

A Gift From the Sea

Natural Immunity From the Ocean
New Zealand Deep Sea Shark Liver Oil

The Deep Ocean Shark Liver Oil Story

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Foreword

Because of my work in marine research I am naturally biased toward the medicinal and health benefits the seas can offer. Today, many of the world's foremost medical scientists have expressed deep concerns over our ability to deal with the widespread diseases which currently afflict mankind. In fact, an increasing number of organisms including bacteria, are now resistant to even the latest advances in antibiotics and other medicines.

In spite of huge research budgets, we have still only managed to wipe out only one serious affliction from the world, smallpox, and at the same time there is growing evidence that diseases such as tuberculosis, cholera and others are staging a worldwide comeback.

Yet strangely enough, we have within our own bodies the capability through our immune system of dealing with just about everything Nature can throw at us. Unfortunately, all too often we neglect this gift of Nature and as a result, we suffer illnesses that theoretically at least, we should have been able to avoid. I believe that I am very fortunate to have been born healthy and, throughout my sixty-six years, I have lived and worked on, and with, the sea. Generally speaking a healthy living and working environment has been a blessing because I have remained free of many of the illnesses which have afflicted some of my relatives and friends.

However, even my healthy state did not prevent me from catching viral infections such as the common cold or influenza, and I suffered these ailments along with everyone else.

That is, until three years ago when, I decided to try taking a small daily dose of New Zealand Deep Sea Shark Liver Oil as a protective supplement. Since then, I have not suffered one cold or influenza attack despite my work in marine work which involves traveling around the world in crowded aircraft, from one climate and time zone to another, and being in close contact with people suffering with colds, flu and many other complaints.

Of course, a positive outlook is a tremendous help in maintaining good health, but it cannot prevent viral infections. From my research and the findings of many others, I am convinced that my freedom from colds and 'flu is due to my daily intake of New Zealand Deep Sea Shark Liver Oil, and the positive effects it has on the immune system.

As you read through this little book you will find that these benefits have not been exclusive to me. Indeed, many people now take 1000mg of the oil daily, in the form of gelatine capsules, and they enjoy the same, and also several other, benefits.

At this point, I want to emphasize that the oil I refer to, is actually a blend of oils derived from the livers of specific species of sharks found in the deep clear waters of the Pacific Ocean of the southern coasts of New Zealand. In fact, there are many different species of shark in the oceans and as you will see, the composition of their liver oils varies

significantly. For this reason I have identified the specific blend of oils which has the properties described in this book, as Deep Ocean Shark Liver Oil.

The benefits described in this book related to New Zealand Deep Sea Shark Liver Oil, are due to the specific combination of oils derived only from certain species of deep sea sharks, and not from sharks in general.

Originally, the oil extracted from the livers of these sharks was a useful material for the production of cosmetics and other products until researchers confirmed its amazing health benefits and positive effects on the human immune system.

It is also important to understand, that this oil is actually a by product from sharks which are caught, in common with many other species of fish, as a source of food.

The ocean and its creatures provide an incredible bounty for mankind, and protecting the marine environment and its precious resources is a vital part of our ongoing efforts to find valuable, new medicines and health products from the sea.

A Gift From the Sea – New Zealand Deep Sea Shark Liver Oil

Introduction

Two of the diseases most commonly suffered by all human beings are influenza and the common cold. Together, they cause considerable discomfort for the victim and are a major contributor to the level of absenteeism due of illness.

Unfortunately these viral diseases spread through populations very rapidly, aided by the opportunities provided by the close contact with others especially during international travel.

Although a boon in many ways, air conditioning systems which are now commonplace in enclosed areas can also assist the spread of infectious diseases where viruses, capable of infecting by aerosol effect, are involved.

Whilst the body has the natural ability to combat infection, the white blood cells on which our immune system is based, may be compromised by other factors or reduced in number by treatments such as radiotherapy or poor nutrition and stress. In these situations, the body's natural resistance to disease is reduced, with the result, we are now more likely to experience the misery of a cold, or worse still an attack of influenza.

Of course, a cold and influenza are just two of the many disorders which can result from an impaired immune system. Chickenpox, Diphtheria, Glandular Fever, Hepatitis, Measles, Scarlet Fever, and Poliomyelitis are some of the diseases caused by viruses.

Whilst there are some specific medicines that have proved useful in combating herpes and some other viruses, antibiotics are generally useless against them and indeed an increasing number of bacteria are proving resistant, even to some of the 'last-chance' antibiotics such as vancomycin.

All of this points to the need for us to develop our own immunity and through this our resistance to infection.

The Ocean – The Source of Life

Two thirds of the surface of this planet is covered by the oceans and in addition to regulating our atmosphere and providing the medium existence for the greater proportion of the world's biological life, the oceans provide the source of a very important range of medicinal and health giving products.

Already, marine and medical researchers have identified many specific agents which offer potential for treating, and even preventing, diseases. For this reason, there is no doubt that during the first ten years of the new millennium, major advancements in the

treatment of some of our most serious diseases will be due to products and discoveries from the sea.

Fortunately however, we do not have to wait for the new millennium to have access to a highly successful preventative treatment for the common cold, influenza and other related diseases.

It is already available in the form of Deep Ocean Shark Liver Oil a specific New Zealand Deep Sea Shark Liver Oil blend. In addition to its immune-stimulating properties, this oil, also provides several other important benefits which add to its value as an aid to better health.

Surely, the ability to strengthen resistance to disease through the use of this natural product from the deep, clear waters of the Southern Pacific Ocean, is a true gift from the sea!

ONE

Deep Sea Shark Liver Oil & Its Benefits

For much of the present century, marine scientists have been studying the animals and plants in the seas and oceans. Attention has been focused on documenting their life cycles, investigating their feeding habits and needs and evaluating their use as a source of food for mankind.

More recently, some species have been used as valuable indicators of levels of the build up of insidious pollutants in the oceans of the world. In addition to these biological concerns, scientists involved in the science of marine pharmacology are now extensively engaged in screening marine flora and fauna for biologically active substances which may be of value for future medicinal products. With all this effort, it is not surprising that as a result of these activities, much has been learned about the life and activities of sharks.

From The Dawn of History...

However, long before scientists began to research natural marine products in order to study their composition and discover the reasons for their therapeutic activity, people who lived close to, or on the seas were often well aware of the benefits to be derived from the teeming life forms within the oceans.

In almost every culture, there are traditional remedies which have been passed on through the generations. Often their benefits were based not on science but on shrewd observation and the fact that they were effective. More recently, some of these remedies such as shark cartilage and the New Zealand Green Lipped Mussel have been the subject of scientific evaluation which has revealed the basis of the valuable healing properties.

Many of these substances are capable of treating diseases without the serious complications which often accompany synthetic pharmacological preparations.

One such traditional remedy is the deep sea shark liver oil which was initially used only for its nutritional value and was also applied to the skin for its ability to treat infections and assist wound healing.

Ocean Predator or Friend to Mankind?

Thanks to the activities of marine researchers we now know a great deal more about the sharks and their role in the ocean. Of special interest is the length of their life span, with some species living more than seventy years.

Sharks also demonstrate a powerful resistance to disease and significantly for us, almost never develop cancerous tumors, which are so common in other species, and today, more common still, in man.

In fact a major research institution in the United States which has studied more than 25,000 sharks over a period of twenty five years, has found only one case of a shark with a malignant tumor!

Obviously this finding has created interest in scientific circles and the result of the research into this phenomenon has revealed that the source of the shark's powerful immunity to disease appears to reside in its liver, and in particular the special oil which is found in the liver of the deep sea shark species.

What About Us?

The obvious question to be asked and answered is this:
“Can we derive the benefits inherent in the oil, and if so, how?”

So far, that question can be answered, at least in part.

Expressed in general terms, the benefits associated with the oil include;-

- An enhanced and strengthened immune system which can act to help protect us from viral diseases such as colds, influenza and herpes simplex (cold sores) and some bacterial conditions as well
- A natural resistance to some rheumatic and arthritic problems
- Enhanced anti-bacterial activity
- The possibility of enhancing the immune system of breast fed babies
- Possible regression of tumor growth, particularly in cases of uterine cancer
- Possible protection from radiation induced damage, in particular the replenishment of our white cells (leucocytes)

Searching For New Medicines...

The process of developing new medicines is a long and laborious one, involving the efforts of many different groups of scientists, working within their own fields of expertise. Often, there are unexpected breakthroughs which seem to make the effort all worthwhile.

One such instance relates to our present interest, the New Zealand Deep Sea Shark Oil.

It may not be coincidence that, during the 1960's and 70's scientists in Scandinavia were studying a group of natural fatty acids substances called diacylglycerol ethers, which are also known as alkoxyglycerols.

The interest in these compounds was directed at their possible use as a means of reducing our regressing tumors in some forms of cancer.

To their surprise the scientists were able to demonstrate positive results and during these studies also found that administration of these alkoxyglycerols could enhance the

immune system of patients whose immunity had been compromised by the more traditional cancer treatments involving chemo and radiotherapy.

The rationale for using alkoxyglycerols (AKG's) for these experiments were based on the fact that they are also found in significant amounts in bone marrow and human breast milk.

Bone marrow is the source of the body's white blood cells which form the basis of our immune system, while mother's breast milk provides a range of immune building substances which help protect the baby during its first few months of life.

Some of the work of these scientists and the details relating to breast milk, alkoxyglycerols and immunity follows in Chapter Two in which the significance of New Zealand Deep Sea Shark Liver Oil will become evident.

The Daily Dose Of Cod Liver Oil – The Winter Protectant...

Research into the health benefits of fish oils is not new, and indeed many folk today have pleasant (or unpleasant) memories of a daily dose of cod liver oil, to boost their defenses against winter ills. Sometimes this oil would be in the form of a patent emulsion, or mixed with malt and even orange juice-and sometimes in the form of small gelatine capsules, which if you were brave (or simply unable to swallow capsules) could be chewed!

Because the two most popular fish oils from the livers of cod and halibut were rich sources of Vitamin A and Vitamin D, they were popular supplements. Vitamin A especially has an important role in protecting the mucous membrane linings of the respiratory system which acts as our first line of defense against bacteria and viruses. However, these oils also contain very small amounts of the AKG's and other fatty acid components, which may contribute to the benefits observed by several generations of parents and their children during the bleak times of winter.

AKG's The Secret of New Zealand Deep Sea Shark Liver Oil...

