



AnaGain™  
Stimulating hair growth  
and fighting hair loss



# AnaGain™

## Stimulating hair growth and fighting hair loss

### **An Organic Pea Sprout Extract to Rebalance the Hair Life Cycle**

Based on sprouts of organic pea, AnaGain™ reduces hair loss by inducing dermal papilla cells to reactivate hair growth.

Hair loss affects both women and men. It is caused by an imbalance of the hair growth cycle leading to a reduced number of growing (anagen) hair combined with an increased number of degenerating (telogen) ones.

AnaGain™ was shown, thanks to DNA microarray analysis of plucked hair follicles, to activate, in the dermal papilla, specific signal molecules which are required to initiate the growth of a new hair.

A clinical study conducted for three months on volunteers with mild to moderate hair loss showed the capacity of AnaGain™ to reduce hair loss:

- the density of anagen hair was increased by about 8%
- the density of telogen hair was reduced by more than 28%.

As a consequence, AnaGain™ increased the hair growth coefficient (proportion of active hair follicles) from 4 to 7.2 indicating a strong hair-regrowing effect.

By reactivating hair growth, AnaGain™ helps the hairs to keep their original density and thickness.

### **Claim Ideas for AnaGain™**

- Stimulates hair growth at the root
- Prolongs the life cycle of hair
- Fully restores the vitality of the hair
- For denser hair in just 3 months

### **Applications**

- Anti-hair loss, hair-regrowth formulations
- Anti-aging hair care products
- Tonics, serums, conditioners, masks, shampoos

### **Formulating with AnaGain™**

- Recommended use level: 2–4%
- Incorporation: For cold processes, dissolve AnaGain™ into the aqueous phase. In cold/hot processes, add during the cooling phase below 60°C.
- Thermostability: Temperatures of up to 60°C for a short time do not affect the stability of AnaGain™.

### **INCI/CTFA-Declaration**

Pisum Sativum (Pea) Sprout Extract (and) Phenoxyethanol (and) Sodium Benzoate (and) Aqua/Water

# The Hair Matrix

## The most active part of the hair

### The Dermal Papilla Controls Hair Follicle Development and Growth

Located in the deepest part of the hair bulb, the hair matrix is one of the most rapidly proliferating tissues in the human body.

The hair matrix, which is a part of the epidermis layer containing keratinocytes, embeds a "ball" of specialized dermal cells called dermal papilla (DP).

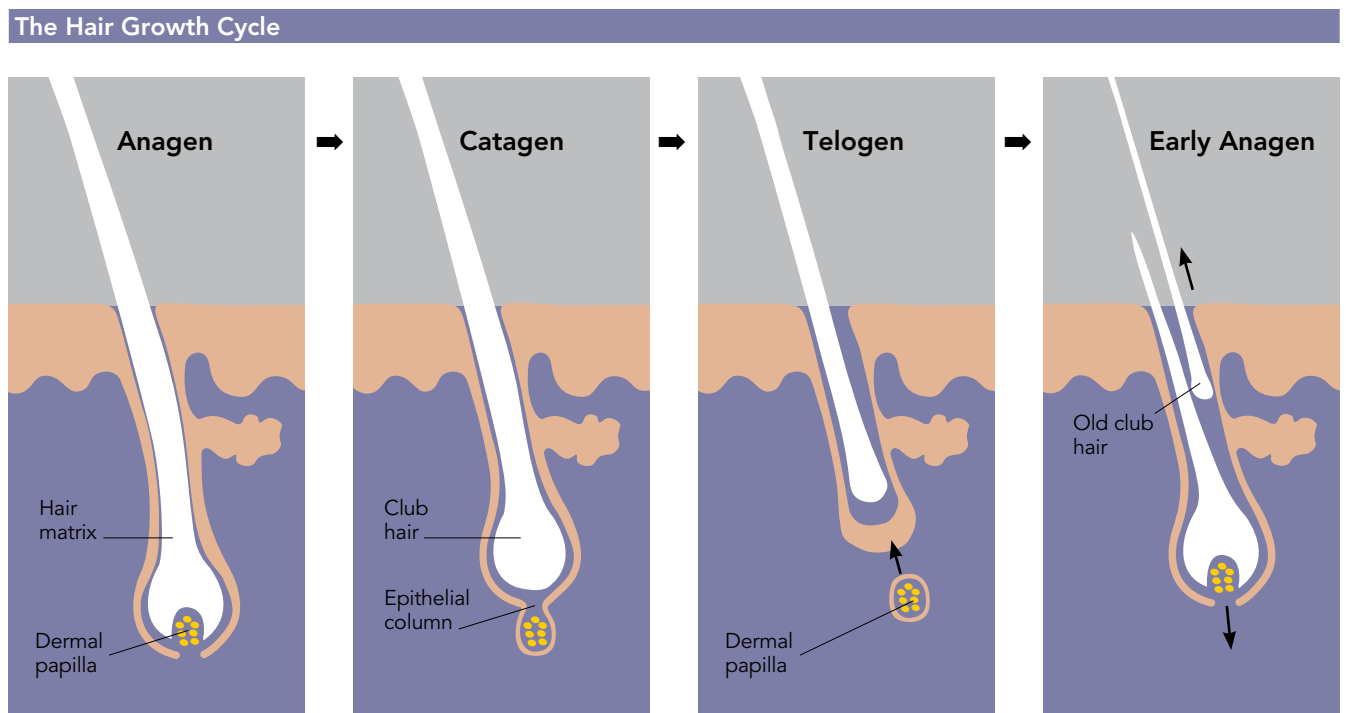
The DP plays a major role in hair follicle development and growth: it initiates the growth of a new hair by:

- controlling the switch from degeneration (telogen) to growth (anagen) phase in the hair life cycle
- instructing the surrounding epithelial cells (the hair matrix) to proliferate, move upward and differentiate into the multiple cell types which will constitute the outgrowing hair shaft as well as its root sheaths.

- During the anagen (growing) phase which lasts 3 to 5 years, the DP initiates the creation of a new matrix which will lead to the formation of a new hair.
- Then the hair moves to the regression (catagen) stage for about 3 weeks. During this transition period, the hair bulb separates from the DP, and the hair follicle shrinks and migrates towards the scalp surface. The DP remains intact and is pulled or migrates upwards.
- At the end of the telogen (resting) phase which lasts up to 4 months, the hair follicle reenters the anagen phase: the DP and the base of the follicle join together again and a new hair begins to form. If the old hair has not already been shed, the new hair pushes the old one out and the growth cycle starts all over again.

### The Hair Growth Cycle

Hair follicles undergo cyclical and asynchronous growth. This cycle is made up of 3 phases (anagen, catagen and telogen); each hair passes through the phases independent of the neighboring hairs.



# Hair Loss

## Is linked to an imbalanced hair growth cycle

### **Hair Loss Has Several Causes**

In people with healthy hair, about 85–90% of the hair is in the anagen phase and the other 10–15% is in the telogen one.

Hair loss, also called alopecia, is caused by an imbalance of the hair growth cycle which results from several factors (androgen metabolism, genetics and stress).

It is characterized by:

- changes in the proportions of anagen and telogen hair: the number of anagen hairs is reduced and at the same time too many hairs remain in the telogen phase.
- a decrease in the duration of anagen phase leading to shorter and thinner hair
- a prolongation of the interval separating the loss of a hair in telogen phase and the emergence of a replacement anagen hair.

### **Women and Men are Affected but in Different Ways**

Hair loss affects at least 50% of men and about 25% of women by the age of 50.

40% of women aged 70 and over are concerned.

Besides, women experience diffuse hair loss and tend to lose the hair on the top of their head. Hair loss in men may be much more extensive, affecting mostly the temporal areas and the top of the head.

# AnaGain™

## A pea sprout extract which rebalances the hair growth cycle

### AnaGain™ is based on Organic Pea Sprouts

The pea (*Pisum sativum*) is a vegetable with pod fruits. Each pod contains several peas that are rich in proteins, starch and fibers.

Sprouts from organic pea were selected as a source of AnaGain™ because of their richness in phytonutrients. These "health promoting phytochemicals" protect the plant from disease, damage, pathogens, extreme UV, pollutants and help to defend it against herbivores. Besides, many of these phytochemicals are known to exert beneficial effects on human health. Phytonutrients are highly abundant in sprouts because at this stage plants are not yet lignified and thus, especially vulnerable. This is why sprouts are the plant material with the highest level of phytonutrients.

