Follicusan™ DP

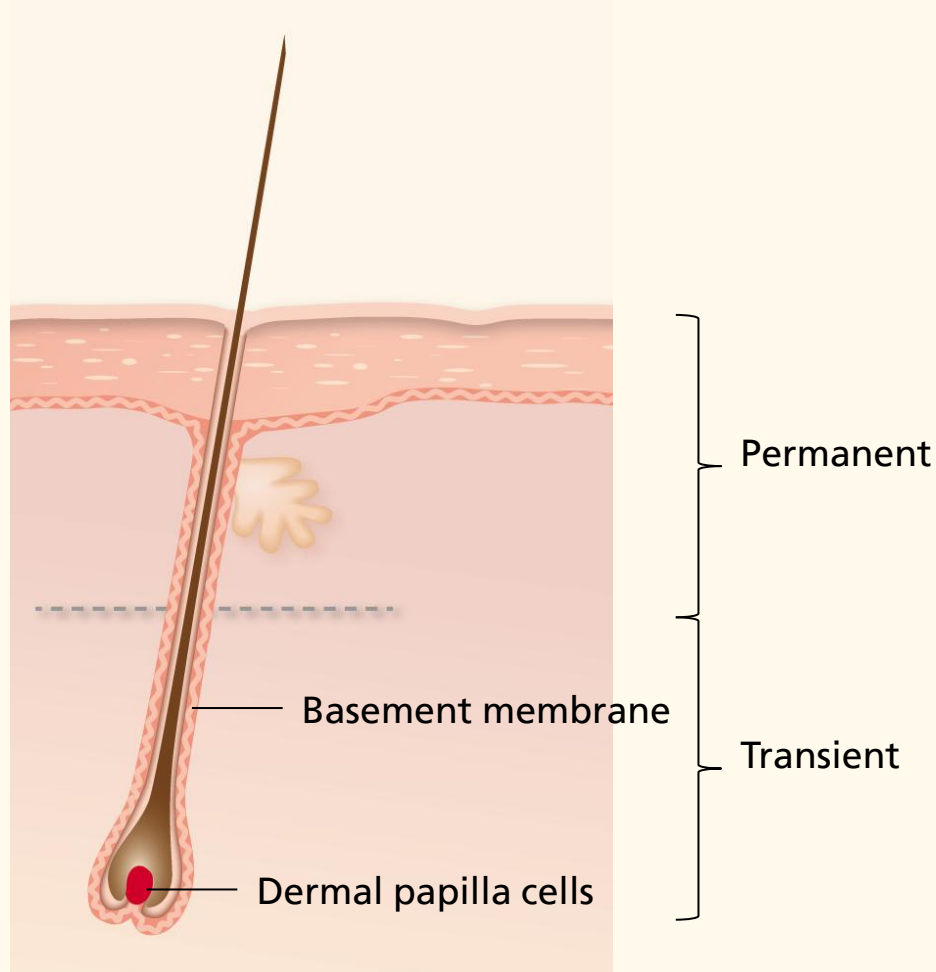## Prevents accelerated Hair Loss

Introduction

- Milk based bioactive signaling molecules

- DL-Ethylpanthenol

- Inositol

- Sulfur-rich amino acids
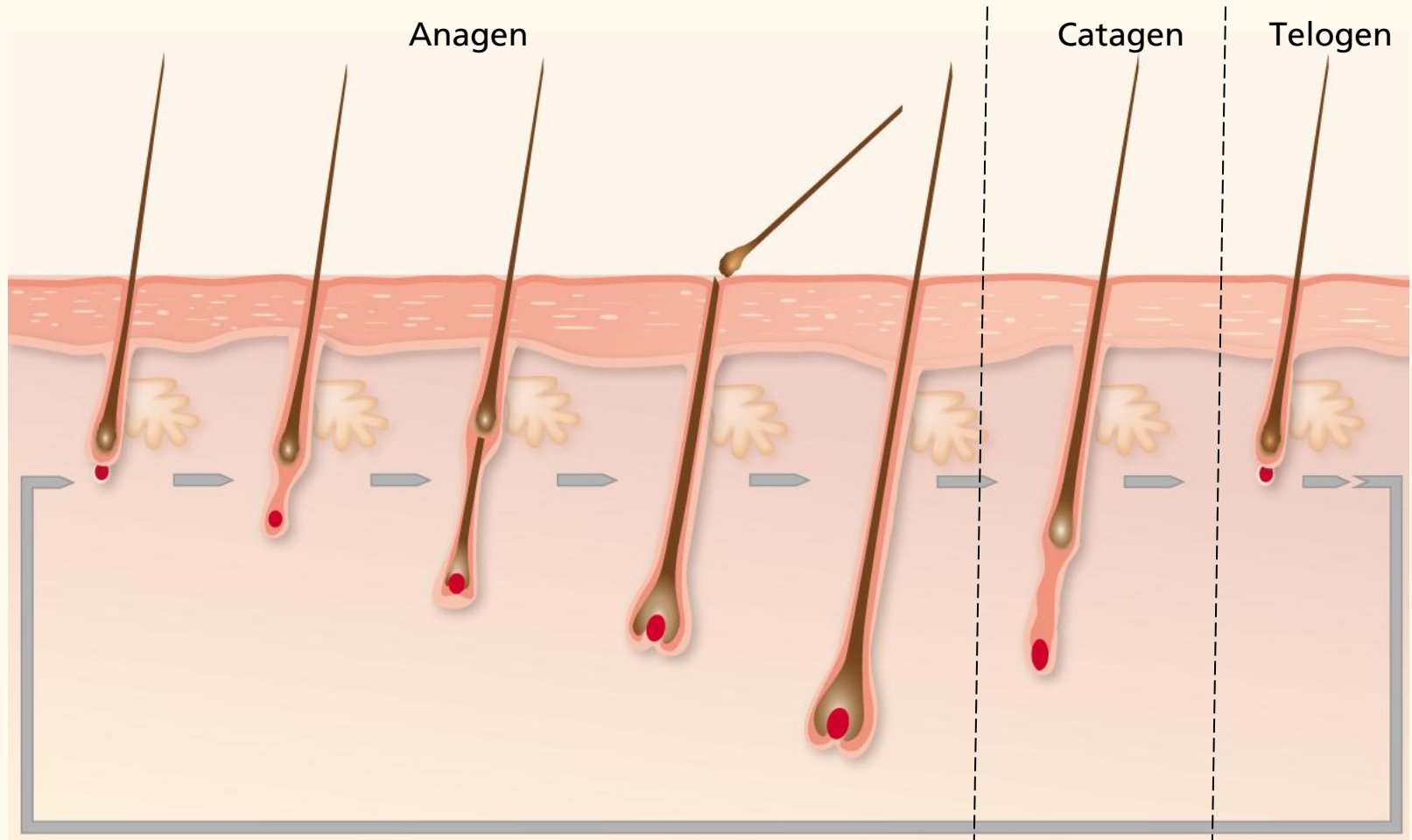 (N-acetyl-Cysteine, N-acetyl-Methionine)

Hair Follicle

Permanent

Basement membrane

Transient

Dermal papilla cells

Hair Growth Cycle

Anagen   Catagen   Telogen

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Dermal Papilla Cells: essential for hair follicle development in the hair growth cycle

DP cells are highly specialized fibroblasts with multiple roles:

