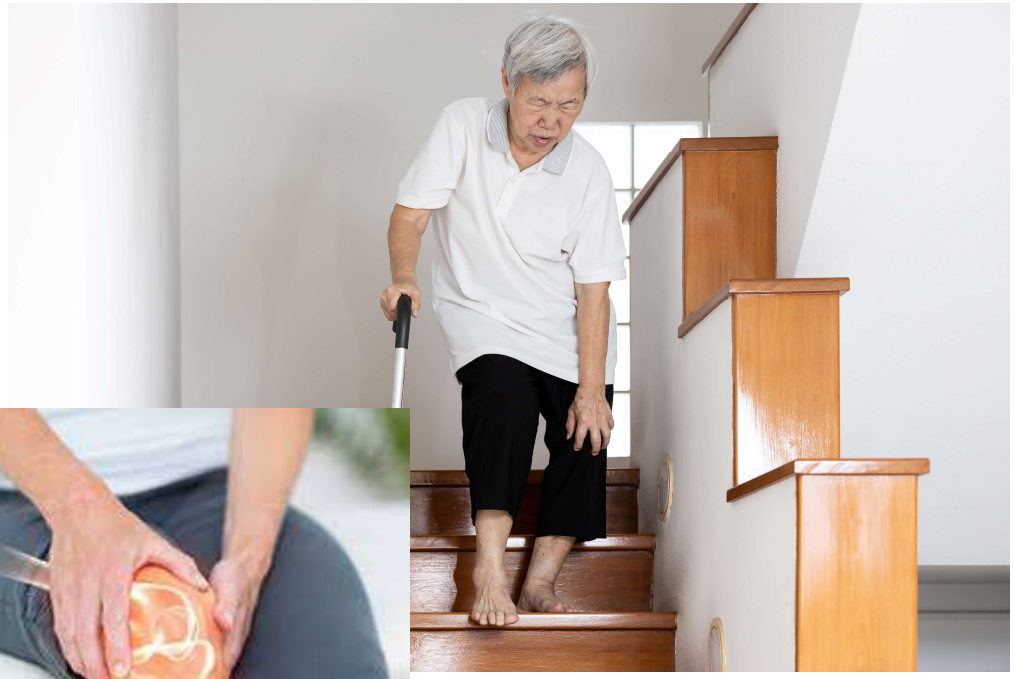
MARUKYOU BIO FOODS Co.

Nano Type Chondroitin

Locomotive Syndrome Improvement

What is locomotive syndrome?

Locomotive syndrome is a decline in motor function due to aging or other causes. Especially common are cases in which knee pain interferes with walking, standing, and sitting.



Osteoarthritis of the knee, a typical condition in which the articular cartilage wears down and lubrication is lost, causing pain, is more common in the elderly.

