AMLEXIN®

Cartilage Protection

What is AmLexin®?

Unigen's unique AmLexin® composition contains a proprietary combination of Acacia catechu heartwood extract and Morus alba root bark extract. AmLexin® has demonstrated the ability to help protect cartilage integrity. *

What Makes AmLexin® Unique?*

There are many ingredient options available in the joint health market space, but very few that take a proactive, protective approach for joint cartilage break-down.

- AmLexin® has been shown to be effective in an ex vivo GAG assay, at reducing Glycosaminoglycan (GAG) released by articular cartilage.
- Clinical trial results demonstrated statistically significant reduction of uCTX-II, a type II collagen biomarker of joint cartilage break down. This indicates a protective quality that may help reduce the degradation of joint cartilage.

Key Benefits*

- Clinically proven to provide joint cartilage protection
- Clinically proven to reduce oxidative stress and increase antioxidation capacity
- Clinically proven to be effective for normal delayed onset muscle soreness after regular exercise
- AmLexin® is a potent antioxidant that specifically neutralizes super oxide anion - a free radical generated by normal wear and tear.
- AmLexin® effectively inhibits cartilage catabolic pathways by modulating COX-1, COX-2, and 5-LO enzyme activity.
- AmLexin® has been shown to have cartilage protective properties in ex vivo and in vivo studies.

Plant Origin

- Derived from roots of Scutellaria baicalensis and heartwood of Acacia catechu.

Applications*

- Alleviate joint discomfort and stiffness
- Provide protection for joint cartilage
- Enhance flexibility and physical function
- Effective for normal delayed onset muscle soreness after exercise

Formulation

Can be used in tablets, capsules, powders, bars and other delivery systems.

Physical Properties

Brown color powder; insoluble in water.

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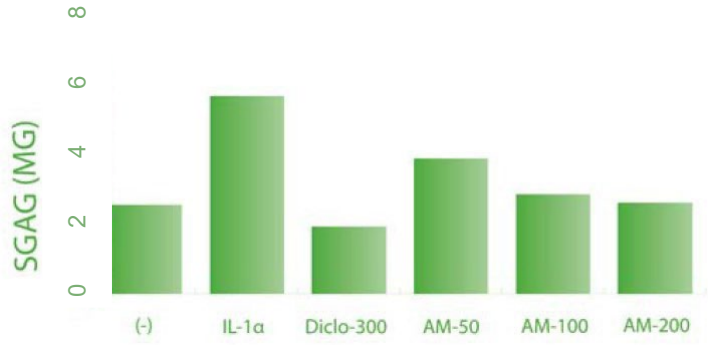
Pre-Clinical Efficacy Data

Effects of AmLexin® on Proteoglycan Degradation in Cartilage Explant Culture

AmLexin®, a composition from Acacia and Marus extracts, reduced the IL-1a mediated degradation of Proteoglycan in a concentration dependent manner ($p<0.05$). AmLexin® at 200 µg/ml almost protected the rhIl-1a induced Proteoglycan degradation at normal level.

Figure 1. Effect of AmLexin® composition on the GAG releasing



COX-1/-2 Activity Inhibition Assay

IC_{50} of AmLexin® and Boswellia extract is 20.9 µg/ml and 98.6 µg/ml, respectively, in COX-1 enzyme activity modulation assay and 49.2 µg/ml and 194.2 µg/ml, respectively, in COX-2 enzyme activity assay. AmLexin® showed more potent effect than that of Boswellia extract in a dose dependent manner.