- scaffold for hair follicle
- cell signaling: activation of stem cells; downward growth of the hair follicle's epithelial part
- production of surrounding connective tissue

DP cells in cell culture:

In vitro self-aggregating behavior under the influence of Follicusan™ DP. Key to induction of hair follicle development.

DP cells in Alopecia Androgenetica:

- decreased formation of connective tissue
- loss of proliferation capacity
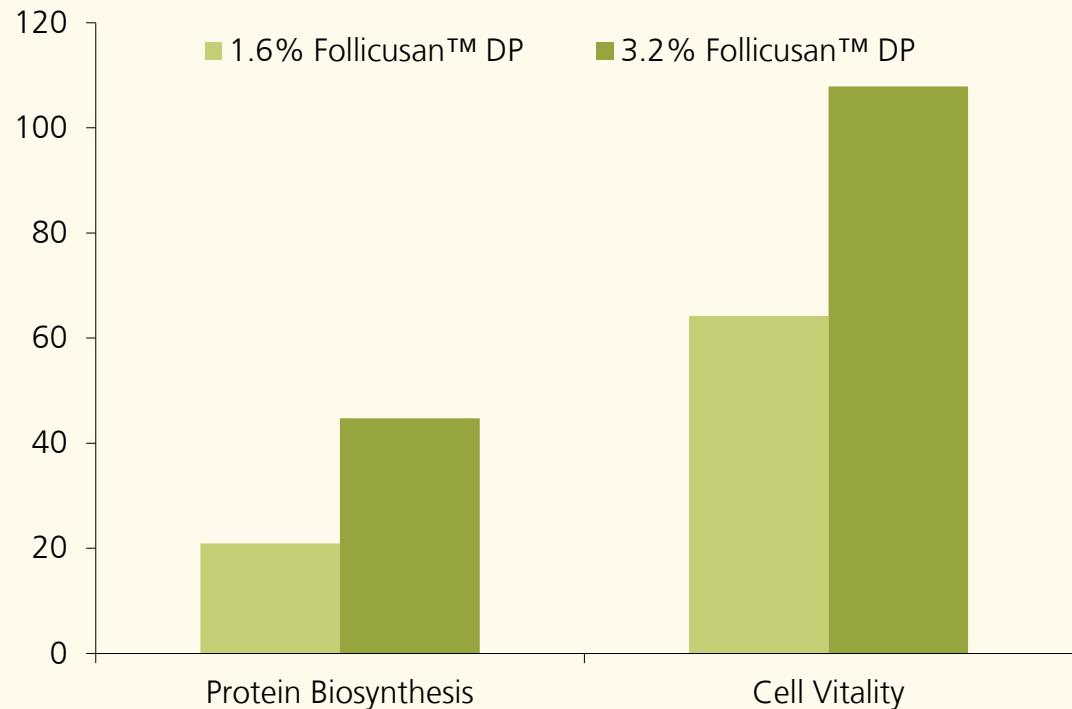
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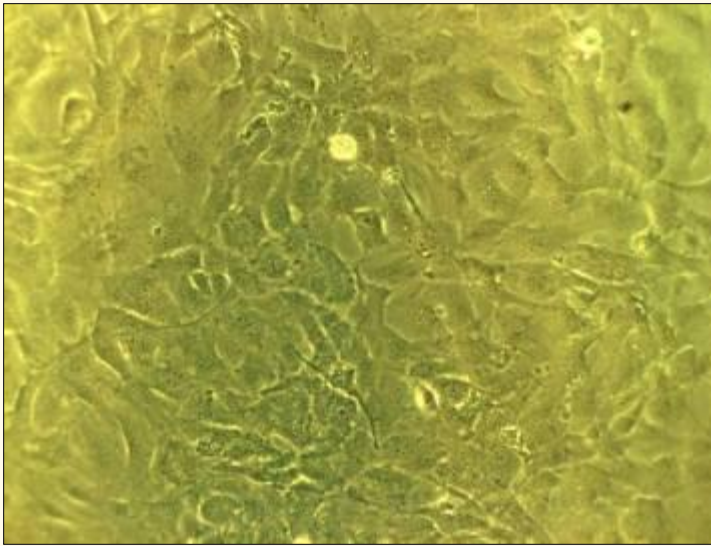# Follicusan™ DP

