

*Interview of Mr John Croft LRSC, MRSNZ, FRSH,  
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by  
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### **Green-Lipped Mussel Extract Interview**

**BA** *How did you discover that the New Zealand Green-Lipped Mussel had properties which could be used to treat arthritic diseases?*

**JC** The discovery was made at the beginning of the 1970's when this mussel was involved in a research programme looking at marine molluscs (shellfish) to see if any of them contained a possible treatment for cancer. The Green-Lipped Mussel (GLM) was included in this programme because it is unique and is only found in New Zealand waters. It is important to point out that the mussel did not prove to be a possible treatment for cancer but the research indicated that the GLM demonstrated significant anti-inflammatory activity. Anti-inflammatory drugs are used to treat arthritis and so it was thought that an extract of the Green-Lipped Mussel (GLME) might provide a valuable, natural anti-arthritic treatment for this very serious disease. We now have over 30 years of dedicated research which, together with the experience of arthritis sufferers worldwide, has proved GLME to be a highly successful treatment with the added bonus of not exhibiting the classical adverse side effects associated with anti-inflammatory drugs.

**BA** *As this extract comes from a shellfish how can you be sure that you are not depleting the natural resources of the sea so that eventually there will be no Green-Lipped Mussels left ? Your activities might be seen by conservationists as simply pillaging the resources of the sea for commercial gain.*

**JC** The mussels are not taken from natural beds, they are cultivated on marine farms. In fact, instead of pillaging the seas we are farming the seas to produce a valuable medicinal product! The marine farms are very strictly controlled by the New Zealand government and our regulations are such that we can trace an individual GLME capsule right back to the time of day and the specific farm from which the mussels used to make that capsule were harvested.

**BA** *How do you farm the sea to grow the GLM?*

**JC** The mussels are grown on special ropes which hang down from horizontal lines at the surface. The horizontal lines are supported by buoys at each end and other buoys are added at intervals along their length as the mussels grow and increase the weight on the lines. They are usually harvested between 14 and 18 months from being seeded. No fertilizers or herbicidal type agents are involved in this farming as it merely optimises the

natural properties of the sea water column by having the shellfish suspended vertically instead of horizontally on the sea bed. We are very fortunate in New Zealand in having clean, unpolluted coastal waters which are highly productive and of an excellent temperature range for cultivating a variety of species.

**BA** *If your coastal seas are so productive, is there not a danger of natural forms of pollution such as toxic algae growing well also?*

**JC** Yes, this is true. However, New Zealand has the best monitoring programme for potential blooms of these algae in the world. All farming sites are monitored on a regular basis and the regulatory authority will prohibit the harvesting of any shellfish from any farms within a suspect area. This programme, in addition to the other monitoring and quality assurance programmes carried out by governmental regulatory authorities ensures that New Zealand shellfish are perfectly safe.

**BA** *As you will know, arthritis has many forms and is a very debilitating and painful disease. How can the Green-Lipped Mussel Extract, which is a natural product, successfully treat such a serious condition?*

**JC** GLME has been shown in laboratory and clinical trials, treating both human and animal subjects, to be effective in treating both the rheumatoid and osteo forms of arthritis. How it does so is an interesting story (involving the use of a few medical and scientific terms which I will try to explain clearly) and is one of the indications of the powers of nature, in particular that occurring in our seas, to provide remedies for most diseases. The difficult part is finding these remedies amongst the multitude of life forms present in the seas!

GLME has a number of varied anti-inflammatory activities naturally present but the important thing about these activities is that they are at a low or moderate level only. This might sound strange since you would think that having potent activity would be the ideal. However, a product providing a range of anti-arthritis activities at a low or moderate level can be significantly more effective because it treats the disease slowly and progressively and, equally important, does not create adverse side effects.

It is sometimes the potency and intense activity of a medication that, while giving rapid relief of disease symptoms, triggers other, undesirable activities. Let me give you an analogy for this. Lets say that you regularly drive home from work in your car using standard gasoline and it takes 30 minutes for the trip. You decide that you want a faster trip so you put aviation fuel in your car! Now you do the trip home in 10 minutes but the engine in your car lasts about a week before having major problems!

**BA** *So what are these various properties that your Green-Lipped Mussel Extract has that allow it to address arthritis, as you claim, so effectively?*

**JC** The principal anti-inflammatory activity in Green-Lipped Mussel Extract is due to a carbohydrate complex which has the ability to inhibit the emigration of neutrophils and T-lymphocytes from the blood vessels. What this means in everyday terms is that soldier cells (neutrophils and T-cells) are inhibited from escaping from the bloodstream to attack our own cells when an inflammatory stimulus is present. This is a grossly oversimplified explanation of neutrophil and T-cell function but, hopefully, explains why the inhibition of

this activity helps to reduce inflammation. This same mechanism is performed by some anti-inflammatory drugs.

