

## The Truth About Joint Supplements –

Let's face it – today's horse-owners are inundated with information regarding horse supplements. When it comes to choosing the product that is best for your horse, from specific supplements, to key ingredients to delivery systems, every product on the market wants to tell you why they are better, faster, and healthier and made with ingredients that are superior to the rest.

Just a few years ago there were about a half-dozen joint supplements on the market. Today there are well over 200 in the United States, with more cramming onto the shelves every month. The question is, why do certain manufacturers see the need to continuously introduce new remedies for the same problems? Are these manufacturers more interested in moving product, or giving you what's best for your horse? They certainly won't answer that question, but hopefully with the help of this guide, you'll become informed enough to draw your own conclusions.

What follows is a breakdown of the joint supplement market – first by ingredients, then by delivery systems and, in both, taking a look at claims present in today's marketplace.

At Grand Meadows, we would like to think our reputation for integrity, intensive research and ethics precedes us, and where appropriate we will interject information as it relates to our specific products. However, the point of this article is to serve as an objective guide to you, the horse-owner. For that reason, we will separate information specific to Grand Meadows products, leaving you with an unbiased point of view.

### GLUCOSAMINE

If you're familiar at all with horse supplements, chances are you've come across glucosamine. The predominant ingredient in joint products for the past several years, glucosamine is derived from "chitin" – which in turn is derived mainly from shrimp and crab shells.

Glucosamine helps keep joints and cartilage lubricated, as well as stimulating the substances necessary for the formation of joint tissue, called glycosaminoglycans, key structural components in cartilage that line the joints. This is important because as a horse's body ages or is subjected to punishing riding disciplines, it may not produce a sufficient amount of glucosamine. This can result in cartilage that loses its ability to act as a shock absorber in the joints. The joints then become stiff and painful, resulting in a limited range of motion and even deformation.

Glucosamine is the most widely researched of the many "nutraceutical" ingredients. Absorption and efficacy studies have shown it to be highly effective

when administered orally to horses. Numerous university studies, most notably, Professor Setnikar, University of Rome *Pharmokinetics of Glucosamine*, conducted research which determined that "...tissue distribution and excretion patterns were consistent with those found after intravenous administration," meaning the ingredient was absorbed very efficiently in the horse's gastrointestinal system, in the range of 96-98%.

### **GLUCOSAMINE: THE GRAND MEADOWS POINT OF VIEW:**

**Grand Flex** was the first Glucosamine based product on the market in the United States that was made available through tack stores, catalogs and the like. Through the mad rush of changes to formulas, introduction of new products and ingredients by other manufacturers of equine joint supplements, the **Grand Flex** formula has never changed. It was well researched and effective when we designed it, and the reasons to provide a joint support product to horses have not changed. As such, neither have we.

### **GRAND FLEX – OFTEN COPIED, NEVER DUPLICATED**

In the very first review of joint supplements in Michael Plumb's Horse Journal, back in 1997, **Grand Flex** was recommended as the best choice for the level of Glucosamine and the inclusion of a number of important co-factors – "**Grand Flex** also contains Vitamin C and bioflavonoids, niacinamide and all the minerals and amino acids we find essential to joint and connective tissue health. Excellent clinical response was seen with this product." After several new Glucosamine products came to market, a number of these products copied the **Grand Flex** formula with 'token' co-factors; added more as "window-dressing" in our opinion than with any plan to make it easier for absorption or health benefits.

In 1997, when the above-referenced article was printed, there were no other products that contained Glucosamine on the market, with one exception - Cosequin™. All the products that were on the market at that time were chondroitin sulfate products that almost universally had just that single ingredient. Within three months of that article there was a rush to market, as manufacturers suddenly "discovered" that Glucosamine was an important ingredient. At least a dozen new Glucosamine products came to market, but at that time very few had recognized the importance of the levels of co-factors. An important element to understand with Glucosamine is that feeding it alone is like eating a sandwich with just bread. It is the addition of the co-factors, in credible amounts, which represent the mustard, mayo, cheese etc. that makes the sandwich a sandwich. In other words, it's not only "complete" and healthy, it "works."

### **GLUCOSAMINE HSL VS. GLUCOSAMINE SULFATE: THE GRAND MEADOWS POINT OF VIEW**

As you may know, there is a never-ending debate about the difference between Glucosamine HCL and Glucosamine Sulfate. Glucosamine Sulfate was used for early clinical review and is a combination of sulfur salts (40%) and Glucosamine. Glucosamine HCL is a purified version containing 98% pure, active glucosamine but provided an adequate level of either ingredient is included in a formula, there is no evidence that a dramatic change will occur by switching from HCL to Sulfate or visa versa. Sulfur is a vital part of the synergistic approach to joint support. The inclusion of another source of sulfur such as Methionine with products containing Glucosamine HCL is the key equalizer.