In vitro Test Results

Stimulation of Protein Biosynthesis and Cell Vitality
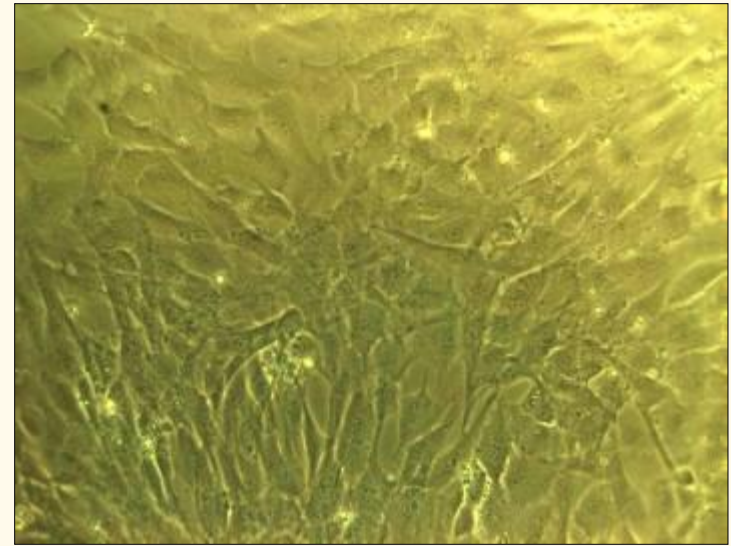
Stimulation of Protein Biosynthesis and Cell Vitality (%)

Protein biosynthesis has been measured by Crystal Violet assay, cell vitality by MTT assay on fibroblast cells related to untreated cells.

Legend:
- 1.6% Follicusan™ DP
- 3.2% Follicusan™ DP

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Stimulation of ECM Synthesis
in Fibroblast Cells

