OPTIMUM WELLNESS

Proven efficiency

Better quality of life

HYDROLYZED COLLAGEN PROTEIN PEPTIDES SUPPORT

+ JOINT REPAIR
+ BONE STRENGTH
+ YOUTHFUL SKIN
+ ANTI-AGEING

Ensuring optimum joint and bone health for an active lifestyle

A healthy, active lifestyle is the goal of many modern consumers. Essential to achieving this are strong bones and joints. As the global population gets older, joint- and bone-related health concerns, particularly osteoarthritis and osteoporosis, are becoming increasingly common. Physically active people, such as athletes, can also encounter joint discomfort and injury to connective tissue as a result of high intensity exercise.

In view of this, proactive consumers are looking for ways to maintain healthy joints and bones and are searching for products with added benefits to help maintain their active lifestyles.

Keeping Active

Osteoarthritis is one of the most disabling diseases in the developed world. Causing joint pain and restricted joint function, it affects almost 10% of men and 18% of women over the age of 60. The degenerative joint condition can seriously impact mobility - currently, 80% of those affected suffer limitation in movement."
Osteoporosis is even more prevalent, with one in three women and one in five men over the age of fifty experiencing an osteoporotic bone fracture.? Osteopenia is the first stage towards developing osteoporosis. With osteopenia rates increasing, particularly among postmenopausal women, preserving healthy bones is vital to avoid unnecessary fractures and to maintain mobility while aging

Stand out from the crowd

As more consumers are seeking ways to stay active for longer, many are now looking beyond glucosamine and chondroitin sulfate products, to new active second generation joint health ingredients, such as collagen peptides.

Rapidly gaining popularity, collagen peptides can be used alone or in combination with other ingredients, and are natural and safe, with no reported side effects. Additionally, based on the body's own connective tissue protein, Optimum Gold Collagen peptides resonate well with consumers, offering real value and proven benefits. Collagen peptides are widely used in dietary supplements and can easily be integrated into functional food and beverage products.

Osteoarthritis
Degeneration of joint cartilage

Osteoporosis
Reducing bone mass density

Protecting joints

Cartilage is made up of cellular building blocks (chondrocytes), which produce an extracellular matrix, consisting of collagen and proteoglycans (mainly aggrecan). Collagen fibers make up 70 95% of cartilage and are responsible for its structure and strength, while proteoglycans serve as lubricant to the joint.

Healthy cartilage is maintained by a finely balanced process that breaks down collagen and aggrecan and replaces them with a newly-formed matrix. In osteoarthritic joints, this balance is disrupted, releasing enzymes which attack collagen and aggrecan. This leads to a loss of cartilage and joint function.

To help prevent osteoarthritis, it is essential to ensure this balance is protected and the necessary building blocks for collagen are available to support cartilage regeneration. Collagen peptides like Optimum Gold Collagen are designed to support this process.

Optimum Gold Collagen beneficial effect on joint health is scientifically proven by a growing body of studies, including a placebo-controlled clinical trial.

Optimum Gold Collagen promotes joint health by:

- Protecting joints and connective tissue
- Reducing joint pain and discomfort
- Improving mobility and flexibility
- Supporting the strength of ligaments and tendons

