



LABORATOIRES
SÉROBIOLOGIQUES

Member of **cognis**

DERMOSACCHARIDES® GY

MARINE GLYCOGEN

HAIR

Hair and Glycogen

1. Hair growth cycle

- It is well established that the hair follicle goes through periodic phases of growth and quiescence. Until adulthood, these changes are cyclic and regular (growth, atrophy, inactivity). With aging, the quiescence phase increases gradually.
- The hair cycle is divided into 3 successive phases:
 - **anagen** (2 to 6 years period). The hair follicle is implanted deeply in the dermis, and the root sustains intense keratin formation activity,
 - **catagen** (1 month period). During this brief transition phase, the mitotic activity of bulbar matrix cells decreases until keratogenesis stops,
 - **telogen** (2 to 4 months period). The hair dies. At the end of this period, a new hair grows under the telogen hair; the dead hair is eliminated spontaneously.
- The growth rate of hairs in the anagen phase is directly related to the proliferation rate of bulbar matrix cells. The mitotic activity of these bulbar matrix cells depends on the nutrition and the energy supply.

2. Role of glycogen in hair growth

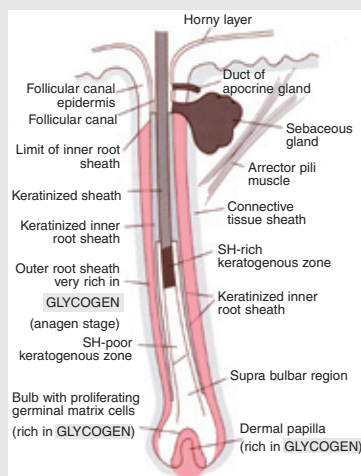


Fig. 1 – Longitudinal section of an anagen hair follicle (according to Jarrett).

during cell proliferation was elucidated by Embden, Meyerof and Krebs.

Glycogen is abundant in cells of the external epithelial sheath of the anagen follicle. This glycogen satisfies the intense energy needs of the follicle during active growth. Likewise, the mitotic activity of bulbar matrix cells during anagen causes an increase of the oxygen consumption rate. The metabolic path by which glycogen is consumed as an energy source

DERMOSACCHARIDES® GY

DEFINITION / COMPOSITION

DERMOSACCHARIDES® GY is a concentrated solution of highly-purified marine glycogen.

Glycogen, an essential energy source for living cells of the skin, is a homopolymeric polysaccharide (monomer = glucose) with an α (1 → 4) glucan structure (Fig. 1).

Main components:

- | | | |
|-----------------------------------|------|-------|
| - Glycogen (purity \approx 85%) | ~ | 7% |
| - Vehicle | q.s. | 100%. |

HAIR BENEFITS

DERMOSACCHARIDES® GY is a **hair tonic** that:

- stimulates **growth** of hair follicles,
- stimulates **mitosis** of bulbar keratinocytes.

COSMETIC USE

DERMOSACCHARIDES® GY is indicated for:

- anti-loss, anti-age and anti-stress care for hair,
- care of tired, devitalized hair.

DERMOSACCHARIDES® GY can be used alone or in association with other anti-loss, moisturizing, repairing or conditioning hair care actives.

ORIGINALITY

The active fraction of DERMOSACCHARIDES® GY is:

- homologous to the glycogen of epidermal cells,
- highly purified, concentrated, bio-available, stable.

DOSAGE / SOLUBILITY / MODE OF INCORPORATION

1. Dose of use: 1 to 3%.

2. Solubility: DERMOSACCHARIDES® GY is water soluble, soluble in dilute ethanol, insoluble in oils and fats.

3. Mode of incorporation: DERMOSACCHARIDES® GY is incorporated into the finishing process at 50°C, or at room temperature for cold processing.

Compatible with pH from 4 - 10. Can be heated to 70°C.

ANALYTICAL CHARACTERISTICS

1. Aspect: slightly opalescent liquid, colorless to pale yellow, of weak odor.

2. Specifications: upon request.

TOLERANCE

Good.

EFFICACY

Test summaries overleaf.

STORAGE

In its original packaging, at 15 - 25°C.

INCI NAME

Water (and) Glycerin (and) Glycogen.

MANUFACTURER

Laboratoires Sérobiologiques S.A.

ACTIVE INGREDIENT FOR COSMETOLOGY

EFFICACY TEST

STIMULATING EFFECT ON THE GROWTH OF HUMAN HAIR FOLLICLES AND THE BULBAR CELLULAR MITOTIC ACTIVITY

Aim

The matrix of the hair bulb is made of undifferentiated cells with strong germinative power. Thus, the study of the benefits of DERMOSACCHARIDES® GY has been conducted on this part of the bulb.

Protocol

Bulbs of human hair (anagen phase) were maintained for 5 days in:

- survival medium, DMEM(*) (control experiment),
- survival medium, DMEM containing 1% DERMOSACCHARIDES® GY.

After 5 days, the bulbs were examined using microscopy.

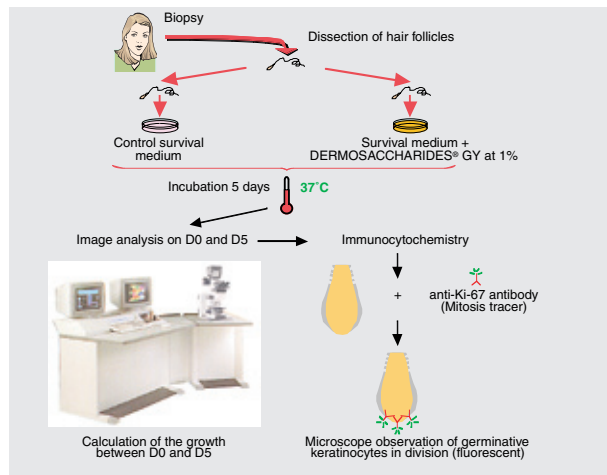


Fig. 2 – Experimental protocol.

