CONFIDENTIAL

Next generation hair growth aging care awakens the hair cycle

Hairgrowju

INCI Name ; Arctium Lappa Root Extract　中文名称 ; 牛蒡（ARCTIUM LAPPA）根提取物

Material that can be blended with quasi drugs

Material that can be used in China

Effective for both men and women

Technoble Co., Ltd.

Anyone can have permanently thick, youthful and supple hair

a natural herbal essence that produces “Collagen Type XVII”,
a critical factor for hair growth, awakens the hair cycle in the skin,
and encourages growth in each strand of hair.

We aim for thick, youthful and supple hair that resists aging.
Next-generation hair-growth aging care is supported by a new mechanism that awakens hair cycle in the skin.

We have succeeded in extracting the two functional ingredients that produce “Collagen Type XVII”,
which has recently been discovered as a critical factor for hair growth, and stems from herbal ingredients,
leveraging Technoble’s proprietary bipolarity balancing method.

The innovative material exercises its effectiveness regardless of the user,
enabling anyone to have permanently thick, youthful and supple hair.

*Technoble's exclusive product born from the latest stem cell research.

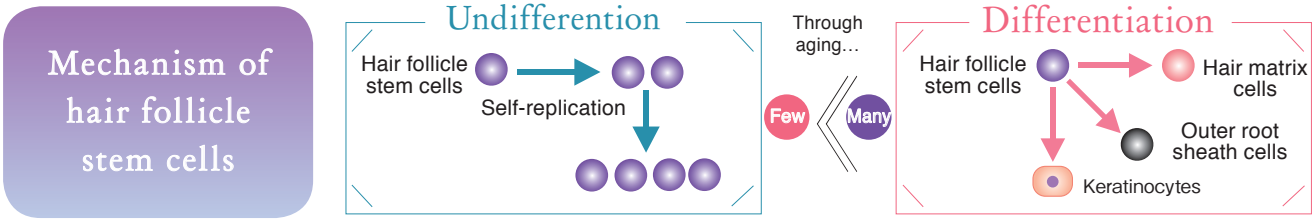
“Hairgrowju” has been developed

*…As of 2017

In research investigating hair thinning caused by aging, we focused on the telogen part of the hair cycle. To support the healthy balance of hair, "hair follicle stem cells" are indispensable.

The latest research has discovered that "hair follicle stem cells", which form the basis of hair, reduce with aging.
Hair follicle stem cells have two states: the "undifferentiation state" and the "differentiation state".
The stem cells replicate themselves during the undifferentiation state",
and turn into various cells through differentiation, thereby maintaining the healthy balance of hair.

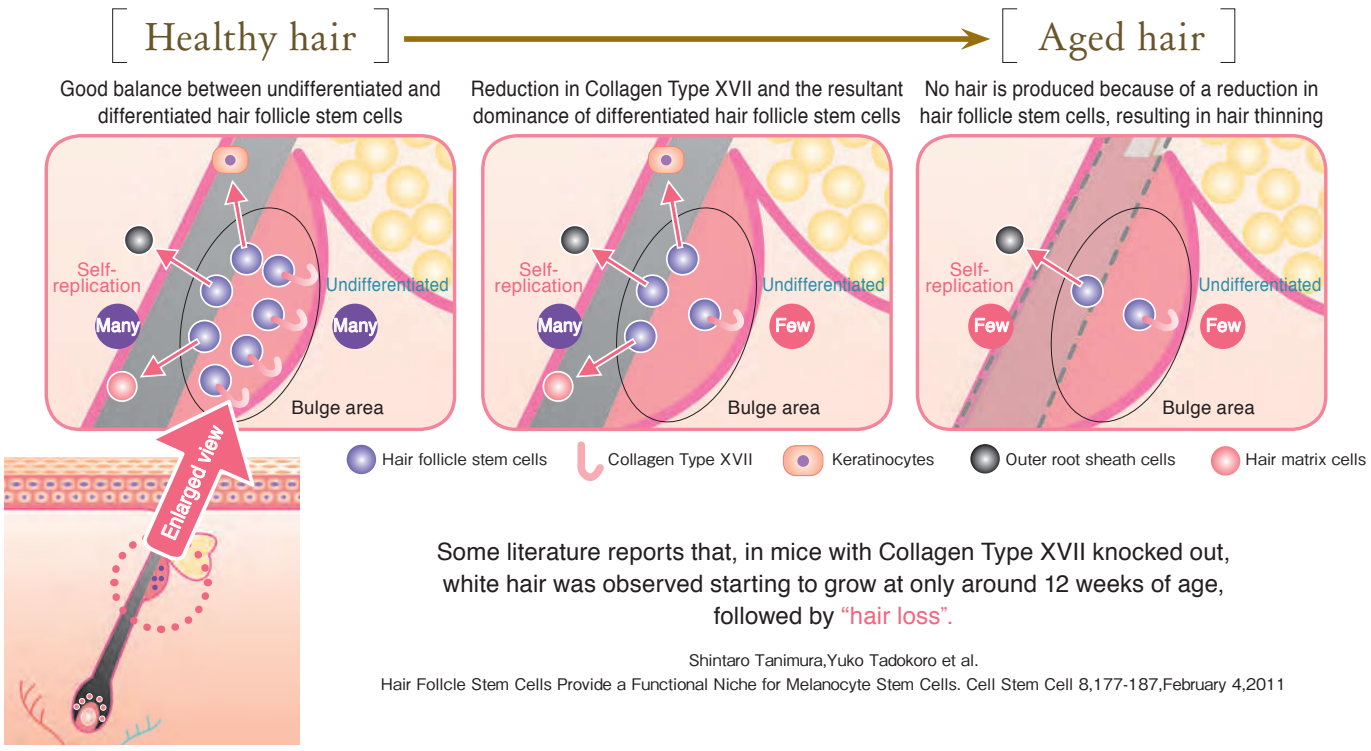
Through aging, however, the differentiated state becomes dominant, and hair follicle stem cells reduce.
This is why it is necessary to increase hair follicle stem cells and to restart the hair cycle,
as the key to the new hair growth mechanism.