Control

with 6.4% Follicusan™ DP

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In vitro Test Results
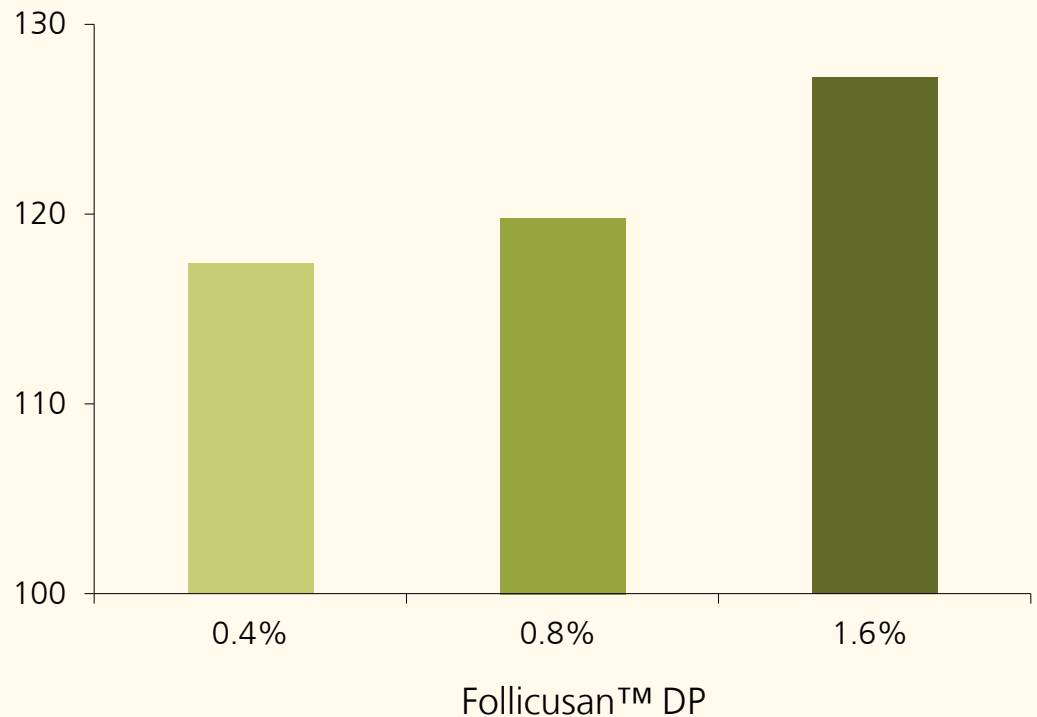
Dermal Papilla Cells

Influence on ATP Content

ATP content (%)

Measured 48h after application of Follicusan™ DP in dermal papilla cells related to the ATP level in untreated cells (100%).

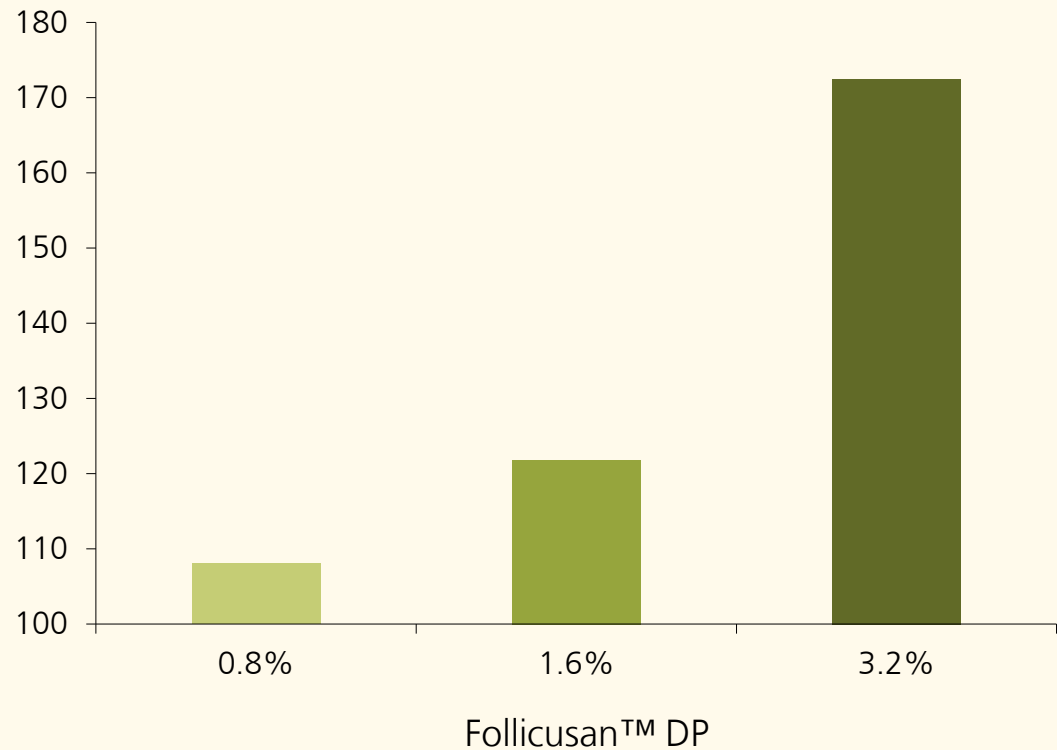(Method: luciferase/luciferin assay)

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Stimulation of Proliferation

Stimulation of proliferation (%)

Human dermal papilla cells were grown under optimal conditions for 72 h.
A BrdU assay was performed after another 72 h after application of different concentrations of Follicusan™ DP. Results are related to the proliferation in untreated cells (100%).