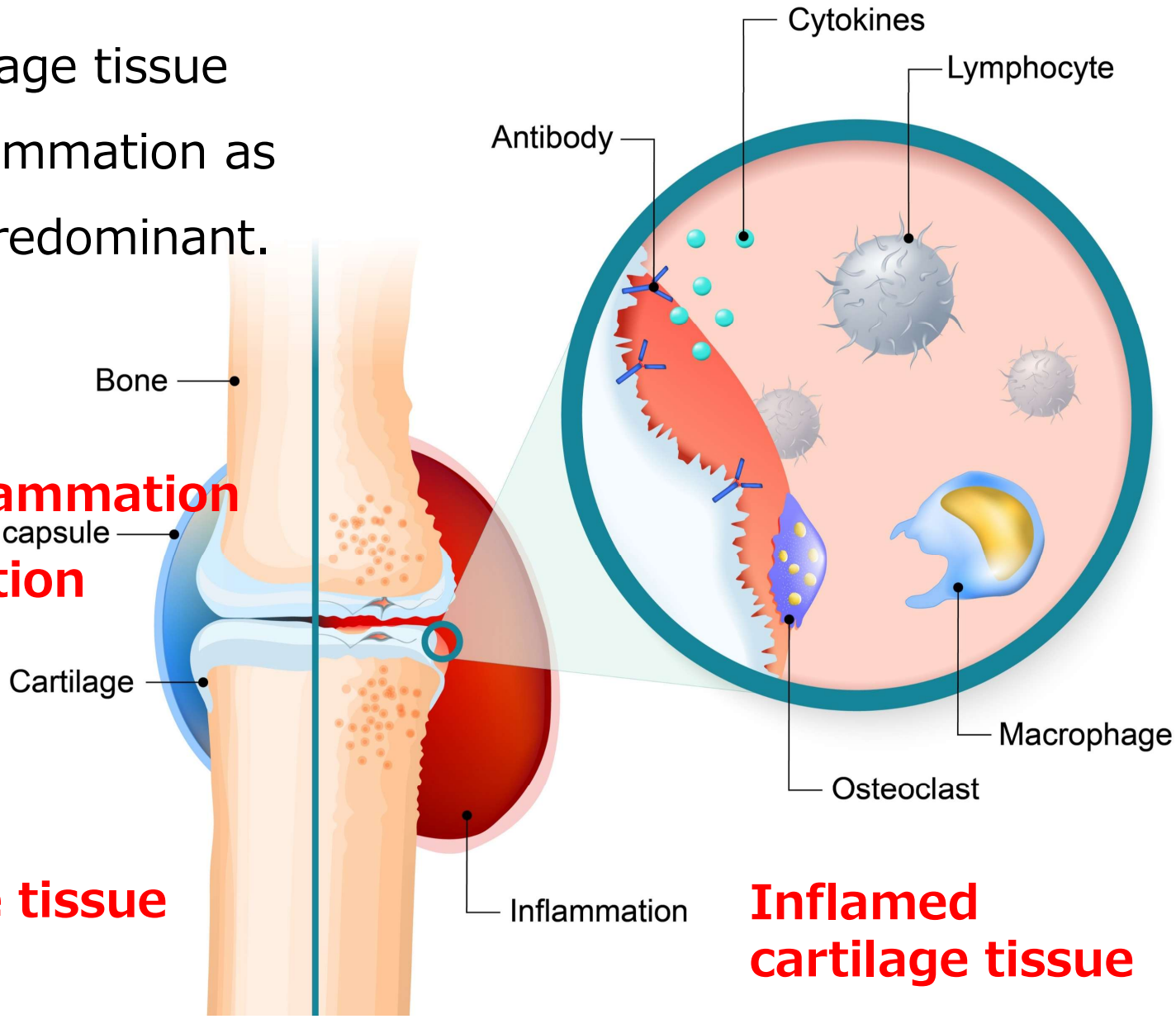
What is locomotive syndrome?

Inflammation of cartilage tissue further promotes inflammation as osteoclasts become predominant. Therefore, improving This In order to,

(1) Inhibition of inflammation

(2) Tissue regeneration

is required.