"Collagen Type XVII" sustains hair follicle stem cells that are critical for the hair cycle, and maintains the undifferentiation state

"Collagen Type XVII" sustains hair follicle stem cells in the bulge area,
and maintains them in an undifferentiated state.
In this way, hair follicle stem cells are thought to maintain the healthy balance of hair.

However, it is known that Collagen Type XVII is reduced through aging.
Therefore, hair thinning caused by aging is probably caused
by a reduction in Collagen Type XVII,
which maintains the undifferentiation state,
and the resultant dominance of differentiated hair follicle stem cells.



Some literature reports that, in mice with Collagen Type XVII knocked out,
white hair was observed starting to grow at only around 12 weeks of age,
followed by "hair loss".

Shintaro Tanimura,Yuko Tadokoro et al.
Hair Follcle Stem Cells Provide a Functional Niche for Melanocyte Stem Cells. Cell Stem Cell 8,177-187,February 4,2011

We anticipated that the recovery of reducing
Collagen Type XVII would improve hair thinning caused by aging,
and developed Hairgrowju.

Next Effects of Hairgrowju

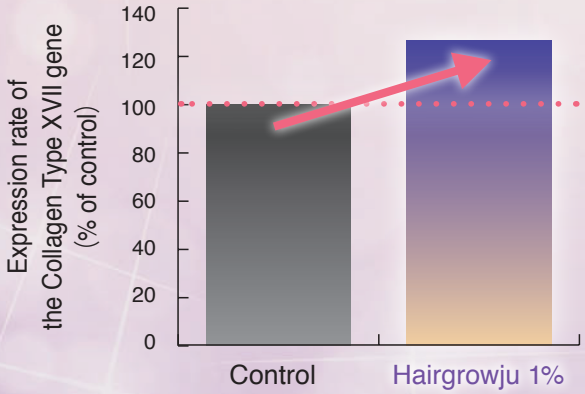
Hair growing effect of Hairgrowju (I)

- Promotive effect on the expression of Collagen Type XVII -

Effect of the Collagen Type XVII gene expression

When Hairgrowju was added to Normal Human Epidermal Keratinocytes, it was discovered that the expression of the Collagen Type XVII gene was enhanced.

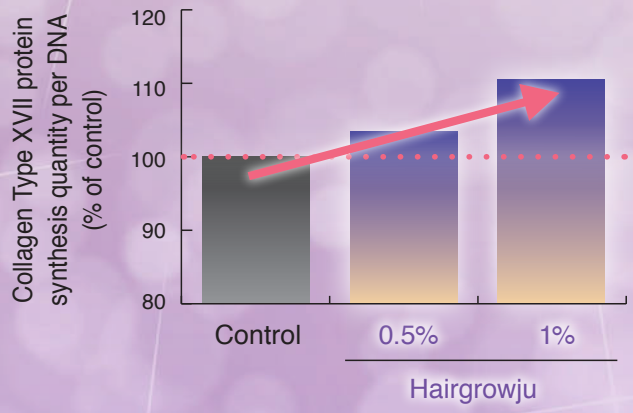
[Study method]
Normal Human Epidermal Keratinocytes (NHEK) were seeded, and a medium that contained 1% Hairgrowju was added for cultivation. After cultivation, the NHEK were collected to extract total RNA, and their influence on the expression of the Collagen Type XVII gene was confirmed through real-time PCR.



