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# Folicusan™ DP

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Prevents accelerated  
Hair Loss



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# Introduction

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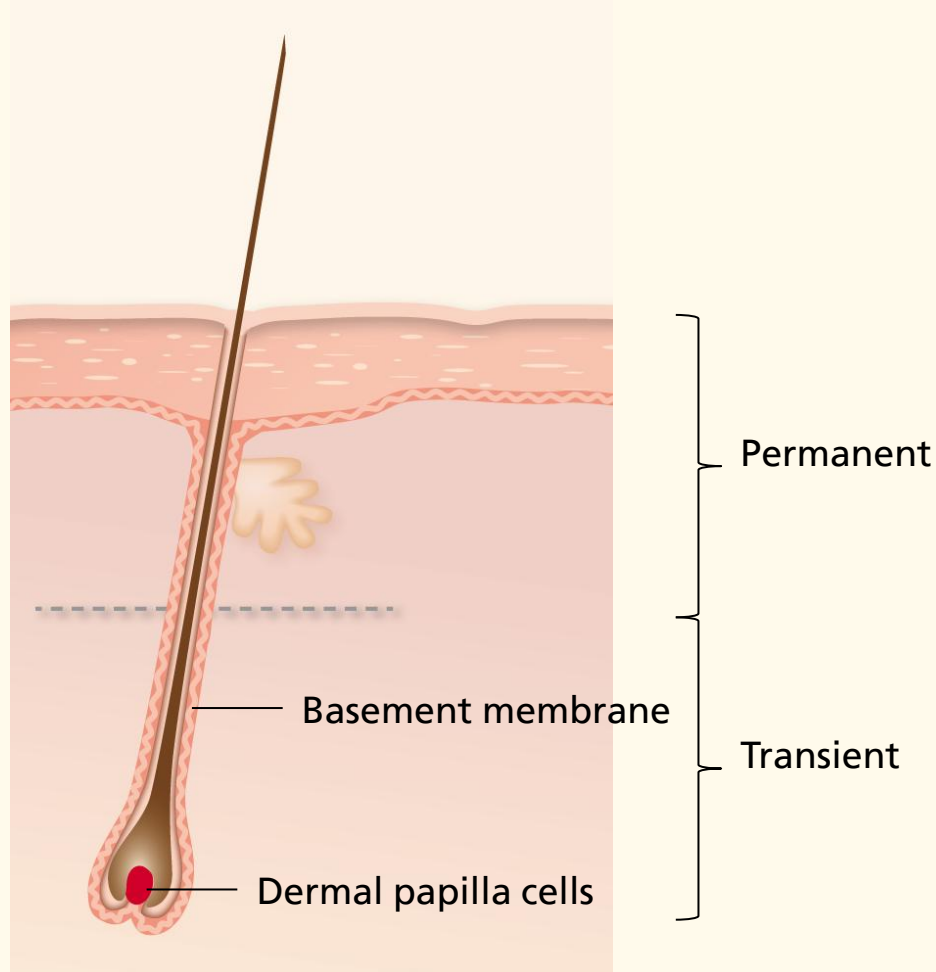
- Milk based bioactive signaling molecules
- DL-Ethylpanthenol
- Inositol
- Sulfur-rich amino acids  
(N-acetyl-Cysteine, N-acetyl-Methionine)



