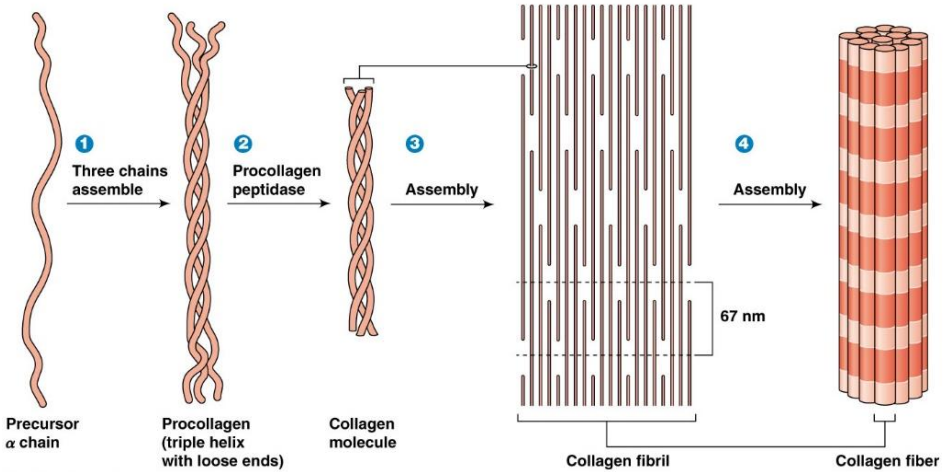
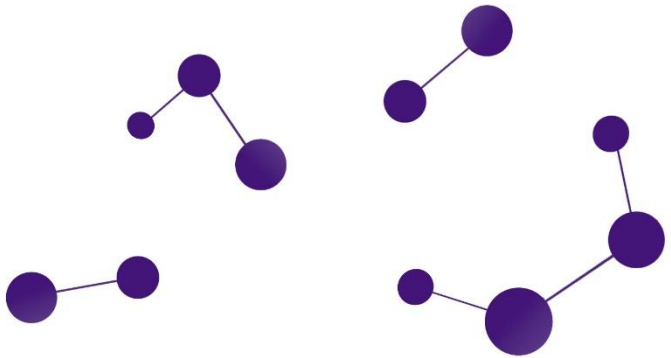
Regenerative peptides

Collagen is the **main protein** of all connective tissues. It is an elastic protein with a supporting function, **evolved to resist tension** thanks to its particular structure: it is composed of three α left-handed chains, with a right-handed supercoil.



Its amino acid sequence is a repeated tripeptide unit **Gly-X-Y**, where X and Y are generally Pro and 4-Hyp



COLLAGEN PEPTIDES

(average MW < 3 kDa)

Collagen is a **resistant molecule**, but it can degrade as a result of trauma or oxidative stress.

The release of peptides as a result of collagen degradation **triggers the repair and reinforcement of the extracellular matrix** of a damaged tissue. This activity can be **stimulated by external administration**.

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Food supplements are an example of external integration, but …

… the gastro-intestinal barrier **limits the absorption of the integrated elements** and the access to the target areas

