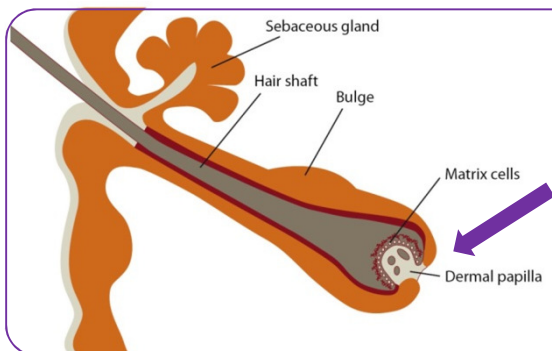


3HC- Hair Stimulation Complex

turn on the dermal papilla hair engine



Abstract

3Hc Hair Stimulation Complex is a mix of plant derived active ingredients able to boost the turnover of Human Follicle Dermal Papilla Cells (HFDPC), a reservoir of **multipotent stem cells** regulating hair follicle development .

3Hc Hair Stimulation Complex increases the lifespan of hair and reduces hair loss.

Hair in Telogen Phase -9,7% in 21 days -13,1% in 60 days

Hair in Anagen Phase +10,7% in 120 days

Anagen/Telogen rate +32,4% in 60 days

Reduction of hair loss -21,3% in 21 days -38% in 60 days

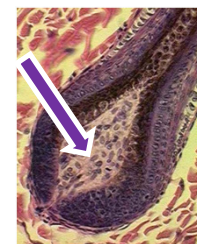


Introduction

Human Follicle Dermal Papilla Cells (HFDPC) are a population of mesenchymal (stem) cells responsible of:

- nourishing hair follicle as connected to blood vessels bringing nutrients and oxygen from the lower layers of epidermal cells;
- determine the size of the hair follicle and the volume of hair fiber being these related to the HFDPC number that differentiating give rise to all the different hair tissues;
- are constituting the core of hair bulbs and therefore are regulating hair thickness and growth speed;
- regulating hair follicle development are controlling the hair growth cycle;

Human Follicle Dermal Papilla Cells can be considered the real engine of our hair



3Hc Hair Stimulation Complex is constituted by:

G-CELL (*vitis vinifera* fruit meristem cell culture): a stem cell containing product derived by grape characterized by highly biocompatible antioxidants also able to positively influence the microcirculation

PRO-STRUCTURE (hydrolyzed walnut extract): a powerful direct antioxidant able to effectively protect hair and skin from UV and harmful radical species

GSH DEFENSE (hydrolyzed *eruca sativa* leaf): able to stimulate the natural synthesis of glutathione in human cells. Glutathione is an endogenous antioxidant that plays a central role in the Phase II defensive system, also acting as an effective detoxifying molecule and a DNA protectant.

In vitro test

Human follicle dermal papilla cells were treated with 1 % v/v of each product (Pro-Structure, GSH-Defense and G-Cell) to assess the metabolic effect of these administrations. Cells were incubated and the total number of cells were counted. Results obtained are reported as increase of cell number vs. untreated cells.

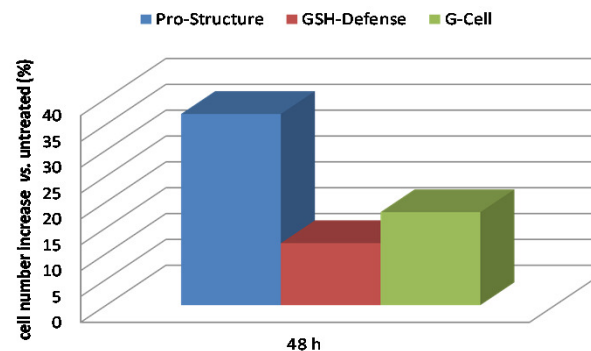
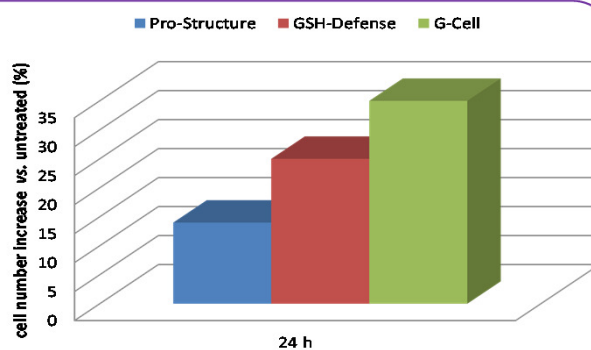
After 24 h

After 24 hours of treatment all constituents have a proliferative effect on model cells. Pro-Structure has the lower effect while GSH-Defence and G-Cell exert a far more intense stimulation.

After 48 h

After 48 hours of treatment the effect measured for GSH-Defence and G-Cell is far less evident than after 24 hours, following the typical path of a short term stimulation process. Samples treated with Pro-Structure show a clear increase, indication of a more long term effect.