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# Hair Follicle

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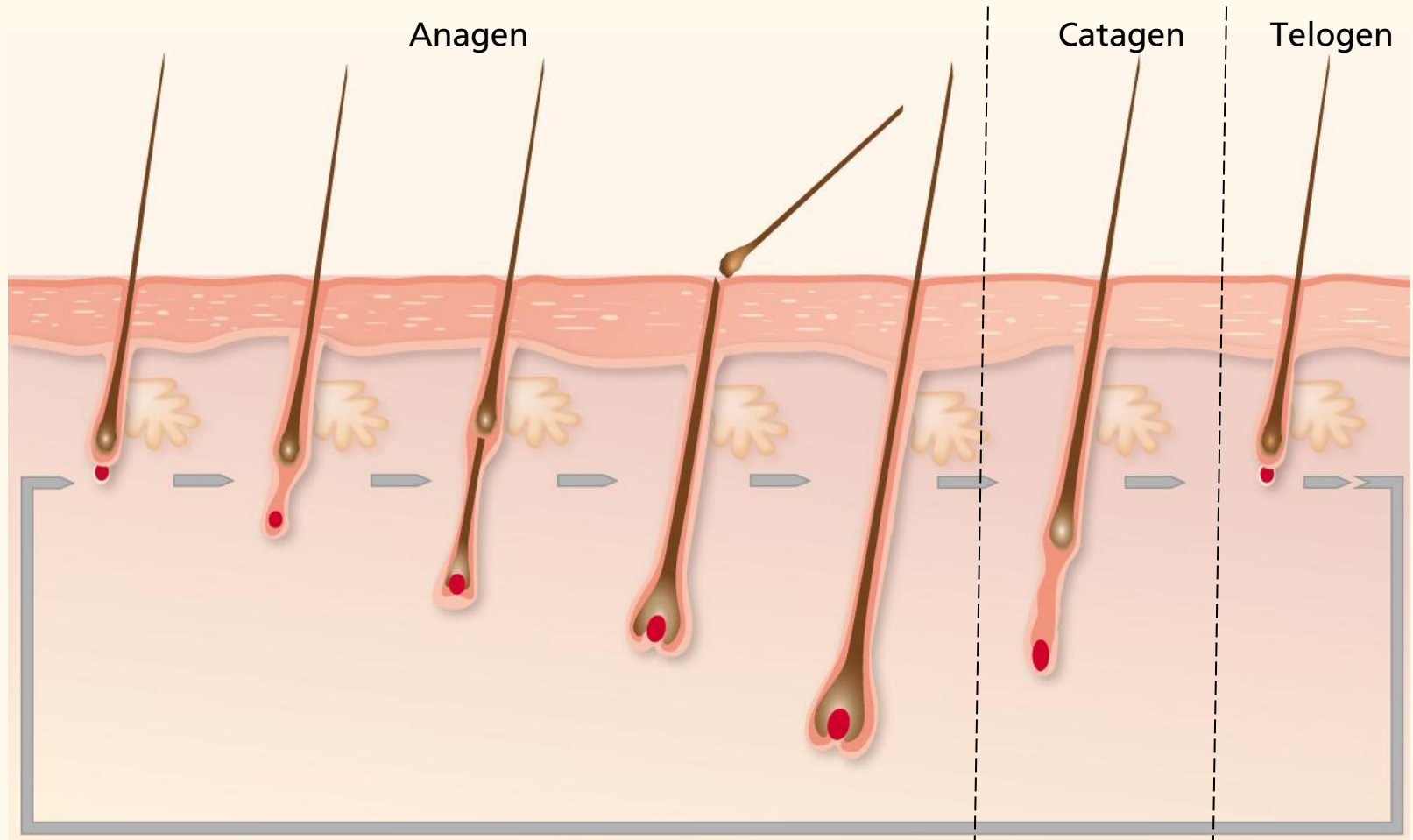


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# Hair Growth Cycle



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

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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 Alopecia Androgenetica:

- decreased formation of connective tissue
- loss of proliferation capacity



DP cells in cell culture:

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



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## *In vitro* Test Results



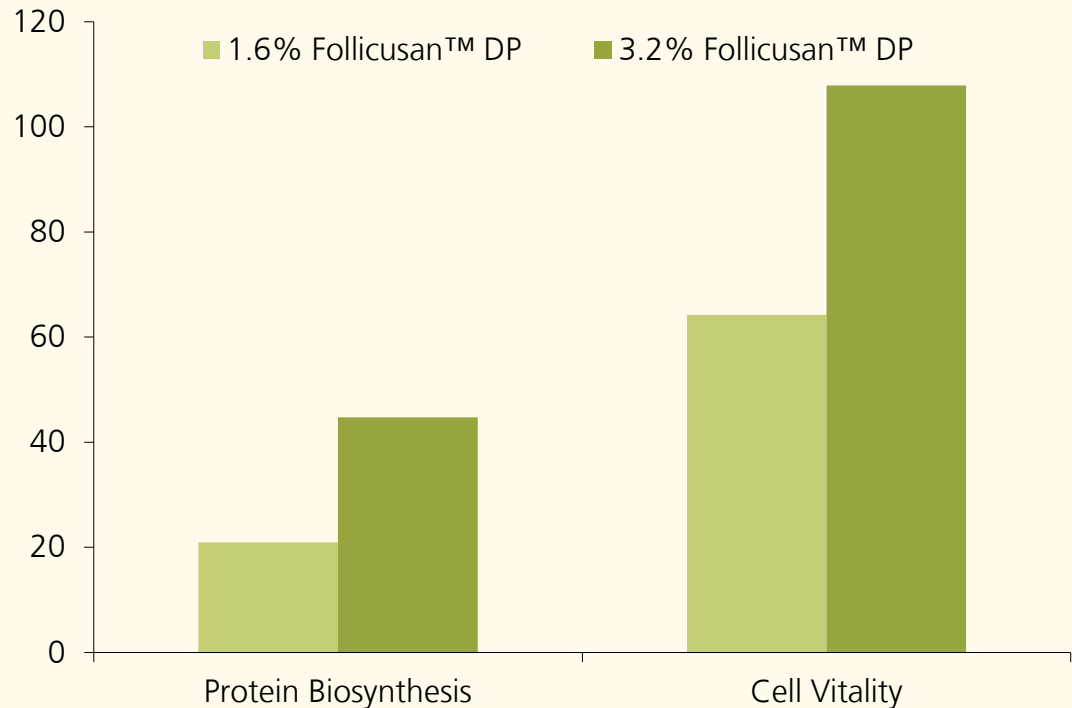
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# Stimulation of Protein Biosynthesis and Cell Vitality

