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Report

Protect Your Joints from Autoimmune Attack

By Michael Downey

More than **52 million** Americans suffer from some form of arthritis.1

Conventional medical wisdom has long held that **rheumatoid arthritis** results from an *autoimmune* attack on joints, while **osteoarthritis** was thought to result from age-related "wear-and-tear."

For the first time, a team of researchers2 at **Stanford University** has demonstrated that *this is not true!*

It turns out that osteoarthritis is accompanied by the same pathological, pro-inflammatory immune factors involved in rheumatoid arthritis. Even more compelling was their finding that, if treatment is initiated *before* symptoms manifest, ***osteoarthritis may be entirely prevented***.

Unfortunately, the list of available drugs to combat autoimmune disorders—including long-term treatment with corticosteroids like **prednisone** —is notoriously limited and comes with life-threatening complications, including **obesity** and **diabetes**.

The exciting news is a novel intervention has been identified that safely regulates the immune system to protect aging joint tissue from autoimmune attacks.

In this article, you will learn about **UC-II**®, a form of ***undenatured type II collagen***. Its unique molecular characteristics prevent immune cells' *overreaction* to proteins normally found in cartilage and joint tissue that lead to pain and stiffness in both rheumatoid *and* osteoarthritis.3-7

In multiple clinical trials using this proprietary collagen formulation, scientists at Harvard8 have been able to achieve relief of arthritic symptoms, with some patients experiencing ***complete remission***!9

You will also learn how **UC-II**®'s mode of action may be synergistically enhanced when combined with *Boswellia serrata* and two other joint-renewing nutrients.

The Stanford team's discovery of the autoimmune link between osteoarthritis and rheumatoid arthritis was first presented in late 2011.

A group of 25 scientists concluded that the development of osteoarthritis is in great part driven by *low-grade inflammatory processes*.2,10 Specifically, the researchers discovered that the body launches an orchestrated, powerful attack on the *synovial joints* via signaling proteins normally used to fight infections. This *autoimmune* response, they reported, plays a key role in osteoarthritis onset.2

Synovial joints are the most common joint types in the human body. They contain soft-tissue cushioning in addition to

cartilage, along with synovial fluid, a natural lubricant. Knees, hips, and shoulders are just a few of the commonly arthritic joints that fall into this category.

What the Stanford team found was that low-grade inflammation is not merely an early symptom of osteoarthritic cartilage destruction in synovial joints—it is the trigger that causes it. The study also revealed that by targeting the autoimmune derangements that occur early on in the development of osteoarthritis, *arthritis might be completely preventable*.

They went on to point out that drugs intended to inhibit the arthritic reaction (like corticosteroids) paradoxically *compromise* the immune system.2 It would be far safer, they reported, if a natural way to turn off the body's abnormal response were available.

Novel Method to Target the Pathologic Immune Response

These compelling new findings coincided with the development of a *natural* intervention shown to protect tissues in aging joints called ***undenatured type II collagen***.

Here's how it works.

Joints are lined with ***cartilage*** that both lubricates joints and absorbs physical impacts, preserving ease of motion and comfort. The bulk of the cartilage in your joints consists of ***collagen***, a biomolecular protein critical to ***reducing friction*** and ***keeping joints youthful***.

Osteoarthritis and rheumatoid arthritis both involve the ***structural degradation*** and gradual ***destruction*** of cartilage in aging joints.7,11,12 ***Osteoarthritis*** was long thought to be a consequence of simple "wear- and-tear" on joints (and hence largely inevitable).7 Rheumatoid arthritis, on the other hand, was recognized as an inflammatory autoimmune disease that arises when the body mistakenly attacks its own tissues, in this case the joint linings and cartilage.7

We now know that both arise from ***pro-inflammatory immune factors***.

Intrinsic to this process is the mobilization of "killer" T-cells into the joints by ***exposed collagen*** within the synovial lining.7,8

Under normal conditions, collagen elicits no immune response. It is ***exposed collagen*** that immune cells mistakenly identify as invasive, foreign molecules.7 In response to the "threat," ***inflammatory cytokines*** are released that draw in more ***"killer" T-cells***.13 Those cells bombard exposed cartilage with toxic chemicals in order to destroy it, creating ***oxidative stress*** and ***further inflammation*** in the process.