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PRODUCT READY IN SYRINGE

in PHYSIOLOGICAL pH PBS SOLUTION

DERIVED FROM HYDROLYZED
COLLAGEN OF BOVINE ORIGIN

COLLAGEN PEPTIDES
WITH LOW MOLECULAR WEIGHT

ECCIPIENTS

STABILIZED VITAMIN C
MAGNESIUM

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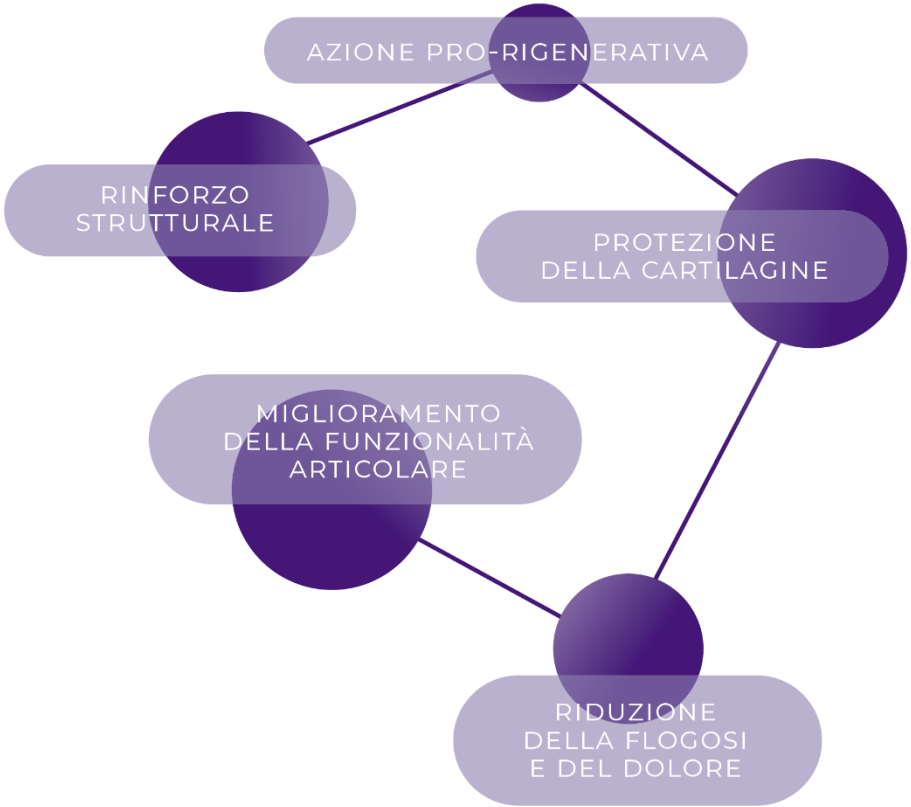
MECHANISM OF ACTION



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Ἄτλας - *Atlas*

Titan supporting the weight of the Earth

STRUCTURAL REINFORCEMENT

Collagen peptides are amino acid chains **essential for the restructuring of connective tissues*** and direct support of joint structures.

**T. Naraoka et al. - Periodic knee injections of collagen tripeptide delay cartilage degeneration in rabbit experimental osteoarthritis*

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PRO-REGENERATIVE ACTION

Collagen peptides **stimulate the synthesis of new type II collagen*** and other extracellular matrix components, such as hyaluronic acid† and glycosaminoglycans

**S. Oesser et al. - Stimulation of type II collagen biosynthesis and secretion in bovine chondrocytes cultured with degraded collagen*

†H. Ohara et al. - Effects of Pro-Hyp, a collagen hydrolysate-derived peptide, on hyaluronic acid synthesis using in vitro cultured synovium cells and oral ingestion of collagen hydrolysates in a guinea pig model of osteoarthritis

Προμηθεύς - *Prometheus*

Titan who stole fire from the Gods, condemned to be devoured by an eagle and to regenerate himself every night.

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Ἑρμῆς - *Hermes*

God equipped with winged boots
with the task of messenger of the gods

CARTILAGE PROTECTION

Peptides have a **chondro-protective action***, preventing cartilage thinning and improving the vitality and phenotype of chondrocytes.

**S. Nakatani, et al. - Chondroprotective effect of the bioactive peptide prolyl-hydroxyproline in mouse articular cartilage in vitro and in vivo*

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REDUCTION OF INFLAMMATION AND PAIN

Collagen peptides **counteract inflammation***, inhibiting catabolic activity of lytic enzymes and reducing joint pain.

**J. Furuzawa-Carballeda et al. - Polymerized-Type I Collagen downregulates inflammation and improves clinical outcomes in patients with symptomatic knee osteoarthritis following arthroscopic lavage: a randomized, double-blind, and placebo-controlled clinical trial*

Ἀχιλλεύς - *Achilles*

Legendary hero of the Trojan War, wounded in the ankle

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Ἡρακλῆς - *Hercules*

Half-god endowed with superhuman strength,
depicted while defeating the fearsome Leo of Nemea

IMPROVEMENT OF JOINT FUNCTION

Peptide activities, along with pain reduction, **help improve joint function*** by allowing postural and loading attitude correction.

