

# Stem Cell & Growth Factors: Their Roles in Skin Cosmetics

(幹細胞とグロースファクター)  
(スキンコスメにおけるそれらの役割)

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# What are growth factors?

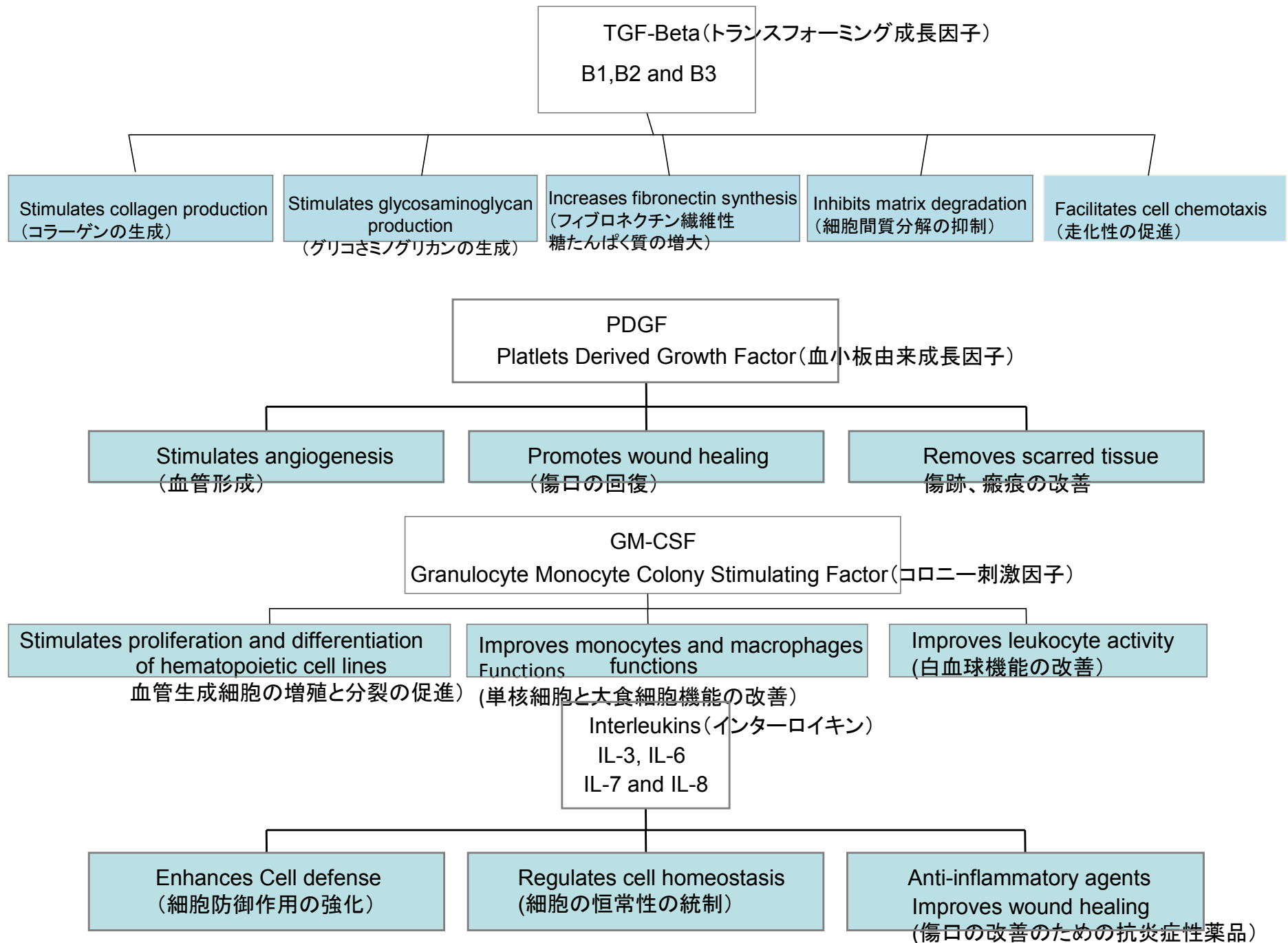
## (グロースファクターとは？)