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Stimulation of
Collagen Type IV Biosynthesis

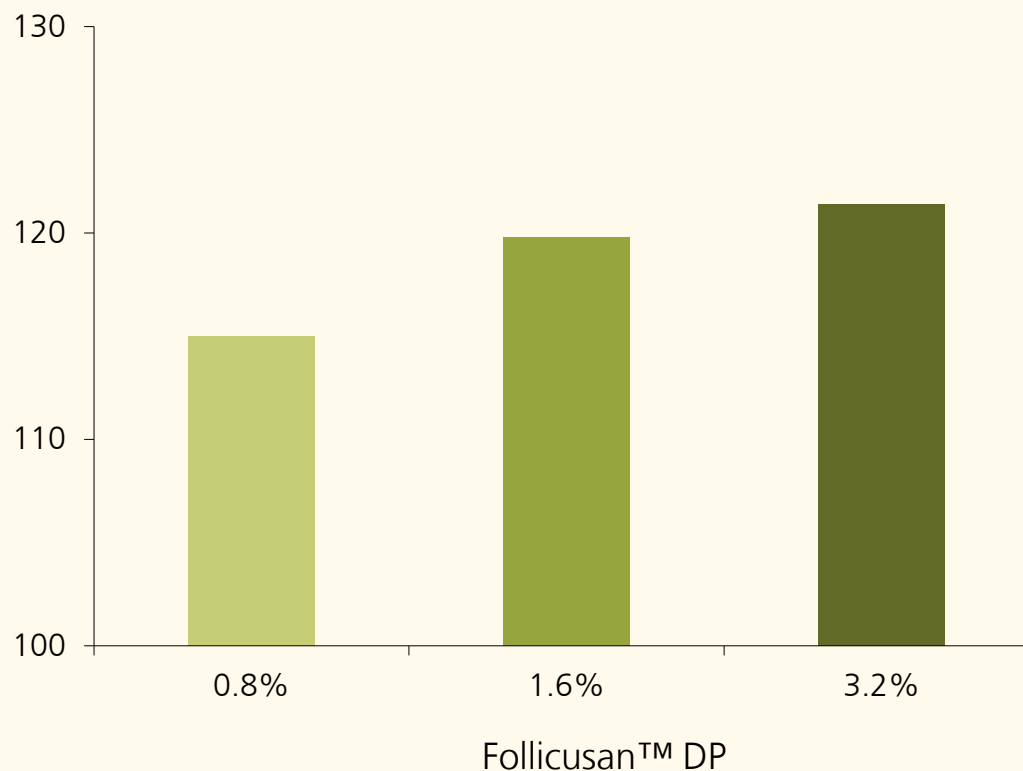**Collagen type IV content (%)**

Human dermal papilla cells were grown under optimal conditions for 72 h.
A Type IV Collagen ELISA was performed after another 216 h after application of different concentrations of Follicusan™ DP. Results are related to the Collagen content in untreated cells (100%).

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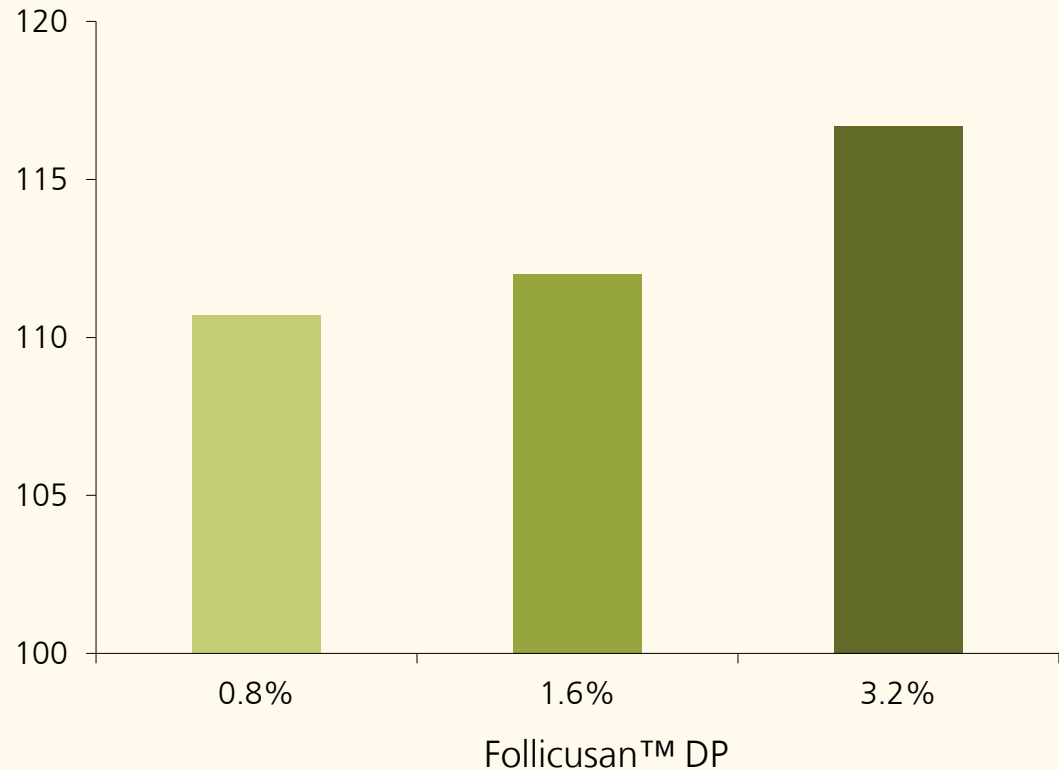
Stimulation of Heparan Sulfate Proteoglycan Biosynthesis

Synthesis of Heparan Sulfate Proteoglycan (%)

Human dermal papilla cells were grown under optimal conditions for 72 h. A Heparan Sulfate Proteoglycan ELISA was performed after another 216 h after application of different concentrations of Follicusan™ DP. Results are related to the Heparan Sulfate Proteoglycan content in untreated cells (100%).