**P. Volpi et al. - Intra-articular injection of hydrolyzed collagen to treat symptoms of knee osteoarthritis. a functional in vitro investigation and a pilot retrospective clinical study*

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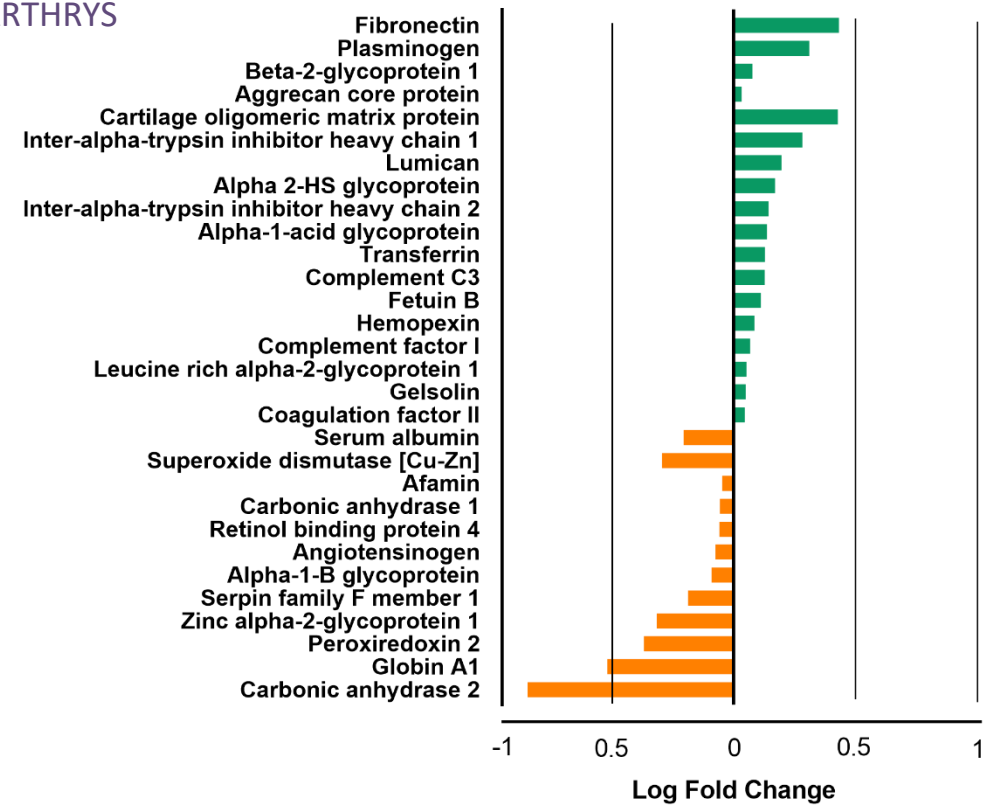
PROTEOMIC ANALYSIS OF SYNOVIAL FLUID

Canis lupus familiaris

BEFORE AND AFTER TREATMENT WITH ARTHRYS

- ✓ PROTEINS INHIBITING PROTEOLYTIC ACTIVITY
- ✓ PROTEINS INVOLVED IN THE COMPLEMENT CASCADE
- ✓ PROTEINS INVOLVED IN THE REGULATION OF TISSUE REGENERATION
- ✓ EXTRACELLULAR MATRIX PROTEINS

- ✓ SERUM PROTEINS
- ✓ PROTEINS INVOLVED IN OXIDATIVE STRESS



STABILIZED VITAMIN C

**A. C. Carr et al. - The role of vitamin C in the treatment of pain: new insights*

James Lind, 1716-1794
ship's doctor from 1739 to 1748

author of the first controlled clinical trial recorded in history

ANTIOXIDANT POWER FOR THE PROTECTION OF PEPTIDES DURING STERILIZATION

PROMOTION OF NEW COLLAGEN SYNTHESIS *IN VIVO*

ANTALGIC EFFECT*

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PROMOTE CELL ADHESION BY STIMULATING THE DIFFERENTIATION OF PRECURSORS IN OSTEOCHONDRAL DEFECTS*

PROMOTE EXTRACELLULAR MATRIX SYNTHESIS AND PREVENT ARTHROSIC DEGENERATION†

MAGNESIUM

**M. Shimaya et al. - Magnesium enhances adherence and cartilage formation of synovial mesenchymal stem cells through integrins*