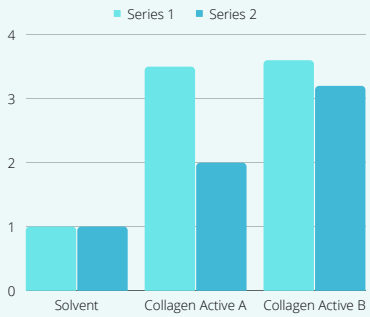
Optimum Gold Collagen

Scientifically proven joint health benefits

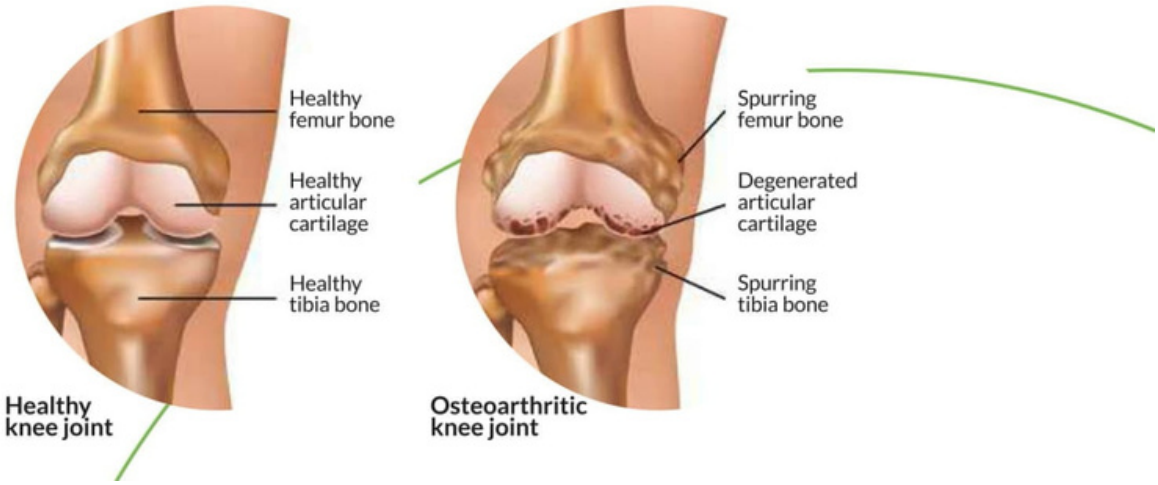
A highly active process of cartilage formation can help to prevent excess matrix degradation and thus prevent the onset of osteoarthritis. Optimum Gold Collagen has been proven to stimulate chondrocytes to produce more collagen and cartilage.

The ability to stimulate chondrocytes (joint cells) to produce more of the key joint matrix compounds, collagen and aggrecan, is shown in the below graph.

Effect of Optimum Gold Collagen on aggrecan and type II collagen mRNA expression after 8 days of treatment (qPCR). *: significant vs control p<0.05



Osteoarthritis of the knee

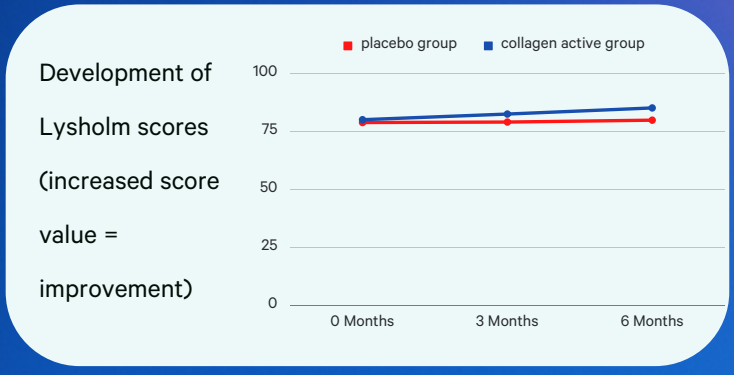


Reduced joint pain and improved mobility.
In a 2013 double-blind, placebo-controlled clinical trial, 94 female participants aged 40-70 suffering from knee joint pain or discomfort due to osteoarthritis were randomly assigned either 8g of Miracle Collagen or a placebo per day for 6 months. Participants were assessed at the beginning of the trial, three months into the trial and at the end of the trial.

These assessments were based on two established methods, a standardized questionnaire, the WOMAC score, to measure joint pain and joint function in daily life and the Lysholm score, to evaluate knee joint function when limping, walking, jumping and stair climbing

Participants who were given Optimum Gold Collagen reported lowering WOMAC scores over time and recorded significantly lower pain scores at the end of the study. In comparison, no significant change was shown in the placebo group.

Compared to the placebo group, participants who received Optimum Gold Collagen also recorded significantly increased scores on the Lysholm system, demonstrating better knee movement. These results demonstrate Optimum Gold Collagen proven ability to reduce joint pain and discomfort and to improve knee joint function in osteoarthritis patients.



Numerous clinical studies have shown similar effects. Recent scientific reviews on joint pain and joint mobility have concluded that collagen peptides are particularly beneficial to individuals with osteoarthritis in comparison to other nutraceutical ingredients, especially for reducing joint pain. 6.2 Multiple trials have also demonstrated that subjects with the greatest joint deterioration benefited the most from the effects of collagen peptides.

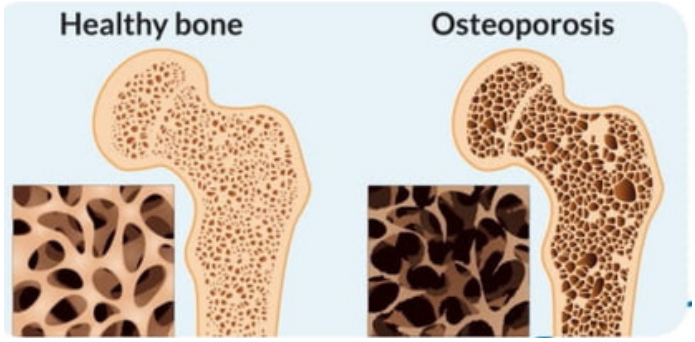
The effectiveness of collagen peptides has also been shown in athletes with activity-related joint pain in a 24-week study. At the end of the trial, an assessment of participants who consumed collagen peptides showed significantly reduced joint pain at rest, when walking, standing or carrying objects.