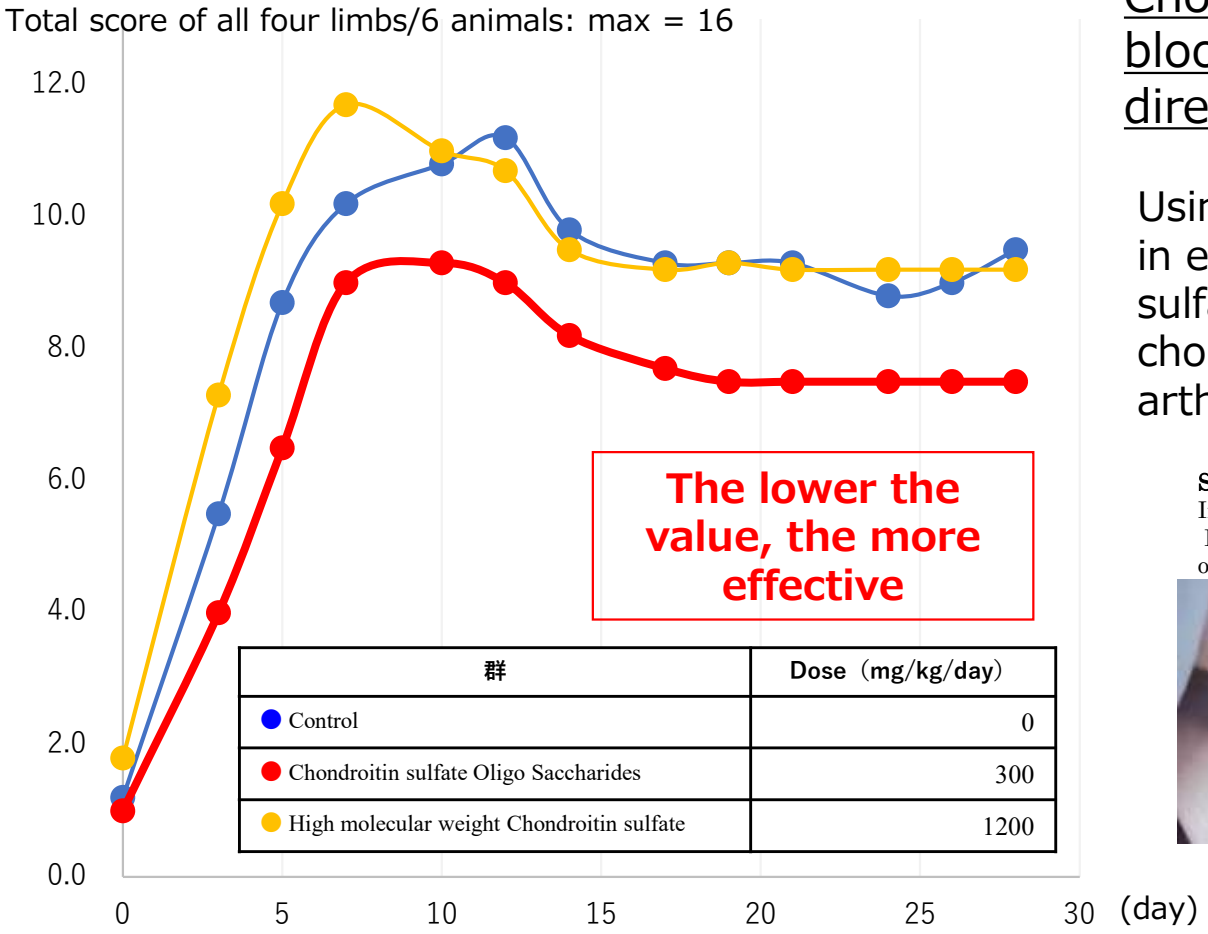
Normal cartilage tissue

Inflamed cartilage tissue

Suppression of inflammation

Evaluation of anti-inflammatory action of chondroitin sulfate oligosaccharides using a mouse model of collagen-induced arthritis

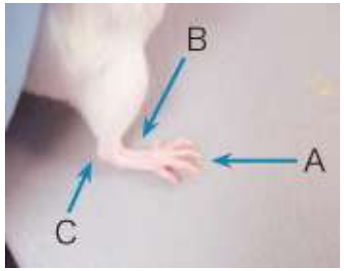
The artheritic score of paws after chondroitin sulfate origosaccharide on DBA/1J mice



Chondroitin sulfate oligosaccharides enter the bloodstream via oral administration and act directly on tissues throughout the body.

Using autoimmune disease-induced mice, six mice in each group were administered chondroitin sulfate oligosaccharides and high molecular chondroitin sulfate for 28 days, and the degree of arthritis was compared and evaluated.

Score 0
In any of the joints
If no inflammation is observed



Score 4
Maximum erythema and swelling throughout one limb

Chondroitin sulfate oligosaccharides compared to high molecular weight chondroitin sulfate, Excellent arthritis suppression was observed.