### An Environmentally-Friendly Process

Pea sprouts are produced indoors without soil.

- Organic pea seeds are first soaked in water then transferred to rotating containers that provide drainage, light, aeration and agitation.
- After a few days of incubation in the containers, the sprouts are harvested and then extracted with water and purified.

This technique has many advantages:

- availability of plant material independent of the season, soil conditions and market demand
- plant material completely free of environmental pollutants and pesticides
- low water requirements.

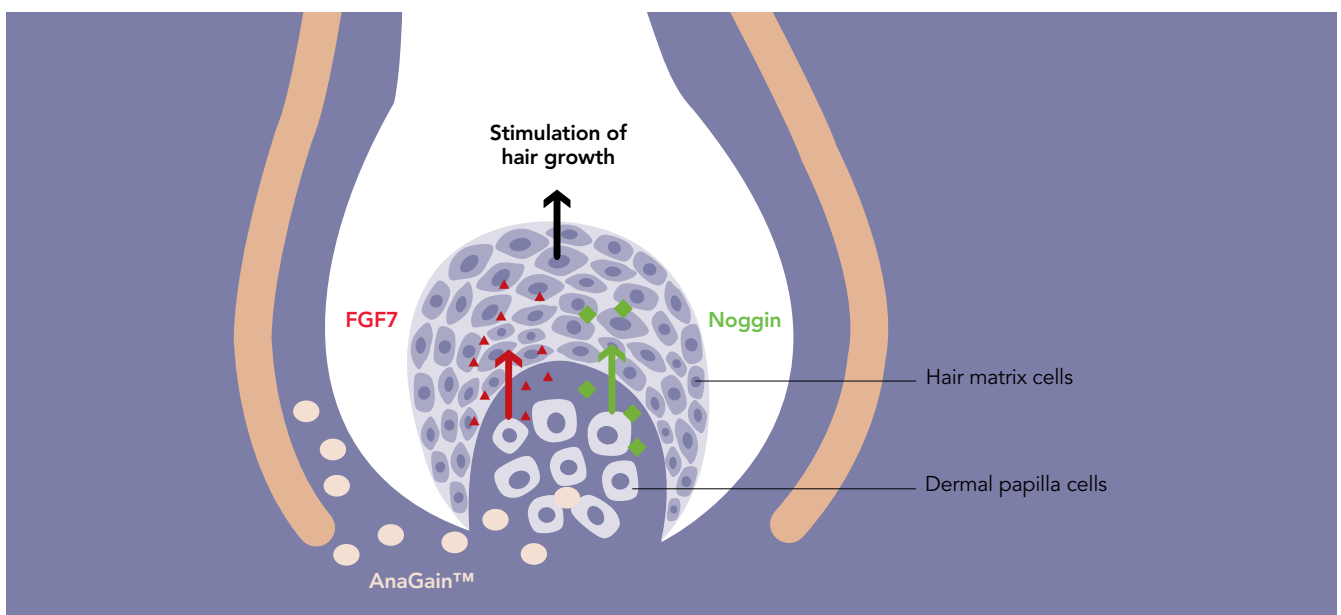
### AnaGain™ Activates the Dermal Papilla to Induce Hair Growth

AnaGain™ was shown, thanks to the DNA microarray technique conducted on plucked hair follicles, to stimulate, in the DP, specific signaling molecules which are required to initiate the growth of a new hair:

- Noggin, a protein that shortens the telogen phase
- FGF-7, fibroblast growth factor-7, which promotes the proliferation activity of the matrix keratinocytes to start a new anagen phase.

These results were confirmed with the phototrichogram technique: After three months' treatment, AnaGain™ was found to reduce hair loss and to increase hair vitality: the density of anagen hair was increased whereas the density of telogen hair was strongly reduced.

### Mechanism of AnaGain™



# AnaGain™

## Study results



### Effect on Hair Gene Expression in Volunteers from 46–60

The effect of AnaGain™ on hair growth was evaluated using DNA microarray technology. This test was conducted on hair bulbs plucked from the occipital area of the head of 10 volunteers (4 women and 6 men aged from 46 to 60 – mean: 53.9). Hairs were pulled out before and after a 14 day treatment with a gel containing 2% AnaGain™.

