



# Moving with the times™

A new generation joint health solution

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# Agenda

## Active Aging Market & Consumer Demand

- Consumer Insights & Benefits

## UC-II® Product Overview

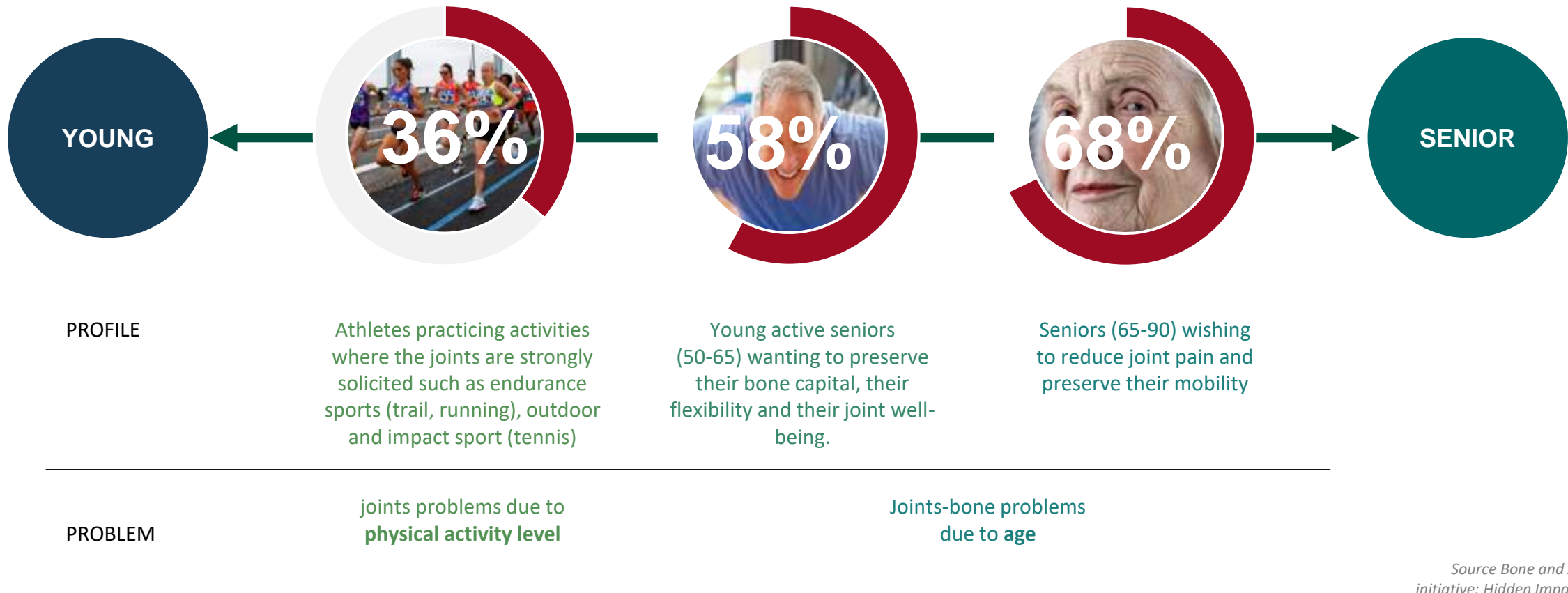
- What is UC-II®?
- Science - Clinical & Animal Research
- Mechanism of Action
- UC-II Ready to Market Product Range
- Summary and Value Proposition

