphogenesis and cycling through epithelial-mesenchymal interactions. Some factors are crucial in HF development like β-catenin and bone morphogenetic protein (BMP) pathways or also growth factors such as fibroblast growth factors (FGF) or platelet derived growth factor (PDGF). Intact DP or DP cells (DPCs) at early passages can be engrafted with epidermal cells to reconstitute HF on mice. However DPCs gradually lost their regenerative capacity after being passaged except if they are cultivated in sphere. This micro-environmental reprogramming partially restores the inductive ability of DPC to make HF. Our objective is to study the dialogue between HF and its macro-environment through secretion of extracellular vesicles (EVs) and their potential to activate DPC and stimulate HF growth.

To recapitulate DPC activation in vitro, dermal fibroblasts (DFs) were stimulated by both bFGF and PDGF-AA and secreted EVs were purified. Primary DPCs cultivated in 2D for 5 passages were treated with EVs for 48h and expression profiles were compared to untreated cells and DPCs cultivated as spheres. Stimulated EVs modulate genes whose expression was restored by sphere formation, including soluble ligands of both beta-catenin and BMP pathways that are included into the conditioned medium from stimulated DPC. In addition, cell proliferation of EVs-treated DPCs was enhanced. Remarkably, EVs enhance the growth of HF cultivated *ex-vivo* and activate beta-catenin in hair follicle keratinocytes (HFK) whereas the soluble growth factors did not. In conclusion, EVs could be a modulator of DPC activation and a valuable tool to maintain and restore DPC activity and HF cycling.

Keywords—Dermal papilla, extracellular vesicles, hair follicle, Wnt/β-catenin

Professional Biography (100-150 words)

Firstly, Alizée Le Riche obtained her master's degree in cellular biology from Université Paul Sabatier in Toulouse and she is now completing her PhD from Université Paris-Diderot in collaboration with a private cosmetic industry named SILAB. Alizée was interested in dialogue between hair follicle and its macro-environment via implication of extracellular vesicles.



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