



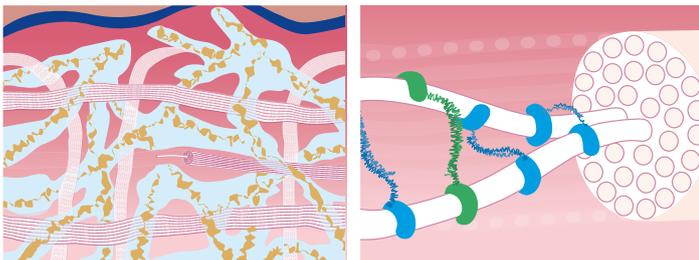
**SYN<sup>®</sup>-HYCAN**

## FIRMING AND REMODELING BY HYALURONAN FROM WITHIN

Loss of skin firmness is one very visible sign of aging. SYN<sup>®</sup>-HYCAN helps to fight sagging skin by boosting hyaluronan content and increasing the expression of decorin and lumican.

Hyaluronan (HA) plays an important role in the skin. This glucosaminoglycan (GAG) consists of a long sugar chain that can bind up to 1,000 times its weight in water. The excellent moisture-holding property (see DSM's Hyaluronic Acid BT for topical use) leads to a gel-like framework for collagen, elastin and skin cells. Also important is its ability to act as a filler, which helps provide the skin with mechanical cushioning. SYN<sup>®</sup>-HYCAN boosts hyaluronan production and allows needle-free HA-based face contour remodeling. Decorin and lumican are two important proteoglycans of the dermis. Their protein part binds to a collagen fibril while the GAG part acts as a spacer between the fibrils (see figure below). The result is the formation of thinner collagen fibrils with increased quality and strength.

Both activities of SYN<sup>®</sup>-HYCAN work nicely together: Fresh hyaluronan and stronger collagen fibrils result in a visible remodeling effect and a firmer skin.



*Left:* extra cellular matrix in the dermis with collagen fibers (striped) and hyaluronan network (brown) with surrounding water (blue)

*Right:* collagen fibrils with decorin (blue) and lumican (green) with spacer function

### Properties

SYN<sup>®</sup>-HYCAN is a tripeptide in a glycerin-based aqueous solution, safe for cosmetic use and easy to formulate.

### Function

- Firming and remodeling effect by stimulation of GAG biosynthesis
- Needle-free hyaluronan booster
- Increases decorin and lumican levels for better collagen fibers

### Cosmetic application

SYN<sup>®</sup>-HYCAN is the ideal active ingredient for:

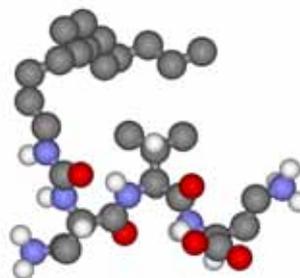
- Firming body treatment
- Remodeling face contour cream
- Anti-sagging treatment
- Moisturizing (from within) lotions
- Anti-aging (filling wrinkles from within) solutions
- Anti-cellulite gels

### Suggested concentration

We recommend using 2.5% SYN<sup>®</sup>-HYCAN in cosmetic formulations.

### INCI name

Tetradecyl Aminobutyroylvalylaminobutyric Urea Trifluoroacetate, Glycerin, Magnesium Chloride

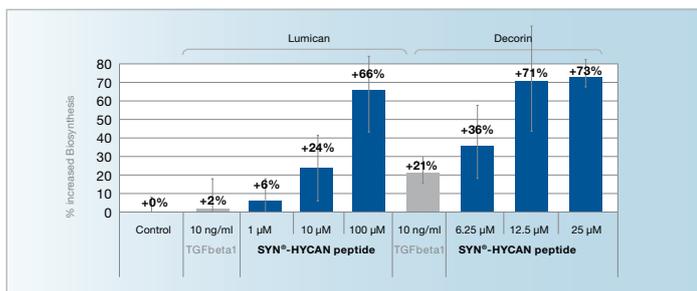


## EFFICACY TESTS

### In vitro

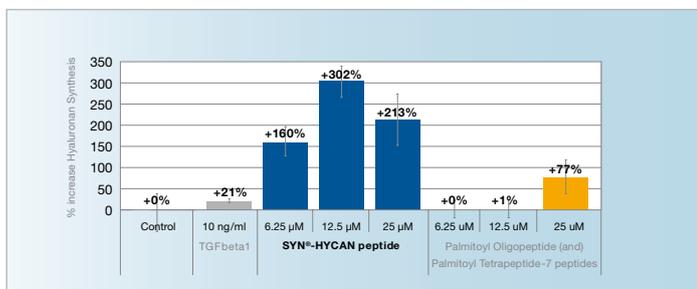
#### Proteoglycan expression

SYN<sup>®</sup>-HYCAN peptide was tested on normal human fibroblasts (NHF). The cells were incubated without FCS for 3 days. The expression of lumican and decorin was quantified. Expression of both proteoglycans was increased by the SYN<sup>®</sup>-HYCAN peptide.



#### Boosting hyaluronan production

In the same setup the increased production of hyaluronan was quantified in direct comparison to another commercially available peptide combination.



SYN<sup>®</sup>-HYCAN boosts the production of skin identical hyaluronan by a factor of four (*in vitro*) and is able to increase the production of the important proteoglycans decorin (+73%) and lumican (+66%).

### In vivo

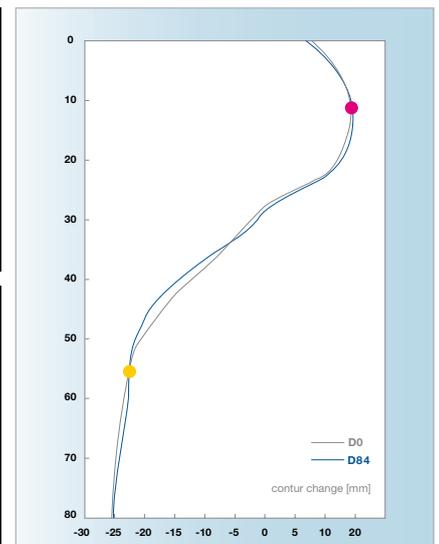
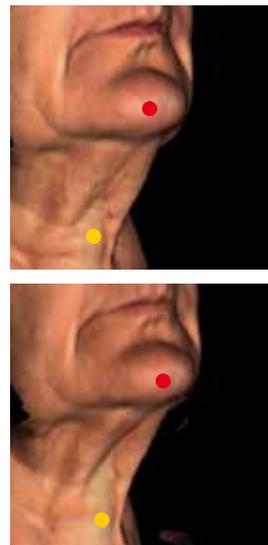
A double-blind study in parallel groups was performed with 40 female volunteers, age 55–65, with visible skin sagging. A formulation with or without 2.5% SYN<sup>®</sup>-HYCAN was applied twice daily on face and forearms.

#### Biomechanical skin properties

SYN<sup>®</sup>-HYCAN significantly increased tension (3%), tonicity (17%) and firmness (7%) of the skin compared to D0. The results were also significant compared to placebo.

#### Contour-changing activity

Using Primos Body<sup>®</sup> measurements, the remodeling effect of face contour was tested. SYN<sup>®</sup>-HYCAN significantly improved the double chin profile by increased skin firmness – a visible face contour remodeling!



The figure shows the remodeling effect on double chin for one volunteer as an example. On the right the measured difference in face contour is shown. The double chin is visibly reduced.