The credit for the discovery that the livers of deep water sharks caught off the coast of New Zealand contain the highest levels of alkoxyglycerols must go to two Japanese scientists, Tsujimoto and Toyama, working as long ago as 1922.

Although more than 75 years ago, the importance of their discovery becomes obvious when we appreciate that this safe, natural products contains high levels of the very substances the Scandinavian scientists found to be so beneficial for the human immune system.

Following the publication by Drs Astrid, Johan and Sven Brohult of their research into the benefits of AKG's in uterine cancers and radiotherapy treatment, other investigators have examined the alkoxyglycerols in their own particular fields in medicine.

The results of these studies, published in Scandinavian, European, American and Canadian medical journals have confirmed the earlier findings that the alkoxyglycerols, found naturally in shark liver oil, have significant and beneficial effects on the immune system.

Many of these scientific reports and their conclusions are summarized in Chapter Two of this book. Because the aim is to aid the reader's understanding these reports have been 'translated' from the often complex scientific terminology used in the publications into a more 'user friendly' form.

At the same time, however, care has been taken to ensure that the accuracy and meaning of statements including clinical and analytical figures presented in the reports have not been altered.

Other Benefits Too...

Deep Sea Shark Liver Oil is a complex substance and not all the beneficial properties of the oil can be explained by the alkoxyglycerol content. In fact the oil also contains another valuable substance called squalene, which is present in approximately the same concentrations as the alkoxyglycerols, plus fatty acids of the Omega 3 group.

Some triglycerides are also present together with useful, but perfectly safe, levels of Vitamin A and Vitamin D. The relevance and importance of these other components is also explained in Chapter Two.

This balanced combination of therapeutic and health giving substances all contained in one natural oil is surely, 'A gift from the sea!'

Shark Liver Oil – The Same But Different...

When we examine the plant world, we see a wide range of species, which although apparently very similar, have special differences which set them apart. As an example, many herbs show significant differences in their chemical makeup, so that some species of a herb may be better healers than others.

The same situation exists in the ocean and the composition of shark liver oils varies significantly according to the species involved. It is important therefore to appreciate that not all shark liver oils have the properties described in this book. In fact it is only the livers from deep sea sharks which have the alkoxyglycerol and squalene at levels needed to provide the special immune-stimulating benefits.

The difference between the liver oil from a deep sea shark and that from a shallow water or surface dwelling shark is immediately clear when we examine the respective levels of alkoxyglycerols and squalene. Because of their different living environment, species

living in shallower waters have little or no squalene and a very different ratio between the two components to that found in the deep water species.

The levels of Vitamins A and D are also quite different. They are low in the deep water sharks but high in the species which inhabit the shallower waters. Because high levels of these oil soluble vitamins taken consistently are undesirable under normal situations, it is important to avoid the use of the oils from many of the shallow water species of shark.

As an added complication, although deep sea sharks have liver oils which contain the alkoxyglycerols and squalene we need, there is a variation between the amounts of these present depending on the species, and their particular habitat. In addition, the ratio of squalene to alkoxyglycerol varies with the age and size of the shark.

In order to overcome these variations, and to provide a standardized product, it was necessary to blend the oils from different species and ages in order to achieve a consistent quality of oil which will have the beneficial properties described in this book. The result was the special New Zealand Deep Sea Shark Liver Oil, Deep Ocean Shark Liver Oil which contains guaranteed levels and ratios of alkoxyglycerols (AKG's) and Squalene, together with other important natural fatty acids and ingredients.

The table over gives the average composition of the blended, purified liver oil from deep sea sharks caught in the southern oceans off the coast of New Zealand.

Table 1.

The Composition of Deep Ocean Shark Liver Oil Blended Deep Sea Shark Liver Oil

Alkoxyglycerols	35 – 40%
Squalene	35 – 40 %
Triglycerides	About 15%
Omega 3 Fatty Acids	About 3%

In a later chapter the variations in shark liver oils and the implication of these variations is discussed. Although not strictly relevant to the medicinal or health giving properties of our deep sea shark liver oil it is fascinating to see how nature is able to adjust biological systems and controls to suit environmental circumstances and how these can influence human life in a totally different environment.

TWO

Deep Sea Shark Liver Oil & The Science

Whilst there are many useful medications and general health products which are simply based on anecdotal reports and evidence of efficacy, it is comforting, and also prudent to have the anecdotal evidence backed up by the appropriate scientific evidence. The good scientist produces evidence for, or against, a perception based solely on the facts obtained in objective research programs.

Obviously it is important that the research programs are designed so that they do produce meaningful results. However, even well-designed programs do not always produce results which prove or disprove a theory or a perception.

Fortunately, in the case of deep sea shark liver oil, the various trials and research projects summarized in this chapter have confirmed that the alkoxyglycerols (AKG's) and squalene components of the oil do have the beneficial properties attributed to them.

Although the science which follows has been translated from the actual reports to a more general, and easier to understand form, every care has been taken to ensure that the original meaning and accuracy of statements made in these, have not been changed.

Most of the research had been involved with the effect of the alkoxyglycerols on the immune system in relation to tumor control and radiation therapy damage. However, it is included here because it relates to the activity of these substances on the immune system which is influential in protecting us from colds, influenza and other viral diseases.

Catching Up With The Terminology...

Because of the complexities of the naming systems used in organic chemistry, there are several terms used to describe the alkoxyglycerols and, because the reports use different ones, it may be as well to identify them here.

Also, because the main active ingredients in our New Zealand Deep Sea Shark Liver Oil are the alkoxyglycerols, and in most of the research projects, the source of the AKG's was oil derived from the deep sea sharks, the effects indicated in the reports are relevant to New Zealand Deep Sea Shark Liver Oil.

Technical Names Time...

Alkoxyglycerols (AKG's) are also known as Alkylglycerols, Ether Lipids, Glycerol Ethers and DiAcylGlyceryl Ethers. All of these terms cover the same compounds.

In some of the reports reference is made to methoxy-substituted glycerol ethers. This refers to a change in the structure of the alkoxyglycerols caused by substituting one attached molecule for another. However, in the natural deep sea shark liver oil a

proportion of the alkoxyglycerol content is in the form of methoxy-substituted glycerol ethers. For those intent on digesting the technical details, some information on the chemistry of the oils is presented in a later chapter.

The Scandinavian Research...

The work which the Doctors Brohult and Joelsson reported, in five publications, 1,2,3,4,5 concerned the effects of the alkoxyglycerols on regression of tumor growth, reduced mortality in cancer patients and the reduction of the adverse effects of radiation therapy.

A review of the history of significant medical discoveries shows that luck or coincidence has played a role in bringing important new treatments to the world.

From the accidental finding by Fleming that a stray mould inhibited the growth of bacteria which led subsequently to the discovery of penicillin, to the finding that the consumption of certain fish oils by Eskimo people led to fewer heart attacks, overall, skilled observation, plus more than a dash of good luck has played a significant part in finding fewer medicines.

As is often the case with important discoveries, the discovery of the modulatory effect of the alkoxyglycerols on the white blood cells by Dr. Astrid Brohult in the early 1950's could be described as a coincidence.

White blood cells which are the basis of our immune system are produced in several places in the body, including the bone marrow. In some forms of leukemia, the activity of the bone marrow is impaired, and presumably, Dr. Brohult reasoned that restoring the bone marrow of leukemia patients by implant grafting, would benefit her patients.

No doubt she was delighted to find that, in fact, this was the case with the young patients she treated. Not only was their white blood cell count normalized by an increase in energy was also reported.

Apparently at that time it was not known which component of the bone marrow was responsible for the modulatory influence on the cells. However, Dr. Sven Brohult, her husband, a professor of chemistry was able to identify the source of this activity in the bone marrow as the special compounds, alkoxyglycerols (AKG's).

The Doctors Brohult continued to research the application of the alkoxyglycerols in the treatment of cancer patients and published their findings in the papers referenced above. The work concerned mainly patients suffering cancers of the uterine cervix, and in particular those undergoing radiation therapy.

They were able to record the effects of alkoxyglycerols, taken from deep sea shark liver oil, on many patients over a period of many years which makes their work particularly valuable.

To give an accurate summary of the results of this work it is worthwhile to quote directly from one of their published papers, since the AKG's used in the studies were derived from the deep sea shark liver oil.

"It is observed that:"

- 1. The incidence of injuries is considerably lower in the alkoxyglycerol group than in the control group – especially for group 1 where alkoxyglycerols have been administered prophylactically. The incidence of total injuries is reduced to about 50 %.*
- 2. Complex injuries are reduced to about 1/3 in the prophylactic group compared with the control group, i.e. the prophylactic administration of alkoxyglycerols has reduced the growth of the tumor.*
- 3. Multiple injuries are less frequent in the prophylactic group compared with the control group (1.1% compared with 6.5%).*
- 4. When AKG's are administered only during and after radiation treatment, no effect is observed on the incidence of complex injuries, while a significant decrease is found for the injuries due to radiation only (22.8% to 8.9%).*
- 5. The preliminary results from the double blind study, where the patients have been followed up for 3.5 years after the commencement of treatment, indicate that the prophylactic administration of AKG's reduced the total incidence of injuries to about 50%.*

The first paragraph of the discussion section of the paper clearly defines the difference in the effect of using AKG's as a prophylactic to prevent the problem compared with their use remedial treatments.

"The analysis of injuries of the bladder (and ureters) and rectum (and intestines) following intracavity and external radiation therapy for carcinoma of the uterine cervix has shown a marked decrease in the incidence of injuries in cases where alkoxyglycerols are administered. There are noticeable differences in effect, however, related to the schedule of administration of alkoxyglycerols, and related to the whether the injury represents a pure radiation damage of the tissue or represents a combination of radiation injury and residual or recurrent tumor growth. The prophylactic treatment with alkoxyglycerols in combination with radiotherapy apparently prevents the development of radiation damage and the growth of the tumor, separately or combined. Non-prophylactic administration of alkoxyglycerols does not seem to influence the tumor growth – but still protects against radiation damage."

Author's note: It is important to point out that the radiation therapy referred to in these studies involved the use of radium and the results of injury and injury prevention with alkoxyglycerols may be different with other forms of radiotherapy.

At almost the same time as the work being carried out by the Doctors Brohult another Scandinavian research group was studying the immuno-stimulating properties of a specific group of alkoxyglycerols incorporated into food.⁶

This study was conducted by six scientists distributed between the pathology and bacteriology departments of two universities and the Astra Research Laboratories in Sweden.

In their experiments the scientists used a special breed of mice, and methoxy-substituted glycerol ethers. This naturally occurring group of AKG's occurs in deep sea shark liver oil. And in this instance from Greenland shark liver oil for use in their experiments.

