# Cyclopeptide-5

## Mode of action

Cyclopeptide-5 is the first cyclic peptide being used as active ingredient in cosmetic applications. As it binds selectively to certain extracellular receptors in the skin such as to αvβ5- and αvβ6-integrins, on the one hand, the gene expression of enzymes degrading the extracellular matrix is reduced. Due to the addition of cyclopeptide-5, for instance, gene expression of the enzymes collagenase 3 and elastase A2 was by 47% and 23% down regulated, respectively. As the extracellular matrix is the structural backbone of skin, a reduced degradation of it can slow down the aging process. On the other hand, cyclopeptide-5 stimulates the synthesis of extracellular matrix proteins such as callagen and laminin.

## In vitro studies

Evidence for the efficacy of this novel active ingredient could be provided by various in vitro studies. In Figure 1 the increase in collagen and laminin in the skin is illustrated. This increase in extracellular matrix components can reduce lines and wrinkles.

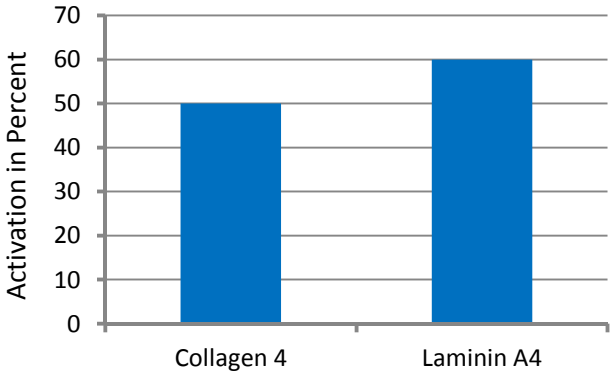


**Fig. 1.** Increase in the biosynthesis of collagen 4 and laminin A4 by cyclopeptide-5 [Study: Merck KGaA, Darmstadt, Germany]

Because of its comparatively low molecular mass cyclopeptide-5 can penetrate into deeper skin layers in order to reach its receptor at the target cell. Furthermore, our formulations contain special penetration enhancers improving the penetration of cyclopeptide-5 in deeper skin layers. Consequently the efficacy of this active ingredient is augmented.

## In vivo studies

These in vitro results were also confirmed by in vivo studies in 20 volunteers in the age range between 37 and 63 years. In Figure 2 the reduction in wrinkles and the improvement of smoothness is shown.

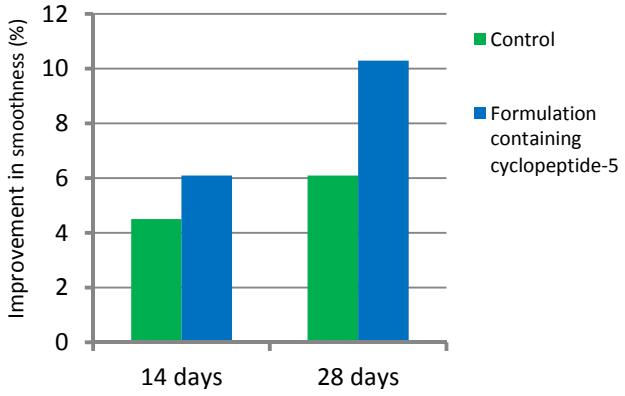


**Fig. 2.** Improvement in smoothness by twice daily treatments with cyclopeptide-5 after 14 days and 28 days [Study: Merck KGaA, Darmstadt, Germany]