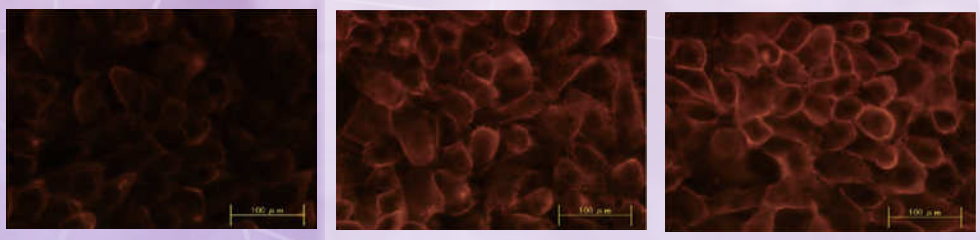
Promotive effect on the Collagen Type XVII synthesis

When Hairgrowju was added to Normal Human Epidermal Keratinocytes, it was discovered that the protein synthesis rate of Collagen Type XVII increased in a concentration-dependent manner.

[Study method]
Normal Human Epidermal Keratinocytes (NHEK) were seeded in a 96-well plate, and media that contained 0.5% and 1% Hairgrowju were added for cultivation. After cultivation, the culture supernatant was removed, before cell fix and blocking were performed. Subsequently, Collagen Type XVII antibody was added as a primary antibody for reaction. After washing and removing the primary antibody, a secondary antibody that was fluorescence-labeled was added for reaction. After washing and removing the secondary antibody, PBS (-) was added, before fluorescence intensity was measured, and observation using a fluorescence microscope was performed. Subsequently, DNA was fluorescence-stained using Hoechst33342, before fluorescence intensity was measured, and Collagen Type XVII protein synthesis quantity per DNA was calculated.



The more intense the red fluorescence, the higher is the synthesis rate of Collagen Type XVII.



Control | Hairgrowju 0.5% | Hairgrowju 1%

It has been confirmed that Hairgrowju raises the synthesis rate of Collagen Type XVII.

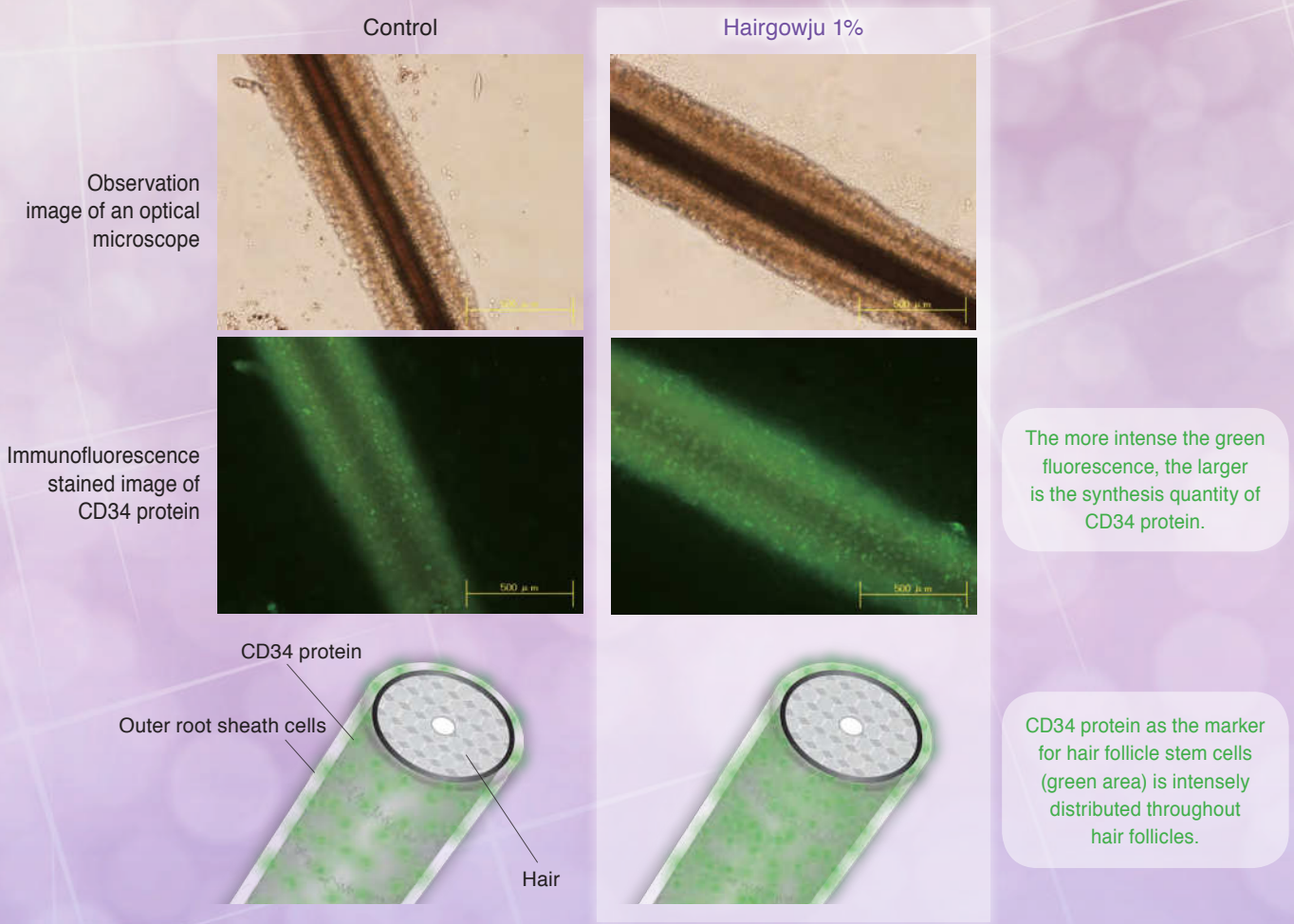
Hair growing effect of Hairgrowju (II)