Bar chart with y-axis "Synthesis of Heparan Sulfate Proteoglycan (%)" ranging from 100 to 130, and x-axis "Follicusan™ DP" with categories 0.8%, 1.6%, 3.2%.
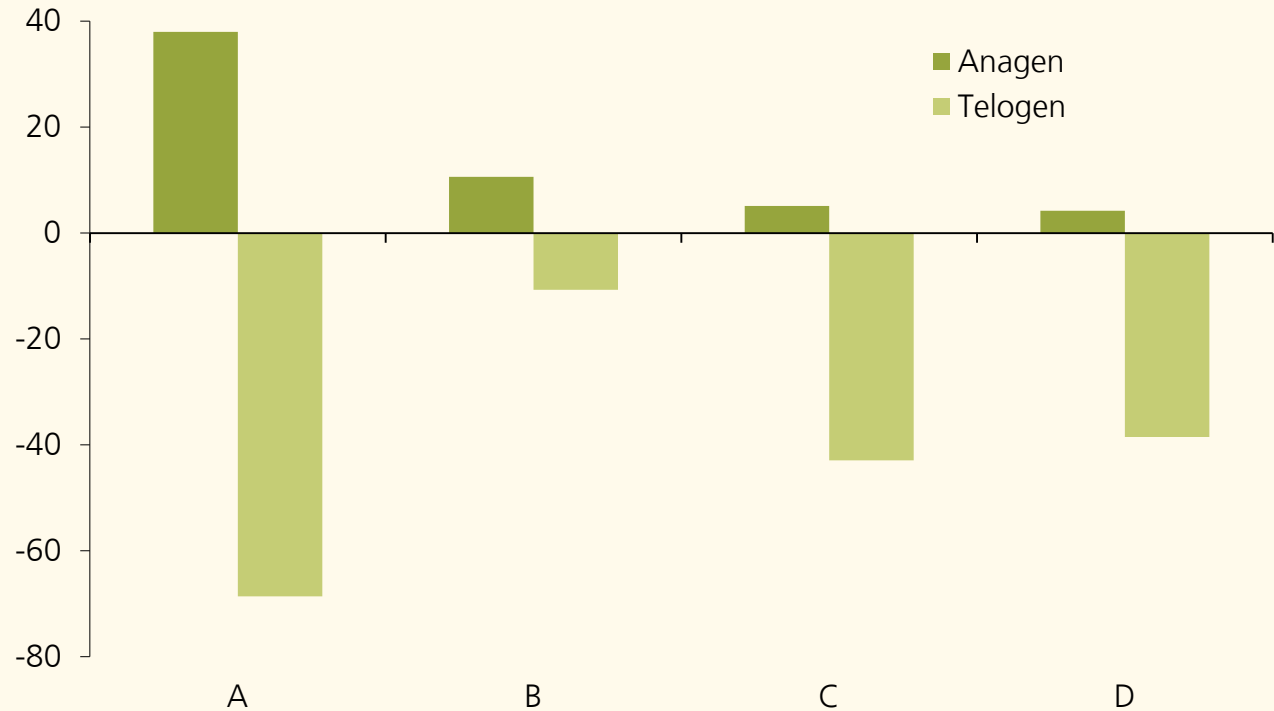
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In vivo Test Results
Trichogram Technique

Influence on *Alopecia diffusa*

Changes in hair growth cycles (%)

after 3 months of treatment with a formulation containing 5% Follicusan™ DP. Trichograms were taken from volunteers (A, B, C, D) to determine the stage of hair growth cycle.

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Influence on *Alopecia androgenetica*

Changes in hair growth cycles (%)