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## 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.



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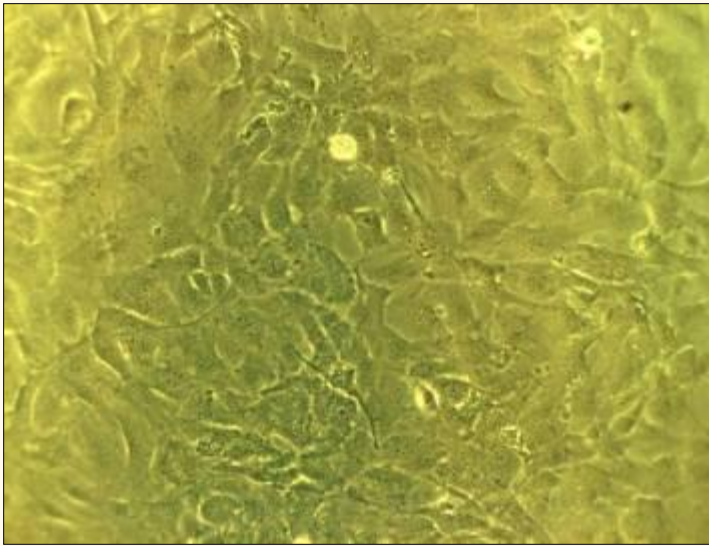
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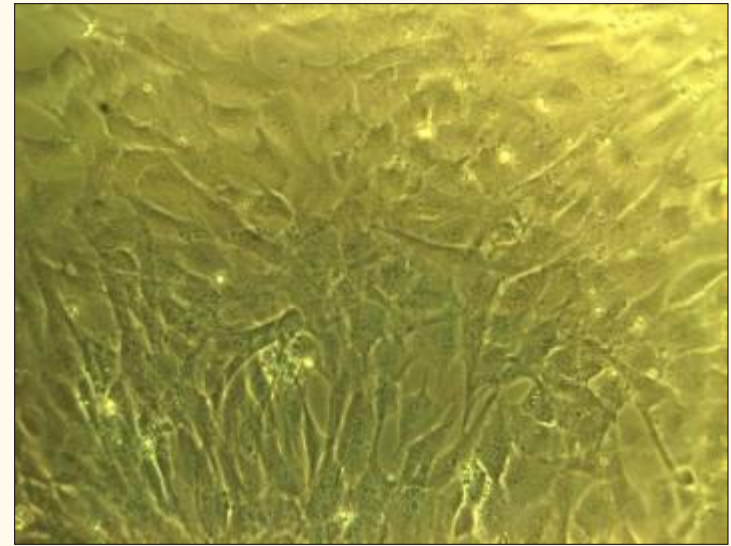
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# Stimulation of ECM Synthesis in Fibroblast Cells

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Control



with 6.4% Follicusan™ DP



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*In vitro* Test Results  
Dermal Papilla Cells