In **Grand Flex**, for example, we use 3000mg of Methionine, a sulfur bearing amino acid. The key to a formulation in which the co-factors effectively and efficiently add to the effectiveness of a Glucosamine based joint product, is the quality and level of either ingredient in the formula.

### CHONDROITIN SULFATE

While Glucosamine is clearly the leading ingredient on the market when it comes to joint supplements, Chondroitin Sulfate has long been considered the other half of the formula needed for joint products to be effective. Chondroitin sulfate is a major constituent of cartilage, providing structure, holding water and nutrients, and allowing other molecules to move through cartilage—an important property, as there is no blood supply to cartilage.

In degenerative joint disease, such as osteoarthritis, there is a loss of chondroitin sulfate as the cartilage erodes. Studies indicate that chondroitin sulfate may support healing of bone, which is consistent with the fact that the majority of glycosaminoglycans found in bone consist of chondroitin sulfate.

There is no question to the function of this ingredient when produced naturally in the body - **however** there is significant research to show that when administered as a supplement, the rate of absorption results for chondroitin sulfate are less than favorable due to its molecular size (anywhere from 250 times the size of a glucosamine molecule).

There have been a number of major studies to support this theory; the New England Medical Journal has concluded the oral absorption of Chondroitin to be less than 12%. The Encyclopedia of Natural Medicine states "...the absorption of intact chondroitin sulfate is estimated to be anywhere from zero to thirteen per cent." Dr Ian Wright, a leading veterinary orthopedic surgeon in the UK, wrote in *Horse and Hounds* "...you can feed supplements containing chondroitin sulfate to horses at the recommended dose rate...none will be absorbed."

Surprisingly, the vast majority of manufacturers continue adding it to their products. When the manufacturers of Cosequin™, Nutramax Laboratories, decided to no longer defend their formulation patent that consisted of a blend of Glucosamine, chondroitin sulfate, manganese and vitamin C, most of the

manufacturers raced to add chondroitin sulfate to their products, or introduced “new” formulas that contained chondroitin sulfate. This was largely because so many people were and have been convinced of the necessity of feeding Glucosamine and chondroitin together,

### **CHONDROITIN SULFATE: THE GRAND MEADOWS POINT OF VIEW**

Due to a significant level of research showing poor absorption, we have chosen not to use chondroitin sulfate as a stand alone ingredient in any of our products due to its large molecular size, which in our opinion (supported by exhaustive research) compromises its ability to be efficiently absorbed. The health benefits of chondroitin sulfate cannot be effectively realized when it is administered as an oral ingredient. We do however use depolymerised Chondroitin Sulfate that is an integral part of the raw material in our BioCell Collagen II™. This ingredient along with the Hyaluronic Acid and Type II Collagen in this triple patented ingredient have all been subjected to a manufacturing process that results in a highly bioavailable ingredient matrix that has been reduced to 1/90<sup>th</sup> of its original size.

### **IF IT DOESN'T WORK, THEN WE WON'T SELL IT**

While other manufacturers may choose to mislead customers (in our opinion) by marketing chondroitin sulfate as an effective ingredient, at Grand Meadows we stand behind our reputation of integrity and ethics. Regardless of whether it will help us sell more product, if it's not proven to be good for your horse, you won't find it in anything with the Grand Meadows label.

However, we are always open to change, and if in the future we see significant evidence of forms of chondroitin sulfate that show better bioavailability, we will be more than willing to re-evaluate our thoughts on this ingredient.