†Y. Zhang - Magnesium and osteoarthritis: from a new perspective

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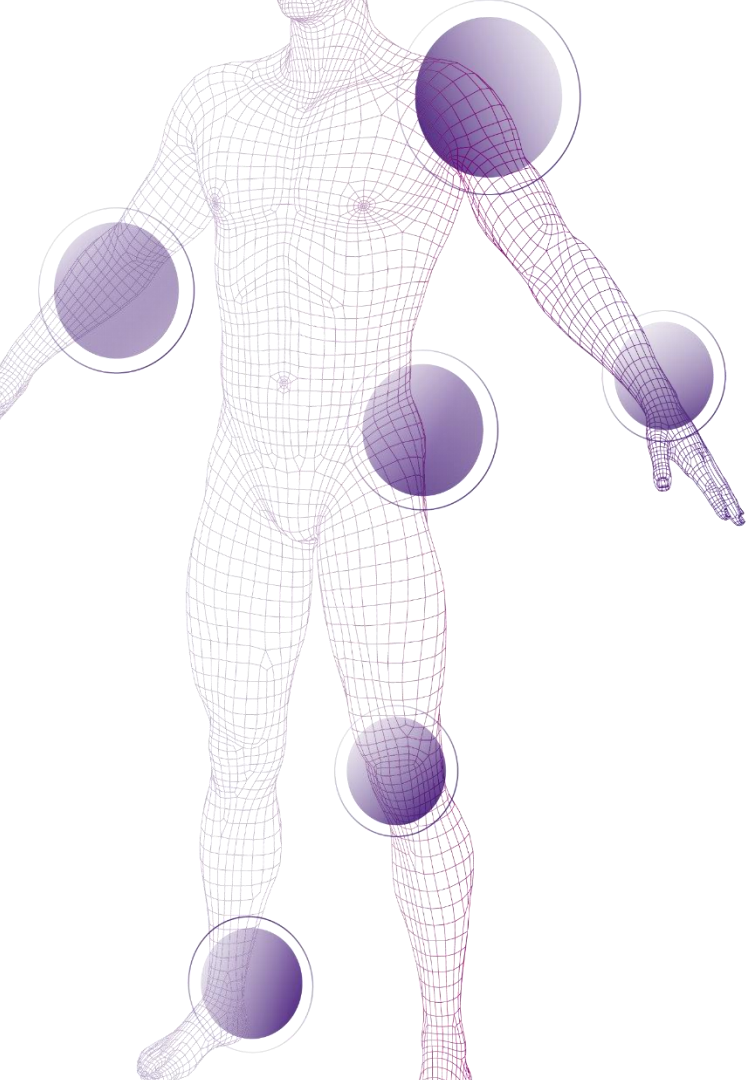

INDICATIONS

- JOINTS
- TENDONS
- LIGAMENTS
- MUSCLE

TREATMENT OF PAIN AND **IMPROVEMENT OF THE FUNCTION** OF JOINTS AND CONNECTIVE SUPPORT STRUCTURES

SPEEDS UP FUNCTIONAL RECOVERY AND POST-OPERATIVE COMFORT FOLLOWING JOINT OPERATIONS

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FORMULATIONS

	ARTHRYS 2	*ARTHRYS 5*	*ARTHRYS Regain*
VOLUME	0.5, 1 o 2 ml	0.5, 1 o 2 ml	10 ml
CONCENTRATION	2 mg/ml	5 mg/ml	1 mg/ml
USE	INTRA-ARTICULAR, INTRA-MUSCULAR, INTRA-TENDINEOUS AND INTRA-LIGAMENT	INTRA-ARTICULAR, INTRA-MUSCULAR, INTRA-TENDINEOUS, INTRA-LIGAMENT, INTRA-DHERMAL* AND INTRA-EPITHELIAL*	POST-ARTROSCOPIC LAVAGE

*AESTHETIC MEDICINE

LITERATURE

Steffen Oesser · Jürgen Seifert

Stimulation of type II collagen biosynthesis and secretion in bovine chondrocytes cultured with degraded collagen

Chondroprotective effect of the bioactive peptide prolyl-hydroxyproline in mouse articular cartilage *in vitro* and *in vivo*

S. Nakatani, H. Mano*, C. Sampei, J. Shimizu and M. Wada
Department of Food Functional Science, Graduate School of Pharmacology, Josai University, Keyakidai 1-1, Sakado, Saitama 3500295, Japan