Figure 2. Effects of AmLexin® and Boswellia extract on COX-1/-2 enzyme activity

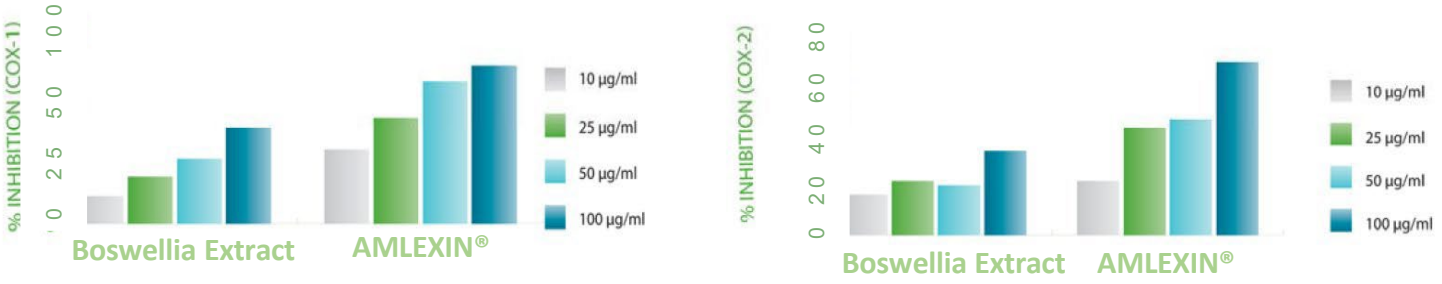
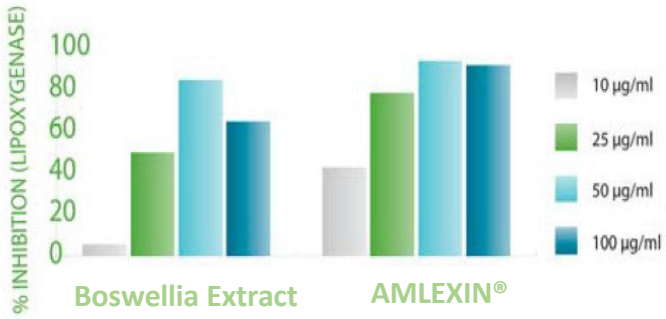


Figure 3.Effects of AmLexin® and Boswellia extract on 5-LO enzyme activity assay



5-Lipoxygenase Activity Inhibition Assay

IC_{50} of AmLexin® and Boswellia extract is 11.1 µg/ml and 30.3 µg/ml, respectively, in 5-LO enzyme activity modulation assay. AmLexin® showed more potent effect than that of Boswelli extract in a dose dependent manner.*

Oxygen Radical Absorption Capacity (ORAC) of AmLexin®

AmLexin® possesses a significantly higher capacity to neutralize highly reactive and oxidative Super Oxide Anion.* Superoxide Anion is generated from normal wear and tear on joints that could initiate NF-kappa B induced cartilage degradation (Mendes, et al. 2003).

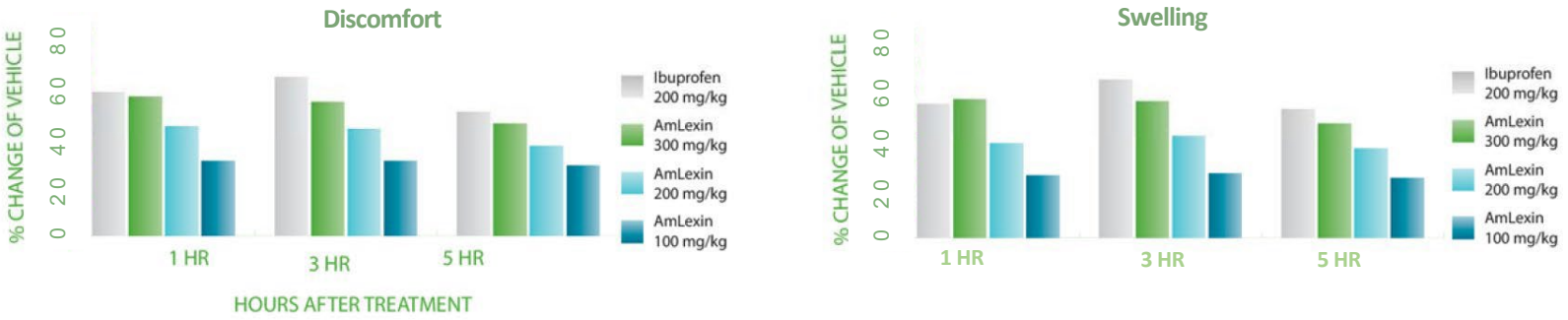
Sample ID	Peroxyl Radicals	Hydroxyl Radicals	Peroxy Nitrite	Super Oxide Anion	Singlet Oxygen	ORAC 5.0 (Total score)
AmLexin™	10249	23451	1263	12066	2734	49763
Citrus Bioflavonoids (20%)	541	1333	22	0	53	1950
Ginkgo flavonol glycosides (24%)	4222	9463	335	6768	2097	22884
Resveratrol	30499	81989	1330	266	43429	157513

Table 1. ORAC results expressed as micromole Trolox equivalency (µmole TE) per gram.

Comfort-Promoting Activity of AmLexin®

Comfort-promoting activity of AmLexin® was demonstrated using carrageenan induced rat paw edema model. AmLexin® showed significant supportive effects at a dose level as low as 100 mg/kg.*

Figure 4. Dose correlated symptom relief activity of composition AmLexin® in carrageenan induced rat paw edema model



Cartilage Protection Activity of AmLexin® in Vivo

AmLexin® showed significant improvements in maintenance of the articular structural integrity of rats while preserving comfort.