after 3 months of treatment with a formulation containing 5% Follicusan™ DP. Trichograms were taken from volunteers (A, B, C, D, E) to determine the stage of hair growth cycle.
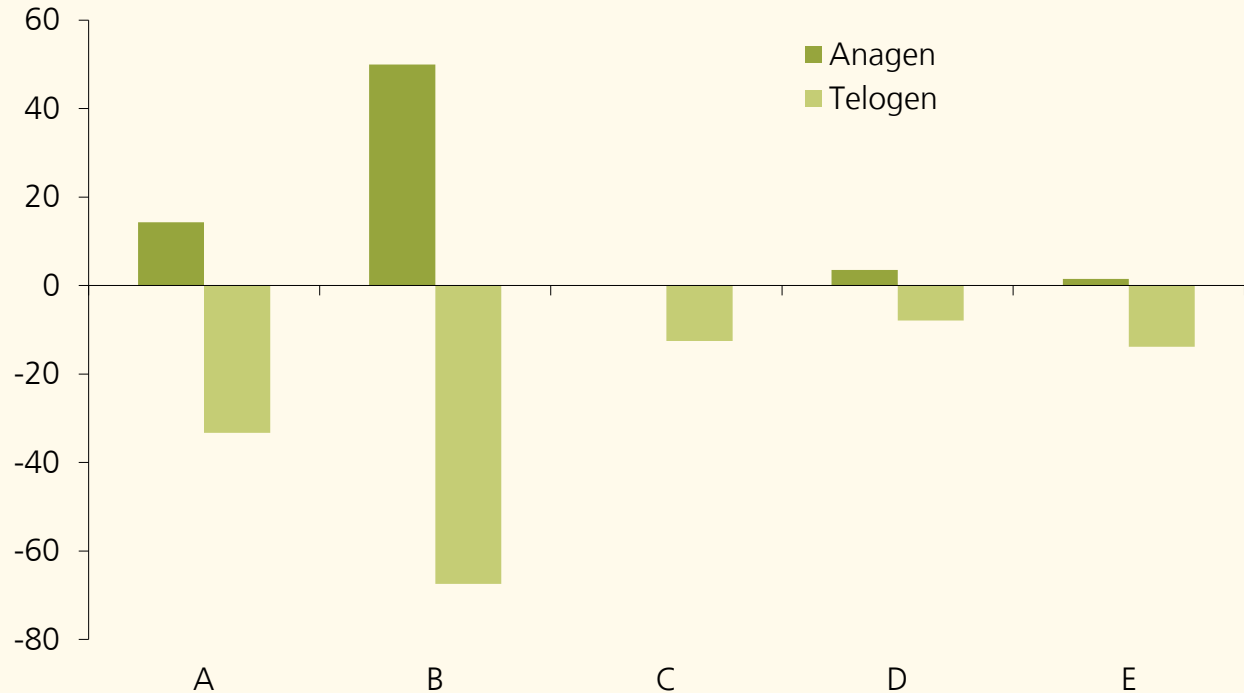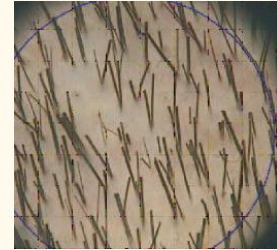

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In vivo Test Results
TrichoScan

TrichoScan

- A small area of hair is clipped on the scalp surface (~ 1.8 cm²)

- After 3 days dye is applied to this area

- Grown hair and not yet grown hair are visualized by high contrast

- Anagen hair grows 0.3 mm/ day, telogen hair shows no active growth

- Digital image at approx. 20-fold magnification is taken

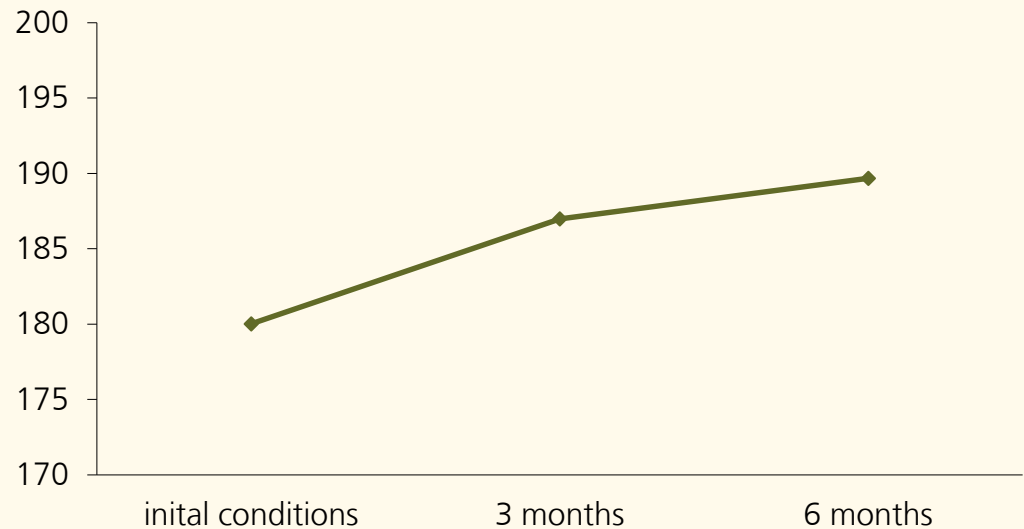- Total hair number is calculated, as well as hair thickness and percentage in anagen/telogen ratio

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Influence on Hair Density

Hair density [1/cm²]

TrichoScans were made from 24 female volunteers suffering from Alopecia androgenetica. A formulation with 5% Follicusan™ DP was applied on the scalp twice daily .