By using a technique which determined the effect of these compounds against induced antigen activity, the studies confirmed that even when given orally, immune stimulation occurred.

This was an important finding since it indicated these substances do not require to be injected and can be safely administered by mouth.

In an earlier series of studies, three of these same scientists showed that metastasis (the spread of disease cells) in the liver and lumbar lymph nodes was significantly lowered when methoxy-substituted glycerol ethers were administered orally, at doses too low to influence the primary tumors, in the test mice.⁷

They also reported that the methoxy-substituted glycerol ethers had an antibiotic effect against a range of bacteria and, in another related series of experiments, published in a separate paper, they noted that these compounds also demonstrated fungicidal activity.⁸

Observation Versus Science...

Although unaware of these scientific findings, generations of fishermen certainly knew of the beneficial effects on the skin of shark liver oil, especially for healing cuts and wounds cleanly and quickly. Applied to the skin, the oil also helped keep it soft and pliable despite the continuous immersion in cold, salt water.

Although not recognized at the time, shark liver oil's bactericidal and fungicidal properties would also have had a significant role in producing these effects.

Treating The Pain and Inflammation...

At the University of Western Ontario in Canada, two scientists in the Department of Pharmacology conducted a study on the anti-inflammatory activity of the alkoxyglycerols in rats.⁹ They concentrated their research program on two substances called Batyl alcohol and Selachyl alcohol which are naturally occurring alkoxyglycerols present in the liver oil of the deep sea shark.

They compared various dose levels of these two compounds, using a variety of standard anti-inflammatory tests, with the known anti-inflammatory treatments aspirin (acetylsalicylic acid) phenylbutazone and hydrocortisone.

The results of the experiments are very interesting and clearly demonstrated that both of the AKG's had significant anti-inflammatory activity.

What is particularly interesting however, is that the ant-inflammatory effects of the AKG's were only effective when administered orally. When given by injection either into the peritoneum or directly into the inflammatory site, they were ineffective.

This is important since it means that the oil can be taken by mouth in liquid or capsule form for those who want to use it as a possible treatment for arthritis.

Of special significance also is the fact that, in one of the anti-inflammatory experiments, on a dose for dose basis, both AKG's were much more effective than aspirin, more potent than phenylbutazone and equally as effective as hydrocortisone when both were in the lower dose range.

Although there were variations in the effects of the two specific and different alkoxyglycerols when administered to young and old rats, these effects are not relevant when the Deep Sea Shark Liver Oil is used, since it is a combination of alkoxyglycerols.

More recently, a study at the University of Kansas Medical Center investigated the effect of adding AKG's to the diet of lactating rats in an attempt to examine the immune responses in their litters.¹⁰

Because of the risk potential during pregnancy and lactation, it is important to know what effects foods or drugs taken during these periods may have on their offspring. This may be even more important when the offspring are being breast fed. In this particular study the purpose was to see if the presence of AKG's in the diet of the female animal would pass through the milk to the offspring and enhance their immunity.

The results of the experiments showed that supplementing the diet with AKG's during lactation significantly increased the AKG concentration in the milk and that the increased amounts were dose dependent.

The effect of the increased AKG's in the milk significantly enhanced the granulocytes and immunoglobins in the young animals, important indicators of immune function.

The authors comment that these findings suggest that the alkoxyglycerols in the milk play a role in the development of the immune response in the newborn rat offspring.

This suggests that a similar effect is possible in humans, so that a breast-feeding mother who is supplementing her diet with deep sea shark liver oil capsules, may pass on the beneficial immune stimulating effects of AKG's to her baby.

Because, in common with other mammals, our bodies, already contain alkoxyglycerols, they are considered to be nontoxic. AKG's are mainly concentrated in the bone marrow where they are involved in the white cell regulation and the building or maintenance of

the immune system. Normally, a mother's breast milk is also a rich source of alkoxyglycerols which will be transferred to the baby in order to help build its immune system.

However, as with most things we eat or take as dietary supplements or medicines, high doses should be avoided. More will be discussed with regard to the safety factors and dosage levels later on. Also in a later chapter we will discuss the immune system in a little more detail.

Although alkoxyglycerols are found in many creatures, by far the richest source is deep sea shark liver oil. A comparison between the levels of alkoxyglycerols in bone marrow, human breast milk and deep sea shark liver oil is interesting and is given in Table 2.

Table 2.

Comparison Between Alkoxyglycerols in Bone Marrow, Human Breast Milk & Deep Sea Shark Liver Oil

Alkoxyglycerol	# 16:0	#18:1
Human Bone Marrow	29.4%	16.7%
Human Breast Milk	23.9%	33.8%
Deep Sea Shark Liver Oil	9.1%	59.4%

Denotes the number of carbon atoms in the long-chain component of the molecule. The number after the colon denotes the number of double bonds.

Source: Biochemical Effects of Alkoxyglycerols and Their Use in Cancer Therapy.¹¹

An Ounce of Prevention...

One of the most interesting results from the above research, is that the beneficial effects of the oil are predominantly preventative. It is therefore wise to think of Deep Ocean Shark Liver Oil in this way, and to take it as a dietary supplement on a regular basis, rather than when you are already suffering the effects of the virus.

In my own experience, I have found this 'daily dose' approach to be the most effective, and it mirrors the concept that was enshrined in the idea of taking cod liver oil daily 'to build up' over the winter. Prevention really is better than a cure!

Today however, the greater stress is associated with 'just getting by' in today's fast-paced society means that we are increasingly vulnerable to viral and bacterial infections, and many of us now suffer unseasonal colds and flu and other infections, because of lowered immunity, brought about by dietary changes and increased stress.

In many instances it is not always possible to take preventative measures against diseases and we have to incur the disease before we can do anything about dealing with it.

Although taking a regular, daily dose of New Zealand Deep Sea Shark Liver Oil does not necessarily prevent the disease causing virus or bacteria from attacking us, it does help to strengthen and prepare our defense system so that we can repel the attack.

Deep Ocean Shark Liver Oil has been properly processed under the most stringent conditions and at the recommended dose levels (around 1000mg daily) it is safe to take on a regular daily basis, without concern for the possibility of adverse side effects so evident in many of the modern-day medicines.

In this chapter we have examined just some of the research findings on the effects of deep sea shark liver oil and its components, on the immune system and also its use as an anti-inflammatory in the treatment of arthritic disorders.

Later we will discuss the personal experiences of others who have used the products for its health benefits.

THREE

Deep Sea Shark Liver Oil & Squalene

The table in Chapter One, which shows the composition of a balanced deep sea shark liver oil, shows that the oil comprises some 35-40 per cent of squalene. The importance of a good level of squalene in the oil is important, and is discussed in this chapter.

Squalene is an unsaturated hydrocarbon which means that it is made up entirely of carbon and hydrogen atoms and that not all the available bonding positions in its molecular structure are used up, or 'saturated.' This is similar to the situation with unsaturated fats and is characteristic of substances which are 'active', in that they are able to combine with other molecules and in the case of the human body, they can take part in many biochemical reactions and perform specific biochemical functions.

Figure 1.

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The Squalene Molecule

The structure of the squalene molecule is very different to that of the alkoxyglycerol molecule.

Squalene is widespread in nature. Sebum, the body's own lubricant contains up to 10% squalene. However, the highest concentrations of squalene are found in the livers of deep sea sharks.

Squalene performs several very important functions in the body and is an essential component for good health. In one of its more subtle functions it acts as a precursor for the biosynthesis of cholesterol. Because of its particular structure, the body can use squalene as a raw material to synthesize this important sterol molecule. Although we are all now very conscious of the problems associated with high blood levels of cholesterol,

the fact remains that cholesterol plays a vital part in our health and is needed for the production of a wide range of essential hormones including estrogen and progesterone.

Here again we come back to the question of 'balance.' Cholesterol only becomes a problem when we have too much in our system, that is, when it is out of balance!

In addition to its role as a precursor for the biosynthesis of cholesterol, squalene has the ability to act as a carrier of oxygen molecules to our cells thus enhancing metabolic efficiency.

Saving Our Cells – Squalene, The Antioxidant!

Although it may seem to be a paradox, Squalene is also a valuable antioxidant, however its antioxidant effect is quite separate from its Oxygen-carrying function, although both effects are due to its unsaturated structure.

Antioxidants perform a scavenging effect, acting on harmful radicals which are produced as a result of our own metabolism or as the result of pollutants and other harmful chemicals in the environment and neutralizing them.

In chemical terms free radicals are molecules in which one or more of the electrons making up the molecule are unpaired. This makes them highly reactive with a potential to damage the sensitive membranes of our cells.

By scavenging or 'quenching' these 'free radicals' which can be compared to the sparks which come from a fire and can damage and even destroy property, antioxidants help protect our cells and tissues from their harmful effects.

Since there are now more than eighty diseases which have been associated with free radical damage, antioxidants are now regarded as one of the most important elements in controlling diseases as diverse as arthritis, heart disease and diabetes!

Squalene – The Healing Oil...

The bactericidal effects of squalene has been known and used for many years. The fishermen and their families who used Deep Sea Shark Liver Oil for its healing properties were obviously unaware of how it worked. They simply knew that it did!

It took the work of a group of scientists who, after following investigation into the effects of the traditional remedies, applied their research expertise to establish the identity of the active principles and materials in the natural oil.

In fact the something similar occurred when it was discovered that the despite a diet high in fats, the Eskimo races did not suffer the same incidence of heart disease as others who followed a high fat diet. Applying the principles of observation and objective investigation the scientists found that the protection against heart disease was due to the

high proportion of fish which formed part of the Eskimo's diet. This special fish was a rich source of Omega 3 fatty acids to the diet, which helped to prevent the development of heart attacks.

When applied to the skin, squalene has an excellent emollient effect, keeping the skin soft and pliable. Fishermen found this particularly valuable because it kept their hands protected and reasonably soft despite being immersed in cold sea water and constantly handling wet ropes and nets.

Finally, the presence of up to 10 per cent of squalene in the sebum, in addition to its lubricating function, is considered to have fungicidal properties and also to reduce the potential for sunburn. From the brief description of the properties of squalene presented in this chapter it is clear that including squalene in the diet provides several important health benefits which result from its presence in the New Zealand Deep Sea Shark Liver Oil, Deep Ocean Shark Liver Oil.