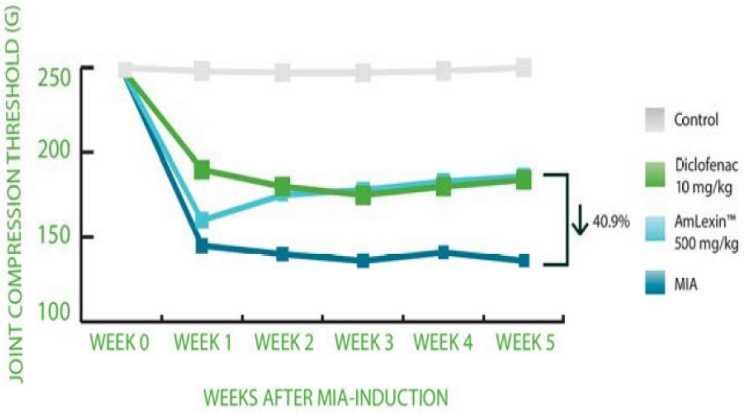
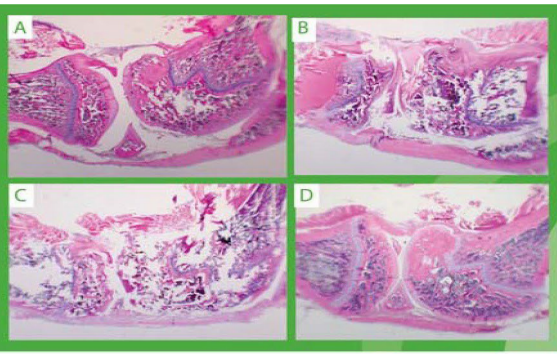


Figure 5: Compression threshold for MIA-injected rats treated with AmLexin®. OA disease model was induced by intraarticular injection of 0.8mg/joint MIA to the left femorotibial joint of SD rats (N=9). Rats were treated with diclofenac and AmLexin® at oral doses of 10mg/kg and 500mg/kg, respectively, for 6 weeks. Compression threshold was assessed every week using Randall-Selitto. Data are expressed as Mean± SD. t P :s: 0.00001; * P :s: 0.000001.

Figure 6: Histopathology: The femorotibial joint was carefully dissected out, fixed in 10% buffered formalin; then decalcified with Calci-Clear Rapid for 1 and a half days and embedded in paraffin. Standardized 5 µm serial sections were obtained at the medial and lateral midcondylar level in the sagittal plane and were stained with hematoxylin and eosin (HE). A= Normal Control; B = MIA Control; C = MIA + Diclofenac (10 mg/kg); D = MIA + AmLexin™ (500 mg/kg).



Pro-Inflammatory Cytokines (TNF-alpha, IL-1 and IL-6) Regulation Activityof AmLexin®

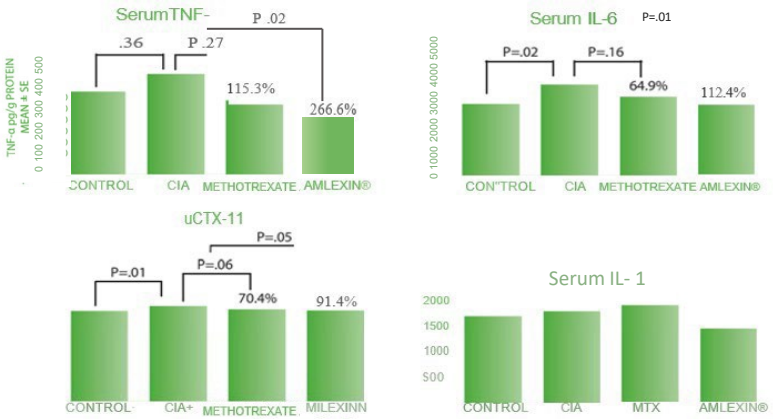


Figure 7: Proinflammatory cytokines and uCTX-II after AmLexin® supplementation

AmLexin® produced statistically significant modulation the level of these proinflammatory cytokines interleukin-1 (IL-1), interleukin-6 (IL-6) and necrosis factor a (TNF-alpha) in collagen induced rat poly arthritis model. Urine (-terminal telopeptide of type II collagen (CTX-II) has been by far the most studied and frequently referred biomarker of cartilage degradation. AmLexin® supplementation showed significant reduction in the level of urinary CTX-II indicating its cartilage sparing activity. *

Clinical Study on Supporting Joint Integrity*

A randomized placebo and active comparator controlled clinical study was conducted to determine AmLexin®'s efficacy on protecting joint cartilage integrity. In this study 135 adults, aged 35 to 75 years, who had symptoms of knee discomfort were enrolled after signing the informed consent. The study participants were supplemented with AmLexin® at 400 mg/day and an active comparator (Glucosamine: 1500 mg and Chondroitin: 1200 mg Combination per day) for 12 weeks.

