



# InterClinical Laboratories Newsletter

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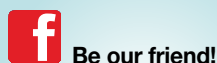
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## Celebrating 15 years and more

Dear Referring Practitioner,

As we wind down to the end of 2011, all of us here at InterClinical are celebrating! We are proud to say that we turned 15 years old this month.

Allowing for all the difficulties that this year has presented, including many major natural disasters, a slow economy and international uncertainties, we are happy to say that we have had a wonderful year with all of your fantastic support at seminars, phone and in-house training sessions, product launches and of course, with our regular, highly reliable hair mineral analysis services and specialty nutritional preparations for use in therapy.

From practitioner education, to patient health screenings, natural medicines and new product development, InterClinical Laboratories have worked hard over the past 15 years to make a positive difference to the quality of healthcare in Australia and New Zealand. We are most fortunate to have such a great team of local and international health care professionals, researchers and experts. During this time, we have developed many leading, cutting edge and original natural medicine formulations that truly make a positive difference when it comes to improving patient health. Reparen, Algotene, Para pack, Sym pack, Aden complex

and our new bioflavonoid rich Açai Premium Fresh are some great examples. Together, with your support, we hope to continue developing natural, herbal and nutritional medicines that make a difference.

In 2012, we are planning an exciting new schedule of seminars and workshops, which we will take around Australia and New Zealand, as well as again support a number of major industry events. We are proud to be a practitioner-aligned company and will always work to provide the best training and support for our referring practitioners. With this in mind, we welcome any suggestions or comments on how we can further help you grow in your practice.

Once again, we thank you for your ongoing support. We truly value all our highly skilled referring practitioners. Thank you for the last 15 years, and here's to working with you for another 15 years!

On behalf of everybody here at InterClinical, we wish you good health, happiness and prosperity, both over the upcoming festive season and for the New Year ahead.

Sincerely,  
**IAN TRACTON**, Foundation Director

*InterClinical Laboratories is a 100% Australian owned company supporting Australian manufacturing and natural medicine development.*

**IN THIS ISSUE – ANTIOXIDANT SUPPLEMENTS: DO THEY HAVE A PLACE IN CLINIC?**

# Antioxidant Supplements

## Do They Have a Place in Clinic?



### ANTIOXIDANTS

Often in our industry, medical terms and concepts become popular, over reported and in some instances completely misunderstood. In the last few years, antioxidants have held a certain fascination with the public. Today, we find antioxidants being added to manufactured foods and beverages. Certain foods which have been used for centuries by traditional people as nutritional or medicinal sources are suddenly 'discovered' by modern society and demand increases. At times, the health benefits can become exaggerated.

There are so many antioxidants to choose from; vitamin supplements, juices, whole foods and powders – the choice is seemingly endless. From natural berries to synthetically-produced vitamins, which ones have a place in clinic and how can we use them effectively to treat disease?

### THE RESEARCH

A **free radical** is any unstable molecule; i.e. any molecule with an unpaired electron<sup>1</sup>. We naturally produce tens of thousands of them in our bodies each day<sup>2</sup>. If left unchecked, the accumulation of these free radicals can lead to cellular damage and degenerative diseases. Free radicals are produced by internal and external processes, meaning that they can arise from a combination of natural and unnatural events. Natural situations that generate free radicals in the body include ageing, exercise and eating fats (even polyunsaturated). Even a small percentage (2-3%) of the air we breathe is converted into free radicals!<sup>3</sup> Unnatural or external free radical generating factors include smoking, alcohol consumption, radiation, pollution, pesticides, herbicides, exposure to heavy metals,

food additives, lack of sleep and stress<sup>4</sup> (emotional and physical). Within the body, there is always a balance between free radicals and antioxidants. When this balance tips in favour of the free radicals, we have a situation of oxidative stress. The body sometimes creates its own free radicals. As a natural part of the immune response, immune cells (e.g. macrophages, phagocytes) will produce free radicals in order to destroy bacteria and viruses<sup>5</sup>. No matter how you look at it, free radicals are ever-present in our systems.