## Q&A



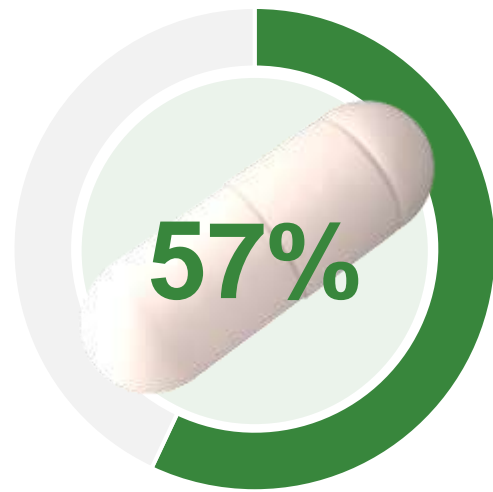
# Moving with the times™

A wide range of consumers with different needs/ concerns to address

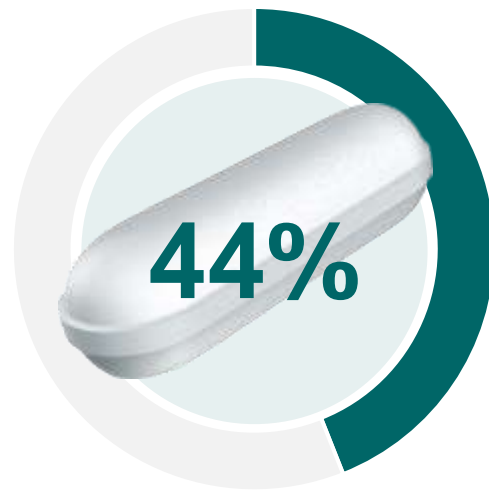


Source Bone and Joint initiative: Hidden Impact of Musculoskeletal disorders, 2014

# Active Silver Ager dosage form preference



Capsule



Tablet



Ready to drink



Sachet

# What is UC-II®

**Lonza**

**THE SECRET TO UC-II®**  
UNDENATURED TYPE II COLLAGEN

Epitopes are the bioactive regions that allow it to bind to the Peyer's Patches and have the ability to induce the oral tolerance process.

Unlike denatured collagen, UC-II® undenatured type II collagen is resistant to gastric acid and digestive enzymes in the stomach. As a result it retains its 3-dimensional shape.

The 3-dimensional shape preserves the bioactive regions called epitopes that have the ability to induce the oral tolerance.

Undenatured type II collagen structure is uniquely preserved in the UC-II® brand using a patented, low-temperature processing method.

**UC-II®**

- Undenatured (native) type II collagen derived from chicken sternum cartilage
- Trademarked, patented, clinically studied ingredient for joint health
- Manufactured in USA under food GMP conditions
- Small dose (40 mg/once per day)
- Unique mechanism of action (oral tolerance)
- Backed by preclinical and clinical science



# Commercially available collagen

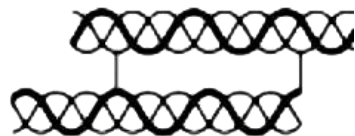
Making the difference with UC-II® undenatured type II collagen