- Promotive effect on the proliferation of CD34 protein -

Promotive effect on the synthesis of CD34 as a marker of hair follicle stem cells

When Hairgrowju was added to hair follicles that were cultured from plucked hair, it was confirmed that the synthesis quantity of CD34 protein, which was believed to function as a marker for hair follicle stem cells, increased.

[Study method]
Hair follicles from plucked hair were seeded on a collagen-coated plate, and a medium that contained 1% Hairgrowju was added for cultivation. After cultivation, the culture supernatant was removed, before cell fix and blocking were performed. Subsequently, CD34 antibody was added as a primary antibody for reaction. After washing and removing the primary antibody, a secondary antibody that was fluorescence-labeled was added for reaction. After washing and removing the secondary antibody, PBS (-) was added, before observation using a fluorescence microscope was performed.



The more intense the green fluorescence, the larger is the synthesis quantity of CD34 protein.

CD34 protein as the marker for hair follicle stem cells (green area) is intensely distributed throughout hair follicles.

It has been confirmed that Hairgrowju increases CD34 protein as an indicator for hair follicle stem cells.

Hair growing effect of Hairgrowju (III)

- Improvement effect of hair thinning -

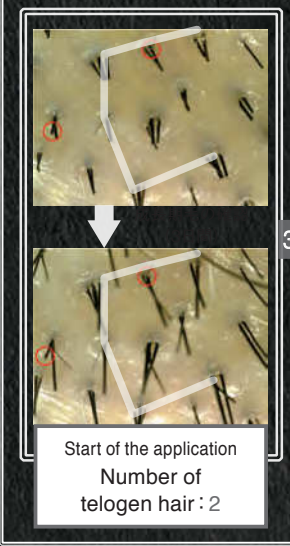
Normalization of the hair cycle *in vivo*

The effect of Hairgrowju on the hair cycle was confirmed in a study using humans actually.

[Study method]
The subjects' hair was clipped in an area of 1 cm x 1 cm on both sides of their head, and photos were taken using a microscope.
Three days later, photos of the test sites were taken again, using a microscope. The telogen hairs were counted through image analysis.
The subjects were asked to apply lotion containing Hairgrowju to the test site on the left side, and control lotion to the test site on the right side, twice every day, in the morning and in the evening, over the three following months.
Three months later, photos of the test sites were taken again, just as on the first day and on three days after that. Changes in the telogen hairs comparing before-application with after application were checked through image analysis.

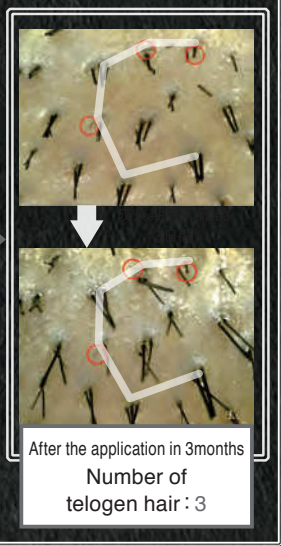
- Model A -

Site where control lotion was applied



Start of the application
Number of telogen hair : 2

3months



After the application in 3months
Number of telogen hair : 3

Site where lotion containing Hairgrowju was applied

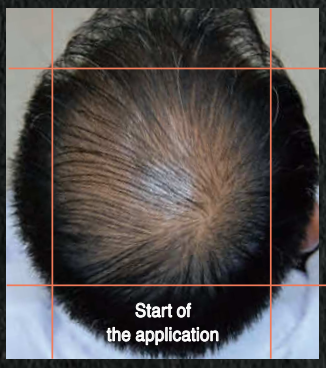
Start of the application
Number of telogen hair : 5

3months

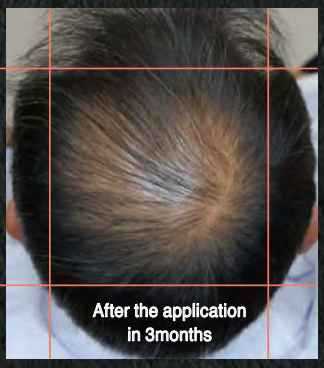
After the application in 3months
Number of telogen hair : 1

Improvement effect on hair thinning *in vivo*

A study was conducted to confirm the effect of Hairgrowju for improving hair thinning in humans. The subjects were asked to apply lotion containing Hairgrowju to the entire head, twice every day in the morning and in the evening, for three months. Photos were taken to confirm the hair status before and after application. Comparison between the status at the start of application and the status three months later indicated that hair thinning was improved on the top of the head.