Suppression of inflammation

Evaluation of anti-inflammatory properties using RAW264/C2C12 cells (inhibition of tissue destruction)

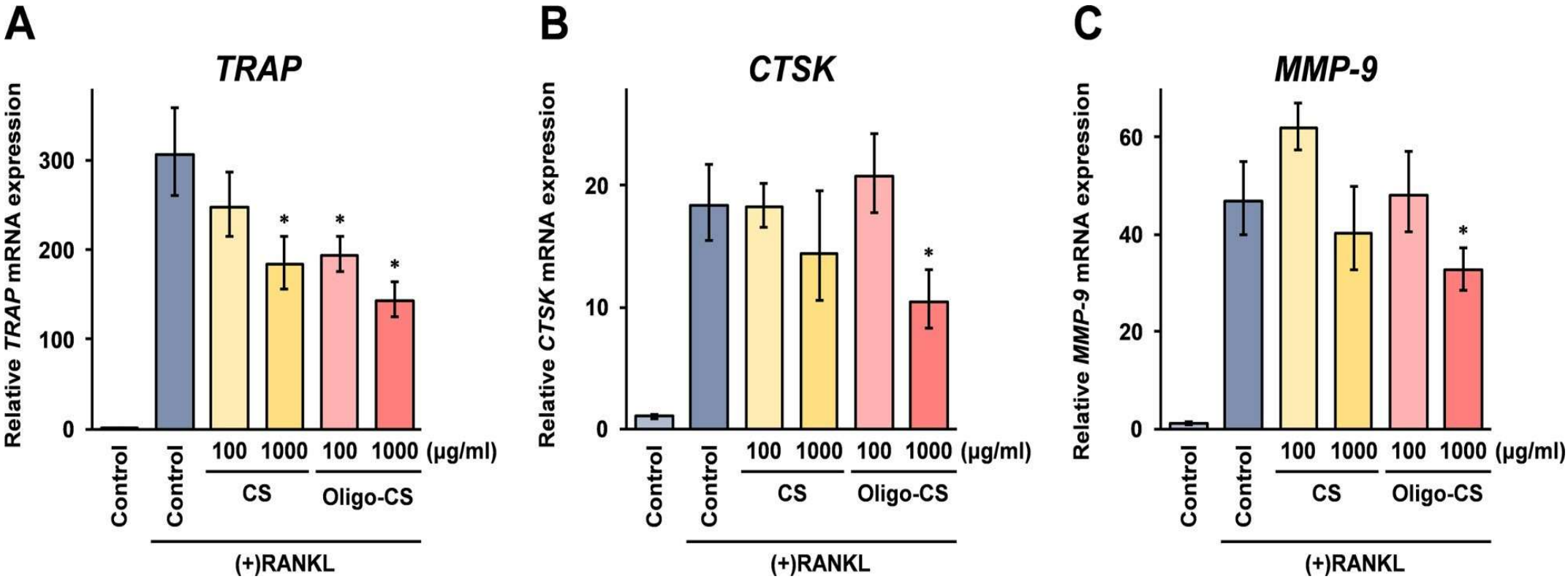


Fig 3. Effects of Oligo-CS treatment on TRAP, CTSK, and MMP-1 mRNA expression in osteoclast differentiating RAW264 cells. RAW264 cells were stimulated with sRANKL to differentiate osteoclasts together with indicated concentrations of CS or Oligo-CS for 5 days. The total RNA isolated from the cells was subjected to real-time RT-PCR analysis using the respective specific primer set for TRAP, CTSK, and MMP-9 mRNA. The data indicate the relative expressions compared with untreated control cells without sRANKL stimulation after normalization with the GAPDH mRNA expression. Error bars indicate the standard deviations (n = 3). Asterisks (*: $p < 0.05$) indicate that the difference is statistically significantly lower than the sRANKL stimulated control.

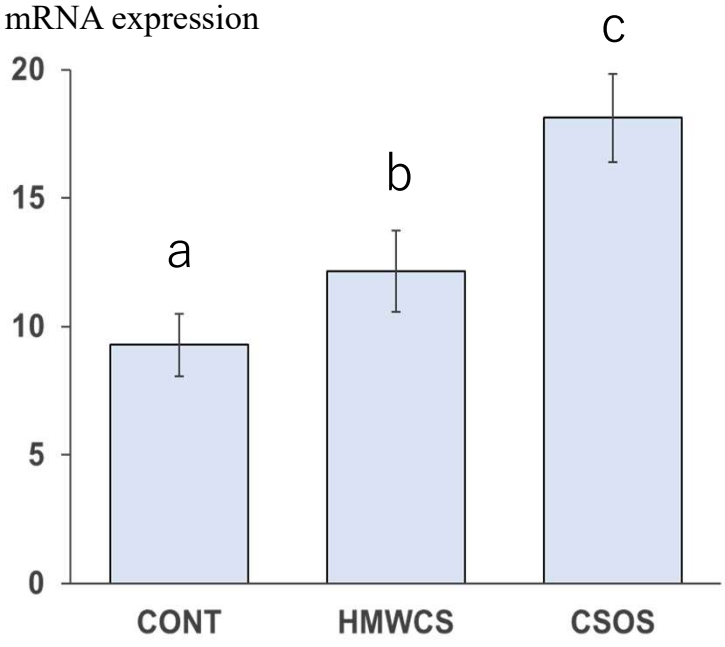
Citation: Uchiyama et al., Effects of chondroitin sulfate oligosaccharides on osteoclast differentiation of RAW264 cells, and myotube differentiation of C2C12 cells. *PLoS ONE* 18(4): e0284343. https://doi.org/10.1371/journal.pone.0284343