## UC-II® Undenatured type II collagen

- No heat
- No enzyme
- Gentle processing

### Retained Structure

- Intact polypeptides
- Active epitopes



## Gelatin

- Partial hydrolysis (heat)
- Harsh processing

### Disrupted Structure

- Mixture of peptides and polypeptides
- No active epitopes

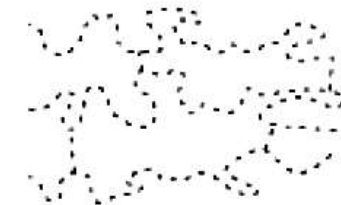


## Hydrolyzed collagen

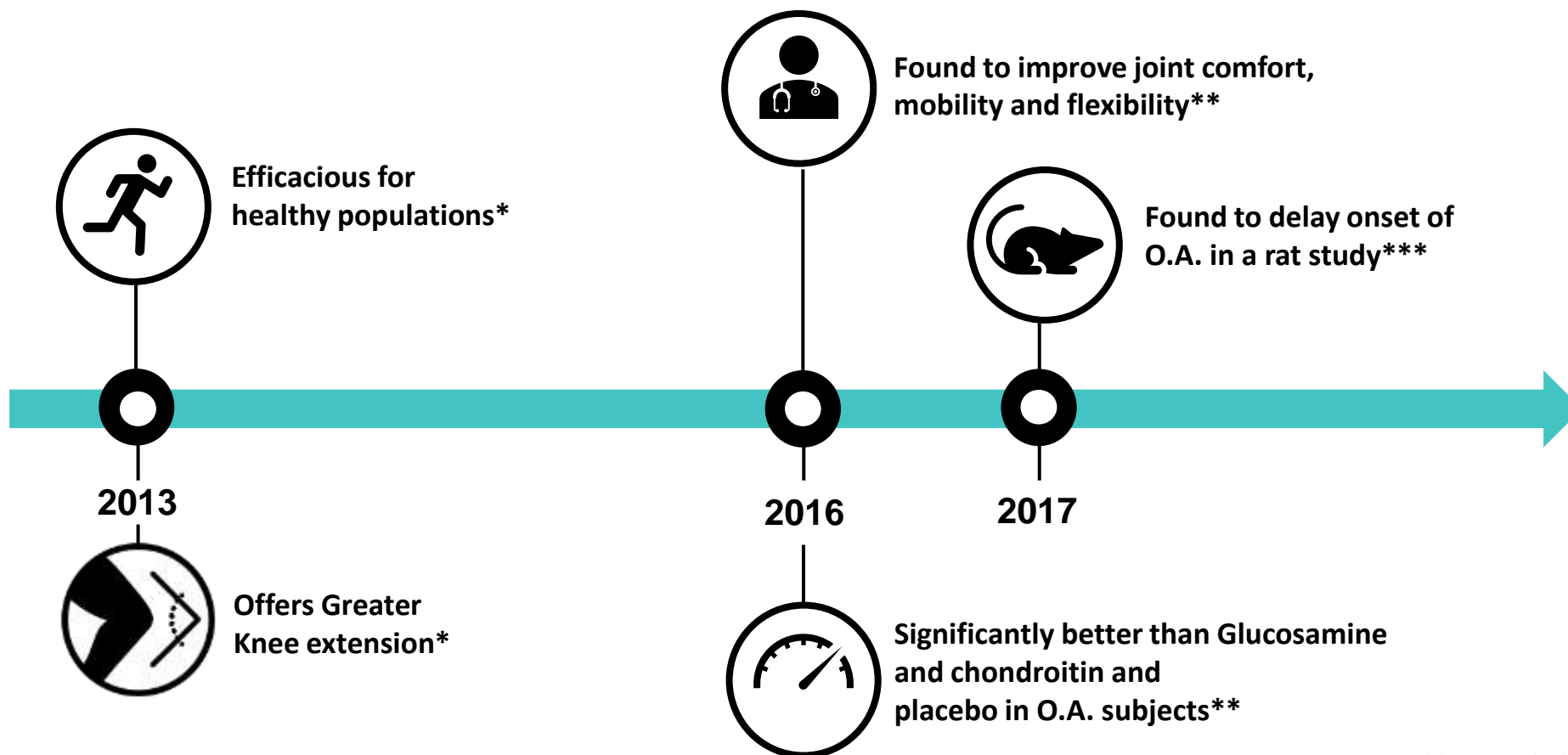
- Complete hydrolysis (heat + enzyme)
- Harsher processing

### Disrupted Structure

- Amino acids & small peptides
- No active epitopes



# UC-II<sup>®</sup> Clinical Studies



\* Lugo et al., *J Int Soc Sports Nutr.* 2013;10:48

\*\* Lugo JP, et al. *Nutr J.* 2016;15:14.