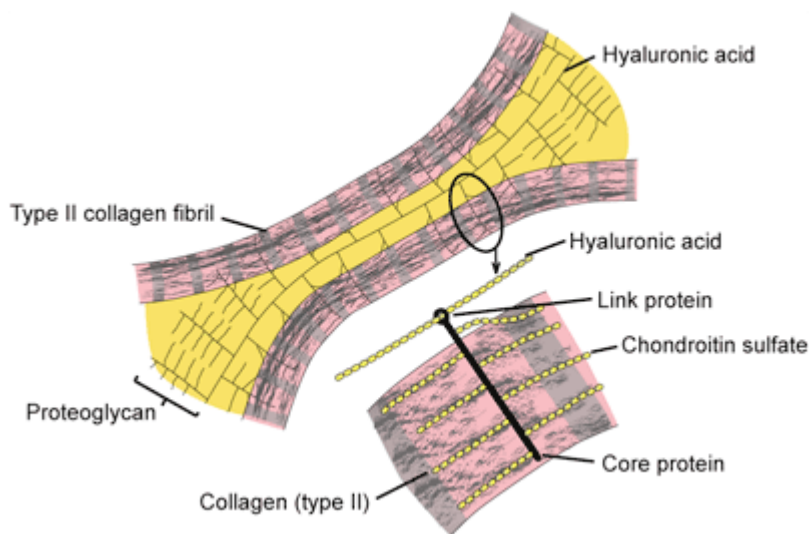
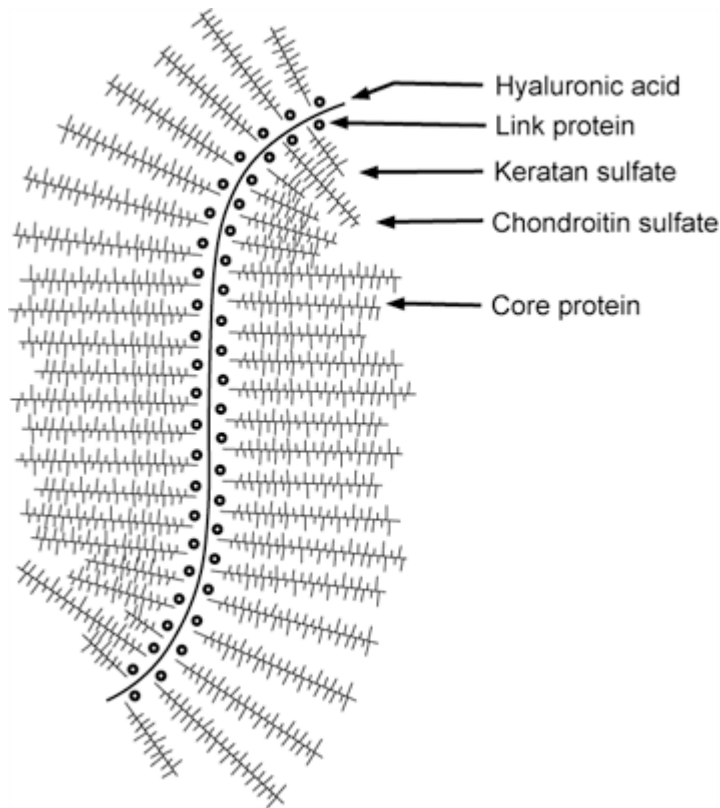
### **HYALURONIC ACID**

One of the hottest ingredients in the horse supplement marketplace is Sodium Hyaluronic Acid, or “HA.” Hyaluronic acid (HA) originally was developed as a drug to be injected into the joint or intravenously, and previously there was little clinical data on oral forms of HA. The original HA products that are currently on the market use Sodium Hyaluronate, which has a very large molecular structure and extremely poor oral absorption. Also, most of the dosage levels on these HA products are far too low to provide the body with support to cartilage that is needed for healthy joint function.

Similar to chondroitin sulfate (see section above), the HA molecule is quite large (much larger, in fact, than chondroitin – see diagrams below), and there was no evidence that the simple HA molecule could be absorbed through the stomach.

The diagram below shows how large the hyaluronic acid molecule is in relation to the size of the whole proteoglycan – particularly note the size of the chondroitin

sulfate strands branching off the central hyaluronic acid spine that runs the entire length of the proteoglycan.



## HYALURONIC ACID: [THE GRAND MEADOWS POINT OF VIEW](#)

As with other ingredients, many of our competitors see HA not as a viable, effective ingredient in improving horse supplements, but as an easy marketing “hook” and following on the shirttails of the successful injectable form of sodium

hyaluronic acid, in products like Legend™.

As more and more HA products came to market, the actual level of HA dropped dramatically, plus it was now blended with Glucosamine, MSM, Chondroitin Sulfate and other co-factors. The levels of HA in these products dropped dramatically from an average of 100 mg HA in HA only products to 15mg - 20mg in blended products – (a classic case of window dressing).

The reason is simple, HA is primarily harvested from rooster combs and is extremely expensive, a hundred times the cost of Glucosamine. Once HA became branded as a viable ingredient manufacturers felt comfortable putting token amounts of HA in their product so they could claim HA on their labels. Considering that the average dose for humans is 20mg of HA per 150 lb you can see how misleading these blended products are for a 1,000 lb horse. Effective, recommended HA levels for 1,000 lb equines should be 150 – 200 mg per day.