Chondroitin sulfate oligosaccharides prevents RAW264 cells from differentiating into osteoclasts.
inhibits proteolytic enzymatic damage to tissues.

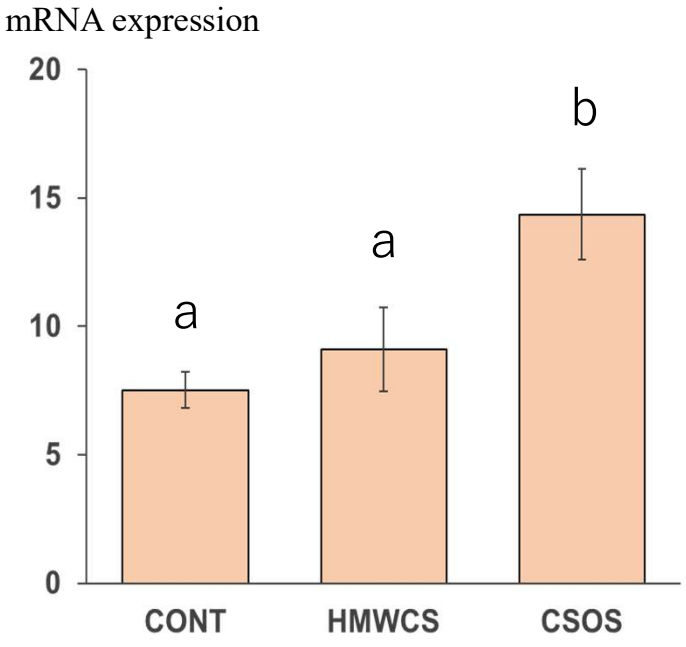
Tissue regeneration

Effects of chondroitin sulfate oligosaccharides on gene expression and glycan synthesis in chondrocyte ATDC5

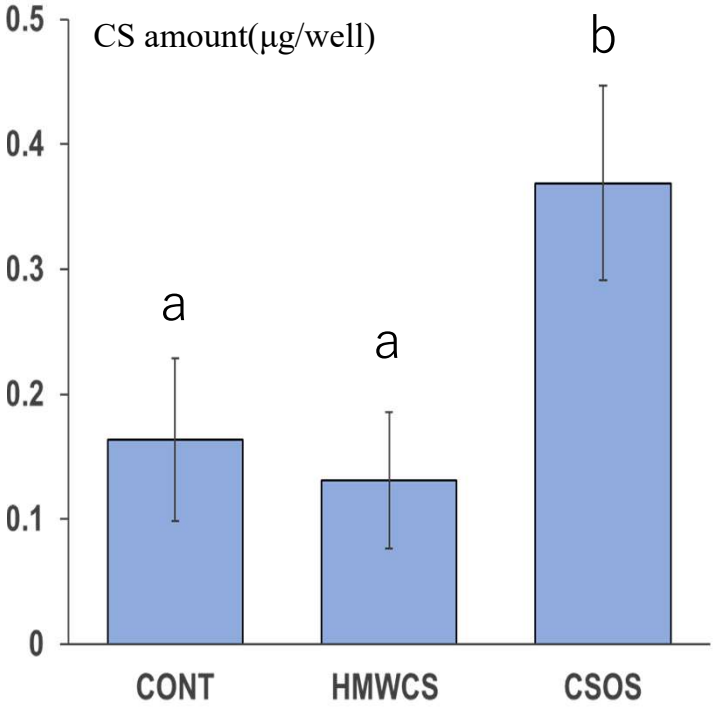
Effects of chondroitin sulfate oligosaccharides on gene expression and sugar chain synthesis in ATDC5 cells