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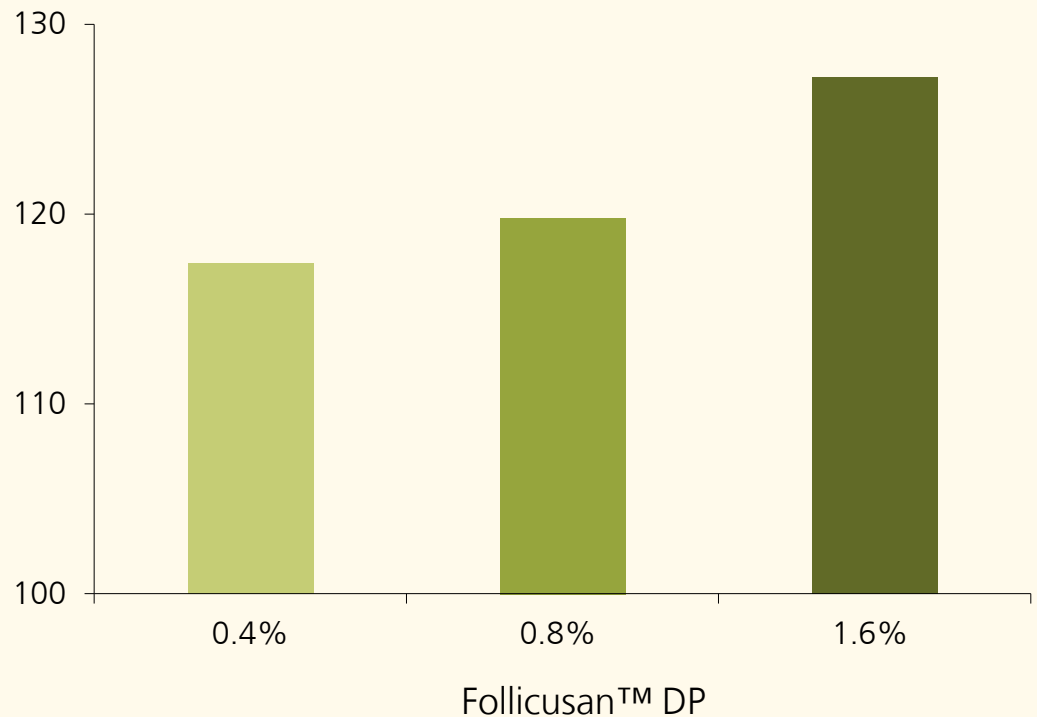
# Influence on ATP Content

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## 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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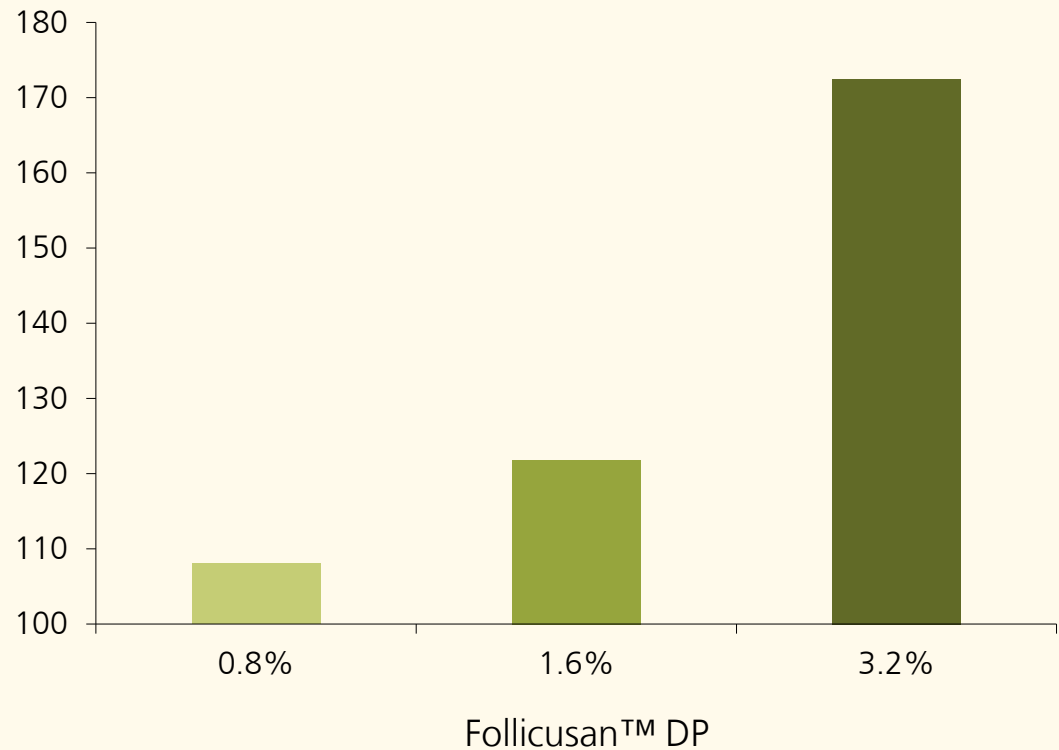
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# Stimulation of Proliferation