Over time, these continuous biomolecular insults ***erode*** and ***disintegrate*** the cartilage that lubricates and functions as a shock-absorber in joints.

The resulting ***pain*** can become chronic and debilitating in lockstep with sensations of friction or grinding involved in joint movement. While less acute at rest, this pain is exacerbated by walking, standing, or any form of weight-bearing.14,15 Osteoarthritis sufferers often experience joint stiffness or immobility after periods of inactivity, for instance upon waking or after a long period of sitting.14

UC-II® Triggers Specific Oral Tolerance for Lasting Joint Relief

In both osteoarthritis and rheumatoid arthritis, the chief cause of autoimmune response is ***exposed collagen*** and the ensuing attack by sensitized killer **T-cells**.7,16

Suppose an effective means of *regulating* killer T-cells before they encountered exposed collagen could be developed? This

would “re-train” them to treat exposed collagen as a harmless substance and prevent joint degradation and destruction.

In 2000, the first hint of just such an intervention emerged.

A team of scientists at the University of Nebraska was surprised to find that ***chicken soup*** prevented the mobilization of immune system cells to sites of inflammation.17 Upon further analysis, it was not vegetables but a ***soluble component*** of the **chicken broth** itself that exerted this anti-inflammatory activity.

The researchers believe that it was likely the ***collagen*** from chicken bones in the broth that was the source of this beneficial anti-inflammatory effect.

NEW WAY TO COMBAT RHEUMATOID AND OSTEOARTHRITIS

- The most common joint disease, osteoarthritis, was long viewed as a disease of wear-and-tear. New findings reveal that it is one of a number of disorders caused by an abnormal response of the immune system.
- Instead of the traditionally prescribed *NSAIDs* and *immune suppressants*, a revolutionary and side effect-free form of **undenatured type II collagen** called **UC-II**® has been shown to desensitize the immune system and prevent pro-inflammatory autoimmune attacks on aging joints.
- ***Undenatured type II chicken collagen*** has been shown in studies to be capable of activating the pathway known as *induced oral tolerance*, which teaches the immune system to correctly recognize exposed cartilage proteins as the body’s own tissues—instead of foreign microbes—thus preventing an inflammatory attack, a newly recognized cause of osteoarthritis.
- The anti-inflammatory action of a novel composition of ***AKBA***-enriched *Boswellia serrata* —and two joint-protective nutrients, ***glucosamine sulfate*** and ***boron***, now available in highly bioactive formulations—can further boost the ability of undenatured type II chicken collagen to fight osteoarthritis, the painful condition behind so many visits to primary care physicians.

Owing to its *particular* molecular structure, the chicken-derived type II collagen in **UC-II**® acts as a kind of “**reverse vaccine**,” one that ***regulates*** the immune system so that it stops mobilizing attacks against proteins normally found in healthy joint cartilage.

It does so by inducing what immunologists call ***specific oral tolerance*** —the *desensitization* of immune response to specific agents via an orally administered intervention. This is why UC-II® may be likened to a kind of oral vaccine that *reverses* T-cell attacks on exposed cartilage.

Scientists at **Harvard** first studied the effects of UC-II® on human patients with rheumatoid arthritis, long established as an autoimmune disorder. In a randomized, double-blind trial of **60** patients, undenatured type II chicken collagen produced a **significant decrease** in the number of swollen and painful joints within **3 months**, compared to the placebo group. In fact, **14**% of patients achieved **complete remission**. No side effects were found.8

Later, a much larger study of **274** rheumatoid arthritis patients confirmed this finding, as did a study on patients with *juvenile rheumatoid arthritis*, a particularly aggressive form of this disease.18

Turning their attention to osteoarthritis, scientists tested **undenatured type II chicken collagen** on horses and dogs. They noted a reduction of **88**% in measurable pain among horses given this formulation.16 In one study, moderately arthritic dogs given the undenatured collagen formulation were able to place more weight on sore limbs, and use them more naturally, relative to those given placebo, or those given chondroitin plus glucosamine.19