Start of the application



After the application in 3months

The hair growth effect of Hairgrowju was tested over approx.
three months.
It was confirmed that hair thinning could be improved by awakening and restarting the hair cycle.

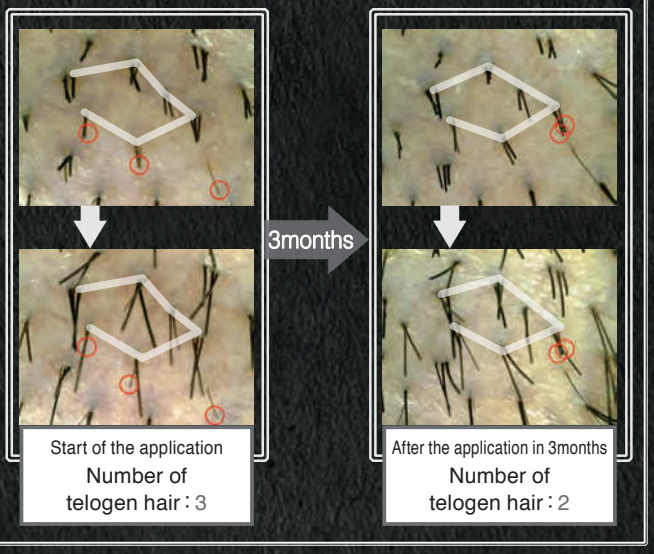
[Composition of the lotion]

	Site where lotion containing Hairgrowju was applied	Site where control lotion was applied
Haiegrowju	1g	-
50BG	-	1g
Ethanol	20g	20g
Polyoxyethylene (20) Sorbitan Monooleate	0.5g	0.5g
Purified water	up to 100g	up to 100g

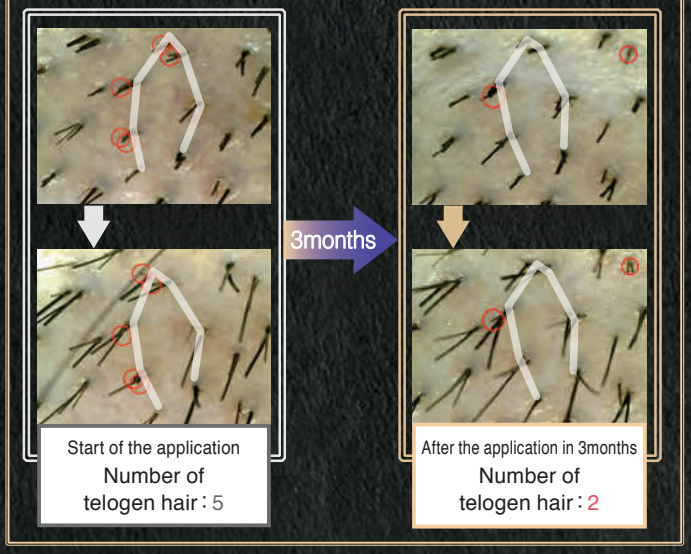
Comparison between the status before application and the status approx. three months later indicated that the number of growing hair was increased by Hairgrowju.

- Model B -

Site where control lotion was applied

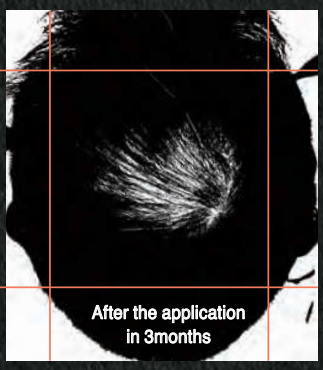


Site where lotion containing Hairgrowju was applied



Point!

When the photos of the top of the head were studied through imaging, it was observed that, following the application of Hairgrowju, pale areas were decreased, indicating an overall reduction in areas of hair thinning.



Hair tonics, extracts, shampoos, conditioners, and more...

This material is easily blended with any product, enabling users to benefit from hair-growth aging care!

3 key points of Hairgrowju

Key point of Hairgrowju 1

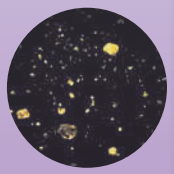
Hairgrowju is made from burdock, which is drawing attention among women for its esthetic effects.