Although there are some who claim that the best way to include squalene in the diet is to take the pure substance in concentrated form, my personal view is that the most valuable contribution squalene can make to our health is in conjunction with alkoxyglycerols and Omega3 fatty acids in a, balanced blend of New Zealand Deep Sea Shark Liver Oil – our gift from the sea.

FOUR

Deep Sea Shark Liver Oil & The Omega 3 Fatty Acids

The Omega 3 fatty acids are just one group of the range of fatty acids present in most living organisms. They play a vital role in the human diet and have medicinal properties which apply to fatty acids as dietary and medicinal agents.

Because of their particular importance to health, it is important to understand their relevance and presence in marine life, especially in regard to deep sea shark liver oils.

“But Aren’t All Fats Bad For You...?”

The discovery that the Eskimo people who consume a very high proportion of the energy from fats, yet have a much lower incidence of heart disease than their western modern-lifestyle counterparts, led to a considerable amount of research into the influence of fish oils on heart diseases, cholesterol problems, etc.

The fact that the Eskimo diet was very high in fats seemed confusing when the incidence of heart disease in Eskimo people was compared with other races who had a very similar level of dietary fat consumption but a much higher incidence of heart disease.

The explanation for this apparent anomaly was that the Eskimo dietary fats were mainly of marine origin whereas the other races derived the bulk of their dietary fats from land-based animal sources.

Since the amount of fats consumed was basically the same for both races the difference in the incidence of heart diseases, it was reasoned, must lie in the composition of the oils from land and marine sources.

From this came the evidence that there is a need to increase the proportion of Omega 3 fatty acids in the western diet, which in turn has led to the desirability of supplementing our diet with the Omega 3 fatty acids, usually in the form of fish oils.

For The Technically Minded...

Lipids is the scientific term for ‘fats’ and they are found throughout nature. Lipids include triglycerides, phospholipids (a combination of fats and phosphorous) and sterols (e.g. cholesterol) and are essential elements of our existence.

Fatty acids are chemical compositions consisting of a chain of carbon atoms attached to each other with a carboxyl or acid group on one end. Hydrogen atoms are attached to the carbons which form the chain.

Fatty Acids can be short chained, medium chained or long chained. Generally those with more than 12 carbons are considered to be Long Chain Fatty Acids (LFA’s).

Saturated Fatty Acids

When each of the carbon atoms in the chain has a full complement of hydrogen atoms (normally four), the fatty acid is said to be 'saturated.' Lard and shortening are examples of saturated fatty acids, and most SFA's are sold at room temperature.

Unsaturated Fatty Acids

Some fatty acids have places along their carbon chain which are not saturated with hydrogen atoms. Instead, two carbons link together creating a 'double bond.' The presence of these 'double bonds' creates the possibility for other changes to the fatty acid structure, and enables the body to use them for a variety of important biochemical functions.

A fatty acid with one double bond is referred to as a 'monounsaturated', and an example is oleic acid, found in olive oil and flaxseed oil. Canola oil, a modified form of rapeseed oil, widely used in cooking is also 'monounsaturated', and is highly regarded by nutritionists for its use in food preparation.

Those with more double bonds are called polyunsaturated and because of their unsaturated state, Poly Unsaturated Fatty Acids (PUFA's) are liquids at room temperature.

Important examples of Eicosapentaenoic Acid (EPA) and Docosahexaenoic Acid (DHA) which are Omega 3 fatty acids, and important components of most deep sea fish oils.

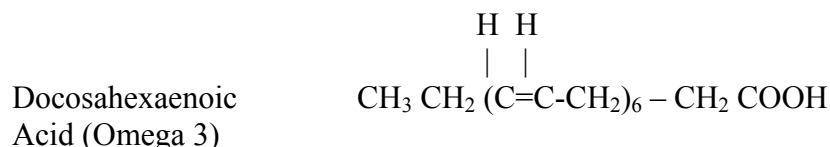
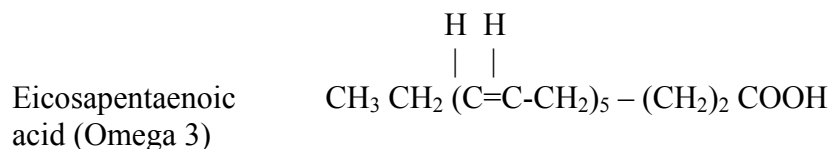
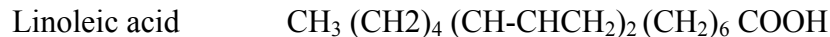
The Omega 3 polyunsaturated fatty acids are particularly important for their health benefits.

Examples of Some Common Saturated & Unsaturated Fatty Acids:

Saturated Fatty Acids:

Butyric acid (found in milk and butter)	$\text{CH}_3 \text{CH}_2 \text{CH}_2 \text{COOH}$
Propionic acid	$\text{CH}_3 \text{CH}_2 \text{COOH}$
Palmitic acid (from palm oil)	$\text{CH}_3 (\text{CH}_2)_{14} \text{COOH}$

Unsaturated Fatty Acids:



When expressed in their structural form, the 'double bonds' are indicated by the = sign.

Although the major source of Omega 3 fatty acids for human consumption presently comes from fish oils, it is not only fish and other marine animals that contain useful levels of these important components. Omega 3 fatty acids are found in marine algae and bacteria. In the following table the relative levels of the Omega 3 fatty acids eicosapentaenoic acids (EPA) and Docosahexaenoic acid (DHA) are shown for a fish oil, fish fillet and marine microalgae.

Table 3.

Omega 3 Fatty Acids in Cod Liver Oil, Salmon Fillets & Microalgae

Omega 3 Fatty Acid	Cod Liver Oil	Salmon Fillets	Microalgae
EPA	9.9%	4.6%	21.0%
DHA	10.2%	7.7%	<1.0%

Source: Omega 3 fatty acids in health and Disease, (Omega 3 fatty acids from Algae) Richard Radner, Marcel Dekker Inc., New York 1990.

An interesting observation, in the paper from which the above table was obtained, is that the Omega 3 fatty acids derived from algae are more stable than those derived from fish and also have the advantage of having no fishy taste or odour. There may well be a time in the future when algae become an economic and practical source of the Omega 3 fatty acids. There is also the possibility of producing these fatty acids using marine bacteria and the principles and genetic manipulation.

The main medical use of the Omega 3 fatty acids is for lowering of blood cholesterol levels in people at risk from heart problems due to excessive levels of fats in their blood. Also the regular use of products containing EPA and DHA in particular will help to lower the risk of disorders such as atherosclerosis or hardening of the arteries, where there is a build up of fatty plaque on the arterial walls.

In the same way that the build up of silts occurs in rivers and streams on the inside of the bends due to the slower speed of the water on the inside curve compared with that on the outside curve, the buildup of fatty plaque tends to form on the inside bends of our arteries. If not controlled, this build up may continue until there is an arterial blockage with disastrous consequences.

Table 4.

Origin	Saturated fatty acids %	Monounsaturated fatty acids (20 : 1 and 22 : 1) %	EPA and DHA %
Cod Liver	21	13	24
Salmon (Atlantic)	26	17	19
Herring (Pacific)	19	35	14
Herring	34	10	7
Sardine	30	8	24
Mackerel	27	38	15

The point has been made that environment, food source and season may all have an effect on the composition of the total oils present in marine species.

In Table 4 the significant difference in the composition and quantity of the Omega 3 oils in Herring from two different oceans is evident. The relationship between the total amount of fatty acids and the Omega 3 fraction is also important because it is the Omega 3 fraction we need.

Although our interest in Deep Sea Shark Liver Oil is based primarily on its alkylglycerol content, there is no doubt that the presence of around 3% of Omega 3 fatty acids in this special gift from the sea, provides an extra health benefit.

FIVE

The Human Immune System

The human immune system is a miracle of Nature, designed to protect us from the harmful effects of our environment and disease-producing organisms, including bacteria, viruses and other microbes. Without a well-developed and maintained immune system, we will suffer infections and serious life-threatening diseases.

All of which makes maintaining our health through improving our ability to fight off disease of major importance.

There are several types of ‘immunity’, and we soon develop these progressively after leaving the safety of our mother’s womb. In fact, by the time we have reached maturity we may well have four types protecting us – to a greater or lesser extent.

We are born with a ‘natural immunity’ derived in part from our parents and which renders us safe from certain diseases which would normally be fatal to other animal species. This form of immunity is our primary defense against anything the body considers to be alien.

Unfortunately, there can be instances when our defense system will fail to recognize some non-alien substance and set about destroying it.

This auto-immune response where the body is literally attacking itself, is at the heart of a range of health problems now generally referred to as ‘auto-immune diseases’, and which includes Lupus and some forms of arthritis such as Rheumatoid arthritis.

Gaining Immunity As We Grow...

As we grow, we develop an ‘acquired immunity’ through contracting diseases such as scarlet fever, measles etc. Having contracted the disease our body fights it by developing antibodies which attack and destroy the antagonist (antigens). Our immune system then has the antibodies on standby in case it is exposed to another attack in which case the disease does not have the opportunity to take hold.

Some immunities of this type are very long lasting and once we have recovered from an attack of the disease we are then protected from any further attack for many years or even our lifetime.

An example of this is Rubella. More commonly known as German Measles it is especially dangerous if contracted during pregnancy. However, if young girls contract the disease early in life, they are then protected by the immunity built up through exposure to the disease.

Today, because of the serious consequence to the unborn from Rubella, vaccination of young girls is encouraged to protect them from the disease.

This form of immunity called 'artificial immunity' is available for a range of serious illnesses including Tuberculosis, Poliomyelitis, Diphtheria and Whooping Cough.

Generally, there are two ways of acquiring artificial immunity.

Through vaccination, which is also termed, 'immunization', the poison, virus or bacteria in a much weakened state, is introduced into the body by injection. Our immune system detects the invasion by a foreign substance and develops the antibodies to attack and destroy it.

Generally the process of vaccination involves gradually increasing the strength of the injected poison or bacteria so that we gradually build up an immunity strong enough to withstand a full scale attack should this be necessary.

This type of artificial immunity is known as the 'active immunity' to differentiate it from 'passive immunity' both of which many of us will experience, or have already experienced.

Passive immunity is obtained when the actual antibodies which fight the infection are injected directly into the body of someone who may be in danger of developing the disease.

Normally the antibodies in the form of immunoglobulins will have been derived from another person or animal which has developed sufficient antibodies or antitoxins, specific to the disease, such as Tetanus, which is also known as Lockjaw.

To obtain the antibodies needed, a weakened form of the disease is injected into a person or animal so that they will develop antibodies or antitoxins to the disease. This part of the operation is the same as that for active immunity.