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## 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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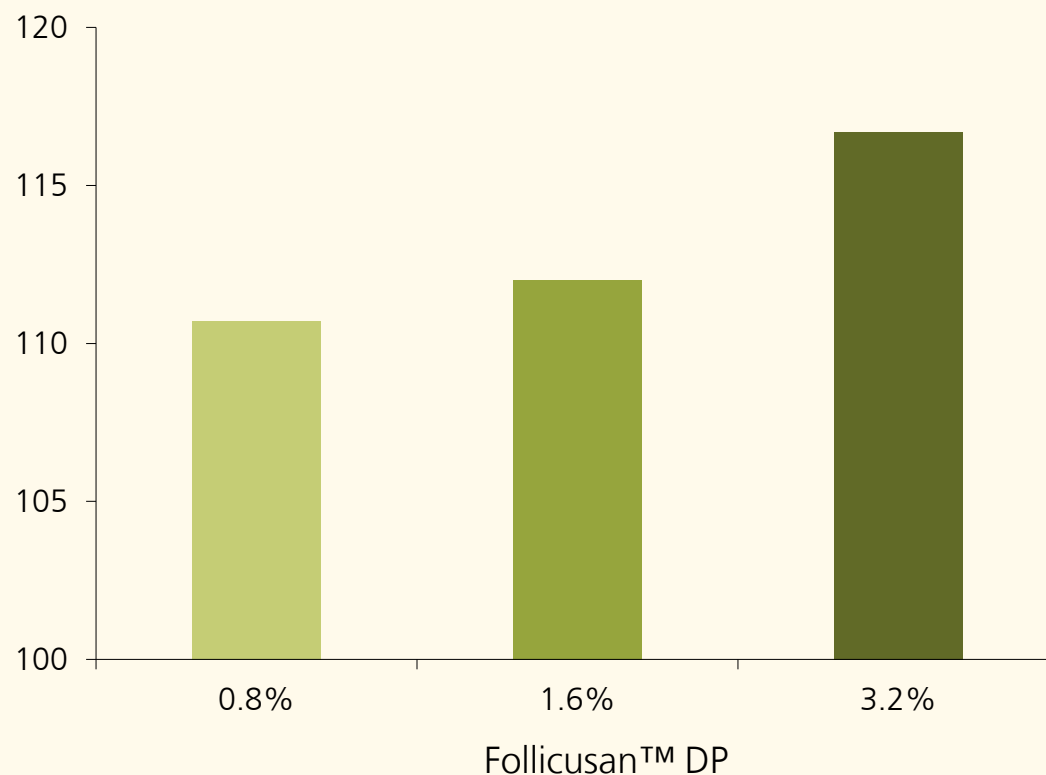
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# Stimulation of Collagen Type IV Biosynthesis

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## 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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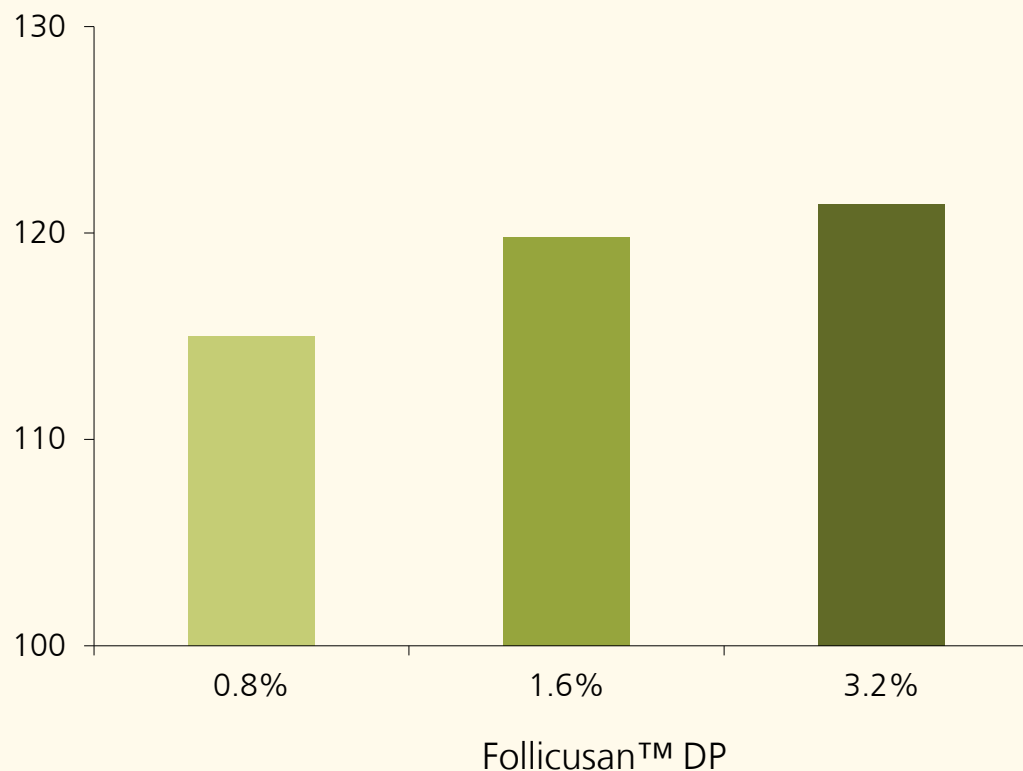
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# Stimulation of Heparan Sulfate Proteoglycan Biosynthesis