Hairgrowju is made from burdock, which has lately been drawing attention for its esthetic effects for dieting and anti aging. Burdock tea, made from burdock, is rich in polyphenols, and is therefore referred to as a “rejuvenation tea”. Burdock tea is loved and drunk by many women, because it is believed to maintain youthful skin and health. It is known that inulin, a water-soluble dietary fiber contained in burdock, promotes the synthesis of IGF-1, which promotes transfer to the anagen (growing) period in the hair cycle, and inhibits transfer to the catagen (intermediate) period.
In this way, burdock has the effects of both anti aging and hair growth. We identified that burdock had the effect of improving the hair thinning that takes place through aging.

Key point of Hairgrowju 2

We use “Uda Golden Burdock Root”, a traditional vegetable from Nara Prefecture, Japan, which is rich in inulin and chlorogenic acid, which are functional hair growth ingredients.

Hairgrowju is made from Uda Golden Burdock Root, a traditional vegetable from Nara Prefecture, Japan. Uda Gold Burdock Root is cultivated in the Ouda district, Uda city, which is located in the eastern mountains in Nara. This district is suitable for cultivating burdock, owing to the cool climate and soil with high water retention. Uda Golden Burdock Root cultivated in this district is “longer and thicker” than typical burdock roots grown in Japan, and it is often physically demanding to dig out.

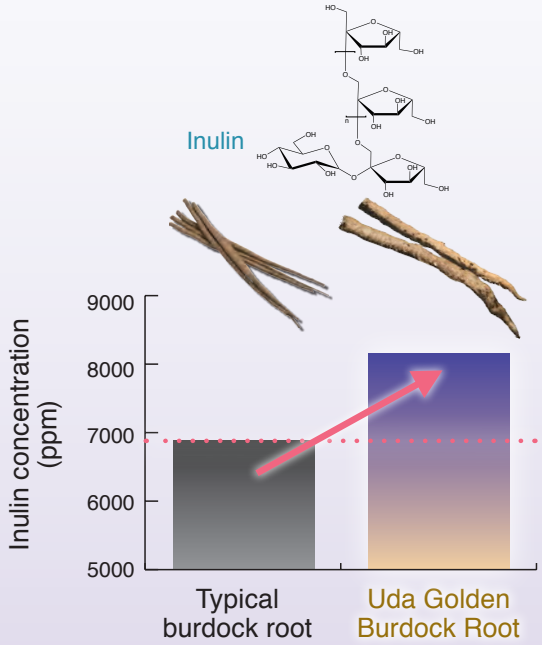


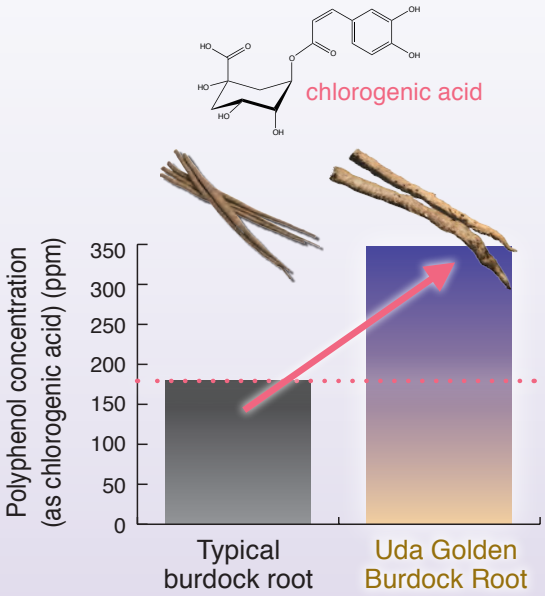
Mica

The soil contains mica and shines brightly. Uda Golden Burdock Root was named after this mica(it looks like gold).

It has also been identified that Uda Golden Burdock Root contains both inulin and chlorogenic acid at higher levels than are found in typical burdock roots grown in Japan. Inulin promotes the synthesis of IGF-1, and chlorogenic acid is a type of polyphenol that is abundant in burdock.

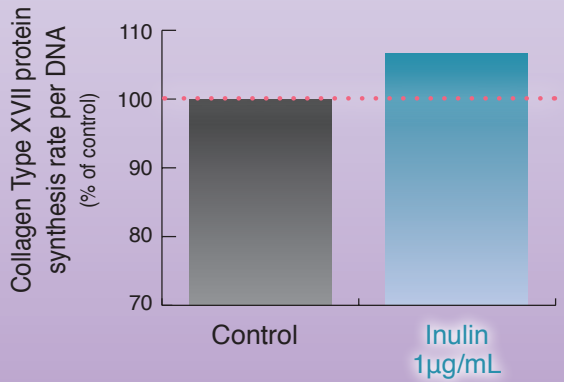
Uda Golden Burdock Root grows thicker and longer than typical burdock roots, and is rich in inulin and chlorogenic acid.