The second anti-inflammatory activity is due to the effect of the natural content of some long chain fatty acids on cyclo-oxygenase and also 5-lipoxygenase activities. These cyclo-oxygenase (COX and LOX) compounds are enzymes which the body uses to biosynthesise chemicals called prostaglandins, prostacyclins, thromboxanes and leukotrienes. There are two forms of these COX enzymes. COX 1 is constitutive and a natural component of normal tissue. It performs important functions in our body. The other form COX 2 is induced when a disease state, such as arthritis, occurs and it produces pro-inflammatory prostaglandins. The 5-lipoxygenase enzyme creates pro-inflammatory leukotrienes. It is therefore desirable to inhibit these enzyme activities. However, it is very important that the inhibition is at a moderate level not a high level. Briefly, the reason is that the COX-1 functions also produce thromboxanes which can cause cardiovascular problems. The COX-2 functions (which we need to mediate because they are pro-inflammatory) happen to produce prostacyclins and these mediate the undesirable thromboxanes! I realize that all this may be rather a lot to grasp but these immunological and enzymic functions are critically involved in the pathology of arthritis.

In addition to these activities, because it is of marine origin, GLME has a natural content of mineral salts present at a soluble level and some of these such as boron, manganese and copper are anti-inflammatory in their own right.

**BA** *Is this not the same way that many of the anti-arthritis drugs work?*

**JC** Yes, anti-inflammatory drugs such as Aspirin, Indomethacin and Phenylbutazone perform this function effectively but, unfortunately, they inhibit both COX 1 and COX 2 activities thus inhibiting the production of the prostaglandins which are needed for the protection of the stomach lining, helping kidney function and also some blood characteristics.

New drugs have been developed which selectively inhibit the COX-2 enzyme functions without inhibiting the COX-1 functions. However, there is the potential for cardiovascular problems if total inhibition of COX-2 takes place as explained earlier.

Incidentally another valuable feature of GLME is that it has been found to have natural gastroprotective properties. This means that, not only does it not damage the delicate stomach lining, it actually provides a protective function for it. Thus the product is able to relieve the inflammatory symptoms associated with arthritic diseases whilst protecting the stomach from the damaging effect of some pain killers should a person need to be taking these at the same time.

**BA** *You mentioned earlier that GLME is effective in treating osteo arthritis as well as the rheumatoid forms. Osteo arthritis has a different cause, and is a very different form of the disease, so can you explain how the product can function for both disease states?*

**JC** This was a question which puzzled us for some time. We were well aware of the product's success in treating osteo arthritis but could not offer an adequate explanation for this success. However, the discovery of the activity of the chondroprotective activity of glucosamine and chondroitin sulphates led to the answer to our puzzle.

GLME has a natural content of glycosaminoglycans and this is the name for a group of polysaccharides which includes chondroitin sulphate amongst a few others such as dermatan sulphate, hyaluronic acid etc. Glycosaminoglycans, (some of which use glucosamine molecules as the raw material for their building blocks), are used by the body for the biosynthesis of compounds called proteoglycans. The proteoglycans have a very strong affinity for water molecules in the joints, to which they bind, and form very large, slippery, space filling molecules. The function of these large combination molecules is to act as shock absorbers and also lubricants in the joints.

We have therefore, in GLME, anti-inflammatory activity which is necessary to relieve the inflammatory component of osteo arthritis coupled with chondroprotective activity which relieves the physical problem of degenerative joint condition (osteoarthritis).

There is one further point which is worthy of mention here and this relates to the increased rate of cartilage degeneration in the joints in arthritic disease and also in advanced age. In young people and those not affected by arthritis, the rate of cartilage degeneration in the joints is equalled by that of regeneration. In the older person and in arthritic disease states this balance is upset leading to a reduction in the padding and lubrication of the joints.

Certain cytokine induced enzyme activity is known to accelerate the breakdown of cartilage process and thus the inhibition of this enzymic activity is desirable. GLME has been shown in laboratory studies to inhibit cytokine activity (in particular TNF- $\alpha$  and interleukins 1 and 6) which lead to the production of cells responsible for this process.

**BA** *You mentioned that it is an extract of the GLM which is used for GLME. There are several products on the market which are called GLM extract, are these all the same extract with the same properties?*

**JC** No, unfortunately there are several 'imitation' products which will not have the beneficial properties I have described for reasons which I will explain. This is a very important question because people could be spending their money and hoping for relief from one of these products which has no therapeutic value whatsoever!

The customer is, unfortunately, not able to tell by the appearance, smell or even the nutritional analysis whether the product is the genuine extract or simply freeze dried (lyophilised) whole mussel meats ground into a powder. The only way the customer can be sure that they are getting the genuine product is by requesting it by a genuine brand name.