The difference is that when the at risk person who has not been previously immunized is injected with antibody containing-serum from the immunized animal or person, they receive the antibodies needed to defend them against the disease.

This method has proved highly successful in treating or preventing a range of illnesses. The serums produced by this technique are called 'antisera' and are in common use for the treatment of tetanus poisoning, snake venom poisoning and botulism etc.

Immunity and The Shark...

Although it seems strange, that in spite of major differences between humans and the shark, something derived from this constant roamer of the deep can have such a positive and beneficial effect on human immune systems.

In the shark, the components of the immune systems are found in the liver. Sharks do not have bone marrow, in fact they do not have bones at all, but a cartilage equivalent to our backbone.

In humans our immune system components are made up of the lymph, the thymus and of course the red bone marrow. The white blood cells which form the basis of the system are called leucocytes or white corpuscles.

The leucocytes themselves are divided into three classes, each of which has a special function in the immune system. They are; B lymphocytes, so called because they are located in the bone marrow, T lymphocytes, because, although they originate in the bone marrow, they are located in the thymus gland and the neutrophils (also known as polymorphonuclear leucocytes)

In general the B lymphocytes are the antibody producing cells; the T lymphocytes attend to cell mediated immunity and the neutrophils are involved in inflammatory based activities.

In very loose terms we can liken these classes of white cells to a nation's defense forces; the navy, army, and air force. In some instances only one of the three will be required to deal with an invasive situation although there may be occasions where all three are required.

How does our deep sea shark liver oil fit into this complex scenario? Basically, by increasing or maintaining the white cell count it is, in effect, similar to increasing the number of combatants employed in the armed forces mentioned above. We are enhancing our immunity to invasion by having a strong army of soldiers or leucocytes! Provided that our immune system is able to recognize the alien cells which are invading it will immediately mobilize the immune forces which then attack and immobilize the invaders.

Therefore, just as is the case with our navy, army, or air force, the numbers of troops and their degree of readiness is important to our security. In the case of the immune system we are more at risk of infection if our white blood cell count is lower than normal!

The reactive power of our individual immune system becomes rapidly evident if we suffer an allergy reaction. Here the white cells have overreacted to a substance, which may well have been harmless, and in attacking it have caused an allergic reaction.

There is even a similarity to this in our analogy with the armed forces if a rebel faction decides to stage a coup and ends up fighting with its own people!

However, as with all things in life, balance is the key to success and a balanced immune system is a gift for which we should be very thankful.

SIX

Deep Sea Shark Liver Oil & Other Fish Oils

There are many different species of shark and the composition of the oils derived from their livers differs significantly depending on whether they live in shallow waters, or at greater depths.

In fact there are differences in the oils of most individual species of fish and even in the liver oils of the same species at different times in their lifecycle or changes of season or habitat.

These differences can materially affect the oil's usefulness for health and medicinal purposes, which makes producing the right blend of oils an important factor in maximizing their benefits to mankind.

In this chapter we look at some of these differences and the potential value of the different oils for health and medicinal purposes.

The main components of marine fish oils are:

- Specialized hydrocarbons. These are mainly Squalene, with some Squalamine
- Diacylglyceryl ethers, also known as Alkoxyglycerols
- Triacylglycerols which include the Omega 3 polyunsaturated fatty acids, EPA and DHA
- Some waxy ethers
- Vitamins, principally Vitamin A (Retinol), Vitamin D (Cholecalciferol) and small amounts of Vitamin E (D-AlphaTocopherol) which has antioxidant activity

The composition of the fish oils is significantly influenced by the environmental conditions in which the creatures spend most of their time.

The oil found in some species is used to protect the fish from the effects of the huge pressures experienced in the ocean. Known as 'ballasting', this effect enables the fish to survive and function, protected from the pressures experienced at great depths. In some fish the oil is also found in the flesh rather than concentrated in the liver, and acts as a form of 'anti-freeze', enabling the fish to survive in temperatures which are well below freezing.

Because the oils have different functions, depending on the species, some oils will contain high levels of some components but little or none of some others.

An interesting example is the Orange Roughy. This fish which has the Latin name, *Hoplostethus atlanticus*, lives normally in very deep water and its oil is very rich in waxy

esters, which, are heavy wax oils. These protect the Orange Roughy against the bitter cold of the deep, and the intense pressure experienced in deep waters.

When refined and processed, this oil has similar properties to that of the Sperm Whale and Goat Nut Oil from the Jojoba, a leathery leafed shrub, native to the South Western USA and Mexico. Jojoba oil has been used for centuries by the American Indians for its healing properties and although unsuitable for human consumption, it is widely used in skin and cosmetic preparations for its soothing and emollient effects.

By comparison however, the oil of the Sixgillshark (*Hexanchus griseus*), is very rich in alkoxyglycerols but contains almost no waxy esters.

In addition to the environmental factors such as depth, water temperature, etc., the composition of their diet plays a major role in the composition of both the liver and body oils for the different species of fish.

Zooplankton, are the animal forms of plankton, and together with phytoplankton make up the basic food supply upon which all oceanic organisms ultimately depend. Research into these creatures, has shown that these small floating or weakly swimming organisms which drift with water currents of the cold Southern and Antarctic oceans contain significant levels of the various lipids which make up oils found in fish and shark species.

In fact, because the zooplankton form an early part of the marine food chain, it is not surprising that these lipid substances are passed on up through the food chain to eventually become an integral part of the composition of largest predators. As is the case with fish species, the ratios of the substances which make up the oils, vary significantly within the different species of zooplankton.

For The Technically Minded...

Table 3 shows that the variation in the composition of the oil fraction (lipids) from some Southern Ocean zooplankton (Pteropods) which form a part of the marine food chain. These figures were derived from research carried out jointly by the Department of Biology at the University of San Diego, California and the CSIRO Division of Marine Research and Antarctic Co-operative Research Centre, in Hobart, Tasmania.

Whilst the purpose of the study was to investigate whether the lipid composition of these zooplankton influenced their buoyancy capabilities, the results demonstrate how environmental circumstances and the influence of diet and habitat influence body chemistry in the marine world.

Table 5.

The Composition Of The Lipids (Oils) From Some Southern Ocean Zooplankton

Sample Species	WE	TAG	FFA	ST	PL	UN	GE	Total
Clione limacina	0.8%	22.6%	23.9%	2.5%	22.1%	0.3%	27.8%	100%
Limacina helicina	Trace	--	54.9	57.7	39.4	--	Trace	100
	0.4	--	59.1	6.3	34.2	--	Trace	100
	0.2	--	57.1	6.7	36.0	--	Trace	100
Spongiobranchea australis	0.2	66.7	0.8	0.7	30.0	--	1.7	100
“	0.2	39.5	0.4	0.9	58.1	--	0.9	100

The following abbreviations are used in the above table:

WE = wax ester PL = phospholipids
TAG = triacylglycerol UN = unidentified
FFA = free fatty acid ST = sterol
GE = diacylglyceryl ether (alkoxyglycerol)

Source: Lipids and Buoyancy in Southern Ocean Pteropods.¹³

However, at the microscope end of the marine food chain, it is not only the zooplankton, which contain these oils and fatty acids. They are also found in plant plankton and bacteria since they are essential for the metabolic processes of these organism as well.

In their search for a potential new source of food containing the essential Omega 3 and 6 polyunsaturated fatty acids for the aquaculture industry, Australian scientists have recently studied the relationship between certain Antarctic bacteria and the microalgae they inhabit.¹⁴

It is therefore clear that the purpose for which the oil will be used will also determine the type of fish needed to provide it.

Fortunately for us, it seems that all the oils we may need are available from normal, commercial catches of fish caught for use as food, making it simply a case of selecting the appropriate species and using the appropriate handling and processing techniques.

Table 6 clearly shows the variation in levels of Squalene, Wax Esters, Diacylglycerol Ethers (Alkoxyglycerols), Triacylglycerols and free fatty acids for a number of different species of Southern Ocean sharks.

Table 6.**Oil Composition Of Shark Liver Oils**

Species	Common Name	HC	WE	DAGE	TAG	FFA
Etmopterus granulosus	Southern Lantern shark	54.7%	0.6%	35.0%	9.0%	0.8%
Centroscymus crepidater	Long-nose velvet shark	68.1	0.2	21.6	9.6	0.4
Centroscymus plunketi	Plunket shark	0.7	0.1	91.9	6.6	0.7
Centroscymus owstoni	Owston's dogfish	54.0	0.4	22.9	22.4	0.2
Deania calcea	Platypus shark	66.5	0.1	23.5	9.1	0.8
Dalatais licha	Black Shark	80.2	0.5	18.4	0.5	0.4
Centrophorus squamosus	Leafscale gulper shark	55.2	0.1	28.5	15.9	0.3
Squalus acanthias	White-spotted acanthias	0.0	0.0	12.4	87.4	0.2
Hexanchus griseus	Sixgull shark	0.5	0.4	70.3	28.7	0.0
Aprisus Species A	Freckled catshark	0.1	0.2	0.2	99.3	0.3
Species B	Fleshynose catshark	0.2	0.1	0.1	85.7	0.7
Species C	Bulldog catshark	28.1	0.3	4.7	66.2	0.6

The following abbreviations are used in the above table:

HC = hydrocarbon WE = wax ester
DAGE = diacylglycerol ether (alkoxyglycerols)
TAG = triacylglycerol FFA = free fatty acid

Source: Marine Oils From Australian Fish, FRDC Project 94/115; Nichols P.D., et al 1997.¹⁵

Processing Technique Is Vital...

Handling the source material for the oil is essential since some components are very sensitive to the effects of sunlight, air and temperature. If the livers or flesh which provide the source of the oil are not adequately protected prior to processing, there is a significant risk that the oil produced will be spoiled, making it unusable for use as a health supplement. Because of the presence of polyunsaturated fats which are readily prone to oxidation, the oil can rapidly become rancid and produce toxic effects if taken internally.

This makes careful control of the handling and processing techniques, an essential element in preserving the nutritional benefits and profile of these precious health supplements.

In most instances the technique of freezing the source materials, immediately following their removal from the fish, and the maintaining them in the frozen state until processing can take place, is adequate protection for the sensitive components.

Making Sure It's The Right Oil!

In this book much emphasis has been placed on the fact that there is significant difference between the various shark liver oils. These differences are affected by several factors, including habitat and diet, and it is important to understand that research into the beneficial effects of shark liver oil has shown that the level of Alkoxyglycerols (AKG's) is a major contributor to the health benefits people have experienced through using Deep Ocean Shark Liver Oil, the specific combination of oils derived from N.Z. Deep Sea Shark Liver Oils.