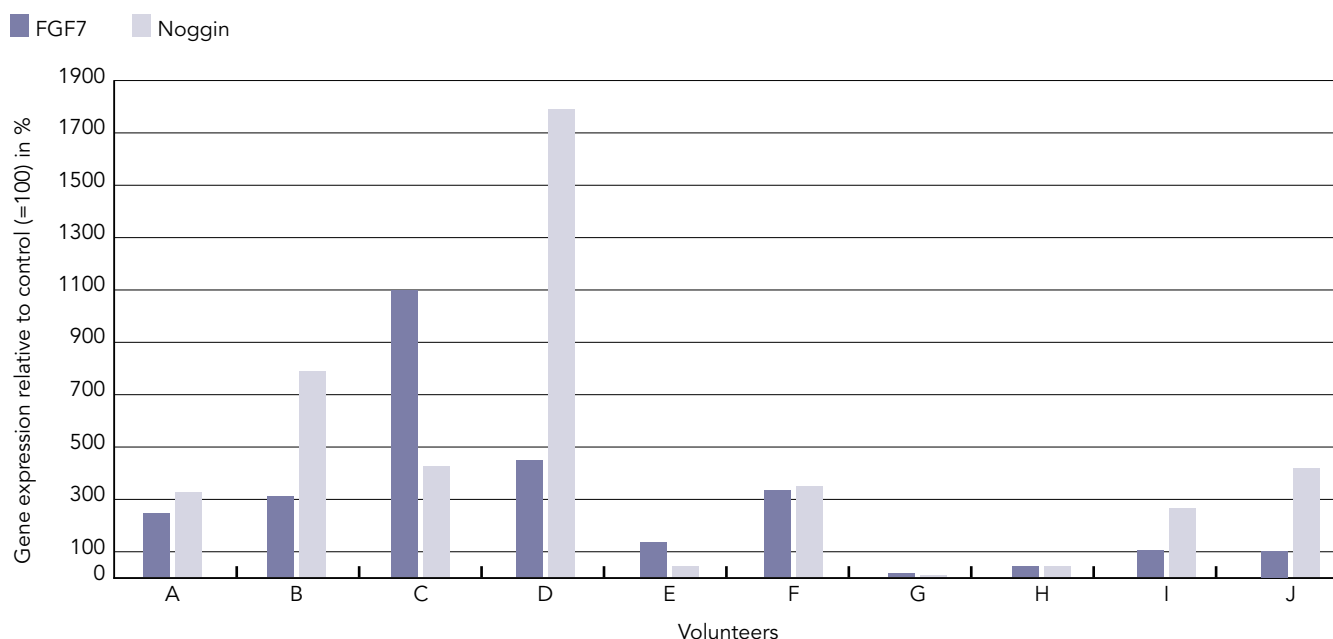
The expression of genes important in hair physiology was analyzed by quantitative PCR.

Gene expression analysis conducted on plucked hair bulbs after a 2 week treatment with 2% AnaGain™ showed an up-regulation of two DP signaling molecules required to initiate a new hair follicle growth cycle:

- the expression of noggin, a protein that shortens the telogen phase, was increased by 85% on average
- the expression of FGF-7 (fibroblast growth factor-7), which promotes the proliferation activity of the matrix keratinocytes at the beginning of a new anagen phase, was increased by 56% on average.

These results showed that AnaGain™ can stimulate the DP to induce the growth of a new hair.