There is no doubt that HA is a vital and major constituent of healthy articular cartilage and synovial fluid. Its structure is the simplest of all glycosaminoglycans and forms the backbone of proteoglycans. Hyaluronic acid is found in connective tissue and manufactured in the synovial membrane and by the chondrocytes. As a major component of synovial fluid it is also essential for proper nutrient delivery.

## **HYALURONIC ACID THE GRAND MEADOWS POINT OF VIEW**



Grand Meadows was aware of the benefits of HA but, convinced that HA products being introduced were not effective. Selecting a form of HA that could be absorbed into the bloodstream was, therefore, a key requirement. We followed the research from many university studies and researched a pharmaceutical company, BioCell Technology, LLC that had developed BioCell II. This was an exciting new “super” ingredient that offered a logical and well-researched approach to joint support. This ingredient has earned three US Patents for its exclusive manufacturing process which results in molecules that have been reduced to 1/90<sup>th</sup> of their original size through a complex hydration process. BioCell Collagen II represents the first oral HA product whose effectiveness was supported by clinical research for absorption and efficacy. Its unique structures, containing Type II Collagen, Depolymerized Chondroitin Sulfate, Hyaluronic Acid and Glucosamine provides the body with a concentrated source of reconstructive materials that make up the cartilage matrix. **Grand HA** and **Grand HA Synergy** were two years ago offering our

customers the first patented HA oral supplement that has been clinically proven for absorption and efficacy.

## **PERMA MUSSEL, SHARK CARTILAGE**

Perma Mussel, Shark Cartilage and other cartilage extracts contain a mixture of glycosaminoglycans (GAGs) and can vary in purity and are poorly absorbed. Perma mussel which comes from the New Zealand green-lipped mussel is still available in some supplements; however the scientific data is pretty limited. Shark cartilage is the other ingredient that is widely touted as having an effect on both rheumatoid and osteoarthritis. Shark cartilage briefly had a high degree of visibility after “60 Minutes” did a story cataloguing potential benefits of shark cartilage in reducing tumor growth in cancer. There has been a very large jump from that evidence to include shark cartilage as a viable ingredient in joint products, likely because of the presence of chondroitin sulfate found in shark cartilage.

## **PERMA MUSSEL, SHARK CARTILAGE: [THE GRAND MEADOWS POINT OF VIEW](#)**

Grand Meadows researches and selects only the highest quality and effective ingredients for all their products. Because of the fact that we have not, as of yet, seen any clinical evidence that either perma mussel or shark cartilage have any meaningful connection to joint function, they are not an ingredient in any of our products. As well, the amount of glycosaminoglycans found in perma mussel is minute on an mg-for-mg basis compared to other sources of glucosamine. . One researcher explained the difference between these GAGs and Glucosamine is comparing crude ore (shark cartilage or perma mussel) and pure gold (glucosamine).

Finally, we are not particularly comfortable with the ethics of harvesting an ingredient from a source that is not infinitely renewable..

## **DEVIL’S CLAW, BOSWELLIA, BROMELAIN, MSM and YUCCA**

“Guaranteed results in five days” (or sooner in some cases) was and still is a popular slogan that has been used frequently in so-called “joint supplements.” One particular product achieved national distribution and widespread acclaim within a matter of months. Unfortunately, the secret behind the success of these products is not in the long term support of healthy joint function, which a well designed joint supplement can provide, but in the delivery of various pain-blocking agents that mask the pain prior to any improvement in the viscosity of

the joint fluid or the improvement in shock absorption of the cartilage tissue. This phenomenon was particularly prevalent with liquid joint supplements – look at the labels of various liquid joint supplements and you will always see one or more of these ingredients on the analysis. It is important to differentiate MSM from this group as MSM has some excellent properties as a sulfur source and to help transporting nutrients through the body. It is also very inexpensive and has been used extensively in joint supplements because at high levels it also acts as a potent pain masking agent.

### **DEVIL'S CLAW, BOSWELLIA, BROMELAIN, MSM and YUCCA : [THE GRAND MEADOWS POINT OF VIEW](#)**

At Grand Meadows we watched with dismay as thousands of horse-owners appeared to throw logic out of the window. Considering that foundations worldwide are spending billions of dollars on research to alleviate this problem, does it seem likely that a small equine supplement company would suddenly discover a solution that works in a matter of days? We think not.