The reason that these imitation products, which are basically just freeze dried whole mussel powder, do not perform the functions I have described for GLME is that the anti-inflammatory activity of the mussel dies off at a rapid rate when the mussel dies and also if the extract is not produced by the appropriate extraction process. Thus, because mussel powders (as opposed to mussel extract powder) are made from frozen mussel meat, in some cases, even from cooked mussel meat, the activity has been lost or destroyed.

This fact does not show up in a nutritional analysis but has to be established by a special bio-assay which has been specifically developed for proving that production batches of

GLME have an acceptable level of activity. There is one other mussel product which is currently being marketed which is an extract. However, it is only the lipid (oils and fats) fraction of the mussel which have been solvent extracted and presented in soft gelatin capsule form. Whilst this product will have some of the activity which I have described for GLME, it is only one of the active fractions which are present in GLME and therefore much less effective than the complete extract.

I feel very strongly, that people suffering painful conditions such as arthritis, should not be misled into paying for products which will only lead to false hope and eventual disappointment which is why I am happy to answer this question in such detail.

**BA** *Your answer to my last question indicates clearly that you are very much against the selling of unproven or copycat products where the marketer's interest lies in profit margins rather than product efficacy. How can you satisfy people that your version of GLME has been proven to benefit sufferers of arthritis? For example, has the product been subjected to proper, and independent, clinical trials?*

**JC** One of the reasons that I have been able to give the information in response to your earlier question with confidence is that the product has been subjected to a number of randomised, double blind clinical trials involving both human and animal subjects.

These trials have taken place in hospitals and research centres in several countries which has included, the USA, United Kingdom, France, Japan, Australia and New Zealand. I have a summary of all the references to this, and other research, most of which has been published in reputable, peer reviewed journals, which I am happy to provide to anyone who wishes to question any of my statements.

Basically the results of the clinical studies have confirmed the evidence received in numerous, unsolicited, anecdotal reports from people all over the world. Many of these reports have come from countries where the product is not on the market but has been sent there by relatives in other countries who have already had experience with it.

Generalising, both the anecdotal and controlled clinical study results indicate a success rate of about 70% for rheumatoid arthritis and 40% for the osteo form in human subjects. It is only fair to point out that these success rates are not better than can be achieved with regular drug therapy. However, the big advantage of the Biolane GLME treatment is that none of the classical adverse side effects of drug therapy will be experienced. Also the product can be taken continuously on a long term basis (I have personal experience with my mother who has taken it for 18years ) with no ill effects.

The benefit for animals (in particular dogs since they have been the subjects for some double blind animal studies) is even higher than that for humans. This may well be due to the fact that animals do not suffer quite the same psychological problems as do humans and therefore have a lower incidence of unrelated stress factors competing with the treatment.

The level of success described by human subjects, (success being a matter of degree), has been surprising. It has ranged from those who have just been able to open a jar or hold a pen to professional surgeons who have been able to resume operating practices, musicians who have resumed playing piano at concerts to wheelchair bound subjects who have been able to resume a more normal mobility.

Because of the beneficial influence noted by athletes (subsequently demonstrated in a double blind clinical trial on athletes) some football teams now issue the product to the team as routine to minimise joint or connective tissue damage and to reduce injury time away from the field!

**BA** You have mentioned long term, continual use of GLME, is it necessary to take the product forever?

**JC** Not necessarily, some people find that, once they are experiencing a satisfactory level of relief, they can stop taking the product altogether until another flare up occurs. However, the majority of people prefer to gradually reduce the daily usage, by trial and error, until they establish the minimum daily maintenance requirement, usually one or two capsules. There are, of course, some cases where it seems to be necessary to continue the full usage all the time but these would certainly be a minority .

I suspect that, in many instances it is a fear of the symptoms recurring, after being free of them, that makes people reluctant to cease taking any capsules at all. Since taking them on a continual basis will not do any harm this is a quite acceptable practice. There could even be some prophylactic benefit in relation to the inhibition of degenerative joint disease but I don't know if this is the case yet.

**BA** *You haven't explained what the recommended daily usage level is for GLME.*

**JC** The normal level is based on about 1 gram of the extract powder per day for the average adult. This equates to 3 x 350mg or 2 x 500mg GLME capsules each day but there is no danger in doubling this level if desired. There have been occasions where doubling the level has achieved results which were not apparent at the recommended level but this has not been a general finding.

**BA** *Are you claiming that GLME has no side effects?*

**JC** Certainly not! In fact I do not believe that there is anything which has pharmacological activity which may not have some side effects. The question is then, the nature and level of side effects which might be experienced.

The side effects which might be experienced by people using GLME are based on the clinical trial reports plus those reported by customers during the 26 years of worldwide usage.