- Growth factors are proteins that bind to receptors on the cell surface, with the primary result of activating cellular proliferation and/or differentiation.
- (グロースファクターは、たんぱく質の一種であり、細胞表面のレセプターに取り付きます。そして、細胞の増殖および細胞分裂を促進させます。)
- Many growth factors are quite versatile, stimulating cellular division in numerous different cell types; while others are specific to a particular cell-type.
- (多くの種類のグロースファクターが、多種類の異なる細胞の分裂に、有効に関与しますが、また、他の種類のグロースファクターが、選択的にある種の細胞の分裂に関与することもあります。)

# General functions of the growth factors

(グロースファクターの役割)

- Chemical messengers between cells  
(細胞間の化学的な伝達物質である)
- Turn a variety of cellular activities “on” and “off”  
(いろいろな細胞活動をオン・オフさせる)
- Increase the rate at which cells in the body grow  
(体の成長に関わる細胞の増加率を上げる)
- Involved in cell division, new cell and blood vessel growth, and collagen and elastin production and distribution  
(細胞分裂に関与し、新しい細胞により、血管の成長をうながし、コラーゲンとエラスチンの生成をはかる。)



# Growth factors and Stem cells

(グロースファクターと幹細胞)

- Do Stem cells produce growth factors?  
(幹細胞はグロースファクターを産生するか?)
- Do stem cells from other species e.g. plants works for human?  
(植物由来の幹細胞は人の細胞に影響を与えるか?)
- What is the best source of human growth factors?  
(人の細胞のグロースファクターとして最適な原料は何か?)
- Recombinant GF  
(遺伝子組み換えによるグロースファクター)

# The role of the fibroblast in wound contraction and healing

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## Fibroblast migration and collagen deposition during dermal wound healing: mathematical modelling and clinical implications

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Oxford OX1 3LB, UK*

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## The multifunctional role of fibroblasts during wound healing in *Hirudo medicinalis* (Annelida, Hirudinea)

Gianluca Tettamanti <sup>a,\*</sup>, Annalisa Grimaldi <sup>a</sup>, Liliana Rinaldi <sup>a</sup>, Francesca Arnaboldi <sup>b</sup>,  
Terenzio Congiu <sup>c</sup>, Roberto Valvassori <sup>a</sup>, Magda de Eguileor <sup>a</sup>