Figure 2 details the variation in composition of the liver oils from four species of shark, all of which are to be found in the Southern Oceans. The differences are clearly evident.

Figure 2.

Showing The Variation In Lipid Composition Of Liver Oils From Some Southern Ocean Sharks

DATA MISSING – SEE PG 47

Source: Marine Oils From Australian Fish, FRDC Project 94/115.¹⁵

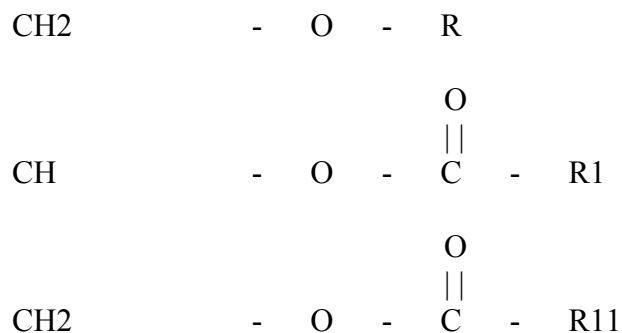
It is immediately obvious that the Oil from the School Shark with its poor content of AKG's and Squalene is of no value to us.

What is also clear from Table 1 is the fact that blending of the oils from the other species provides a superior and balanced product shown in Table 1.

Our specific use for shark liver oil in human health is to boost our immune system and enhance our natural anti-bacterial capabilities which stem from the competence of our white blood cells. For this reason, the two most significant components of the oil for us are Squalene and the Alkoxyglycerols. (Please note, in Figure 3 AKG's are shown as Diacylglyceryl Ether, an alternative name for them).

Figure 3.

The Structure of the Diacylglyceryl Ether Molecule



Source: Marine Oils from Australian Fish, FRDC Project 94/115.¹⁵

When selecting shark liver oils for their health benefits and medicinal use we are mainly concerned with four general component groups in the oils.

These are, the hydrocarbons (Squalene), Diacylglycerols (Alkoxyglycerols or AKG's), the Omega 3 polyunsaturated fatty acids and the oil-soluble vitamins.

In addition, the Triacylglycerol group, which also includes the Omega 3 fatty acid fraction, is important because it provides an energy source and acts as an aid to digestion through the action of pancreatic enzymes which produce AKG's and fatty acids.

Figure 4 shows the pathway from Triacylglycerol to glycerol and the fatty acids.

Details of the fatty acids and their significant benefits for medicinal purposes have already been discussed in chapter 4.

Figure 2.

DATA MISSING – SEE PG 49

The vitamins normally present in the largest amounts in fish oils are Vitamin A, D and E. In fact some unprocessed fish liver oils contain dangerously high levels of vitamins A and D which can have toxic effects if consumed on a regular basis at high levels, and which should certainly be avoided during pregnancy.

However, through the processing techniques, described earlier in this book, for the preparation of the New Zealand Deep Sea Shark Liver Oils, the levels of these vitamins are fortunately low and pose no threat to health when the product is used as directed. The relatively small amount of vitamin E naturally present in the New Zealand Deep Sea Shark Liver Oil is useful for its anti-oxidant properties.

SEVEN

Deep Sea Shark Liver Oil & The Personal Touch

Tests, Tests & Still More Tests...

Through the use of laboratory experiments and clinical trials we can demonstrate objectively that a product is effective in influencing the course of a disease. We may also be able to determine how the product works and explain the biochemistry involved.

In addition we can carry out experiments to establish that a product is safe to use, and has a low potential for toxicity or harmful side-effects. However, given the ethical concerns this is more difficult in determining the safety of any substance, if given during pregnancy, although animal studies can often give a good indication.

All of this work is essential, since just as those who took the Hippocratic oath which demanded that healers 'First do no harm', as part of their commitment to help and benefit their patients, we must be sure that the use of any compound is as safe as possible in all who use it.

In the final analysis however, as individuals, we are left with the situation of 'trial and error', where we need to play the guinea pig to see if we can obtain the benefits for ourselves.

In this situation there is no doubt that personal experiences provide a very valuable guide, especially if the source of the experience is known to us, such as a friend or relative.

Here then are just a few personal accounts of the effects of using New Zealand Deep Sea Shark Liver Oil on a regular basis.

Perhaps I should start with my own personal account since it is relevant to the main reason for using Shark Liver Oil as a preventative medicine.

The Constant Traveler...

I consider myself very lucky to have been born healthy and to have followed a healthy lifestyle and enjoyed good health throughout my whole life to date. However, because as part of my work I have to travel extensively throughout the world, it has meant that I have often been exposed to the possibility of illnesses associated with this aspect of my busy lifestyle.

Today, international travel means being amongst large crowds of people, at airport waiting lounges and then herded together onto transport buses and aircraft. In my opinion, because of their air handling systems which involve constant recycling of the air from more than 400 passengers, aircraft are probably one of the worst sources of infection from airborne bacteria and viruses.

In these environments I have suffered many attacks of influenza and the common cold. The results of these illnesses, although minor irritations compared to some of the serious health problems which affect so many people today, including arthritis, heart disease and cancers, has still added an extra stress burden, and made my work, and my life, that much more difficult. I feel sure that you have probably had similar experiences.

Three years ago during my research into therapeutic products from the sea I came across information relating to the effects of Alkoxyglycerols (AKG's) on the immune system.

My interest in this information was enhanced by the fact that I was involved at the time with the development of processing techniques of New Zealand deep sea shark liver oils. Of special significance was the fact that the very oils I was working with, were shown to have the highest concentration of AKG's of any source discovered. And this is still true today!

It was not long before New Zealand Deep Sea Shark Liver Oil capsules of this oil were available, initially in 250mg capsules. From my knowledge of the research and in the hope that my immune system would be strengthened to the extent that I would increase my resistance to contracting colds and influenza, I began to take the capsules every day.

At first I began by taking 1000 milligrams of oil (4 x 250 milligrams capsules) each morning with breakfast, later reducing to 500 milligrams per day.

Looking back, I cannot say when the immune-stimulating effects of the deep sea shark liver oil became noticeable. However, I am able to say that I have not suffered a cold or a bout of influenza for the past three years, even though I am still traveling extensively.

In fact, as I write this, I am on board a Singapore Airline 747 bound from Auckland to Singapore en route to South Africa where I have an interest in clinical trials which are currently underway on another valuable health product from the sea.

Those Who Do & Those Who Don't...

The fact that I have not suffered colds or influenza since starting to take the shark liver oil three years ago may not be particularly remarkable, since because of the individuality of our biochemistry, no two people are exactly alike.

However, in my work in the laboratories and office in New Zealand I am surrounded by mainly young, vibrant people and, at age 66 I am by far the oldest person.

Significantly (for me at least!) I am also the only person who has not had time off work due to colds or influenza!

A short while ago, I had occasion to travel back from England to New Zealand with a younger colleague. We sat together on each flight but when we arrived in New Zealand

my colleague was beginning to suffer the early symptoms of a nasty bout of influenza whilst I was totally unaffected.

Add to these experiences the fact that, during these past few years, the many other occasions where, despite being surrounded by people coughing and spluttering with various respiratory diseases, I have remained impervious to infection. Frankly, in light of the research and the growing numbers of people who report similar results to my own, I believe it cannot be merely coincidence. Rather it is the effect of my daily dose of New Zealand Shark Liver Oil on my immune system.

Of course, as I mentioned in the Foreword, I am probably biased because of my love for the sea and my belief that the oceans can provide us with many precious gifts to enhance our health.

That being so, let us consider some instances where people were not under the Ocean's hypnotic spell...

During a recent lecture tour in South Africa I met a lady who told me the circumstances relating her young son who had suffered since a young baby, with asthma.

Seven months prior to my visit she had started the boy, now aged 12, on the deep sea shark liver oil at a dose rate of two 250 milligram capsules daily.

To her surprise and delight, the symptoms began to improve and gradually the asthma disappeared together with the constant wheezing and coughing which are the characteristic symptoms of this all-too common illness.

At the time I met this lady, her son had been accepted for entry to a prestigious school and the improvement in his breathing was such that he was able to cope with the demands of choral singing and he had been accepted as a member of the school choir.

He is now taking just one 250 milligram capsule of the oil each day and is free of any of his earlier symptoms.

During the same lecture tour in South Africa I met another lady who had an interesting account of her experience with deep sea shark liver oil to tell me, and which I want to share with you also.

For eight years she had suffered a most distressing condition in which she would have severe bouts of violent coughing at least three times every day. Each bout would last up to half an hour and although it would eventually stop, it would leave her feeling exhausted and drained of energy. All treatments had failed and she was very depressed.

She found the coughing to be stressful in several ways. In company it was embarrassing to feel an attack coming on and to know that it could last for up to thirty minutes

continuously. Apart from the discomfort and the effect on her guests it was also impossible to hold a conversation while the attack lasted.

She was unable to attend social functions or the theatre, which she loved, because the attacks were very likely to occur at such times and the disturbance and embarrassment they created was intolerable.

Almost one year prior to our meeting, she had heard about the New Zealand Deep Sea Shark Liver Oil product, realizing that her condition might be connected to a problem with her immune dysfunction, she decided to try taking the oil daily.

After two months of taking four 250 milligram capsules of deep sea shark liver oil each day (a total of 1000mg daily), her coughing bouts ceased.

Since then she has continued to take a maintenance course of two 250 milligram capsules each day and has been free of her coughing attacks ever since.

Again, and in line of my own experience and that of many others, she has not suffered a cold or influenza attack for the past year.

For this lady, the relief from the coughing attacks has been a tremendous boon, and it has eased the physical stress she suffered and at the same time has restored her social life so that she can now enjoy those elements which were so important to her, and which she felt may have been lost forever.

Other Reports...The Story Continues...

Interest in the benefits of Deep Sea Shark Liver Oil continues to grow as more attention is directed at this amazing gift from the sea.

In a recent book, 'Shark Liver Oil, Nature's Amazing Healer' published in 1997 by Kensington Publishing Corporation, 850 3rd Avenue, New York, NY 10022, USA the authors reveal several other interesting properties of the deep sea shark liver oil.

The authors, Neil Solomon, Richard Passwater, Ingemar Joelsson and Leonard Haines are all respected physicians and medical researchers in the USA. In particular they have focused on specific benefits related to shark liver oil in a number of conditions ranging from hyperallergic response to the protective effects of the oil in reducing the severity of some forms of cancer treatments, especially radiotherapy and chemotherapy.