\*\*\* Bagi et al., *Osteoarthritis Cartilage* 2017; 25:2080-90

# UC-II® healthy subjects study

Randomized, double-blind, placebo-controlled study

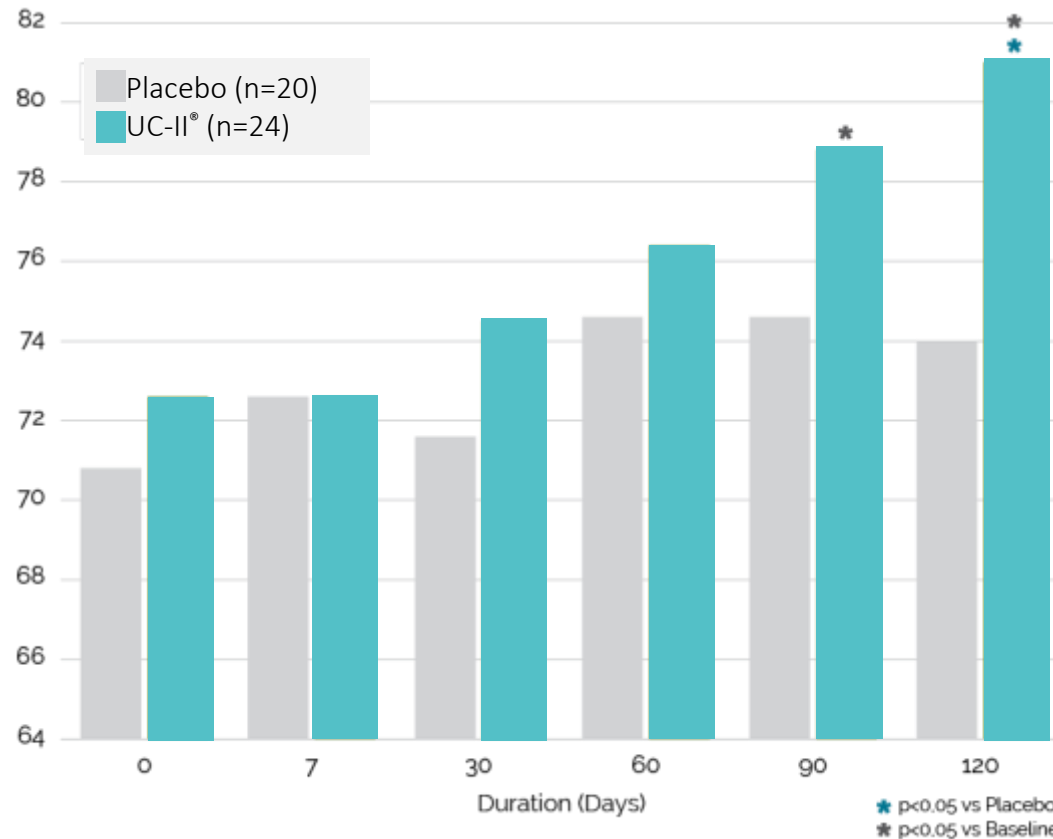


<b>Groups</b>	Group 1: UC-II® Brand, 40 mg Group 2: Placebo
<b>Subjects</b>	N=55
<b>Duration</b>	120 Days
<b>Primary Endpoint</b>	Improvement in knee function
<b>Secondary Endpoints</b>	Time to onset of knee joint pain on Stepmill Time to offset of knee joint pain after stepping off the Stepmill
<b>Time Points Measured</b>	0, 7, 30, 60, 90 and 120 days
<b>Average Age of Subjects</b>	46 years



# UC-II<sup>®</sup> healthy subjects study

Randomized, double-blind, placebo-controlled study



UC-II<sup>®</sup> undenatured type II collagen significantly increase average knee extension compared to placebo



UC-II<sup>®</sup> undenatured type II collagen appears to be alleviating joint discomfort in healthy subject



Participants in UC-II group exercised longer before experiencing joint discomfort and recovered faster from joint discomfort.



17-week supplementation with UC-II<sup>®</sup> undenatured type II collagen was well tolerated

# UC-II<sup>®</sup> Osteo Arthritis Study

Randomized, double-blind, placebo-controlled study

Study Design	
<b>3 Groups</b>	Placebo GC (1500 mg G + 1200 mg C) UC-II <sup>®</sup> Brand (40 mg)
<b>Subjects</b>	N = 186
<b>Primary Endpoint</b>	Change in Total WOMAC at Day 180 vs PBO & GC
<b>Secondary Endpoints</b>	Mean VAS, LFI and WOMAC Subscales at Day 180 vs PBO & GC
<b>Visits</b>	Days 0, 7, 30, 60, 90, 120, 150 & 180
<b>Population</b>	Osteoarthritic subjects (Moderate to severe)
<b># Centers</b>	13 clinics participated in study