Aggrecan gene (Acan)



Type II collagen gene (Col2A1)



Chondroitin sulfate production

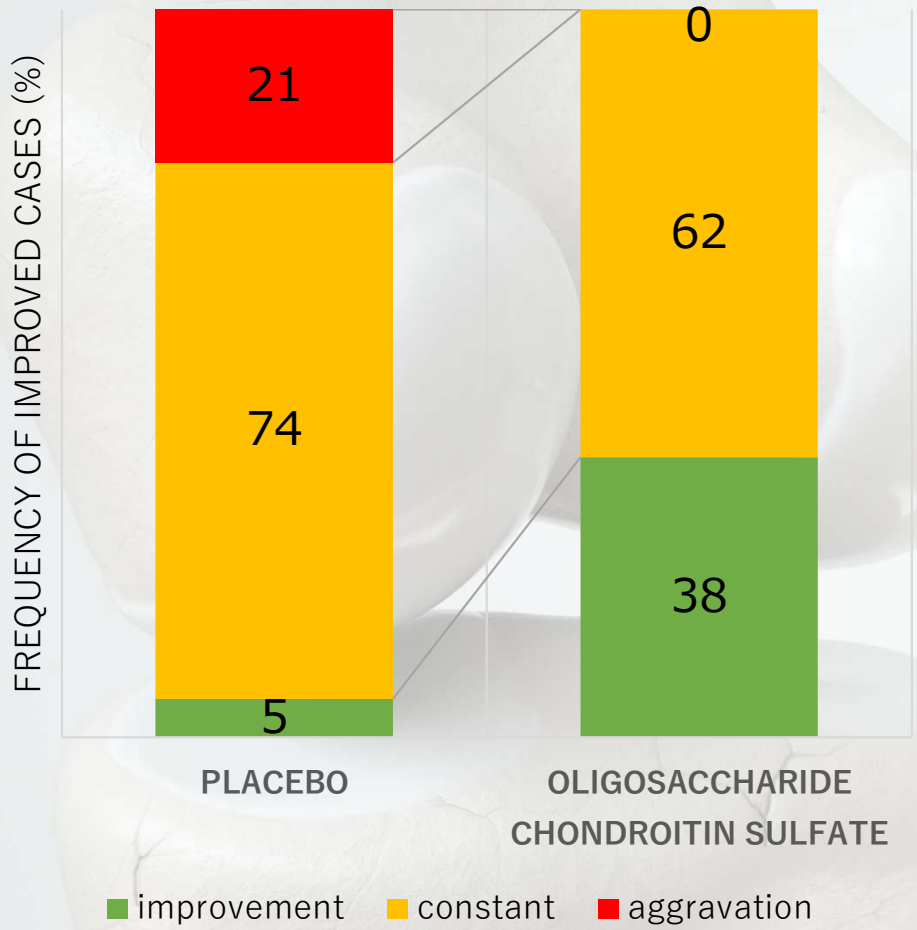
Dalphabets indicate significant differences in the Tukey test (p<0.05ifferent)

Chondroitin sulfate oligosaccharides enhance aggrecan and type II collagen gene expression in chondrocytes and increase chondroitin sulfate production