**Antioxidants** come from natural sources. By their chemical nature, antioxidants neutralise free radicals by donating an electron and therefore stabilising it<sup>6</sup>. According to the CSIRO, most of the antioxidants we consume are from plant sources. Their research suggests that we utilise antioxidant compounds best when they are consumed in whole-food form<sup>7</sup>. Antioxidant compounds are therefore a natural component in any balanced diet that includes fruits and vegetables. Antioxidant compounds function via a number of chemical processes in the body. The term antioxidant can refer to enzymatic, non-enzymatic and even preventative compounds<sup>8</sup>, all of which help to repair free radical damage and prevent their accumulation into a situation of oxidative stress. To create an enzymatic response, our bodies produce antioxidant enzymes in the mitochondria and cytoplasm areas in our cells. The three major enzymes involved are superoxide dismutases (SOD), catalases and glutathione (GTH) peroxidases<sup>9</sup>. These enzymes convert reactive oxygen species (ROS) into neutral chemical components which can be readily excreted from the body. Maintaining a steady intake of antioxidants can be challenging for some clients, especially in the case of chronic disease, and so practitioners may recommend adding antioxidant supplementation in addition to various therapies and a healthy diet plan.

Get to the root of your patients health problems more quickly...

## Oxygen Radical Absorbance Capacity (ORAC)

One way to measure water-based antioxidant levels in foods, is by using the ORAC scale (Oxygen Radical Absorbance Capacity)<sup>1</sup>. This allows practitioners to see which foods might be beneficial to their clients. It has been recorded that we need 5000 ORAC scale units to maintain our antioxidant levels<sup>2</sup>. Once you add in external factors of stress, chronic disease, pollution and toxins into this, then the levels for antioxidant intake double or triple.

Unfortunately, the main issue with using ORAC as a form of measurement is that fat-soluble antioxidants (e.g. carotenoids) cannot be assessed on this scale. Therefore, ORAC value only really tells half the story when it comes to antioxidant potential. As a consequence, a number of high antioxidant foods and supplements are not on the ORAC list or their real values are substantially understated (e.g. *Dunaliella salina*).

**Oxidative stress** refers to the imbalance between antioxidant and oxidative compounds in the body, in favour of the inflammatory oxidant compounds<sup>10</sup>. Oxidative damage is a natural component of human functioning and development, and is one of the chemical processes by which we age. The rate at which we age is dependent on a number of factors, genetic and external, but antioxidants can help to reduce free radical damage and therefore maintain more balance in the system. For any practitioner operating in today's modern society, there will be a high proportion of clients presenting with oxidative stress. This may manifest as stress, inflammation, injury or chronic disease. Although the term 'antioxidant' is somewhat over used, it is important to be able to recognise which clinical situations could benefit from antioxidant support and also how to convey this to the client.



## THE MYTHS AND EXAGGERATIONS

We consume antioxidant sources through our diet, but the current debate is whether or not an increase in antioxidant food intake or supplementation will positively influence health in the context of a present health problem.

Some reports have condemned antioxidant treatments as being at best a waste of money and at worst, harmful. Here, it is important to consider which constituents are being tested. Many of the clinical trials are using extracts of synthetic substitutes and depending on the form of the nutrient, they may produce negative responses<sup>11</sup>. Here are two examples to illustrate the effects of different nutrient preparations:

**Example 1:** In 1996, The New England Journal of Medicine published an article on the effects of beta carotene and vitamin A on lung cancer and cardiovascular disease<sup>12</sup>. While a positive result was expected, the actual results were very negative. This study received wide spread attention and still has an influence on many people today. The study involved heavily toxic subjects (long term asbestos exposure or heavy smokers) taking synthetic *all-trans* beta carotene and vitamin A formulations, at the high end of their dosage spectrum. Synthetic vitamin A (as retinyl palmitate) and synthetic all-trans beta carotene are fat soluble antioxidants and so have the potential to accumulate in the body when not being utilised. If there is already pressure on fat-soluble detoxification pathways (e.g. liver toxicity from chemical toxicity) then high-dose, concentrated, *synthetic* sources of these supplements may cause harm. Whereas, all other research shows that high amounts of natural beta-carotene, which contain several beta-carotene and other isomers, have displayed an overall positive effect on health and well being.

**Example 2:** As with most nutrients, a natural form is generally preferred. However, not all isolated constituents are necessarily bad. In the case of synthetic vitamin C (i.e. ascorbic acid, calcium ascorbate, etc), research suggests that these forms are safe and effective forms of vitamin C<sup>13</sup>, with little or short term side effects.