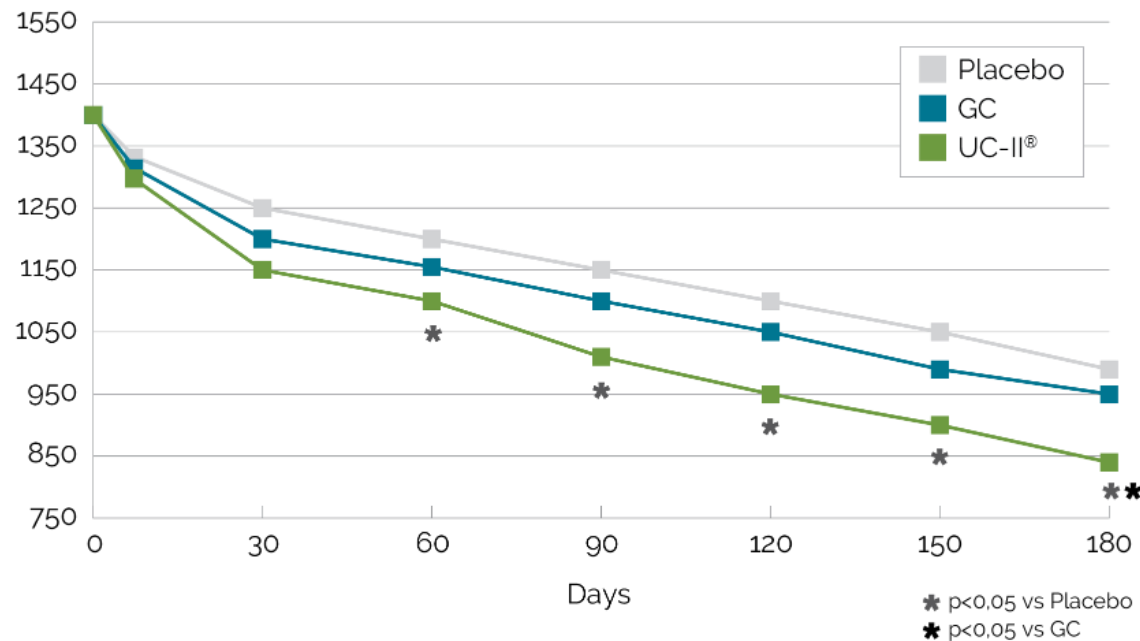
**Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)** – A clinically validated questionnaire used to assess arthritis symptoms in three domains (subscales): physical function, stiffness and knee pain.

# UC-II<sup>®</sup> Osteo Arthritis study

Randomized, double-blind, placebo-controlled study

## Total WOMAC Score Reduction

- UC-II<sup>®</sup> brand achieved statistical significance versus placebo and GC
- GC failed to achieve significance versus placebo



UC-II<sup>®</sup> achieved statistical significance versus placebo



UC-II<sup>®</sup> achieved statistical significance versus GC



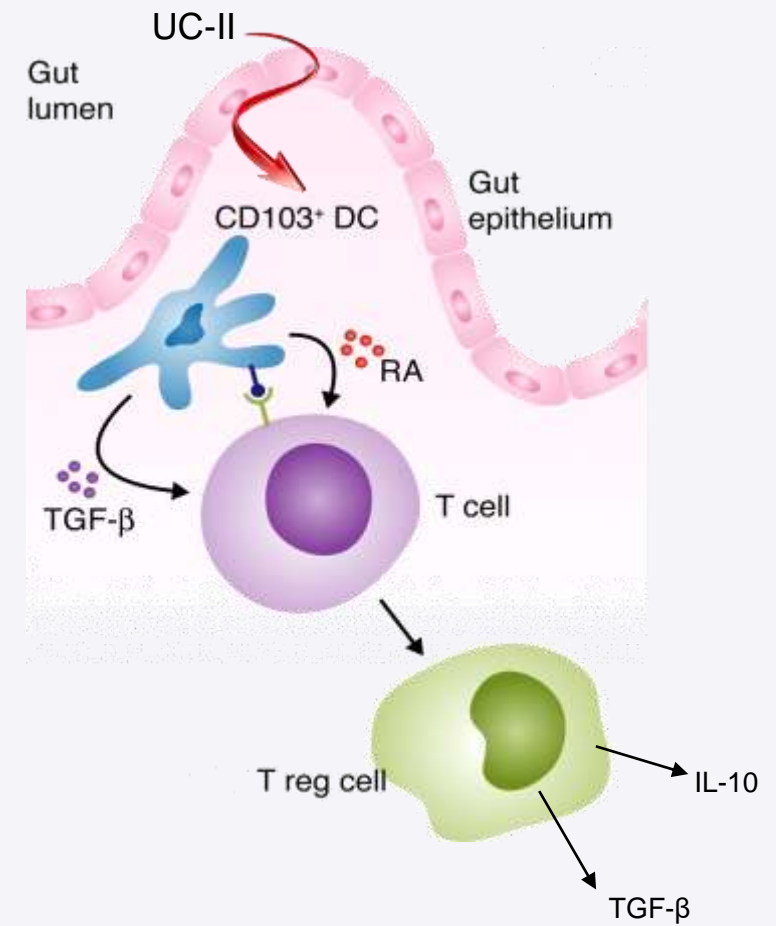
GC did not achieve statistical significance versus placebo