Strengthening bones

Bones are in a constant state of flux. The maintenance of the bone matrix and minerals is dependent on a process called bone remodeling, or bone turnover, which replenishes the cells and matrix which form our bones.

Bone turnover replaces approximately 15% of bone mass in healthy adults each year. Imbalanced rates of bone resorption and formation, leading to more bone loss than formation, are indicators of osteopenia, a bone mineral density deficiency.

Representing around 90% of organic bone mass, collagen provides the structural framework on which calcium and other minerals are anchored. Collagen fibers also provide bone flexibility. Research has shown that a daily intake of 8 10g/day of bioactive collagen peptides can assist in maintaining collagen levels and can help preserve bone health."



Optimum Gold Collagen can promote bone health by:

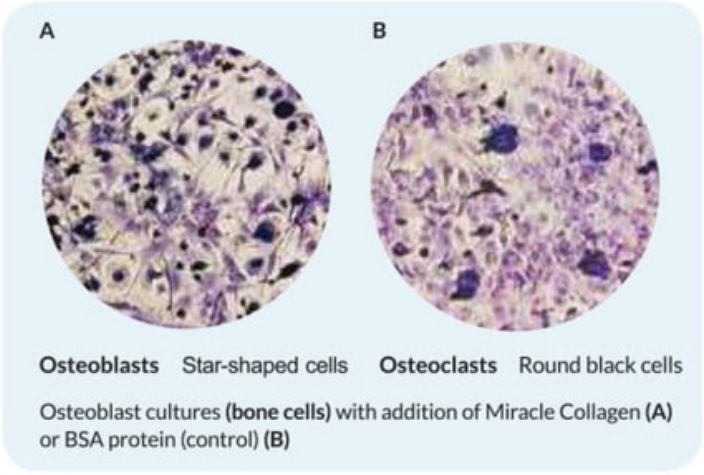
- Reducing bone resorption (breakdown)
- Restoring bone mineral density
- Increasing bone size and solidity

Collagen peptides

Scientifically proven bone health benefits

Beneficial effects on bone health have been documented in multiple in vitro and in vivo trials 12,13

Positive effects on bone formation shown to preferentially stimulate the bone cells responsible for bone formation (osteoblasts) compared to cells involved in bone resorption (osteoclasts), triggering an increase in bone formation. These findings have been supported in various studies. 14,15,16

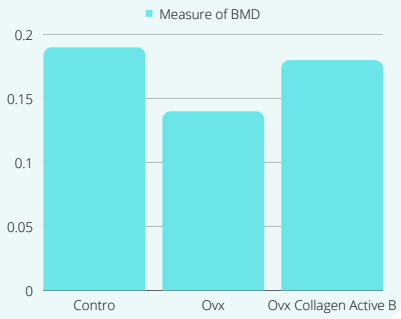


Osteoblast cultures **(bone cells)** with addition of Miracle Collagen **(A)** or BSA protein (control) **(B)**

Restores bone mineral density

In a recent in vivo study at the Physiology and Ingestive Behavior Laboratory, INRA AgroParisTech, ovariectomized (ovx) mice were used to mimic osteopenia in postmenopausal women and divided into two groups, with only one group fed a diet including Optimum Gold Collagen over a 12-week period. A group of normal (non ovariectomised) mice was also used as a control. The trial found that the group fed a diet with Optimum Gold Collagen maintained the same bone mineral density (BMD) level as the non-ovariectomized mice over the test period. These results suggest that a daily intake of Optimum Gold Collagen can help prevent the loss of bone mass after the onset of menopause.

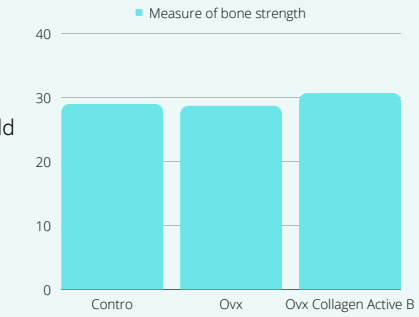
Increase in bone mineral density for Ovx mice fed Optimum Gold Collagen for 12 weeks



Positive effects on bone strength

In the same study, the daily intake over a 12-week period was shown to also promote the restoration of bone size and increase bone strength and solidity compared to the ovariectomized (ovx) and control group.