Human trials

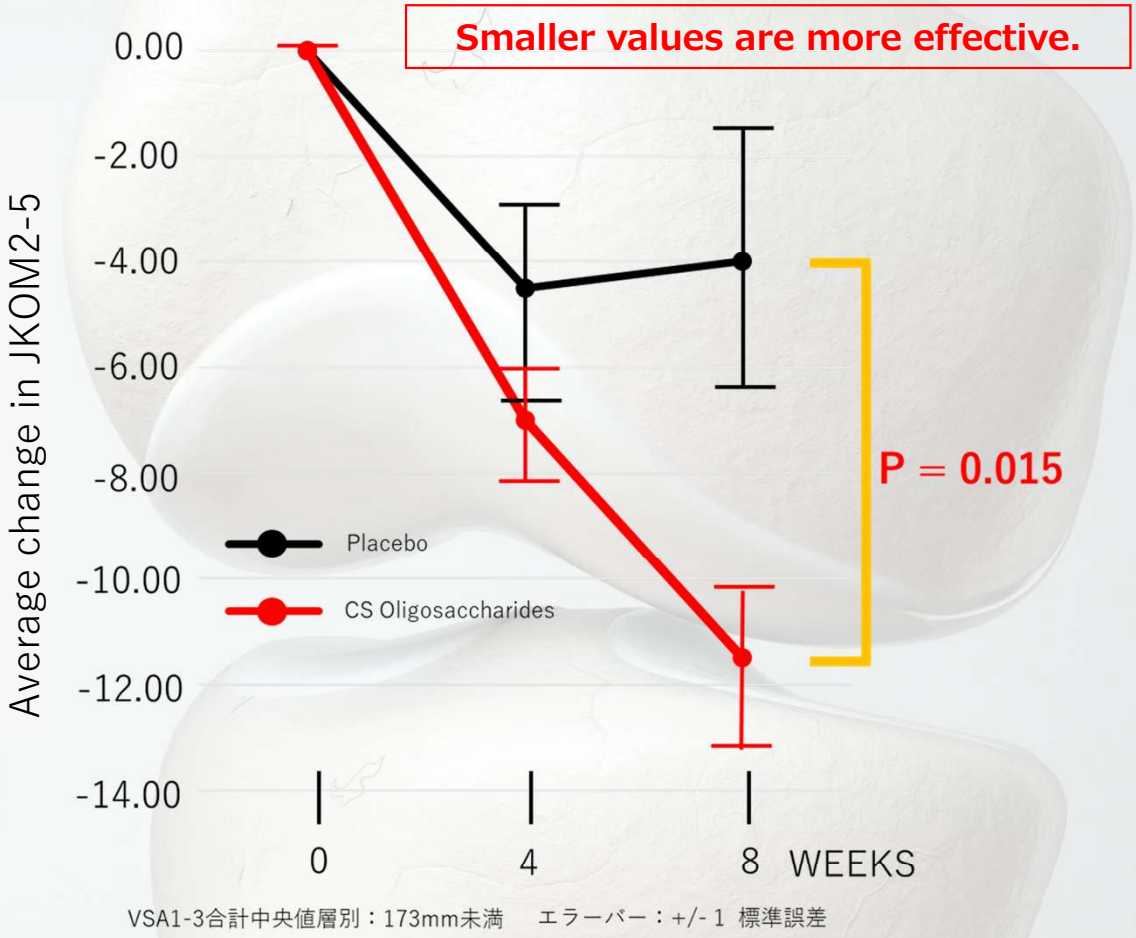
Placebo-controlled, double-blind, parallel-group study of chondroitin sulfate oligosaccharides for improvement of knee joint function

Daily Oral Chondroitin Sulfate Oligosaccharides for Knee Joint Pain in Healthy Subjects: A Randomized, Blinded, Placebo-Controlled Study , Mie Nishimura, et al, *The Open Nutrition Journal*, 2018, 12, 10-20



The chondroitin sulfate oligosaccharide group showed significantly improved rise test results compared to the placebo group. (after 8 weeks of administration) P=0.024

A: Stand-up test



Chondroitin sulfate oligosaccharide significantly improved symptoms in the group with poor VAS score (relatively poor knee joint condition) compared to the placebo group.

B : JKOM Score

Chondroitin sulfate oligosaccharides improve locomotive syndrome

CONTACT US

MARUKYOU BIO FOODS Co., Ltd.

Fine Chemical Laboratory

Research and Product Development in Glycan Functionality

2-1-40 Nishimiyanosawa, 4-jo Teine-ku, Sapporo,
Hokkaido, JAPAN
TEL 011-676-5702

URL https://mbf-net.com

https://nanomedica.jp

https://nano10-9.jp

Mail finechemical@mbf-net.com