The gold standard of scientific evidence is a *randomized, double-blind, clinical study on humans*. In a study of this type involving **52** adult human volunteers with osteoarthritis, who had an average age of 59, scientists found that in just **90 days**, undenatured type II chicken collagen produced "**significant enhancement** in daily activities suggesting an improvement in their quality of life."14

In this trial, using the standardized WOMAC (Western Ontario McMaster Osteoarthritis Index) scale, scientists found that **40 mg a day** of undenatured type II chicken collagen reduced osteoarthritis symptoms by **33**% in **90 days**. By comparison, the combination of **1,500 mg** a day of glucosamine and **1,200 mg** a day of chondroitin sulfate reduced WOMAC scores by only **14**%.14

Pain scores on the visual analog scale (VAS) decreased **40**% for the collagen group, while pain scores for the glucosamine/chondroitin group decreased just **15%**.14

Finally, using the Lequesne's functional index score—which measures pain during daily activities, such as walking—the study team found that undenatured type II chicken collagen reduced this score by **20**%, while the combination of glucosamine and chondroitin lowered the score by only **6**%. All results were observed in just **90 days**.14

So scientific studies have established that a dosage of **40 mg a day** of undenatured type II chicken collagen induces oral tolerance to exposed collagen—inhibiting the arthritic immune response that inflames joints, degrades cartilage and bone, and as a result, further inflames joints in a vicious and degenerative cycle.8,9,14,16,18,19

WHY "UNDENATURED" TYPE II COLLAGEN?

As discussed earlier, immune system ***T-cells*** are tasked with recognizing and distinguishing between "self" molecules and "foreign" ones. They do this important work by responding to very specific molecular shapes and **3-dimensional structures**.41 If ***T-cells in the blood*** are simply exposed, without any "training," to a previously unrecognized protein structure (such as those found on joint collagen) they react violently and trigger a ***massive inflammatory response*** to destroy the protein.42

This is why, when scientists want to create an animal model of arthritis, they inject collagen into their subjects, sensitizing the T-cells ***in their blood*** to the protein.43 Those ***circulating T-cells*** set up inflammation in the animal's joints, with their rich supplies of collagen.

If T-cells are given adequate preparation, however, they can be "taught" that a specific molecule is a friend rather than a foe. Where does such T-cell "training" take place?

In the **intestinal tract**, specifically the lower end of the small intestine, which is rich in collections of immune tissue called ***Peyer's patches***. Peyer's patches act as "training centers" for T-cells, exposing them to all sorts of molecular shapes that are natural components of the food we eat.44 In that fashion, we ***desensitize our immune systems*** and develop a natural ***tolerance*** to new foods without having constant allergic or inflammatory reactions.44

So, by providing ***native collagen*** of the right 3-dimensional structure to the ***digestive tract***, rather than to the bloodstream directly, we can "educate" our T-cells to ignore collagen when they encounter it in joints.5,41 Scientists say that this enables people to develop ***oral tolerance*** to collagen.45,46

And ***oral tolerance to collagen powerfully suppresses joint inflammation***, as has been shown in numerous laboratory studies.5,47,48 Oral administration of soluble type II collagen even prevents arthritis induced experimentally by collagen injections.45,46

But ***not just any collagen works***. Typical commercial processing causes collagen to become ***denatured***, uncoiling from its normal helical shape and losing its 3-dimensional structure. Denatured collagen has no beneficial effects on joint

inflammation.48

A more natural form of collagen, called ***undenatured type II collagen***, or ***UC-II***®, has recently been developed. **UC-II**® is a highly effective product derived from chicken breast cartilage, a rich source of natural collagen.49 UC-II® retains *its original 3-dimensional molecular structure*, keeping it recognizable by T-cells in Peyer's patches. And UC-II is ***robust*** enough to survive the harsh conditions in the stomach and small intestine, arriving at Peyer's patches with ***its molecules intact***.41

Neutralizing the Pro-inflammatory *5-LOX* Enzyme

Incorporating a safe anti-inflammatory agent in a joint protection program may provide an additional layer of defense against arthritic damage and pain, by helping to eliminate the immune trigger.