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## 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%).



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*In vivo* Test Results  
Trichogram Technique



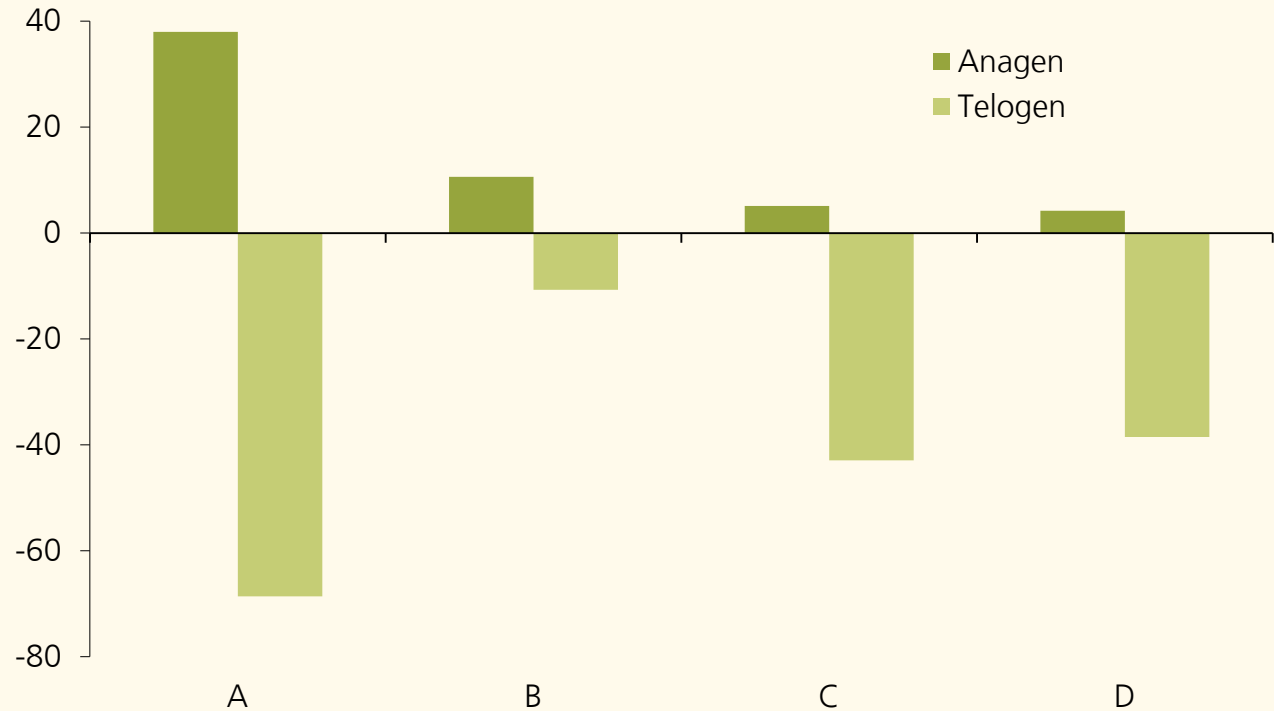
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# Influence on *Alopecia diffusa*