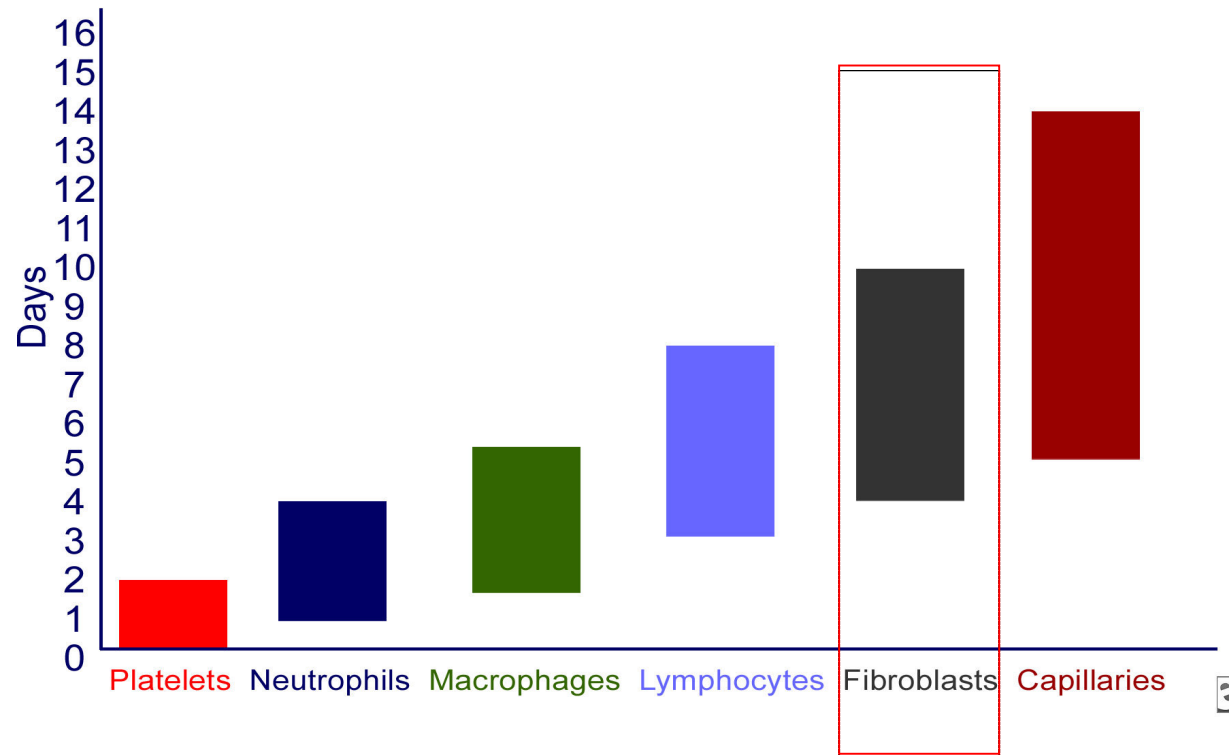
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## Cells Involved in Wound Healing



(外傷の治癒に関わる細胞の役割と機序)

[www.agskinsolutions.com](http://www.agskinsolutions.com)

# Skin Grafts

## (皮膚移植手術の現場)





# After Skin Graft Procedure (皮膚移植、直後の状態)



# Results After Skin Graft Surgery (皮膚移植後の状態)



# Other Burn Healing

## (その他のやけど治療の例)



7 days



14 days



21 days



Before



7 days



14 days



21 days



# Current use of Growth Factors in Medicine and Cosmetics

## (医療および化粧品におけるグロースファクター応用の現状)

### A. Treatments for skin conditions

#### (A. 皮膚への治療)

しわ、肌のきめ、こじわ)

- Wrinkles, texture, fine lines

### B. Alopecia Androgenic ( Hair loss )

#### (B. 脱毛症の治療)

- Male pattern baldness
- Female hair loss

(男性の脱毛症および女性の脱毛治療)

### C. Wound Healing

#### (C. 皮膚外傷の治療)

- Diabetic ulcers & Burns

(糖尿病による腫瘍およびやけどの治療)

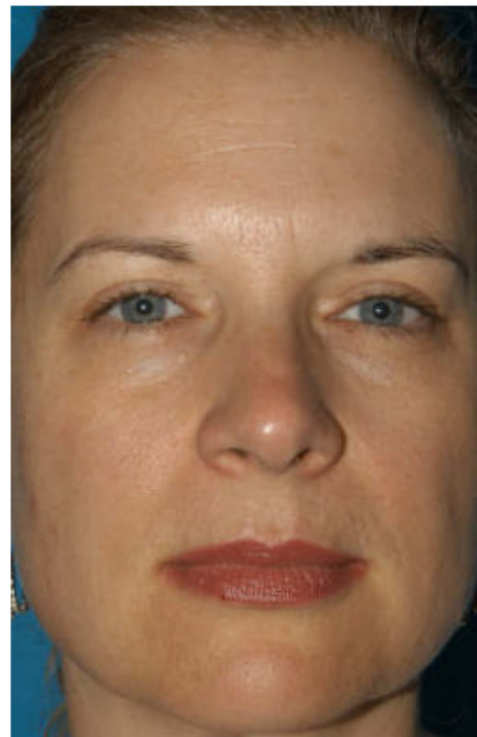
### D. Growth factors with clinical modalities that give controlled damage and transdermal delivery. (laser, dermal stamp, dermal roller, IPL, etc.)