Standard healthy hair density ~ 240/cm²
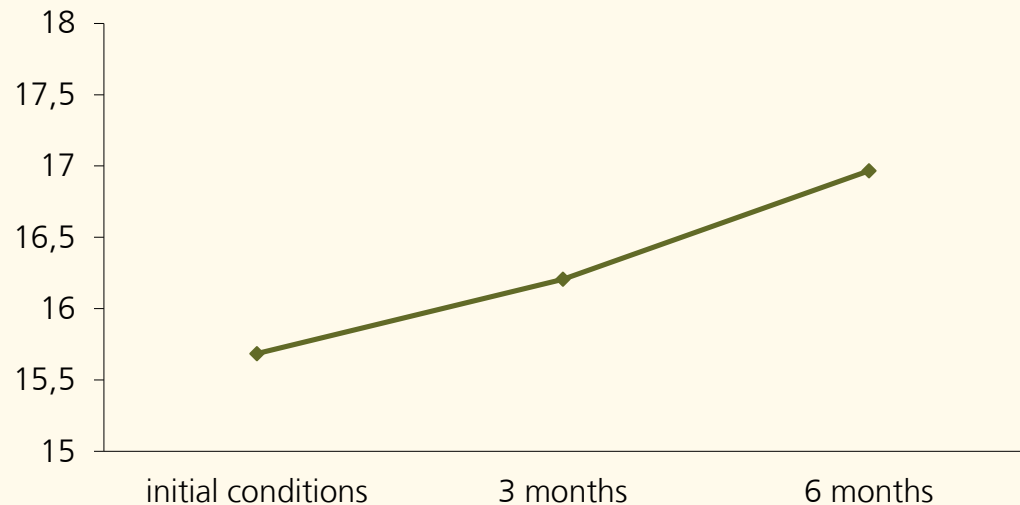

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Influence on Cumulative Hair Thickness

Cumulative hair thickness [mm/cm²]

TrichoScans were made from 24 female volunteers suffering from Alopecia androgenetica. A formulation with 5% Follicusan™ DP was applied on the scalp twice daily.

A healthy hair is 0.1 mm thick, with a density of ~240/cm², the cumulative hair thickness is ~24 mm/cm².
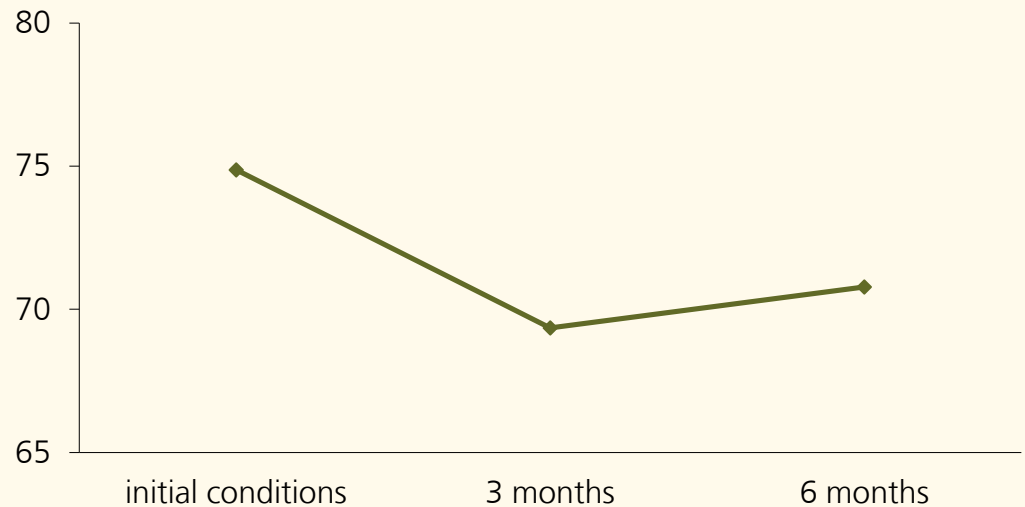

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Influence on Anagen Hair Rate

Anagen rate [%]

TrichoScans were made from 24 female volunteers suffering from Alopecia androgenetica. A formulation with 5% Follicusan™ DP was applied on the scalp twice daily.

Standard healthy percentage of hair in anagen phase ~ 85%.

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Summary

- **Prevents functional disorders of scalp and follicle cells through vitalization**

- **Stimulates proliferation and ECM synthesis of human dermal papilla cells**

- **Stops the progression of *Alopecia androgenetica* in women**

INCI Name:	Water, Alcohol Denat., Panthenyl Ethyl Ether, Milk Protein, Lactose, Inositol, Acetyl Cysteine, Acetyl Methionine, Sodium Citrate, Citric Acid
Dosage:	3.0 - 5.0%
pH-range:	> 5.8
Preservation:	preserved with phenoxyethanol and dehydracetic acid (Na salt)

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