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**AmLexin™ Studies for Delayed Onset Muscle Soreness and Joint Health
Featured Prominently in Peer-Reviewed Scientific Publications**

Two recently concluded studies on Unigen's joint health ingredient AmLexin™ have been published with particular recognition in scientific periodicals *Nutrition* and the *Journal of Exercise Nutrition and Biochemistry*. AmLexin™ is a patented botanical composition that contains a standardized blend of bioflavonoids from the heartwood of *Acacia catechu* and the root bark of *Morus alba*.

The AmLexin™ clinical study for delayed onset muscle soreness (DOMS) is the highlighted Special Article in the *Journal of Exercise Nutrition and Biochemistry [December 31, 2018 edition]* and presents clinical data detailing the benefits of AmLexin™ with regards to fast recovery from DOMS in healthy runners. "The aim of the DOMS study was to investigate the benefits of AmLexin™ on exercise recovery and redox balance in healthy runners, in comparison to a placebo," said Dr. Qi Jia, Unigen's Chief Scientific Officer. The double-blind placebo-controlled clinical trial was carried out over 9 weeks in a single fitness center. Thirty physically active male and female volunteers within early 40s years of age were randomized into AmLexin™ (mean age = 42.92 ± 2.48 and gender 7/5, male/female, respectively) and placebo (mean age = 41.15 ± 3.5 and gender 10/3, male/female, respectively) groups. Volunteers were supplemented with 400 mg of AmLexin™/day or a look-alike placebo during an 8-week training program, and for one week following a 13.1-mile half-marathon. Twenty-six subjects completed the 9-week supplementation trial.

According to Dr. Jia, clinical trial results showed the AmLexin™ group experienced significantly lower levels of post-exercise discomfort on day 1 to 3 following the half-marathon compared to the placebo group. The AmLexin™ group also showed statistically significantly lower post-exercise oxidative stress and higher antioxidant capacity on day 6 after the half-marathon run. These results demonstrated the benefits of AmLexin™ on exercise recovery and oxidative stress within 1–6 days post-exercise. "Our data suggests that AmLexin™ could be a safe, effective botanical alternative for delayed onset muscle soreness," Dr. Jia stated. To read the published study, visit <http://www.jenb.or.kr/>.

Published as the Feature Article in *Nutrients [January 2019 edition]*, AmLexin's preclinical study looks at self-immune response compromised joint structure and function lab model and the protective benefits with AmLexin™. The preclinical study was carried out over 3 weeks *in vivo*, explained Dr. Jia. "Wear and tear of joint is characterized by progressive depletion of articular cartilage," he noted. "Although there have been significant advances in scientific understanding of the cause of such loss of cartilage structure integrity and function, to date, there are no effective options to modify the progression of the depletion of articular cartilage. We believe these unmet needs could be bridged by nutrients and bioactive natural products."



The Collagen Induced Arthritis lab model was developed *in vivo* and utilized to evaluate catabolic effects from proinflammatory pathways and potential cartilage protection activity of orally administered botanical composition, AmLexin™ (50 mg/kg) daily for three weeks. Objective joint function evaluation and biomarkers from urine, synovial fluid, and serum were quantitatively examined with histopathology analysis of joint tissue for cartilage structural integrity. Urinary cartilage degradation biomarker (uCTX-II), pro-inflammatory cytokines (tumor necrosis factor - (TNF- α), interleukin-1 β (IL-1 β), and IL-6), and proteases (Matrix Metallopeptidase 3 and 13 - MMP3&13) were measured.

The AmLexin™ orally supplemented group showed statistically significant reduced joint symptomatic severity and improved catabolic biomarkers, including uCTX-II (91.4% reduction) serum IL-1 β , TNF- α , and IL-6 levels, as well as synovial MMP-13. The histopathology data for cartilage thickness, joint bone erosion, inflammatory cellular infiltration and matrix GAG loss were also well aligned with the cartilage protection benefits observed in the AmLexin™ group. Results concluded that AmLexin™ could potentially be considered as a natural dietary nutrient for joint cartilage protection. To read the published study, visit <https://www.mdpi.com/2072-6643/11/2/272>.

Unigen is pleased to include AmLexin™ in its patent protected joint health pipeline, stated Dr. Jia. “With targeted cartilage protection and DOMS recovery efficacy, AmLexin™ functions as a stand-alone ingredient, but partners extremely well with Unigen’s premier joint health product, Univestin®, clinically proven to alleviate joint discomfort, reduce stiffness and improve mobility in as soon as 3 days. The combination of AmLexin™ and Univestin® is a powerhouse solution for total joint care.”

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About Unigen

Unigen discovers, develops and manufactures proprietary natural-product active ingredients for dietary supplements, cosmetic and personal care products, prescription medical food and botanical drug products. The Company discovers its ingredients through its high throughput screening PhytoLogix™ approach applied to a proprietary well-annotated collection of botanicals and a legacy mining approach applied to botanicals having known medicinal benefits. Mechanism of action, safety and efficacy are documented with extensive preclinical *in vitro* and *in vivo* testing and by human clinical studies. Unigen protects its discoveries with issued patents and patent filings in all major territories and manufactures its products to GMP standards. Unigen commercializes its proprietary ingredients through licensing and ingredient supply alliances with commercial partners engaged in the manufacture, distribution and marketing of end-products in each of Unigen’s target markets. www.Unigen.net