There are now many studies which have found antioxidant therapy to be beneficial to certain conditions (please read below information on vitamin C, E, selenium, beta-carotene (i.e. natural from *Dunaliella salina*) and bioflavonoids (i.e. açai, green tea, goji and other berries). In these papers, antioxidants have been found to be helpful in removing toxins, reducing inflammation and even reducing proliferation of in-vitro tumour cells<sup>14 15 16</sup>.

The information out there, both positive and negative, is as prolific as it is contradictory. A patient may find this overwhelming and confusing, so the onus is on the practitioner to demystify some of the research. It is important to pay careful attention to the form of antioxidant discussed, the amount and what they were trying to achieve. The main point coming through all the research is that no single antioxidant compound will reverse a disease state. Rather, research suggests that taking a combination of antioxidant forms (as close to their natural state as possible) will yield the most positive outcomes.

Nature provides us with an enormous amount of antioxidant phytochemicals. We still cannot identify them all and we are unable to fully assess how the interaction between them can enhance their effects.

Listed opposite are some of the major and most commonly prescribed antioxidant supplements.



## VITAMIN C, VITAMIN E, SELENIUM, BETA CAROTENE AND BIOFLAVONOIDS

### VITAMIN C

Vitamin C is a remarkable antioxidant vitamin. It is a cofactor in the synthesis of thyroxine, tryptophan, adrenal hormones and the neurotransmitter dopamine<sup>17</sup>. It is a water-soluble antioxidant and has received positive research results for anything from metabolic syndrome in young adults<sup>18</sup> to reducing damage from radiation exposure<sup>19</sup>. Not only is it rich in antioxidant compounds, but it is also an important nutrient for collagen formation in bones, cartilage, blood vessels and muscles<sup>20</sup>. It also assists the body to absorb iron, which is an important consideration as iron is susceptible to being excreted if certain heavy metals are present in the body. Some heavy metals that reduce vitamin C absorption are mercury, lead, cadmium and copper<sup>21</sup>. Vitamin C is therefore an important consideration for a clinical situation of heavy metal toxicity. Vitamin C supplementation is often in the forms of ascorbic acid, calcium ascorbate or sodium ascorbate. Natural, plant-derived, powders are available however are lower dose. Depending on the condition, higher dose supplementation may be more effective and is well tolerated with good research on its safe use in clinic.

### VITAMIN E

Vitamin E is a fat soluble, lipid based antioxidant vitamin and it is available in natural or synthetic forms. Vitamin E is found as eight different isomers; alpha-, beta-, gamma- and delta-tocopherol; and alpha-, beta-, gamma- and delta-tocotrienol. Natural forms of vitamin E will include the prefix 'd-' whereas the synthetic forms will be identified with a 'dl-'. As an antioxidant, vitamin E works via the fat-soluble pathways involving the liver and so may be an important vitamin for heavy metal detoxification as it is antagonistic to the heavy metals mercury and arsenic<sup>22</sup>.

### SELENIUM

Although discovered in 1817, understanding about selenium's role as an important nutrient was not realised until the 1950's. At this time through animal studies, a compound in selenium was found to have protective properties for necrosis of the liver. Selenium is also a component of glutathione peroxidase, which helps to reduce oxidative damage to red blood cells. Healthy levels of glutathione peroxidase can also prevent premature ageing and chronic inflammatory conditions<sup>23</sup>. Selenium is important for preventing chronic diseases such as cardiovascular disease and some cancers, and is also essential for healthy sperm development and motility<sup>24</sup>. It has also had a vital role regarding proper immune system functioning. In fact, selenium has even been found to play a major role the inhibition of HIV progression into AIDS<sup>25</sup>.

### BETA CAROTENE AND OTHER CAROTENOIDS

Beta carotene and other carotenoids are major antioxidants found in fruit and vegetables. Beta-carotene is a potent fat-soluble antioxidant and in nature is essential for preventing free radical damage in plants. Natural beta-carotene will also act synergistically with other antioxidants (e.g. vitamin E and C)<sup>26</sup>. One of the best known sources of natural dietary beta-carotene and mixed carotenoids is from *Dunaliella salina*, a marine phytoplankton (microalgae). This single cell algae becomes bright orange or red in colour as they accumulate high amounts of natural carotenoids; beta-carotene, alpha-carotene, lutein, zeaxanthin, and cryptoxanthin. In fact, *Dunaliella salina* is the

world's richest source of dietary beta-carotene<sup>27</sup>. It is important to note that *Dunaliella salina*, like other fruits and vegetables provides a natural form of beta-carotene, which contains balanced amounts of all-trans and 9-cis isomer in a mixed carotenoid base. Synthetic forms of beta-carotene contain only the all-trans isomer. As a safe and natural source of vitamin A, beta-carotene will only convert to vitamin A as required by the body. In terms of maximising health and wellness, the importance of maintaining high levels of natural carotenoid antioxidants in the body cannot be understated!

