NeoFollix: Programming dermal cells to stimulate hair regeneration

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Dermal Condensate (DC): specialized dermal cells essential for hair formation

Millar, J Invest Derm, 2002
Hardy, Trends Genet, 1992
Xin, Greco, Myung, Cell 2016
Unmet need for effective hair loss treatments

Current treatments:
Maintain or transplant EXISTING hair

1st Line
- Minoxidil
- Finasteride

2nd Line
- Hair transplantation
- Alternatives

No NEW hair!

Miniaturized hair
Existing Normal-sized hair

https://www.bosley.com/
https://www.mayoclinic.org/diseases-conditions/hair-loss/
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US population diagnosed with androgenetic alopecia (AGA)
- 80M

Patients seeking treatment
- 50M

Unsatisfied patients
- 25M

- Cost of hair transplant: ~ $10,000

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Our strategy:
Induce NEW hair follicles

Hair-inductive factors

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Our strategy:
Induce NEW hair follicles

Hair-inductive factors

Miniaturized hair → Existing Normal-sized hair → NEW healthy hair
Dermal condensate size controls hair follicle size
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The Barrier: How do dermal condensates form?
Discovery: We identified TWO signals required and sufficient for DC formation
Discovery: We identified **TWO** signals **required** and **sufficient** for DC formation.

Signal X

Signal Y

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<thead>
<tr>
<th>Control</th>
<th>Signal X</th>
<th>Signal X + Signal Y</th>
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Skin with *in vivo* genetic activation of Signal X and/or Signal Y.
Discovery: We identified TWO signals required and sufficient for DC formation

Control

Skin with in vivo genetic activation of Signal X and/or Signal Y

The level and duration of these signals modulates DC size
Where we are: First in-vitro platform to generate DC cells with X and Y

**Signal X agonist**
**Signal Y agonist**

- DC progenitor
- Proliferating DC progenitor

Robust DC expansion
Robust DC gene expression

**X marker**

- **Y marker**

- **DC marker**

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<tr>
<th>Relative Expression</th>
<th>CONT</th>
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Proliferating DC progenitor

**X marker**

**Y marker**

**DC marker**

![Graphs showing relative expression levels for X, Y, and X+Y markers across different conditions (CONT, X, Y, X+Y).]
Next Steps: Proposed experimental plans

Hair Graft Model (4-6 weeks)

High-throughput platform

New hair follicles

Signal X

Signal Y
Budget and Milestones

Optimize dose and duration of X and Y
Functional validation of DC cells to make new hair

Synthesis and delivery of small molecules for signal X and Y in collaboration with experts

Clinical-stage development

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<th>Workstream</th>
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