### Effect on the Expression of DP Signaling Molecules



# AnaGain™

## Study results

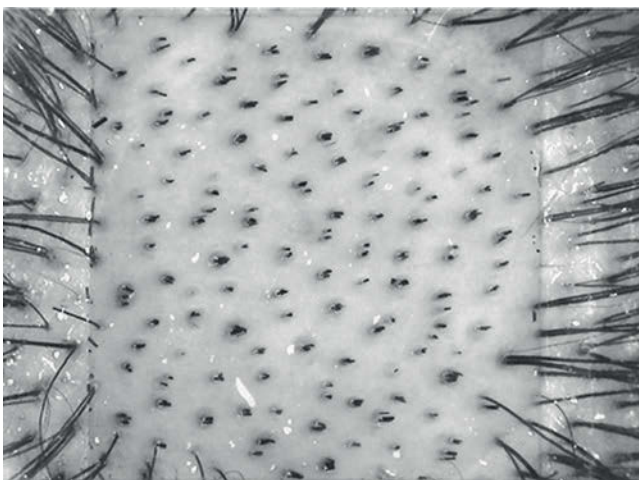


### Anti-Hair Loss Effect and Hair Growth Reactivation

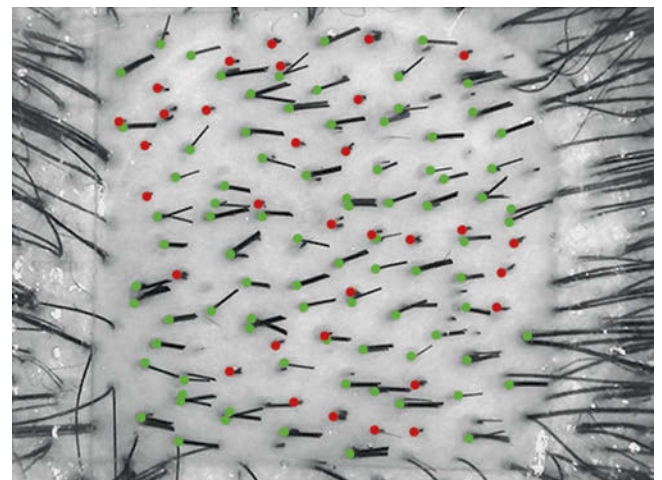
The effects of AnaGain™ on the hair growth cycle were evaluated using the phototrichogram technique on 20 volunteers suffering from mild to moderate hair loss corresponding to telogen hair superior or equal to 15% for women and 20% for men. 17 women and 3 men aged from 21 to 37 (mean: 26) applied a gel containing 4% AnaGain™ to their scalps twice a day for three months.

The phototrichogram is a non-invasive technique which allows measurements of the proportion and the density of hair in the different phases of the hair growth cycle. For this, an area of 0.7 cm<sup>2</sup> was defined in the scalp (vertex area). The hairs in this area were cut short, a photograph was taken at this moment and then again 2 days later. Hairs that started to grow during these 2 days are in the anagen phase and hairs that stopped growing are in the telogen phase.

### Phototrichogram Technique



● Anagen hair ● Telogen hair





Results showed that AnaGain™ significantly:

- decreased the density of telogen hair (-28.3% / p = 0.001 versus initial conditions)
- increased the density of anagen hair (+7.9% – p = 0.002 versus initial conditions).

AnaGain™ can thus reduce hair loss which is characterized by too much telogen hairs and reduced anagen ones.

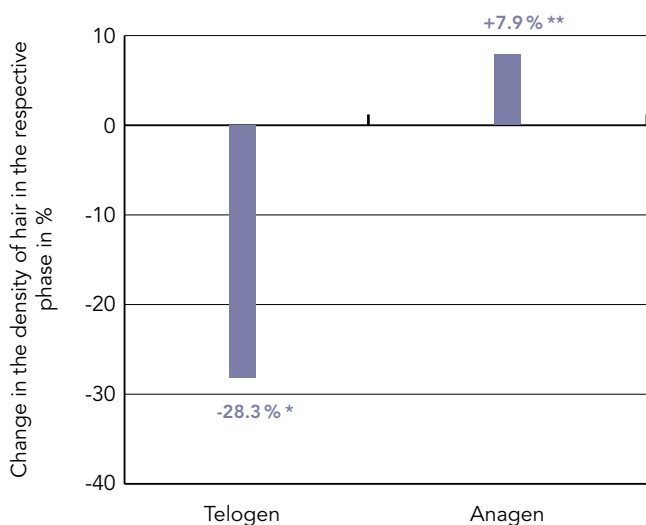
As a consequence, with AnaGain™, the hair growth coefficient (A/T ratio) was significantly increased.

The ratio of the number of anagen hairs to the number of telogen hairs indicates the proportion of active hair follicles. If A/T is above 5, the hair loss is normal.