The authors report includes reference to a lady in the USA who suffered a severe immune system problem which left her highly allergic to anything and everything.

As a result she experienced recurrent hives, which failed to respond to the standard treatment of antihistamines and corticosteroid drugs.

Dr. Haimes then began treating her with high doses of the Deep Sea Shark Liver Oil and, after only one week, the hives disappeared.

At the end of the month, the high dosage treatment was reduced to 2000 milligrams per day and, although her immune system response is still in a fragile state, Haimes reports she has remained stable so far.

A similar story, also mentioned by the authors, relates to a woman who was extremely allergic to bee stings. If stung, even mildly, she would suffer intense pain and swelling for at least two weeks following the antidote injection.

However, after taking Deep Sea Shark Liver Oil for some months she was again stung by a bee but did not suffer any swelling or nausea and did not require the antidote injection.

On a personal note I am grateful to the authors of the book referenced above for including these accounts because it has emphasized the potential for the deep sea shark liver oil to help those suffering allergy problems in significantly difficult cases.

While still referring to these authors' work it is also important to note that it confirms the beneficial effects of the oil for asthma sufferers as well. I have already described the case of the young boy in South Africa whose asthma attacks ceased after treatment and the American book confirms that it is common for asthmatic people to respond positively to treatment with deep sea shark liver oil.

Asthma is a widespread, debilitating disorder, that now affects an increasing number of people, especially children. And for anyone who has had to watch a child struggling to breathe, the availability of a simple, easy-to-take natural product which can help to alleviate the symptoms of this condition, has to be received with enthusiasm.

Viruses Have No Respect...

As we all know, bacterial and viral infections are not limited to any particular age group. In fact young people in schools, universities and at many of their particular social events, are probably the most likely group to be affected by the common cold or influenza virus due to their involvement with large numbers of other people in confined environments.

One young lady in England, studying at the University of Bristol, told me that she suffered frequent attacks of influenza and until she was introduced to the deep sea shark liver oil capsules by her mother who was receiving them from New Zealand for herself. Both mother and daughter have now been taking the capsules daily for more than a year and report, that although they occasionally suspect that a cold or influenza attack is about to commence, it doesn't eventuate.

This comment on the suspicion that an infection has occurred, despite taking the capsules daily, is not uncommon. In fact in my own case I have occasionally felt the first signs of a cold or influenza coming on by a slight tickle in the throat and perhaps even a sneeze or

two. However, this has been the full extent of it, and after one day at most, I have remained free from discomfort and any further symptoms.

Whilst still talking about England, a lady in Surrey writes to me regularly just to let me know how she is getting on. Significantly, this lady, now in her eighties, has been using another of the products of the sea in introduced her to, for more than ten years now and swears that it changed her life and continues to keep her mobile and free of pain.

This product is the New Zealand Green Lipped Mussel Extract which is referred to in Chapter 8. However, because she has such success with the Mussel Extract she was keen to try the New Zealand Deep Sea Shark Liver Oil when I first her about it. She has been taking the oil capsules for over two years now and tells me that she recommends them to everyone she meets when out shopping if they just mention colds or influenza!

Coincidentally, now that I am back in New Zealand and still writing away at this chapter of the book. I have just received a fax from a lady in Reading, Berkshire on another subject altogether. She finished her fax with the statement “I am still taking my shark liver oil capsules every day.” This lady is also in her eighties but is still active, working and maintaining good health.

It must be quite obvious that almost all the reports quoted here are given by women. Whilst this does not mean that males do not use the deep sea shark liver oil capsules or gain benefit from them, it is further evidence that, in general, women are far more willing than men to discuss and offer advice on medical matters. Also they tend to pay more attention to editorial, advertisements and discoveries with regard to new products than does the average male.

For most of us men it is very fortunate that women do take the trouble to keep up with medical and health matters, otherwise we could certainly miss out on many things which are to our benefit. In this case, a good example is the specially blended New Zealand Deep Sea Shark Liver Oil Capsules. Certainly they are- ‘A true gift from the sea!’

EIGHT

Other Gifts From The Sea

In the introduction to this book I mentioned that I believe there will be major advances made in the treatment of many of our most serious diseases during the first ten years of the new millennium and that many of these treatments will come from the sea.

In fact, there are already several such treatments already available in addition to the New Zealand Deep Sea Shark Liver Oil.

In this chapter some of these treatments which are also valuable gifts from these are briefly described.

Probably one of the best-known, and certainly most effective, natural treatments from the sea for the very debilitating arthritic diseases, is the New Zealand Green Lipped Mussel Extract. This product, derived from a species of mussel found only in New Zealand (*Perna canaliculus*), has now been in use around the world for some twenty four years with a most impressive record of success.

The New Zealand Green Lipped Mussel, so called because the edges of its shell are a very bright green is a popular shellfish delicacy which is now farmed commercially for its food value – and the beneficial effects of an extract derived from it.

Processed by a special technique, designed to retain the active principles in their active form, the product has three individual properties which have proved beneficial for the treatment of most types of arthritis. In addition Green Lipped Mussel Extract has been shown to demonstrate gastro protective properties which actually protect the delicate lining of the stomach from damage by other agents.

This is particularly important when the sufferer is taking drugs such as voltaren and other Non Steroidal Anti Inflammatory Drugs (NSAID's) which often damage the stomach lining as part of their anti-inflammatory effects.

The beneficial properties of Green Lipped Mussel Extract for arthritis sufferers relate to its anti-inflammatory and chondroprotective activities.

The Green Lipped Mussel Extract helps control inflammation by two mechanisms.

Inflammation is a feature of almost all forms of arthritis, and causes pain, swelling and stiffness. Therefore preventing or reducing inflammation is the principal objective of most treatments for arthritis.

The main anti-inflammatory activity of the mussel extract is due to its content of a glycogen complex which has the ability to perform a function known as Neutrophil Emigration Blockade.

A secondary anti-inflammatory activity is associated with the Omega 3 fatty acid content of the mussel extract, in particular Eicosatetraenoic acid, which has been shown to block the synthesis of special inflammatory prostaglandins.

The chondroprotective activity, which is involved with affecting the strength and viscosity of the fluids lubricating the joints, and the development of healthy cartilage is due to the natural content of a group of specialized carbohydrates known as glycosaminoglycans. The principal glycosaminoglycans present in the mussel extract are the Chondroitin Sulphates hence the term chondroprotective. These carbohydrates have a strong affinity for water molecules and acts as a 'water magnet', drawing water into the cartilage of the joint to act as a buffer to protect the bones which form the joints from rubbing together. In this they act as shock absorbers and also help to lubricate the joints.

***Shark Cartilage –
May Offer New Hope For Arthritis & Cancer Sufferers ...***

During the current decade, there has been increasing interest in the benefits of shark cartilage as an anti-inflammatory treatment.

Researchers have also shown that this product, derived from the cartilaginous backbone of the shark, has the capability of inhibiting the development of new blood vessels for growth and survival.

Currently, clinical studies are currently underway in the United States to investigate the possibility that the product, known generically as 'shark cartilage', may have a role to play in the treatment of some types of cancers.

It may well be that angiogenesis inhibiting properties of the shark cartilage product are also responsible in part for its beneficial influence on rheumatoid arthritis. By inhibiting abnormal capillary growth the damage done to joint cartilage by such growth would be reduced or prevented.

However, the most likely effect on arthritis is related to the special group of compounds, called Glycosaminoglycans (GAG's) which are also found in the Green Lipped Mussel Extract and which exert the same chondroprotective influence on the joints.

The Glycosaminoglycans are combination of complex sugar molecules which contain Nitrogen in the form of amines, provided from the non-essential amino acid, Glutamine.

Beauty Potential Too – Through Healthier Skin ...

Now extracted from shark cartilage and purified these substances are being incorporated into moisturizing beauty products because of their special affinity for water.

When combined with other materials and oils etc., they can play a significant role in skin condition. Because the elasticity and texture of skin are critical factors in maintaining a healthy and youthful appearance, the values of a natural product which can supply the essential ingredients can easily be appreciated.

Protecting Our Resources ...

At this point, it is important to mention that all the shark-based products we have discussed, now come from what used to be the waste material from the fishing for sharks for food. Until relatively recently, all shark cartilage was thrown away when the fish were filleted.

It is refreshing to see that, in common with other by-products of the fishing industry, much of what was previously considered waste, can now be used for the extraction or preparation of valuable health and cosmetic products.

The Sea Cucumber ...

Whilst discussing GAG's (Glycosaminoglycans) and also marine products which have a beneficial influence on arthritic disorders, it is appropriate to mention another creature of the sea, commonly known as the Sea Cucumber.

Sea cucumbers, have nothing whatsoever to do with the cucumber vegetable but are so called because some of the species have a cucumber odour! They belong to a group called Holothurians and have been used medicinally by the Chinese for thousands of years.

They are a source for a substance called Holotoxin which has a very specific antifungal activity.

However, more recently, interest in the sea cucumber has been directed towards its anti-inflammatory activity and its natural content of glycosaminoglycans (GAG's). Preparations of sea cucumber extract are now available in capsule form for use in treating arthritis and their glycosaminoglycans are being extracted for use in cosmetic preparations.

Sea Cucumbers are relatively widespread and there are several different species, ranging from those found in the tropical regions to those inhabiting the cold seas in the high latitudes of both the northern and southern hemispheres.

They are, however, one of the least attractive animals, with some species resembling a very large, hairy slug! Nevertheless they are highly prized for their culinary attributes in many parts of Asia.

However, now that they have been identified as a valuable source of important benefits for some health problems, it is important that some controls are put in place to ensure that the harvesting of the desirable species is not allowed to exceed the sustainable natural stock levels.

For this reason a research project is currently underway in New Zealand to establish the criteria necessary for the successful cultivation of the species of sea cucumber needed for food, health products or medicines on shore-based marine farms.

The Impact Of Diet On Health ...

We now live in an era where most of us are conscious of the effects of certain foods on our health and well-being. Unfortunately many of the most desirable foods are the ones which have the most detrimental influence!

Whilst high levels of cholesterol are not always due to poor dietary habits there is no doubt that the consumption of certain foods is likely to exacerbate cholesterol levels in many people.

The properties of yet another product of the sea, once discarded as waste, have now been demonstrated as effective in reducing the amount of fat taken up by the body from foods.

