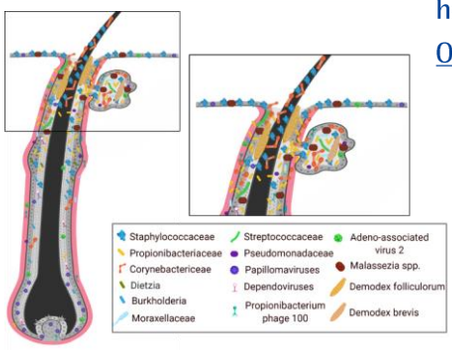
Investigating changes in the human scalp hair follicle microbiome *ex vivo*

Claim substantiation:

- Healthy skin with a balanced microbiome
- anti-dandruff
- anti-acne



The human hair follicle is colonized by **unique and complex microbiota and serves as a microbial habitat**, providing a maximal surface area for microbe-host interactions regulating scalp health. Hair follicle microbiome dysbiosis is involved in hair follicle disorders, such as acne vulgaris, alopecia areata, androgenic alopecia, dandruff. Therefore, targeting the hair follicle microbiome leads to the development of **novel cosmetic strategy to manage hair disorders and maintaining scalp health.**

Our models:

Amputated microdissected hair follicle

Full-length microdissected hair follicle

We can also investigate **human skin microbiome** *ex vivo*!

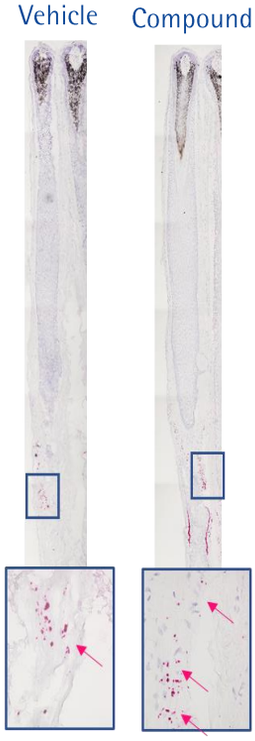
We have access to affected skin samples: Alopecia Areata, Androgenetic Alopecia, Acne Inversa,...

Case study: Compound X restores a healthy microbiome in the hair follicle

1. Compound X stimulates the production of DCD in the hair follicle

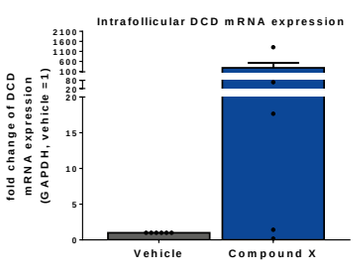
Healthy HFs manage and efficiently control their microbiome by production of **antimicrobial peptides (AMPs)** with different microbial specificities, and which are inducible by bacterial products/metabolites. We analyze how manipulation of the microbiome changes AMP expression and how treatment with selected compounds may help in boostering certain antimicrobial peptides.

Vehicle Compound X

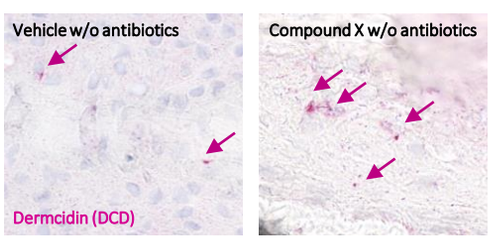


Dermcidin (DCD)

Representative images from n=6 healthy donors, qualitative observation by *in situ* hybridization using a DCD specific probe



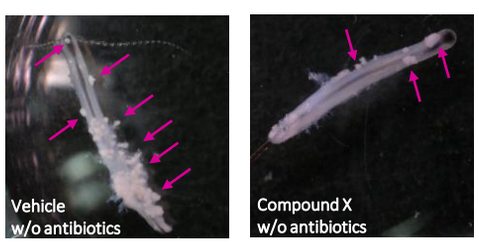
Data from n=5-6 healthy donors, analysis 6h after treatment, mean±SEM.



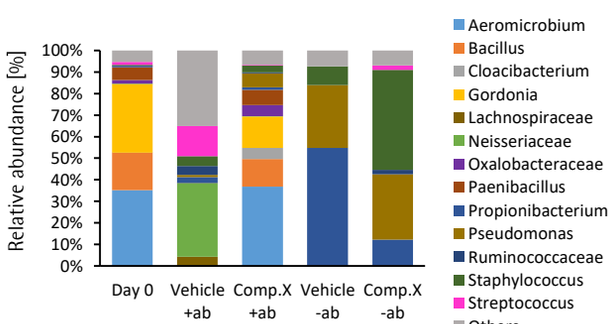
Representative images of DCD positive cells (immunostaining) in the HF epithelium.

2. Compound X prevents hair follicle contamination by bacteria and fungi

We analyze how **treatment with cosmetic compounds changes the hair follicle microbiome** and whether this treatment could be a suitable adjunct therapy in hair disorders characterized by dysbiosis, in order to have a more equilibrated microbiome.



Representative images of full length hair follicle treated with vehicle or compound X in absence of antibiotics.



16S RNA sequencing of full-length hair follicles from one donor.

Additional Read-Out Parameters:

In vitro: agar diffusion assay; MIC determination; 96 well liquid cultures and determination of viability

Ex vivo: shotgun sequencing; alpha diversity and taxonomic evaluations; Pas/Lightgreen staining to quantify fungal colonies; in situ hybridization of bacteria strains; analysis of inflammatory markers, antimicrobial peptides, pigmentation, etc.

Contact us for a customized study:

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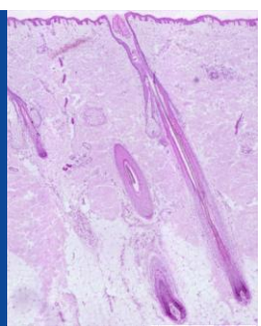

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- Delivering mechanistic action stories, biomarkers & predictors of response
- Claims support for cosmetic ingredients in skin or hair follicle models
- Clinical trials carried out with strategic partners for healthy skin and hair benefits
- Comprehensive project reports & manuscript drafting and submission

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