#### (D. 物理的な皮膚への加療・治療における、グロースファクターの併用)

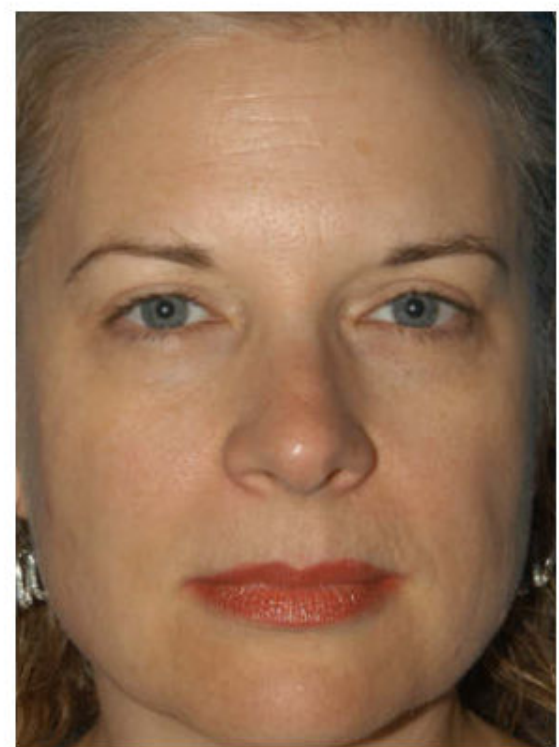
(レーザー治療、デルマスタンプ、デルマローラー、IPLなどとの併用)



**Pre-Treatment**

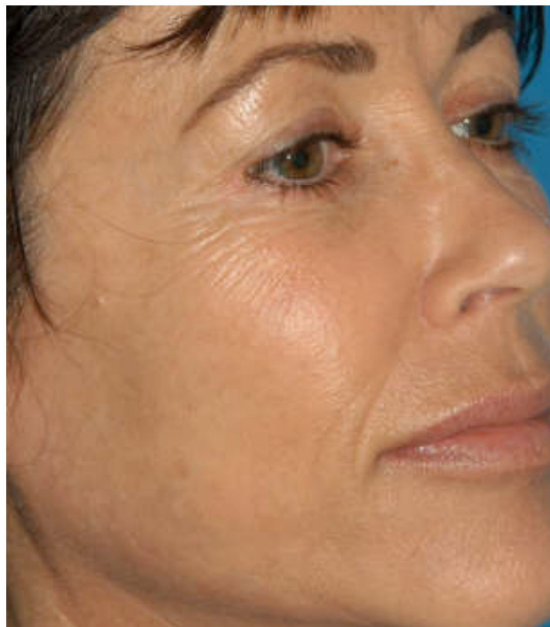


**Week 1**



**Week 2**

Courtesy: Dr. Norman Leaf (Beverly Hill, CA)



**Pre-Treatment**



**Week 1**

Courtesy: Dr. Norman Leaf (Beverly Hill, CA)



**Pre-Treatment**



**Week 1**



**Week 2**

Courtesy: Dr. Norman Leaf (Beverly Hill, CA)



**Pre-Treatment**

**Week 1**



**Pre-Treatment**

**Week 1**

Courtesy: Dr. Norman Leaf (Beverly Hill, CA)



