SOLUGEL® SUPPORTS BONE HEALTH

SOLUGEL® supports bone health by **promoting new bone formation, restoring bone structure, and enhancing bone strength.** This was the outcome of the study conducted in collaboration with Beijing University of Chemical Technology. This study examined the effects of SOLUGEL® collagen peptides *in vitro* on bone forming cells (osteoblasts) and *in vivo* on bones of mice with induced osteoporosis (OVX) symptoms.

Factors affecting bone health

Bone health naturally declines with **age, hormonal changes**, such as low estrogen levels, which particularly occur during menopause and certain **lifestyle factors**. Therefore, it is very important for people to consider new ways of improving their bone health.

The role of collagen for bone structure

- Collagen provides **flexibility and toughness,** helping bones to absorb impact.
- Collagen also acts as a matrix for mineralization, **giving bones their strength.**
- Collagen fragments send biological signals to osteoblasts - the cells responsible for bone formation , thereby **promoting repair and growth.**

Key findings:

SOLUGEL® supports healthy bone development

SOLUGEL® supplementation was shown to **improve the body's natural bone-building process** by **increasing osteoblast activity** and **enhancing the mineralization process**[1]. Those are two key factors in maintaining strong and healthy bones.

Figure 1: Osteoblast activity (MC3T3-E1 cells) based on staining of the ALP biomarker deposits in the cells and relative absorbance measurements.

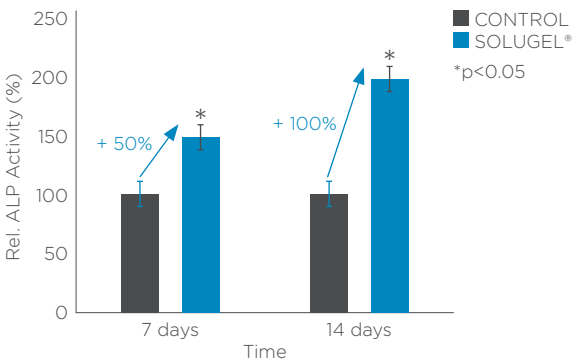
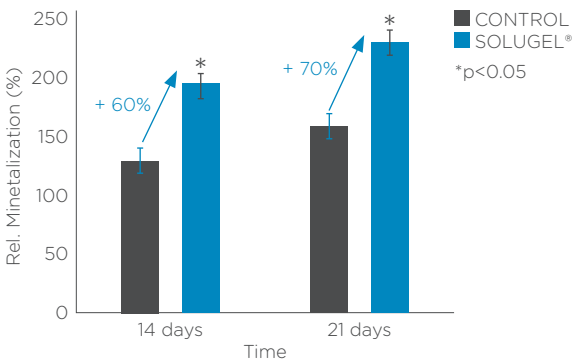


Figure 2: Mineralization state in osteoblasts (MC3T3-E1 cells) based on Alizarin Red S staining of calcium deposits and relative absorbance measurements after solubilization of the calcium nodules.



SOLUGEL®
collagen peptides

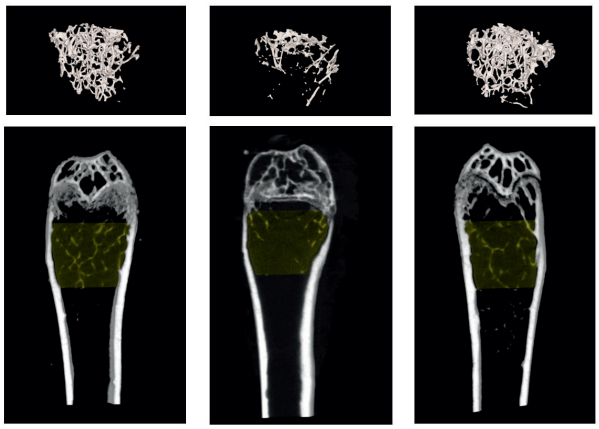
Clinical study

Key findings:

SOLUGEL® restores bone structure

SOLUGEL® **promotes the production of new bone tissue formation** by interacting with osteoblasts. A significant **increase** in **bone mineral structure** in 6 weeks has been observed.[1]

Figure 3: Representative 3D images of micro-CT based trabecular bone of femur at 6 weeks after SOLUGEL® intake



With SOLUGEL®: Denser and more intact bone plates that closely resemble healthy bone structure (CONTROL) within 6 weeks.