Chitosan is a complex material derived from the shell of certain crabs and other creatures including prawns which are made principally of chitin. When specially treated to remove the complex amine structure found in chitin, the resulting material Chitosan has a high affinity for binding with dietary fats found in the intestines.

The effect of this affinity is to reduce the absorption of the fats taken in a meal, and to allow them to be passed out of the body with the wastes rather than being absorbed into the bloodstream serum.

In addition, a very recent research project at the University of Auckland, has shown that the product has the potential for use in the treatment of atherosclerosis where fatty degeneration of the arterial wall has occurred.

Although Chitosan is made from chitin which, in turn, is made from the husks or shells of shrimps, crayfish, lobsters and crabs, it is considered that a better quality of chitosan can be made from the chitin made from the backbones of squid.

By a relatively simple chemical process, these waste products from the fishing industry can be processed to yield a dry, off-white powder which is suitable for encapsulating in hard gelatine capsules convenient for consumption with meals.

Because Chitosan, carries a positive electrical charge, it has an affinity for, and binds strongly to the negatively charged fats in the acidic environment of the gut thus helping to prevent the bound fats from entering the bloodstream and increasing cholesterol levels.

Of course, not all the fats consumed in the diet will be removed. In fact, this would be undesirable, since the body needs some fats to carry out normal functions and maintain the integrity of our cells.

It is also pertinent to mention that most of the natural content of cholesterol is manufactured by the body itself and only a proportionately small amount is taken up from fatty foods.

However, it is known that a diet which provides a high content of saturated fats will increase the levels of serum cholesterol whilst a diet rich in the polyunsaturated Omega 3 Fatty Acids which are found in fish oils will help to lower cholesterol levels.

Oysters...More Benefits Than You Might Expect...

Oyster extracts have been used for many years in Japan and more recently in the rest of the world for their purported benefits in relieving the adverse effects of hangovers, reducing the insulin dependence of some diabetics and enhancing eyesight.

Whilst there appears to be more anecdotal evidence than science-based fact for these activities, the continued use and demand for oyster extract tends to support the idea that the benefits claimed for them may have some basis.

The presence of a significant amount of the amino acid taurine in the oyster extract may have relevance to its beneficial influence on hangovers where the removal of aldehydes produced when alcohol is metabolized in the body results in some relief!

There is also a correlation between eyesight problems and diabetes mellitus. Diabetes is an oxidative stress disease and the production of free radicals and the damage they cause affects the blood supply to the finer capillaries, especially of the eye.

Traditionally, some of the benefits ascribed to oysters have included male virility, and the basis for this appears to lie in the fact that oysters are an excellent source of Zinc. Zinc has many uses in the body, including a specific role in the production and release of energy, and enhancement of levels of the male hormone Testosterone. In addition, Zinc is also an important antioxidant and helps protect the cell membrane against free radicals and viruses.

Recent studies have suggested that zinc levels are generally low in diabetics and that supplementing with zinc is beneficial, especially in terms of reducing eyesight problems.

This seems to give support to the many anecdotal claims of those whose eyesight has improved significantly when oysters formed a significant part of their diet.

Perhaps even more significant however as far as its role in diabetes is the fact that Zinc is an essential element in the production of Insulin in the pancreas!

Of course there may be other factors as well, since like most foods, oysters are a complex combination of nutrients and we still have not completely identified all the elements which go to make up, 'The Noisy Oyster.'

Seaweeds...The Ocean's Rich Forests...

Still concerning the problems associated with diabetes mellitus it is interesting to relate some findings of a research project involving marine algae (seaweeds). Insulin is a hormone which is produced by cells in the pancreas called the 'Islets of Langerhans' and is responsible for the regulation of sugars in the blood. In those with diabetes mellitus there is a lack of insulin due to a defect in the production of the hormone in the pancreas.

A research experiment was conducted in which Islets of Langerhans cells were injected into pigs in order to see if this would stimulate the production of insulin. Pigs were used as the subjects because their digestive system is very similar to our own! The experiment found that there was a stimulation of the production of insulin after injection of the cells but that after a time the cells were rejected by the host animal.

However, if the cells were given a coating of a substance called alginate, a product derived from seaweeds, the cells were not rejected. This was a very important discovery and, although these findings were at the experimental level, it offers encouraging possibilities for future use in the treatment of diabetes mellitus.

Seaweeds, and in particular, the kelps, have long been used in the form of powders and tablets for the treatment of thyroid gland problems. This is due to their natural content of iodine. Other types of seaweed have properties which range from those of nutritional foods with an extensive range of mineral and vitamins naturally present to ice cream and other dairy product thickeners and finally to sophisticated compounds called agaroses which are used in the analysis of deoxyribose nucleic acid (DNA).

Possibly the most prolific source of purely therapeutic substances currently found in the sea in the sponge family. There are many different types of sponges and closely related species and, possibly as a result of their sedentary lifestyle and restrictive feeding mechanisms, they contain some powerful and potent chemicals, some of which have been found to have useful anti-cancer properties. There are currently several hundred potential cancer treatment drugs, derived from these marine sources, being screened for safety and efficacy, at the National Cancer Institute in the United States.

Finally, although by no means making a comprehensive list of the health, beauty and therapeutic products available from our marine environment, there are now special glues being used in dentistry and invasive surgery, the compositions of which have been elucidated by analyzing the structure of the glues used by oysters and mussels respectively to secure themselves to a firm substrate!

Oysters, when they change from their free swimming larval stage to the sedentary stage, have the ability to cement their shell to a rock, wooden structure or another oyster with a glue which sets hard in microseconds in a cold, salt water environment. The benefits such a glue would have for dentistry is not hard to imagine and following the discovery of its composition, it is now synthesized for use in dentistry.

Mussels also go through a stage where they cease to be free swimming larvae and become sedentary animals. Unlike the oyster, they do not cement their shell to a firm substrate but put out threads which they secure to the substrate with another glue capable of setting firm in microseconds in cold salt water.

It has taken some time to elucidate the composition and structure of this powerful adhesive but, now that this has been achieved, it can be produced synthetically and has been used to close surgical wounds without the need for the more traditional stitches.

Although both are now produced synthetically the discovery of these two powerful adhesives can still be regarded as yet another ‘Gift From The Sea.’

When taken together with its other properties related to its anti-inflammatory extract and its gastroprotective properties for use in arthritis and other conditions, the New Zealand Green Lipped Mussel, can truly be seen as and appreciated as a true ‘Gift From The Sea.’

NINE

Protecting Our Marine Resources

In this book we have discussed the valuable benefits that New Zealand Deep Sea Shark Liver Oil can offer us in terms of our health. We have also seen, in Chapter 8, that there are many other valuable health and medicinal products which are sourced from the sea. In future years there will be many more such products and, in particular, the medicinal ones will have a significant impact on the treatment of our most serious diseases and afflictions.

It is obvious therefore that we must exercise every care to ensure that the environment in which the life forms which yield these valuable, and in some cases unique, products is maintained in a healthy state.

There are two ways in which the animal or plant life forms provide the source of our health and medicinal products. They can be harvested from natural stocks or through cultivation on marine farms. Both of these require our special attention.

Of prime importance in both cases, is the conservation of stock levels. This is especially true where harvesting of species from the wild is concerned. This is not just a matter of retaining numbers of stock but is also vital to ensure that the stock is healthy, of breeding age and maturity.

Due to the expansion of international fishing activities, the management of wild stocks has become a very difficult matter. All the seas and oceans are now fished by many nations some of which have little or no regard for size limits or sustainable stock management.

The development of sophisticated electronic detection equipment has allowed modern fishing vessels to target fish stocks very accurately whereas it used to be a random process operation which gave the fish a better chance to avoid capture. Also modern fishing vessels are more powerful and able to handle bigger equipment and fish greater depths than before.

Of course we need to fish to eat, and companies need the by-products from fishing industries to process into valuable health and medicinal products. What we also need is

strict enforcement of catch quotas and size limits for species to ensure that we have the fish and the by-products in future years.

Although marine farming removes some of the problems associated with straight harvesting of the seas, it too needs careful monitoring. If the number of marine farms in one area of the ocean becomes too great for the amount of natural food present in the water then the cultivated species will not reach maturity.

Whilst the farming of fish such as Salmon involves the addition of food to the water, the farming of shellfish and algae merely utilizes the natural nutrients present. This can lead to overstocking. Although Salmon farms are not as sensitive to overstocking on the basis of food supply, overstocking with fish may result in problems due to other factors including insufficient oxygen in the water.

I hope that it is as obvious to you, the reader, as it is to me, that once more we come back to the same principle – balance. If we maintain the all-important ‘balance’, then the problems mentioned above will not occur.

Finally, we must consider pollution. It is hard to imagine that there is anyone today who is not aware of the extent to which we pollute our environment. What is often forgotten, however, is how much of the pollution actually finishes up in the sea.

Even oil or chemicals spilled on the road, eventually find their way into the ocean. They wash through the road drains into the streams and the rivers and then finally into the sea. When fields or crops are sprayed or treated with fertilizers or pesticides the rain washes some into streams and rivers and, again, they finish up in the sea.

Floods created by storms, wash mud and all sorts of residues down to the rivers and the sea. Fumes and smoke from the chimneys of industry meet rain in the atmosphere and they too eventually find their way into the sea.

When all of this is taken into account and added to the direct discharges of domestic sewage and industrial waste, it is obvious that our seas and oceans carry the heavy burden of modern industrial society.

Pollution of the oceans may take many forms. Much of our present day pollution is in the form of plastic waste. Although inert in most cases which does not affect water quality, plastic affects many of the animals and plants living in the sea.

Marine animals swallow plastic objects and choke or are trapped in non-degradable plastic netting to drown or die of starvation. Seaweeds can be tangled and smothered in plastic detritus with fatal consequences.

The extent of this type of pollution will be obvious to anyone who walks along the seashore where piles of plastic bags, bottles, and pieces of polystyrene foam can be seen littering the beach.

Unfortunately, the main influence of pollution in general occurs in the inshore and coastal regions and this is where most of our fishery activities take place.

Although only referred to briefly in this book, the impact of these factors on our reliance on the sea as a source of health and medicinal products cannot be ignored.

In addition to the role of providing us with the materials for these products, the seas and oceans are the life blood of our planet. They are responsible for our very existence since they affect climate control, water supply and – balance.

It is our essential responsibility to preserve our seas and oceans and the animals and plants which live in them, so that we may continue to benefit from such valuable products as New Zealand Deep Sea Shark Liver Oil – just one of our Gifts From The Sea!

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