In traditional Indian medicine, the gum resin of *Boswellia serrata* is associated with alleviating inflammatory diseases such as arthritis. Double-blind, placebo-controlled studies have shown boswellia decreases swelling and pain in patients with osteoarthritis of the knee.20

Various compounds within boswellia exert an anti-inflammatory action that is different from most anti-inflammatory agents: they inhibit the pro-inflammatory enzyme ***5-lipoxygenase*** or **5-LOX**.

A highly bioactive boswellia compound—called ***3-O-acetyl-11-keto***-b-***boswellic acid***, or AKBA—directly binds to and selectively inhibits **5-LOX**.21,22 This prevents 5-LOX from facilitating the production of ***leukotriene***, a pro-inflammatory compound that damages cartilage and joints. AKBA also reduces pro-inflammatory ***leukocyte elastase*** activity.21 The problem up to now has been limited bioavailability of AKBA following oral administration.

Fortunately, researchers have developed a boswellia formulation with enhanced bioavailability. Scientists administering this patented boswellia compound to animals found that it increased the bioavailability of AKBA in the systemic circulation by **52**%, compared with a standard boswellia extract.21

The researchers concluded that the AKBA-rich boswellia product "consistently…confers better anti-inflammatory efficacy," and "provides more potential benefits in recovering articular cartilage damage… due to inflammatory insult in arthritis such as osteoarthritis or rheumatoid arthritis."21

In a double-blind, randomized, placebo-controlled study on human patients with osteoarthritis, **100 mg** of the patented AKBA-enriched boswellia extract inhibited the cartilage-degrading enzyme ***MMP-3***, and exhibited an anti-inflammatory action that was superior to a standard boswellia extract. Benefits were seen as early in the 90-day study as **7 days**. The journal-published report described the formulation as a "novel synergistic composition."23

Additional Nutrients to *Rebuild* Aging Joints

In addition to inducing oral tolerance in the immune system, and blocking pro-inflammatory 5-LOX enzymes—it is important to support the structure of healthy joints.

Two of these nutrients—***glucosamine sulfate*** and a patented form of ***boron*** —round out an effective anti-arthritis program by protecting existing cartilage and synovial fluid in the joint, as well as providing nutritional support for healthy joint structure.

Glucosamine

Glucosamine is a component of cartilage that has been shown to be joint-protective. While generally viewed as a partial treatment for osteoarthritis, research suggests it may also be effective against rheumatoid arthritis.24

Inflammatory cytokines are directly implicated in the development and progression of osteoarthritis. In the lab, researchers found that glucosamine produces a **four-fold** reduction in inflammatory cytokine-induced gene expression.25

In another lab study, glucosamine successfully inhibited a number of pro-inflammatory factors (*nuclear factor-kappaB* activity, *prostaglandin E2*, and the gene expression of COX-2) supporting its use "as a *symptom- and structure-modifying drug* in the treatment of [osteoarthritis]."26

Glucosamine was also found to prevent joint cartilage degradation in the lab, providing "further support for the use of glucosamine in treatment or prevention of cartilage loss."27

Turning their attention to humans, scientists conducted a randomized, double-blind study of patients with osteoarthritis of the knee. They compared **1,500 mg a day** of glucosamine to **1,200 mg a day** of ibuprofen for two weeks for effectiveness and side effects. They concluded that glucosamine "is a selective drug for osteoarthritis, as effective on the symptoms of the disease as NSAIDs [non-steroidal anti-inflammatory drugs] but significantly better tolerated."28

When scientists orally administered glucosamine to human osteoarthritis patients in therapeutic doses of **1,500 mg a day**, they found it to be *bioavailable* both systemically and within the joints.29

Not all studies show that glucosamine by itself confers relief from osteoarthritis.30-33 These studies showing lack of efficacy strongly underscore the need for arthritis suffers to utilize a multi-modal approach.