UC-II<sup>®</sup> is safe and effective

# UC-II<sup>®</sup> Unique mode of action

**Lonza**



# UC-II® ready-to-market joint health formulation

- **Science Backed UC-II® ingredient:**
  - May trigger natural rebuild of cartilage in your joints during the joint repair cycle and daily activities, exercise or normal stress
- **Convenience product:**
  - 1 small clean label capsule a day
- **Market proof Formulation:**
  - Robust and tested formulation
  - Includes Vit C, Vit D3, Manganese, Copper for health claims on joint health



With Vitamin C and D, manganese and copper contributes to the maintenance of normal bones and the normal formation of connective tissue and collagen

Including innovative, UC-II® undenatured type 2 collagen

One-a-day!

**1** SMALL CAPSULE CONTAINING 40MG UC-II® UNDENATURED TYPE II COLLAGEN

VS

**3** TABLETS CONTAINING GLUCOSAMINE AND CHONDROITIN



**Comparison**

75% of consumers consider easy to swallow important in their buying decision of dietary supplements.\*\*

# UC-II® Consumer convenience

Just one tiny easy to swallow capsule daily

## “One tiny pill per day”



• 75% OF THE CONSUMERS CONSIDER EASY TO SWALLOW AS IMPORTANT IN THEIR BUYING DECISION OF FOOD SUPPLEMENTS



• UC-II® UNDENATURATED TYPE II COLLAGEN SUPPORTS JOINT HEALTH IN ONE, 40 MG DOSE



**1** SMALL CAPSULE CONTAINING 40MG UC-II® UNDENATURATED TYPE II COLLAGEN



**VS 3** TABLETS CONTAINING GLUCOSAMINE AND CHONDROITIN

**40mg UC-II® significantly outperforms 1500mg Glucosamine and 1200mg Chondroitine**

(Lugo et al. Nutr J. 2016;15:14)





# UC-II® Moving with the times™ portfolio

Complete range of ready to market products

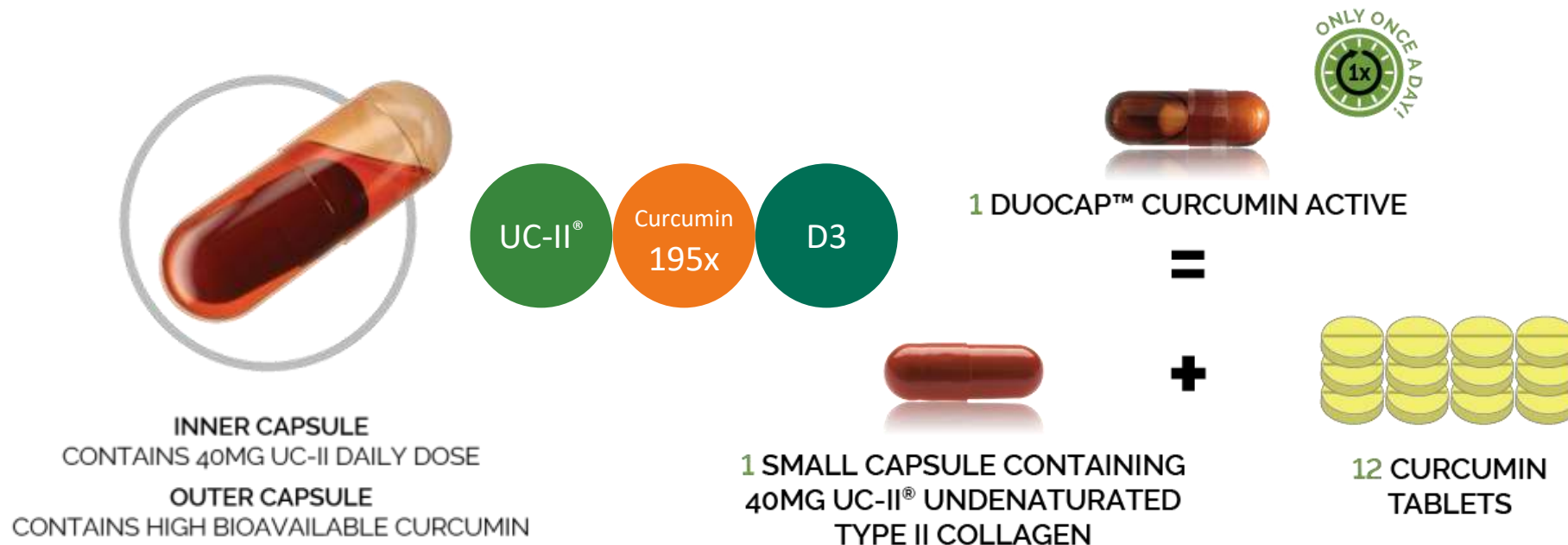
- UC-II® Portfolio addresses the needs of different age groups and their specific concerns to keep their mobility
- Convenient backed by science UC-II formulations that support joint health claims
- Specific UC-II® combination products for consumers looking into food supplement products addressing joint inflammation concerns.
- Innovative UC-II® combination products that address synergetic concerns eg joint - bone health.