CONTROL: control group not receiving treatment
MODEL: osteoporosis-induced group
SOLUGEL®: group receiving SOLUGEL®

SOLUGEL® improves bone strength

SOLUGEL® significantly **expands the bone surface area** compared to bones of untreated model group.[1] Such an expansion signifies active bone formation and results in **stronger** and **more adaptive bones.**

Furthermore, SOLUGEL® was shown to markedly **increase bone volume**[1], reinforcing **durability** and **strength.**

Figure 4: Quantitative analysis of **bone surface** based on micro-CT images of trabecular bone of mice femur at 6 weeks after SOLUGEL® intake.

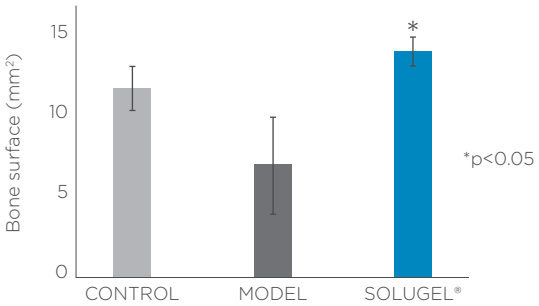
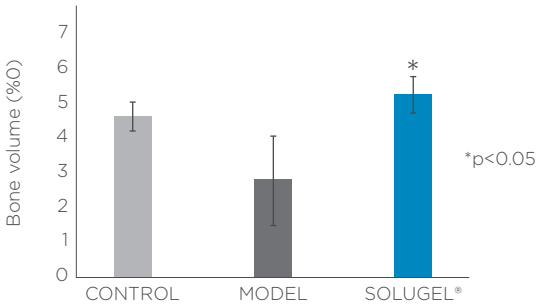


Figure 5: Quantitative analysis of **bone volume** based on micro-CT images of trabecular bone of mice femur at 6 weeks after SOLUGEL® intake.



References:
1. Du BW, Deng GY, Song ZH, He TW, Nergiz-Unal R, Li CM, Yu TF, Huang YQ.. Collagen peptides promote osteogenesis and angiogenesis by activating the PI3K/AKT signaling pathway in mice. Chin Med J. 2025 5;138(5):610-612.
2. Sun C, Yang A, Teng F, Xia Y. Efficacy of collagen peptide supplementation on bone and muscle health: a meta-analysis. Front. Nutr Sec. Clinical Nutrition, 2025. Volume 12 - 2025.

PB LEINER
The Clear Solution

www.pbleiner.com | info@pbleiner.com

Part of Tessenderlo Group

Over 100 years of craftsmanship

© PB Leiner - Part of Tessenderlo Group – 2025, SOLUGEL®, clinical study bone health. All Rights Reserved. The content and information contained in this brochure may not be reproduced, redistributed or translated in any form without prior written permission of PB Leiner. This brochure is intended for professionals and is not intended to diagnose, treat, cure, or prevent any disease. This brochure is intended to report on scientific research or studies that have been performed on the SOLUGEL® product. Any research or study results are presented in this brochure for information purposes only. This brochure cannot be considered an endorsement of any product's properties nor as health claims under EU, US, Chinese, or any other laws and regulations. The uses and claims for SOLUGEL® recommended in this brochure should be adapted to the applicable local regulatory requirements. This brochure has not been evaluated by the FDA, EFSA, CFDA, or any other public administration.