Boron

The trace element ***boron*** influences calcium and magnesium metabolism and can inhibit pro-inflammatory factors, while potentially helping to maintain bone growth and density.34-37

In a review of previous studies, scientists found that boron exerts favorable immunomodulatory effects on the inflammatory process, decreasing joint swelling and improving restricted movement. Boron was also found to inhibit ***lipoxygenase*** (LOX)—an enzyme that triggers the inflammatory cascade—and this inhibitory effect on LOX decreases levels of inflammatory **leukotrienes**.38

In a double-blind pilot study in people with severe osteoarthritis, scientists found that of those who started the trial, **50**% of those taking boron improved; and of those completing the trial, **71**% of those taking boron improved; but only **10**% of those taking placebo improved. No side effects were observed.39

In another study, bone samples were taken from fracture patients and compared to samples from osteoarthritis patients and to control bone samples. Researchers found no differences between fracture and control bone samples, but samples of bone from areas adjacent to osteoarthritic joints showed reduced mineral content, including a lower level of boron. This may indicate that there is a more rapid turnover of bone in these afflicted joints, and that boron—used as a bone-building material—is quickly depleted.40

Scientists have now developed and patented a form of boron that is identical to that found in plants, making it highly bioavailable. A dose of just **1.5 mg** of the patented form of boron may provide a key constituent for rebuilding the damaged bones and joints of osteoarthritis patients.

Glucosamine and boron—two natural, joint-supporting nutrients—may be key supporting players for the beneficial effects

of **undenatured type II chicken collagen** and the inflammation-blocking action of the patented, more ***absorbable*** form of ***Boswellia serrata***.

Summary

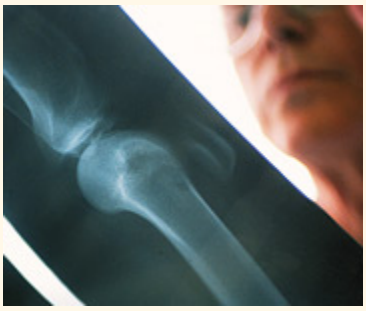
A team of Stanford researchers recently demonstrated that both rheumatoid and osteoarthritis are triggered by an abnormal immune response.

Arthritis is traditionally treated with side effect–prone anti-inflammatory and immune-suppressing drugs. A unique compound has been developed that is capable of safely and naturally *desensitizing* the immune system so that it "learns" to stop launching the attacks on aging joints that cause arthritis pain and swelling.

Through a pathway known as induced oral tolerance, **undenatured type II chicken collagen** retrains the immune system to correctly recognize exposed cartilage proteins as the body's own tissues—instead of incorrectly seeing them as foreign microbes—thus preventing the inflammatory and destructive attack that causes osteoarthritic joint pain and stiffness.

Supported by the anti-inflammatory action of a novel composition of AKBA-enriched *Boswellia serrata* —and further boosted by the joint-rebuilding nutrients, glucosamine sulfate and boron, **40 mg a day** of undenatured type II chicken collagen may halt the abnormal immune process that strikes arthritis sufferers.

COMPLETE RELIEF - *WITHOUT* A POTENTIALLY LIFE-THREATENING PROCEDURE*



An 88-year-old female presented with knee cartilage degeneration, severe pain, and bone spurs. Her doctors advised that she undergo **total knee replacement surgery** as the best option.50

Total knee replacement comes with significant risks and complications, especially in maturing individuals. These include:

- Blood clots in the legs that can travel to the lungs (pulmonary embolism)
- Urinary tract infection,
- Nausea and vomiting (related to pain medication)
- Chronic knee pain and stiffness
- Bleeding into the knee joint
- Nerve damage
- Blood vessel injury
- Infection of the knee which can require re-operation

Ultimately the patient opted for the recommended **40 mg** per day dose of a proprietary ingredient supplying 10 mg of undenatured type II collagen. Within three years, at age 91, she achieved restored mobility and is able to climb five flights of stairs without aid or rest.

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If you have any questions on the scientific content of this article, please call a **Life Extension**® Health Advisor at 1-866-864-3027.

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