### BIOFLAVONOIDS

Water soluble, bioflavonoid antioxidants are found in many fruits and plants around the world. Some of the best known examples are açai and other berries, green tea, white tea, black rice and even coffee and chocolate<sup>28</sup>. The antioxidant chemicals involved in these foods are varied; anthocyanins, polyphenols, caffeic acid, flavonoids to name a few.

Based on ORAC value, Açai berries have been found to contain the highest amounts of natural bioflavonoid antioxidants. The antioxidant chemicals in the skin are predominantly water soluble compounds; namely anthocyanins, proanthocyanins (PACs) and resveratrol<sup>29</sup>. Like most antioxidant compounds, anthocyanins easily oxidise when exposed to air. Evidence suggests that freeze-dried açai powder *if kept fresh* will retain high amounts of proanthocyanins; potent antioxidant chemicals<sup>30</sup>.

### TESTING FOR FREE RADICALS

Assessing a client's need for antioxidants today goes beyond a straight dietary intake evaluation of the patient. The use of clinical markers and pathology testing can tell us much more as to what is going on with a patient. To add to this, clients today are also becoming more interested in preventative health with evidence based information and treatments. Patients appreciate seeing test results, which is a positive step for the natural medicine industry.

Therefore, one way to facilitate this growing interest is by testing antioxidant requirements. Testing of this kind will assist clients in staying motivated to eat well and take the supplements you have prescribed. Testing is also a concrete way to monitor the client's road to better health and has the additional benefit of continually reinforcing your prescribed protocol. It allows the focus to stay on the client and assist them to participate in their own health management.

### ASSESSING ANTIOXIDANT REQUIREMENTS USING URINE

Most free radical testing procedures around the world test antioxidant status by using a urine sample. They test for the presence of malondialdehyde [MDA], which is the by-product created when free radicals oxidise fat. In simple terms, the



Açai Berry

higher the amount of MDA detected in the sample, the higher amount of free radicals circulating in the system. These test kits will have a colour grade to indicate MDA concentration and therefore the need for antioxidants. These tests can be used as frequently as required (usually weekly or monthly) to help monitor and continue to motivate your patient to follow antioxidant protocol (food or supplementary).

Causes of free damage may also need to be investigated. Earlier in this article, it is suggested that heavy metals are a factor for oxidative stress. Heavy metals are readily stored by the body and may not always be evident in excess in blood or urine. Hair tissue mineral analysis (HTMA) is one test you can do to assess heavy metal accumulation in body tissue.

If heavy metals are found to be in the system in high amounts in HTMA, blood testing for these metals is often recommended. This will help to assess whether or not the source of toxicity is current and on-going or from previous exposure. This is important for treatment as it will impact your choice of action and treatment protocol. Keep this in mind particularly for cases of toxic metals in children, as there is less time for accumulation to have occurred and hence toxicity may be from a current source.

#### ASSESSING ANTIOXIDANT REQUIREMENTS USING HTMA

Hair tissue mineral analysis (HTMA) is an important and very useful test for assessing antioxidant requirements. As hair cells grow, they are exposed to internal metabolic activity of the body. As the hair grows away from the internal environment of the skin's dermal layer, the cells dry out, harden and lock in a record of this recent metabolic activity<sup>32</sup>. HTMA not only indicates nutritional mineral imbalances, but has also been shown to be an effective measure of heavy metal status<sup>33</sup>. Presence of heavy metals in the body such as lead, mercury, cadmium, arsenic, uranium, beryllium and aluminium can increase free radical damage significantly, as they have a detrimental effect on body functioning; liver, kidneys, brain, cardiovascular system and even ageing.

Fat-soluble antioxidants, such as beta carotene or vitamin E will help to remove certain heavy metals; e.g. mercury and arsenic. Water-soluble antioxidants, like dark coloured berries and green tea will help to remove other heavy metals; lead and cadmium. HTMA is also an excellent indicator of selenium status; a crucial mineral antioxidant.