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## 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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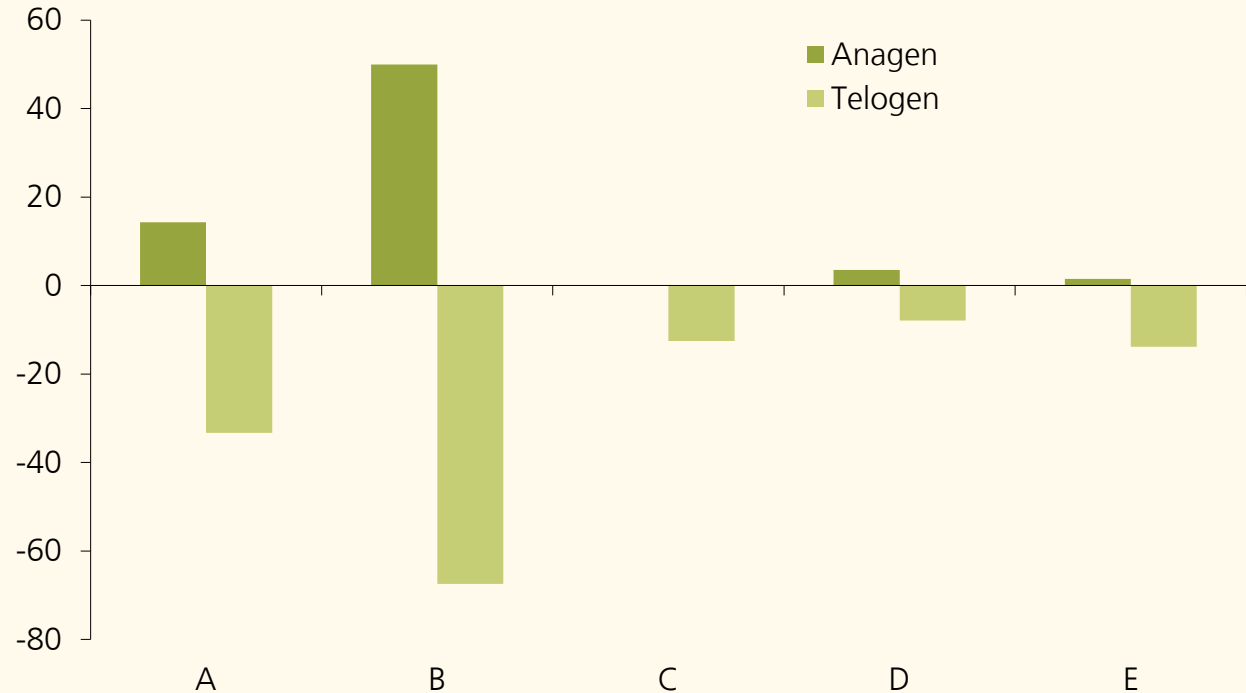
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# Influence on *Alopecia androgenetica*

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## 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

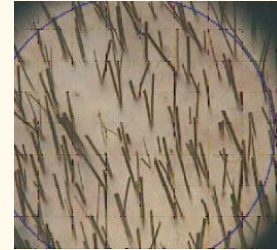


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# TrichoScan

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- A small area of hair is clipped on the scalp surface (~ 1.8 cm<sup>2</sup>)
- 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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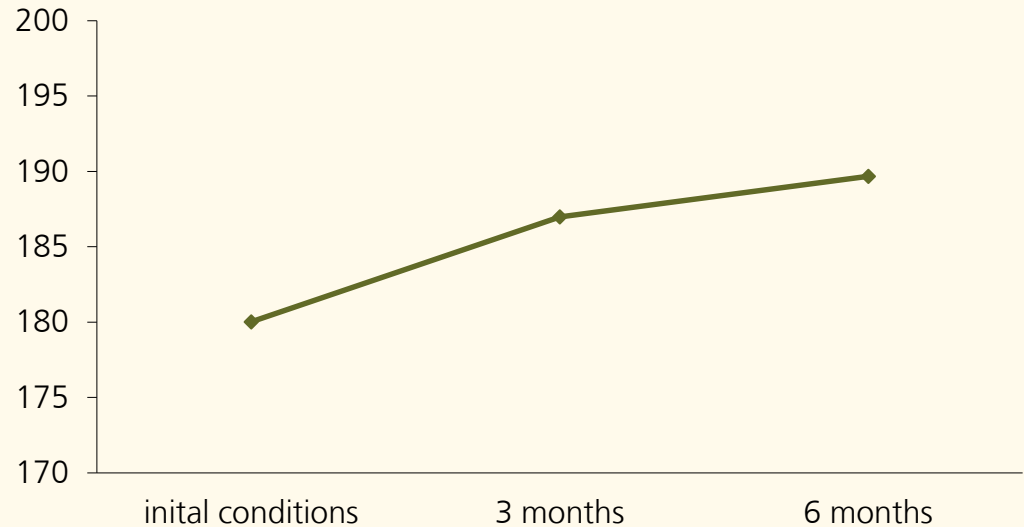
# Influence on Hair Density