Results

1. Stimulation of hair growth

In a culture of pilar follicles maintained for 5 days in DMEM medium the pilar stem increased by 0.28 mm. This growth confirms that the follicles were in a dynamic survival state. Under the same experimental conditions, but with addition of 1% of DERMOSACCHARIDES® GY to the DMEM, the pilar stems (from follicles of the same human subjects as in the control experiment) grew by 0.37 mm.

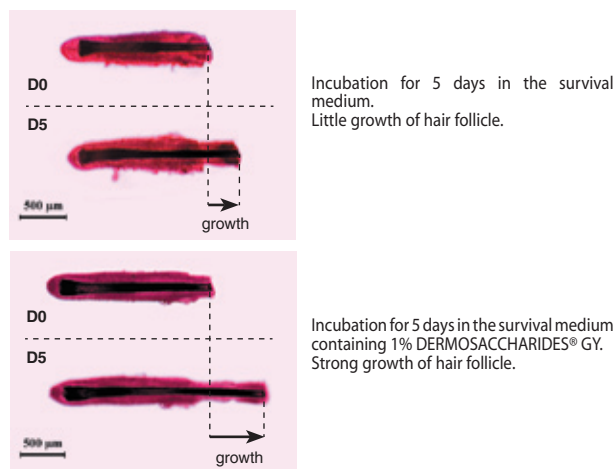


Fig. 3 – Demonstration of the growth of human hair follicles. Microphotographic illustrations showing the stimulating effect of DERMOSACCHARIDES® GY.

(*) DMEM = Dulbecco's Minimum Essential Medium

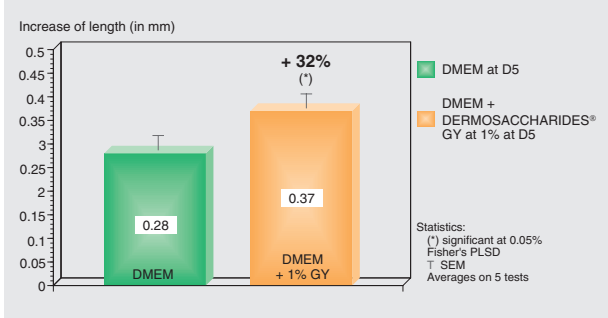
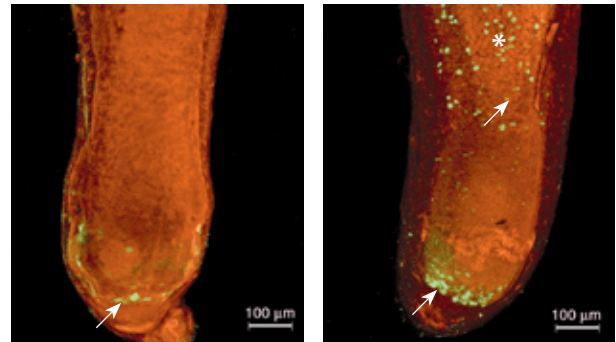


Fig. 4 – Stimulating effect of DERMOSACCHARIDES® GY on the growth of human hair follicles ex vivo. Quantification by image analysis.

2. Stimulation of mitosis of bulbar keratinocytes

In the control experiment (DMEM survival medium) mitotic activity of the cells of hair bulbs was observed with a fluorescence staining method. See Fig. 5. Adding 1% DERMOSACCHARIDES® GY increased the proliferating cellular activity of the hair bulb by 98.3% relative to the control.



Incubation for 5 days in the control survival medium.

Incubation for 5 days in the survival medium containing 1% DERMOSACCHARIDES® GY: increased mitotic activity in the bulb (↗) and the external sheath (*).

Fig. 5 – Demonstration of the mitotic activity of human hair follicles. Illustration by microphotographs.

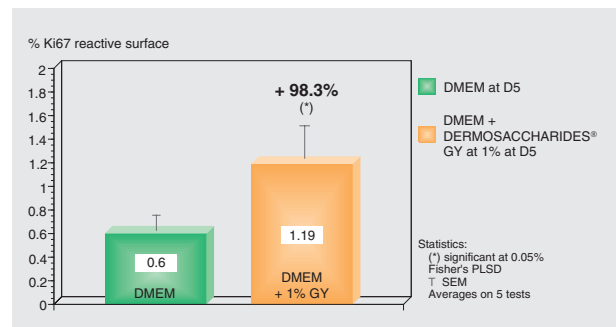


Fig. 6 – Stimulating effect of DERMOSACCHARIDES® GY on the cellular mitotic activity of the bulbs of human hair follicles ex vivo.

Conclusion

After incubation for 5 days in DMEM containing 1% DERMOSACCHARIDES® GY:

- hair growth increased by 32% relative to the control ($p < 0.05$) and,
- mitotic activity of keratinocytes of the bulb increased by 98.3% relative to the control ($p < 0.05$).

DERMOSACCHARIDES® GY at 1% has clearly increased the growth of hair follicles and the mitotic activity of the bulbs.