After three months' treatment with 4% AnaGain™, the A/T ratio improved from 4 to 7.2 thus going clearly beyond 5. This indicates that after treatment with AnaGain™, hair regeneration is restored to a normal level.

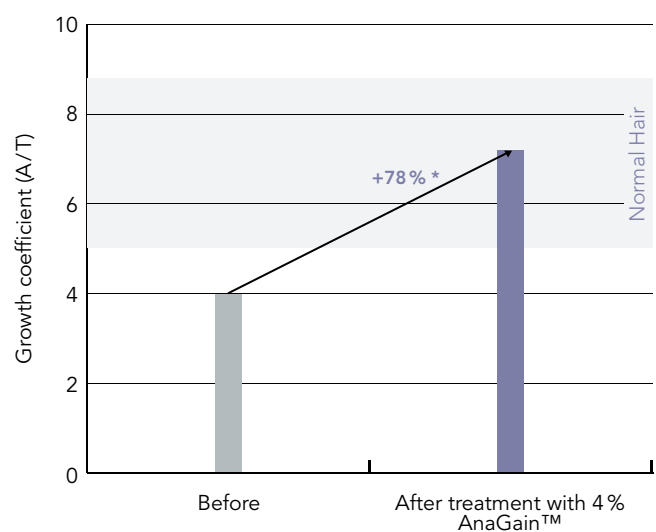
### Reduction of Hair Loss/Stimulation of Hair Growth

■ 4% AnaGain™



\*p=0.001 versus initial conditions  
\*\*p=0.002 versus initial conditions

### Stimulation of the Hair Growth Coefficient



\*p=0.001 versus initial conditions

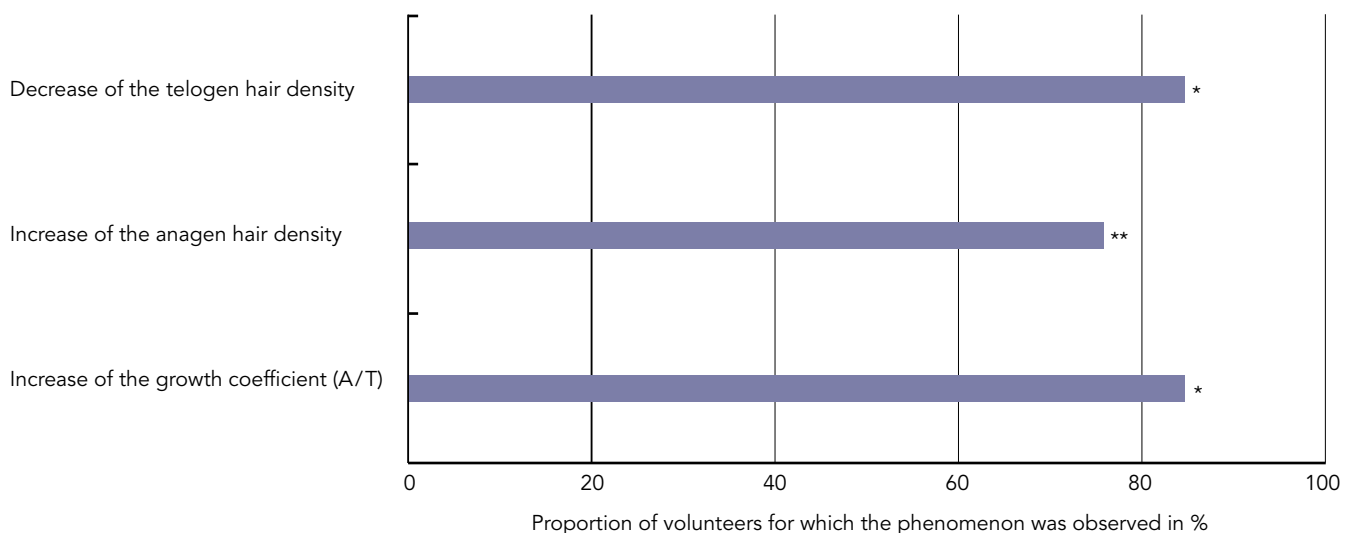
# AnaGain™

## Study results

The anti-hair loss effect of AnaGain™ was observed on a very large part of the panel:

- the decrease of the density of hair in the telogen phase was observed in 85% of the volunteers
- the increase of the density of hair in the anagen phase was observed in 75% of the volunteers
- the increase of the growth coefficient was observed in 85% of the volunteers.