Vit C, Vit D, Mn, Cu	Anti-oxidants		Science Backed, size 2 formulation	
Curcumin, Boswelia, Omega3, Vit D	Anti- inflammatory		DUOCAP high bioavailable tumerid SOFTGEL Omega 3	
Vit K2	Directs Ca towards the bones		Synergetic joint-bone health formulation	

# UC-II® Curcumin Active

DUOCAP® Capsule in capsule high performance ingredients combination

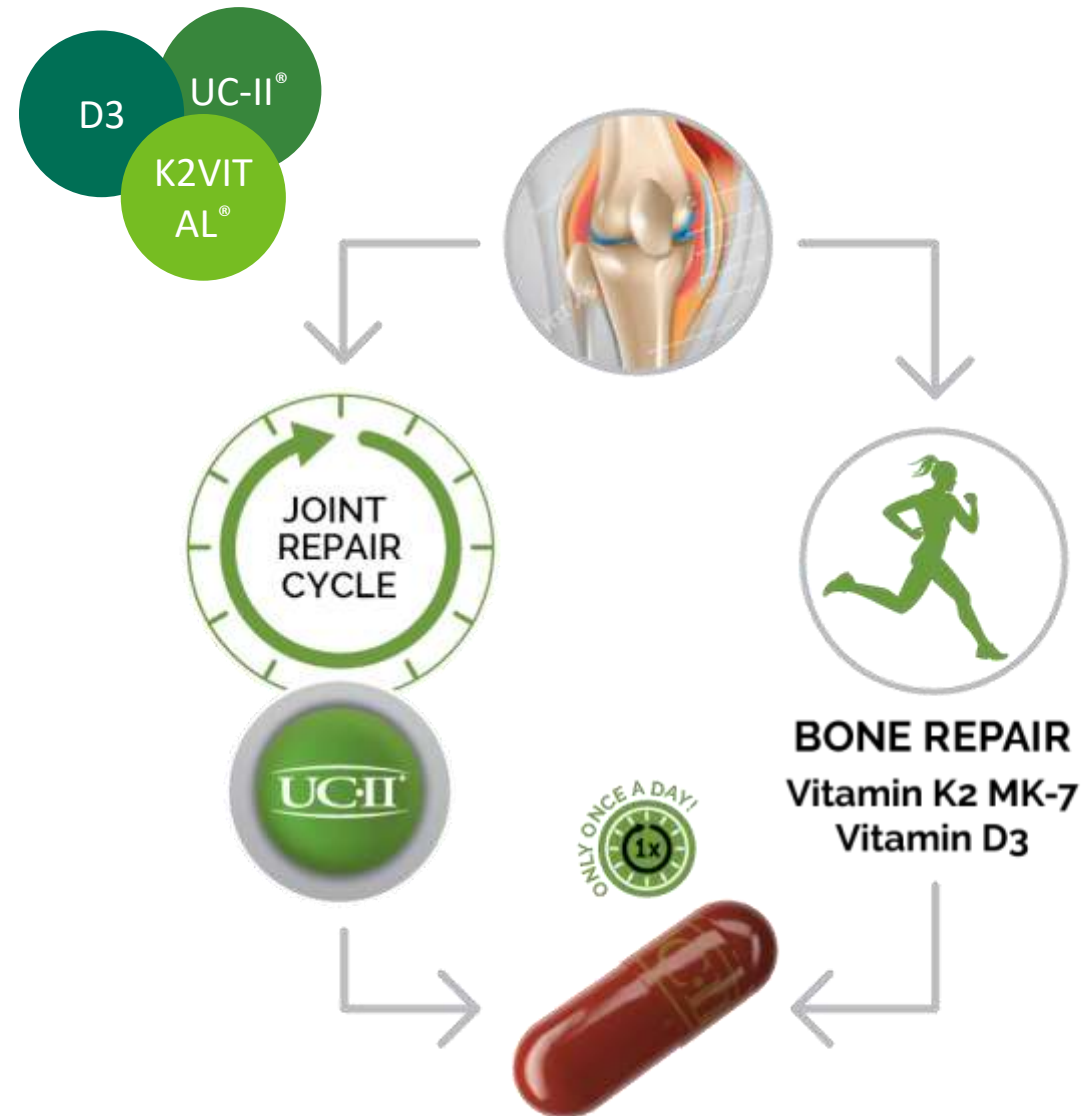
- Science Backed ingredients:
  - May trigger natural rebuild of cartilage in your joints during the joint repair cycle and daily activities, exercise or normal stress
  - Contains 40 mg UC-II® undenatured type II collagen for single daily dose
  - Contains NOVASOL® liquid formulation of clinically proven high bioavailable Curcumin
  - 1 single daily dose easy to swallow capsule.