## Acne Scars



Courtesy: Viol Clinics - Korea

## Hyperpigmentation



Scar

48yrs - male



Week 0



Week 3



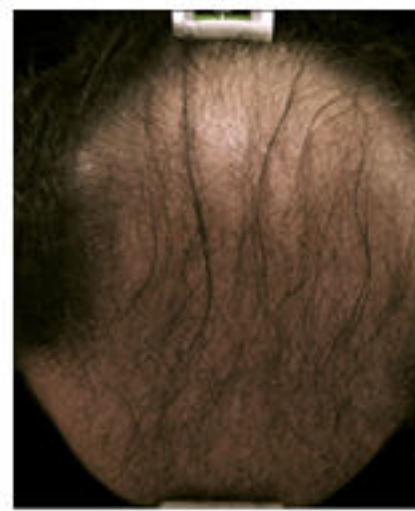
Week 5



Week 8



Week 12



Week 15

Courtesy: AQ Skin Solutions Inc.

59 yrs  
male



57 yrs  
Female



by Seishin Clinic - JAPAN



**Before**



**8 Weeks After**

52 yrs - male

Courtesy: JRX and AQ Skin Solutions Inc.





Week 0

37 yrs  
male



Week 15

Courtesy: AQ Skin Solutions Inc.

## Study on Mice (ねずみによる実験例)



**Day 0**



**Day 14**

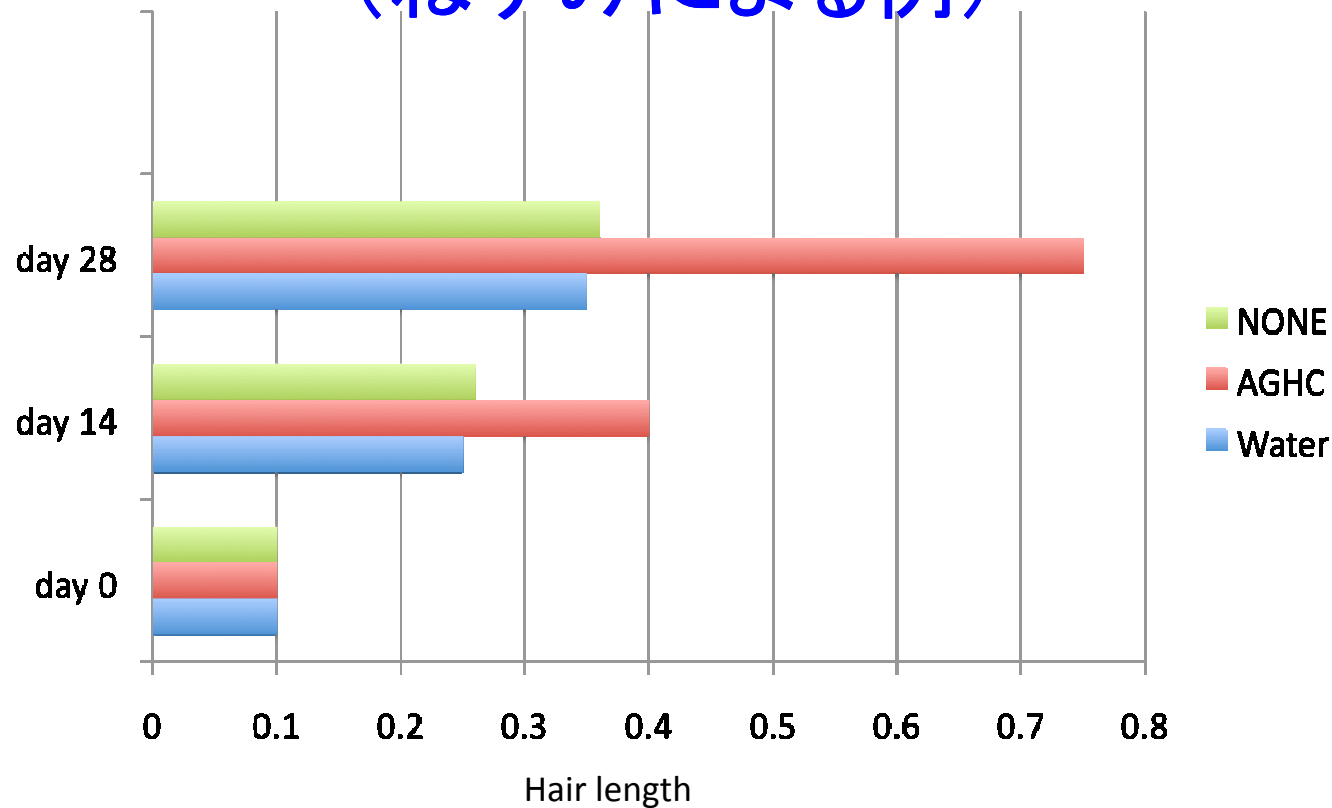


**Day 28**

Mice that received the GF Hair Care Complex showed increased hair re-growth. Mice treated with water exhibited similar progress to the mice that received no treatment. Mice hair color was not affected in this experiment.

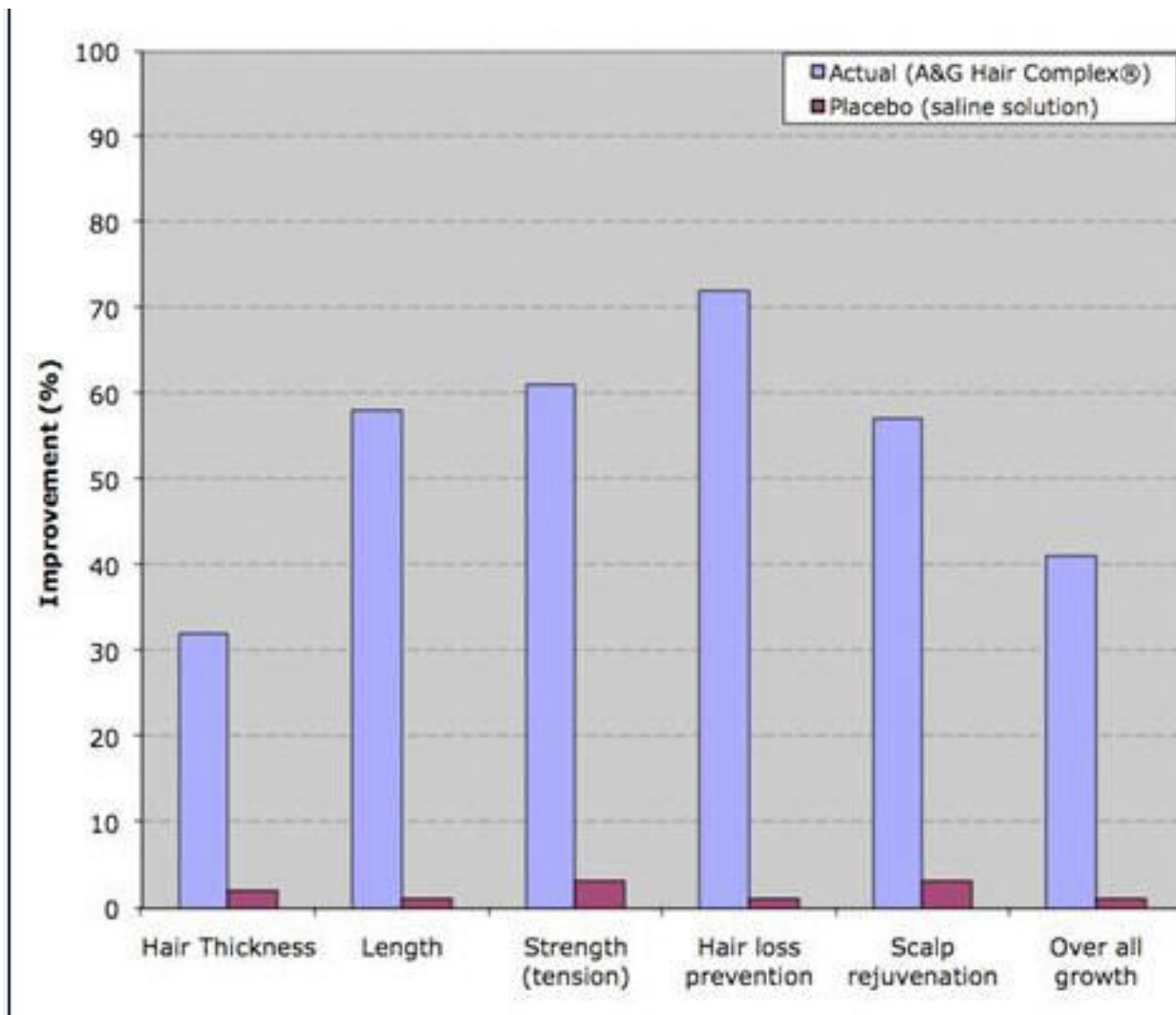
(グロスファクターを含んだ頭髮治療用薬剤をねずみに使用すると、何も含まない水を塗布されたねずみと比べて、発毛が促進される。この例では、ねずみの毛の色には、何も影響を及ぼさなかった。)