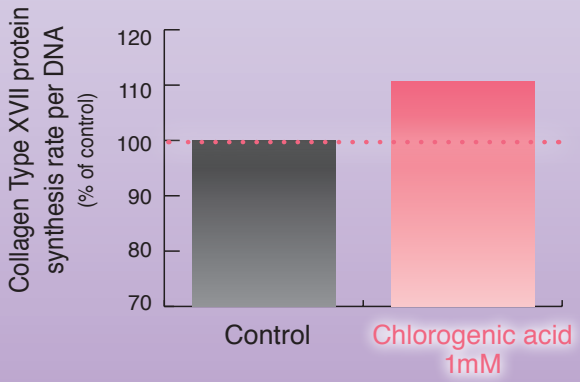




- Active ingredients of Hairgrowju -

We researched the active ingredients of Hairgrowju, associated with promoting the expression of Collagen Type XVII, and confirmed that inulin and chlorogenic acid had this effect.



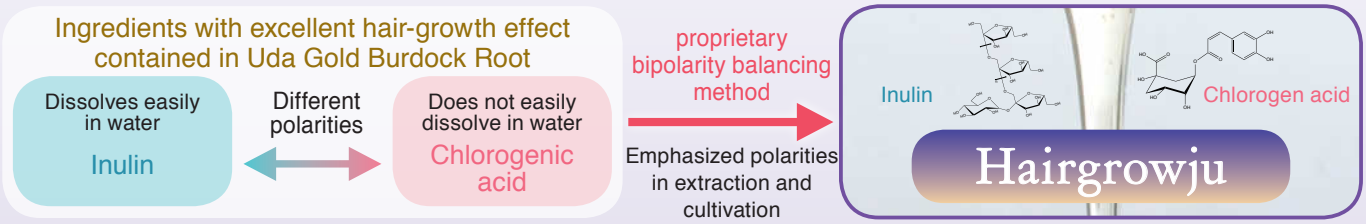


We recognized that inulin and chlorogenic acid contained in Hairgrowju had the effect of promoting the synthesis of Collagen Type XVII.

Key point of Hairgrowju 3

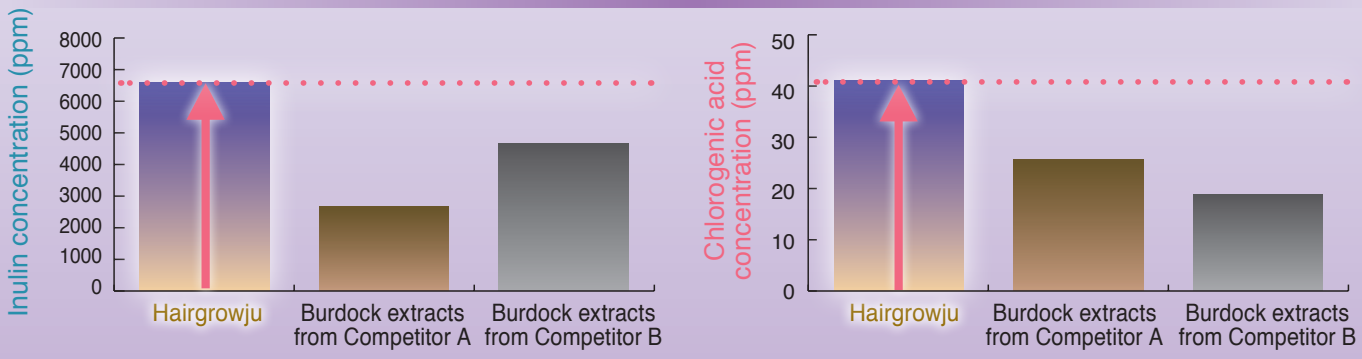
We adopted Technoble's proprietary "bipolarity balancing method" for extracting generous amounts of inulin and chlorogenic acid as functional hair growth ingredients.

"Uda Golden Burdock Root", as the material of Hairgrowju, is rich in inulin and chlorogenic acid, which have excellent hair growth effects. Of these two ingredients, inulin has high polarity and easily dissolves in water, while chlorogenic acid has low polarity and does not easily dissolve in water. To maximize their hair-growth effect, we reviewed the solvent and temperature conditions for extraction countless times, so that the two ingredients with different polarities would be retained at the highest levels. Technoble's proprietary bipolarity balancing method was developed in this way.