Increase in ultimate bone strength for Ovx mice fed Optimum Gold Collagen for 12 weeks



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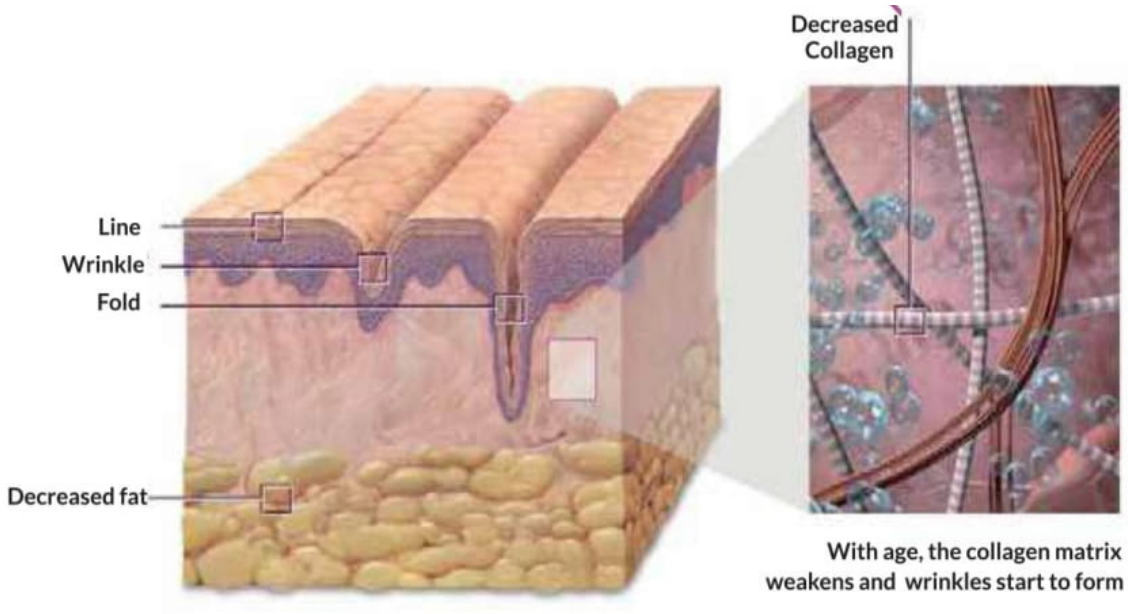
Delivering clinically proven anti-ageing benefits



For years now, much investigation has been done in supporting clinical research involving women to substantiate the efficacy of our Optimum Gold Collagen ingredients. Scientists continue to invest in ongoing research and studies.

Recently a medical research institute in the USA has commissioned three placebo-controlled clinical studies, conducted with leading skin institutes in France and Japan, using the latest advanced analytical technology. These aimed to demonstrate the multiple benefits of Optimum Gold Collagen across a number of key skin health criteria.

Improving skin collagen density and structure

Skin that has aged by the passage of time and by exposure to the sun shows significant levels of damaged, fragmented collagen in the dermis. Presence of fragmented collagen can inhibit collagen synthesis and elastin production, leading to a loss of elasticity and a reduction in total collagen density. It also disturbs important collagen-water molecular interactions, which affect the collagen matrix stability. The degree of collagen fragmentation can be assessed by confocal laser image technology to provide evidence of the collagen re-structuring process in the deeper layers of the skin.

OPTIMUM GOLD

Innovative ingredients for improved joint and bone health

Alleviate joint pain

Reduce risk of injury

Boost joint comfort

Strengthen bones

Collagen is the most abundant protein in the human body. It holds together all living tissue and provides the infrastructure of the musculoskeletal system, making it essential for mobility.

ollagen peptides – the hydrolyzed form of collagen - are increasingly recognized as a highly effective solution for manufacturers targeting the bone and joint health market. They offer specific benefits that cannot be found n other protein sources, are derived from 100% natural sources, and are highly digestible and bioavailable. In fact, studies have shown that more than 90% of the peptides are digested and absorbed within 12 hours of oral ingestion, ensuring they are rapidly available in the connective tissue to stimulate endogenous collagen synthesis in bones and joints. 7,18,19

Optimum Gold Collagen can be easily and cost-effectively used in a range of dietary supplements and functional foods, beverages and nutraceuticals. The ingredient provides the nutritional support to help prevent osteoarthritis and osteopenia.