## Study on Mice (ねずみによる例)



Overall hair growth progress was compared among all three groups. Mice that received the GF Hair Care Complex exhibited an average 43% increase in the rate of hair re-growth. (ねずみによる発毛効果の状況を3つのグループに分けて検討した。その結果、グロスファクター含有の発毛剤を塗布されたグループは、平均43%の発毛率の増大を見た。





Courtesy: AQ Skin Solutions Inc.

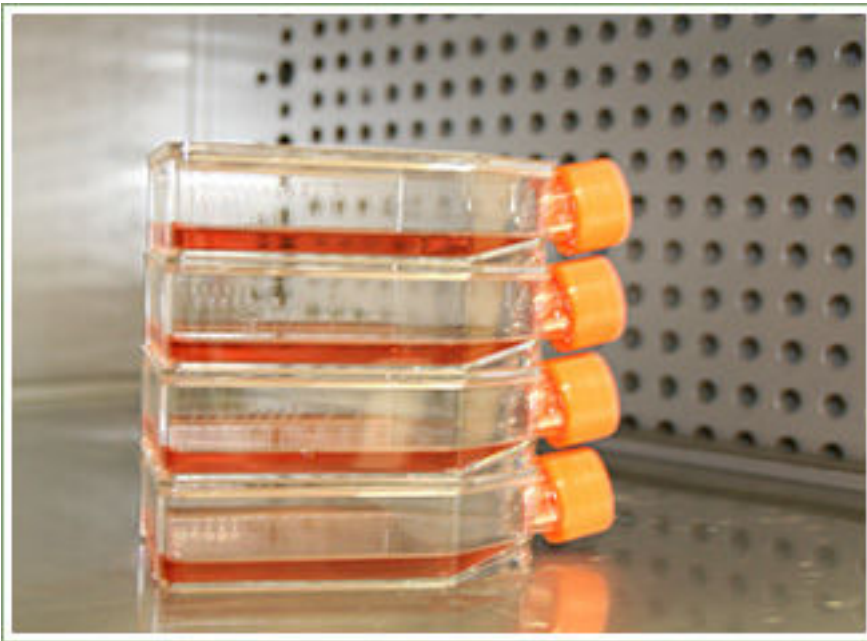
## **Hair growth stimulated by conditioned medium of adipose-derived stem cells is enhanced by hypoxia: evidence of increased growth factor secretion**

Byung-Soon PARK<sup>1</sup>, Won-Serk KIM<sup>2</sup>, Joon-Seok CHOI<sup>3</sup>, Hyung-Ki KIM<sup>3</sup>, Jong-Hyun WON<sup>4</sup>, Fumio OHKUBO<sup>5</sup>, and Hirotaro FUKUOKA<sup>6, 7</sup>

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ขอบคุณครับ



THANK YOU