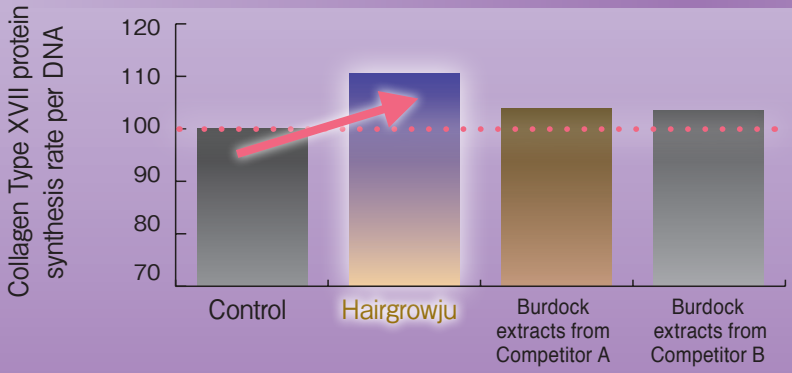


We compared Hairgrowju, which was actually produced using the bipolarity balancing method, with burdock extracts produced by competitors, in terms of ingredients and effectiveness. Hairgrowju contained inulin and chlorogenic acid at higher levels than burdock extracts from competitors. It was also confirmed that Hairgrowju had a greater effect in promoting the synthesis of Collagen Type XVII than burdock extracts from competitors.

- Comparison of active ingredients with burdock extracts from competitors -



- Comparison of effectiveness with burdock extracts from competitors -



Hairgrowju contains inulin and chlorogenic acid at higher levels than burdock extracts from competitors, and therefore promotes more powerfully the synthesis of Collagen Type XVII.

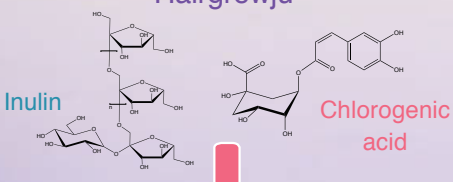
Hairgrowju

Produce × Increase × Awaken

realizes next generation hair growth aging care in 3 steps!

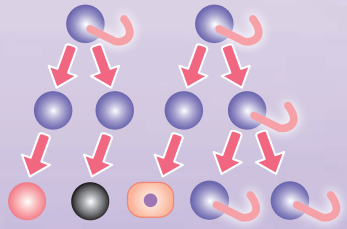
Produce
Collagen Type XVII

Hairgrowju



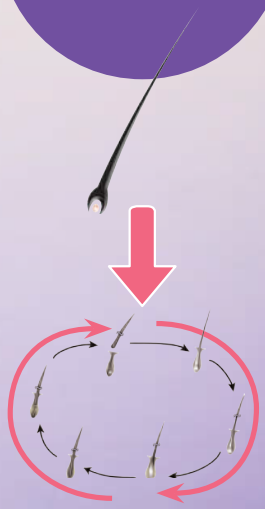
Inulin and Chlorogenic acid in Hairgrowju produce Collagen Type XVII.

Increase
Hair follicle stem cells



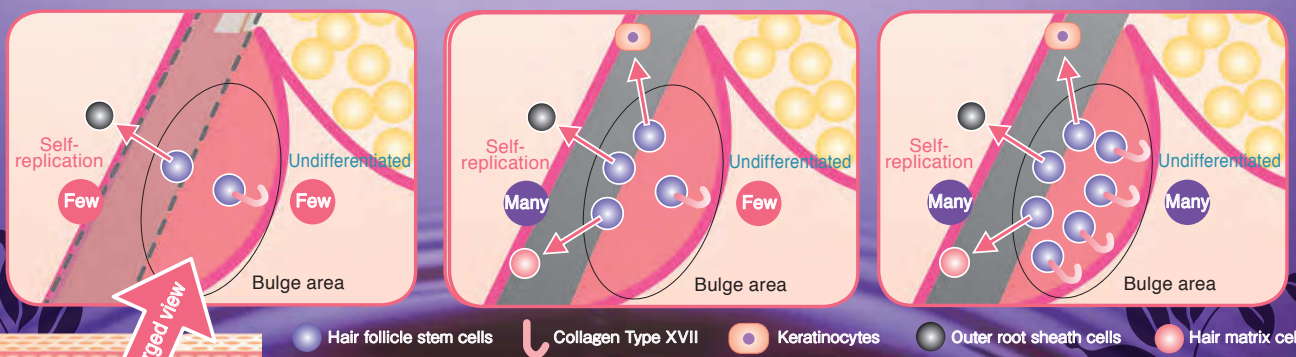
Collagen Type XVII maintains hair follicle stem cells in an undifferentiated state, thereby enabling their increase and differentiation.

Awaken
Hair cycle



Because hair follicle stem cells increase the number of cells available for producing hair, the hair cycle is awakened.

Aged hair → Healthy hair



Hairgrowju enables everyone to have permanently thick, youthful and supple hair.

CONFIDENTIAL

Information of Hairgrowju

Safety

Please contact with our sales staff for the details.

Specification

For details, please contact our sales staff.

Storage

Store in dark place at room temperature (15-25C°).

Remarks

This product contains 1,3-butylene glycol (50%).
The INCI name of this product is "Arctium Lappa Root Extract"
The Chinese name of this product is 牛蒡（ARCTIUM LAPPA）根提取物
(Listed in IECIC2015).

Inquiries

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