Urinary levels of uCTX-II were measured and standardized to the total urine creatinine. As seen in Figure 8, there was a statistically significant difference between the changes of uCTx-II for AmLexin® 'M(UP1306) and placebo groups after 12 weeks product use (p=0.029). Participants in the AmLexin® group showed an 8.9% reduction in the uCTX-II while there was a 25.1% increase in the uCTX-11 level for the placebo group. The Glucosamine/chondroitin group showed only 0.5% changes from baseline.

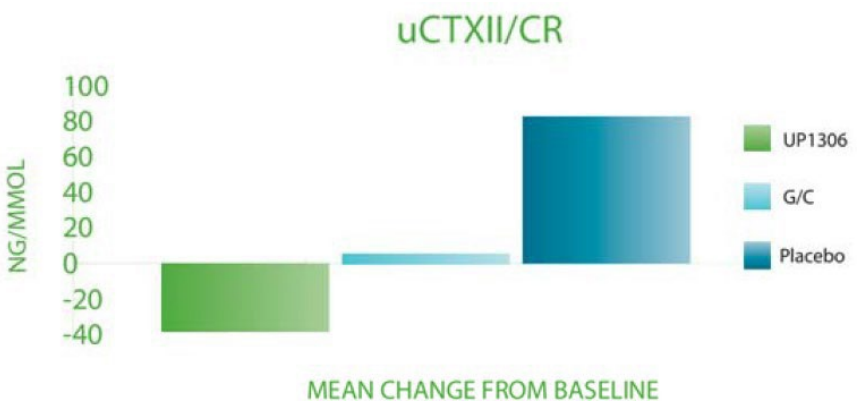


Figure 8. AmLexin® Significantly Reduces uCTX-II Levels vs. Placebo*

Clinical Study on Exercise Recovery and DOMS

A double-blind placebo-controlled clinical trial was carried out over 9 weeks in a single center. Thirty physically active male and female subjects within 18-70 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. Subjects 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. Results showed that AmLexin® group experienced significantly higher levels of post-exercise comfort on day 1-3 following the half-marathon compared to the placebo group.*The AmLexin® group also showed lower post-exercise oxidative stress and higher antioxidant capacity on days 1 and 6 following the half-marathon. *These results demonstrated the rapid benefits of AmLexin® on comfort and oxidative stress within 1-6 days post-exercise.

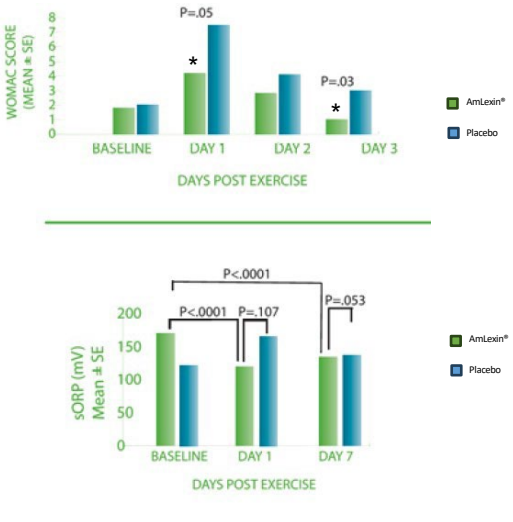


Figure 9. AmLexin® reduced WOMAC discomfort scores as of day 1 post exercise. The anti-oxidation activity of AmLexin® was assessed using the RedoxSYS diagnostic system.The system measures the oxidation-reduction potential (ORP) such as static ORP (sORP),and the capacity ORP (cORP).While sORP values represent oxidative stress level, the cORP is the measure of available antioxidant (Stagos et al., 2015).In the current study, there were clear evidences favoring the beneficial effects of AmLexin® on the level of oxidative stress (asmeasured by sORP) (decreased after supplementation) and anti-oxidant reserve (as measured by cORP) (increased after supplementation).*

Figure 10: Anti-oxidation effect of AmLexin® as measured by RedoxSYS

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Bring the inspiration of science to your business

2121 South State Street, Suite 400
Tacoma, WA 98405
Phone: 253.274.7160
www.Unigen.net