Unfortunately many consumers are quick to jump at such “miracle cures,” with even more unfortunate results. What we fear is that many horse-owners in seeking to quickly find instant/fast pain relief remedies the symptoms associated with joint problems have actually accelerated the damage to the articular cartilage surfaces by riding the horse(s), often in punishing disciplines, well before there has been any improvement in the function of the joint.

If you have taken supplements in the past, you'll recall just how quickly you felt an appreciable difference – and if you are like most people we have posed this question to you will quickly realize that these claims based on speed of results are entirely unrealistic.

All of the ingredients listed in the title of this section block pain in some way, and we continue to marvel at the willingness of consumers to buy into marketing hype. This is not to say that reducing pain is necessarily a bad thing – if you want to get through an important show, or if you have an older horse who simply needs help there is nothing wrong with the concept, but don't be fooled – there is a difference.

What we do object strongly to is the long term feeding of products that are presented in the marketplace as joint support products, when largely their main function is simply to block pain without any attempt to explain their primary function. This is of particular concern with younger horses. As a company with a reputation for ethical behavior, we will never market a pain blocker as a long-term joint supplement. We may lose millions in sales, but we won't lose our integrity. There are exceptions to this rule where horses have extensive damage that a well designed joint supplement alone, free of pain blocking agents, and is not

able to produce the results that we would like to see. In those circumstances it may well be necessary to provide products that are more “aggressive” and that contain some of these agents. Our products Grand HA Synergy and Mega Grand Flex are both designed to address these situations - but we would always prefer horse owners to try Grand Flex or Grand HA first – neither of which contains any pain masking agents.

We include a tiny amount of Yucca in **Grand Flex** for its flavor enhancing benefits.

### **DELIVERY SYSTEMS – POWDER, PELLET, LIQUID**

Another development that we saw in the category was the introduction of liquid joint supplements, like devil’s claw, boswellia, bromelain, yucca & msm, many of which claimed dramatic results in as little as five days – our sentiments about this approach are addressed above.

Other significant drawbacks of liquid supplements are the issues of shelf stability and dosage accuracy. Many ingredients, particularly vitamins, are unstable in water. Vitamins lose their potency from heat, light and oxygen and water is composed of hydrogen and oxygen. Vitamin C for example will disappear within 24 hours; the chelation of minerals dissipates in 48-72 hours etc.

As for dosage accuracy – (how many times do you need to shake the bottle to ensure an accurate dose, and perhaps more importantly in many barn operations, how many times does the groom shake the bottle when feeding twenty or more horses?) Murky areas such as these are the reason 95% of the supplements sold in the much larger human supplements industry are sold in tablet or powder form and in dark bottles.

Pellets are another popular form of delivery system for joint supplements but it is important again to look at the types of ingredients in the formula. Pelleting is a heat process where the premix is added to fillers and then steamed and forced through a die that produces the pellets. This process, in particular, will again dramatically affect Vitamin C potency, unless the manufacturer uses a form of Vitamin C called Ascorbyl Phosphate that is heat resistant; it is also considerably more expensive than normal Vitamin C. No form of glucosamine has been found to hold its activity level and will breakdown with temperatures above 110 degrees.

### **DELIVERY SYSTEMS – POWDER, PELLET, LIQUID: THE GRAND MEADOWS POINT OF VIEW**

At Grand Meadows we worked hard to try to develop a method for making a premixed liquid product shelf stable and one that would consistently provide an

accurate dosage. We worked with some very cutting edge labs in this quest and finally concluded we could not produce a product that would meet our standards.

While powders still represent the best system for ensuring accurate dosage and stability of ingredients, there are still questions that need to be answered. Blending powders is a science that requires sophisticated blending machines to ensure that a scoop at the top of the bucket is the same as a scoop at the bottom. At Grand Meadows we use a state of the art blending machine that cost over \$350,000. An expensive investment? Yes. Worth it for the quality it brings to our product? Absolutely.

## **SUMMARY**

When it comes to horse supplements, everyone has an opinion. And in the end, the only opinion that matters is yours. However, it's important to remember that there is a wealth of factual information available to help you make an informed decision about what supplement products and ingredients are best for your horse. Hopefully this piece has presented many of those facts in a way that will be helpful to you as you look to make an informed choice about supplements. If nothing else, we hope you are now convinced to look closer at the products you are buying and make sure you are getting what you pay for.

At Grand Meadows we pride ourselves on researching and selecting only the highest quality ingredients to create our product line, and we hope that in your research you'll come to the same conclusion we have – Grand Meadows products are the best on the market, and the best for your horse.