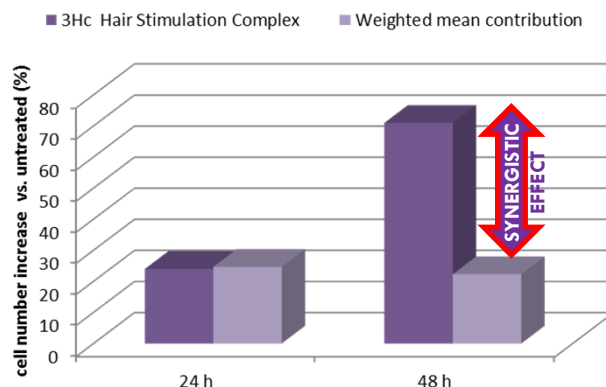
The constituents of 3Hc hair stimulation complex seem to exert on HFDPC two different effects, a more rapid stimulation due to the contribution of GSH-Defence and G-Cell, and a more long term stimulation effect delivered by Pro-Structure. These data suggest that the constituents of 3Hc hair stimulation complex might be able to act at different levels, stimulating different metabolic paths of hair follicle cells.



3HC- Hair Stimulation Complex

In vitro test, synergistic stimulation effects

The effect of 3Hc hair stimulation complex on proliferation of HFDPC was tested treating Human Follicle Dermal Papilla Cells with 1 % v/v of 3HC for 24 and 48 hours. The results obtained are reported as % of increase of cell number vs. untreated cells. 3Hc hair stimulation complex has an interesting stimulation effect on HFDPC that can be already appreciated after 24 hours of treatment but after 48 hours the figure rises to over + 70%, indicating a very strong long term proliferative effect delivered to hair follicle cells. The effect measured during the stimulation with 3Hc hair stimulation complex was compared with the weighted mean of stimulation effects of the constituents obtained during the preliminary assays. Data confirm 3Hc hair stimulation complex is able to work at different levels on HFDPC metabolism inducing synergistic long term stimulation effects on cell growth

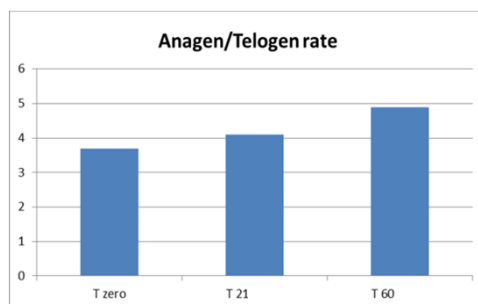
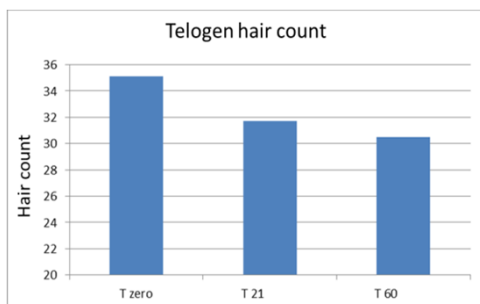
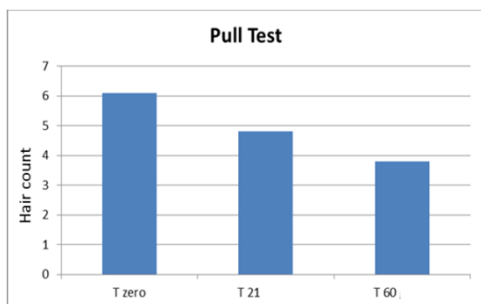


In vivo test

A clinical and instrumental assessment of the effectiveness of **3hc stimulation complex** for the treatment of hair loss problems was performed by the Department of Biomedical Sciences, University of Sassari. 15 male and female subjects were selected as panel of volunteers, aged 18-65 years, with idiopathic chronic telogen effluvium which caused a thinning of hair mild or moderate. Volunteers applied on the scalp 10-15 drops of a lotion containing 3% w/w **3hc stimulation complex** once a day and rub the skin until completely absorbed lotion for a 21 days. The effectiveness of the product was evaluated using **pull test** and **phototrichogram**.

The **Pull Test** is a method that allows to estimate roughly the amount of hair loss. The dermatologist takes a few strand between thumb and forefinger and pulls on them gently.

The **Phototrichogram** is an objective method that allows to obtain on the number of hairs in the different development stages (Telogen and Anagen). To obtain these numerical values volunteers hair were trimmed to 1 mm in length. Immediately after shaving and after 48 hours phototrichogram was acquired with a digital dermatoscope Dermalite HR pro. The two images were analyzed and compared with a dedicated software.



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Hair in Anagen Phase
+10,7% in 120 days

3Hc Hair Stimulation Complex increases the lifespan of hair and reduces hair loss

Technical specifications:

- CTFA name: WATER (and) VITIS VINIFERA MERISTEM FRUIT CELL CULTURE, WATER (and) HYDROLYZED ERUCA SATIVA LEAF, HYDROLYZED WALNUT EXTRACT
- Ingredients: water, *Vitis vinifera* (fruit meristem cell culture), *ErUCA sativa* (leaves), *Juglans regia* (fruit), citric acid, sodium benzoate, potassium sorbate.
- Suggested concentration of use: 1 - 3% w/w
- Solubility: soluble in water, glycerin
- pH: 2.5 – 3.5



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