# UC-II<sup>®</sup> Vit K2

## Holistic approach for the Musculoskeletal system

- Synergetic science backed ingredients:
  - UC-II<sup>®</sup> triggers the chondrocytes to rebuild cartilage
  - Vit K2 ensures activation of bone building Osteocalcin
- Ready to market formulation:
  - 1 single capsule dose a day contains 40 mg of UC-II<sup>®</sup>
  - VIT K2, Vit C and Vit D3 for joint/bone health claims
  - K2VITAL<sup>®</sup> 100% pure and stable Vitamin K2
- Consumer convenience:
  - Small size 2 easy to swallow Licaps<sup>®</sup> liquid filled capsule.



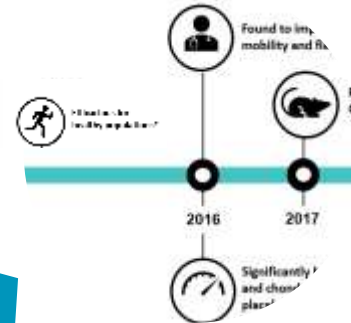
# End-to-end partnership

Formulation development, dosage form expertise , go to market services

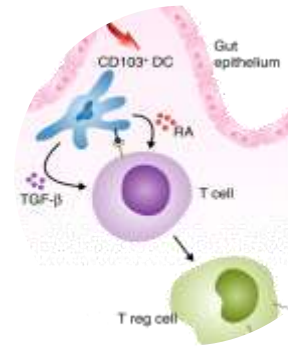


# Take Away's

Backed by science ingredient shown in multiple published studies to be effective



Significantly more effective than Glucosamine plus Chondroitin.



Unique mode of action (Oral tolerance)



Changing consumer landscape requires new solutions to address mobility concerns



UC-II® 40mg daily dose can replace bulkier, less efficacious ingredients with a smaller serving size



INNER CAPSULE CONTAINS 40MG UC-II DAILY DOSE  
OUTER CAPSULE HAS HIGH BIOAVAILABLE CUP

Vcaps® Plus, DUOCAP™ and Licaps® innovative dosage forms can be used to create synergetic formulations.

## Contact us

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[www.capsugel.com](http://www.capsugel.com)



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