### Anti-Hair Loss Effect Observed on a Large Part of the Panel



\*p=0.001 versus initial conditions

\*\*p=0.002 versus initial conditions



### Perception of the Efficacy by Self-Evaluation

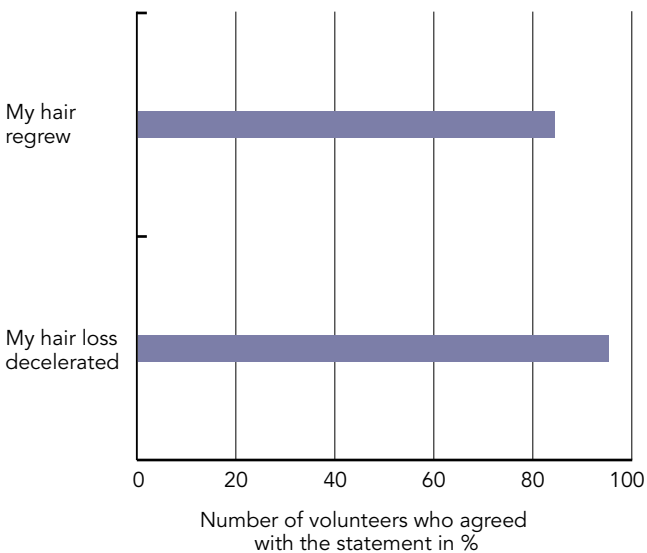
At the end of the study, the volunteers were asked, using a questionnaire, to tell whether they perceived improvements of specific criteria.

Results showed that, after 3 months' treatment with AnaGain™:

- 85% of the volunteers noticed a slight to strong regrowth of their hair
- 95% of the volunteers noticed a slight to strong deceleration of their hair loss
- 80% of the volunteers found their hair less breakable
- 70% of the volunteers found their hair more resistant
- 95% of the volunteers noticed a slight to strong improvement in the look of their hair.

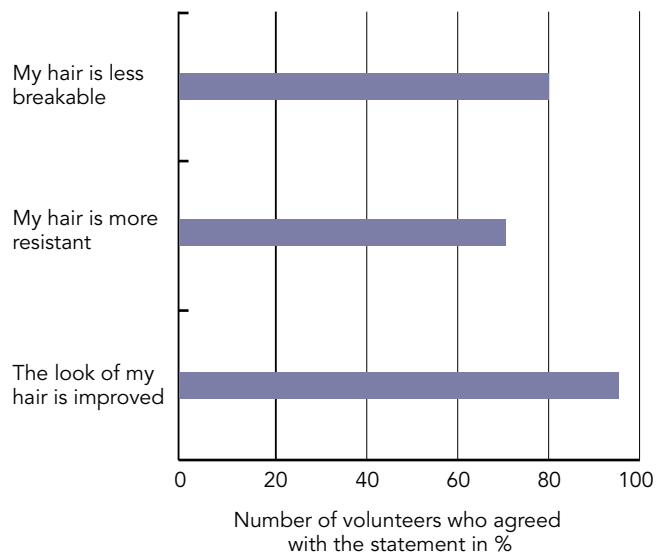
### Perception of the Anti-Hair Loss Effect

■ 4% AnaGain™



### Perception of an Improved Hair Quality

■ 4% AnaGain™



# AnaGain™

## Stimulating hair growth and fighting hair loss

### Claim Ideas for AnaGain™

- Stimulates hair growth at the root
- Prolongs the life cycle of hair
- Fully restores the vitality of the hair
- For denser hair in just 3 months

### Applications

- Anti-hair loss, hair-regrowth formulations
- Anti-aging hair care products
- Tonics, serums, conditioners, masks, shampoos

### Marketing Benefits

- In vivo proven on women and men
- Organic source of the plant

### Innovating for your success

Mibelle Biochemistry designs and develops innovative, high-quality actives based on naturally derived compounds and profound scientific know-how. Inspired by nature – Realized by science.

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