There are no serious adverse side effects associated with use of GLME. However, because the product is a shellfish derivative, it may create an allergy reaction in people susceptible to shellfish allergy. If a person wishes to try the product but suspects that they may be allergic to shellfish, they can just take one capsule per day for a few days and if no allergy reaction occurs, they can then increase gradually up to three capsules.

If a person does experience an allergy reaction they should stop using the product and the symptoms will disappear. A reduction of the allergy symptoms can be accelerated by use of a suitable anti-histamine prescribed by a medical practitioner.

In a few cases, there has been a temporary exacerbation of arthritic symptoms shortly after commencing to use the capsules. This condition has only lasted for a few days and has almost always preceded excellent results.

Some people have experienced mild indigestion and flatulence but the likelihood of these can be minimised by making sure that the product is consumed at the start of a meal.

On the positive side, there is one beneficial side effect which has been reported frequently by humans and is very noticeable in animals. This is a significant enhancement of vitality, often described as 'a feeling of well being'. This could, of course, be simply due to the effect of relief from pain coupled with increased freedom of movement.

Incidentally I should advise that, even though GLME is derived from a widely consumed food, the product has been subjected to the standard, international tests for toxicity and also teratogenicity to ensure that it is perfectly safe to consume at many times the recommended usage level without causing toxic effects or adversely influencing a developing foetus in a pregnant person.

However, I recommend that the product is not used during a pregnancy because there are so many different hormonal functions taking place. As you know, one lady can sail through her pregnancy with no problems while another will endure morning sickness for weeks! Also, in most instances arthritic symptoms will disappear during the pregnancy so anti-arthritic treatment may not be needed.

**BA** *Is GLME safe to take together with other medications?*

**JC** There have been no reports of any contra-indications when GLME has been taken together with other anti-inflammatory products whether these have been drugs or natural preparations.

It is unlikely that GLME would contra-indicate with other pharmaceuticals due to its basic food status. However, it would be preferable for it not to be used if a person was using monoamine oxidase inhibitory drugs (anti-depressants which are now not generally used).

It should not be used if a person is on anticoagulant medications such as Warfarin or Heparin.

Also, it is important to note that GLME should not be used to treat gouty arthritis. The reason for this is that gout is caused by an excess of uric acid which precipitates in the joints. In common with cheese and wine shellfish contain a significant level of purine nitrogen which would act as a precursor for the biosynthesis of uric acid!

**BA** *You have frequently referred to the fact that GLME is beneficial for treating animals with arthritis. Do many animals suffer from arthritic complaints?*

**JC** Yes, most animals suffer arthritic complaints at some stage in their lives. This tends to be degenerative joint disease in most cases and, unfortunately, the modern

lifestyle has made this complaint almost inevitable for big dogs such as Labradors and German Shepherds as they reach middle to old age. It is usually a combination of lack of adequate physical exercise coupled with too much food which leads to degenerative joint disease in dogs but also factors such as restricted movement or lack of incentive for extensive movement in zoo animals and some farm animals.

Domestic cats also suffer from this disorder but, probably because they tend to remain relatively agile in old age compared to the other species mentioned, the incidence is lower.

GLME has been clinically trialled in both cats and dogs and SF4 has a product that has shown particularly successful results. However, the bulk of the evidence for the beneficial activities of the SF4 product in animals has come from anecdotal reports from delighted owners.

Reports of such effects have not been limited to owners of dogs and cats, however. Racehorse trainers, in particular, have reported significantly reduced 'off track' periods caused by inflammatory problems in their horses followed by significantly enhanced performance when back racing.

The veterinary surgeon at Auckland zoo reported success in treating an elephant, a camel and a giraffe - all of which had developed arthritic problems. A veterinary surgeon in South Africa reported to me personally that he had successfully treated a parrot which had been unable to grasp its perch prior to receiving the product!

These are just a few examples of the range of subjects which have responded favourably to treatment with GLME. The importance of this evidence for me is that it removes the suggestion of a placebo effect being responsible for the results. This is a common suggestion which is made when good results are described by human subjects.

I firmly believe that the combination of this evidence, together with that from the independent clinical trials in humans and in animals, is sufficient to prove the value of this marine natural product as a safe and effective treatment for one of the world's most debilitating diseases.

**BA** *Many thanks for your time, candour and insights Mr Croft. It is clear to me that Biolane GLME has the potential to be a worldwide arthritis treatment phenomenon and that SF4 is a major breakthrough for the care of animals suffering arthritis problems. It appears that all is required is press activity to educate sufferers the world over.*

**JC** There is no doubt that use of natural products such as Biolane GLME and SF4 can bring the relief long term sufferers deserve, without the plethora of side effects and contraindications caused by OTC and POMs.