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## Hair density [1/cm<sup>2</sup>]

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/cm<sup>2</sup>



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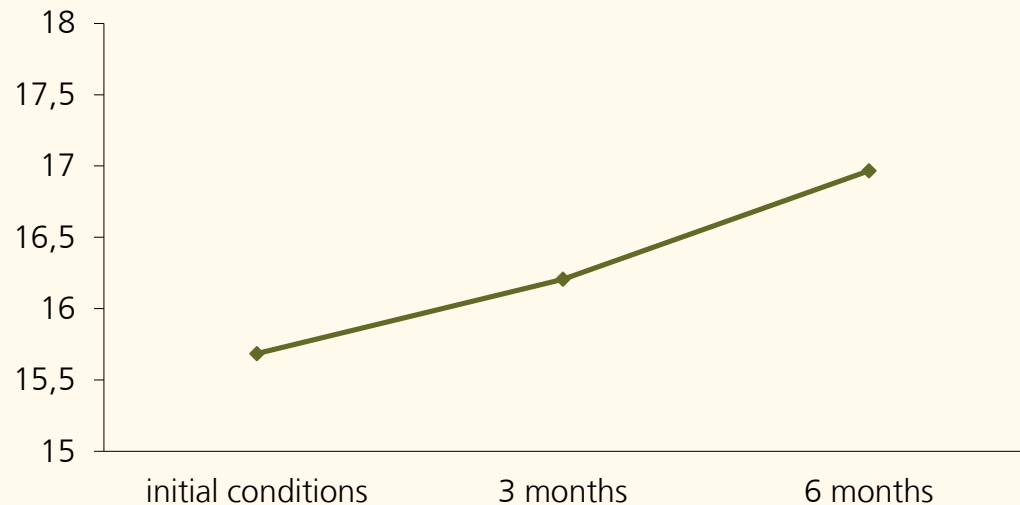
# Influence on Cumulative Hair Thickness

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## Cumulative hair thickness [mm/cm<sup>2</sup>]

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/cm<sup>2</sup>, the cumulative hair thickness is ~24 mm/cm<sup>2</sup>.



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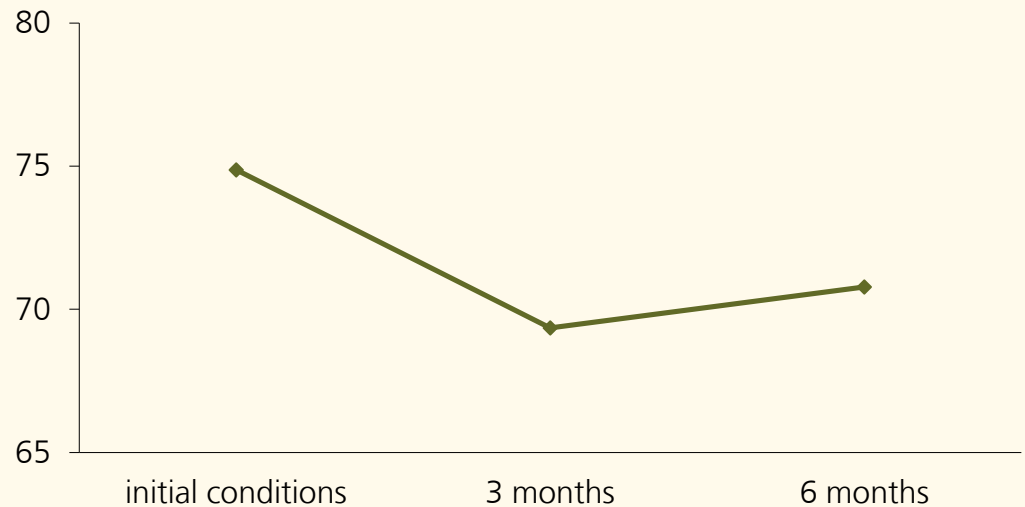
# Influence on Anagen Hair Rate

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## 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

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- 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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