## Summary

Antioxidants are a natural part of our diets as well as our body chemistry. We ingest them, but also have the ability to create them. They are an essential component of any healthy eating and lifestyle plan. In summary:

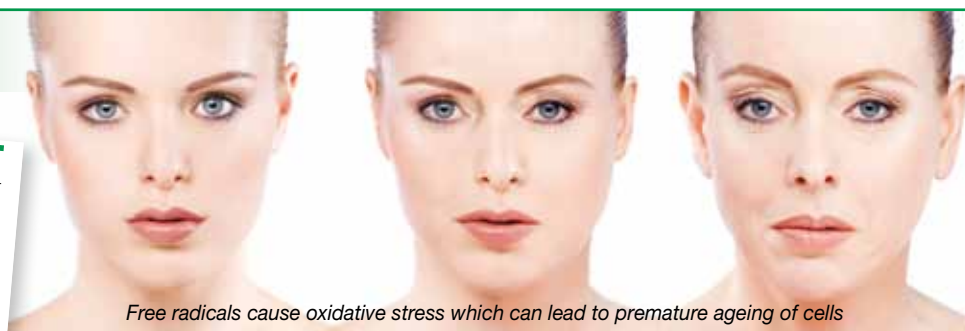
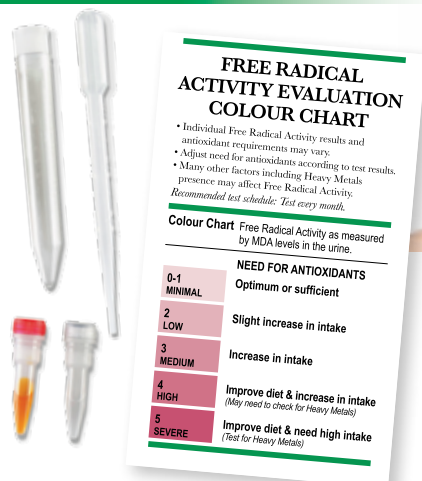
- Free radicals are created by the body as a response to stress, toxins, disease
- Free radicals are also naturally occurring in the body (e.g. as part of the immune response to fight bacteria and viruses)
- Oxidative stress is when the balance of free radicals and antioxidants tips in favour of free radicals and negative symptoms appear
- Antioxidants come in many forms, natural and synthetic – know your antioxidants
- Natural/ whole-food forms of antioxidants are readily absorbed, and contain other vitamins and minerals which will benefit general health
- Supplementation with high antioxidant foods and supplements is appropriate for certain disease states
- *Freshness* is a critical consideration for any antioxidant supplement
- Many antioxidant whole food supplements can be taken life-long
- Antioxidants can improve symptoms of oxidative stress (inflammation, fatigue, mild pain or stress)
- It is important to use testing to accurately assess, as well as motivate, your client

References available at: [www.interclinical.com.au/newsletter.php](http://www.interclinical.com.au/newsletter.php)

### For further information:

please contact our technical support team on +61 2 9693 2888 or email us at [lab@interclinical.com.au](mailto:lab@interclinical.com.au)

## IN HOUSE TEST KITS



# test for free radicals

A simple and reliable in-house test to measure the level of free radicals or "oxidative stress" within the body.

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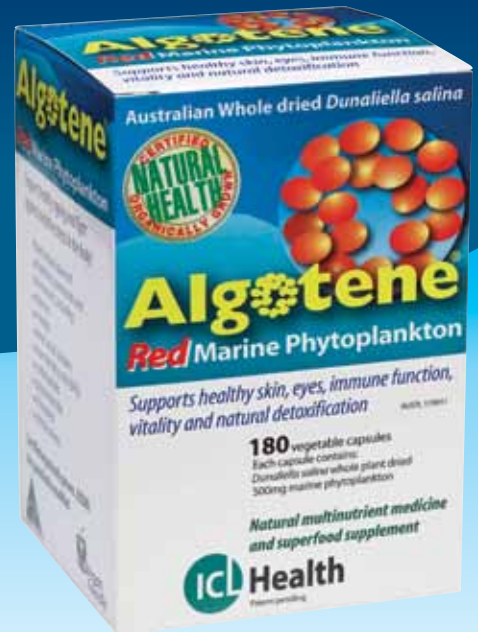
## Red Marine Phytoplankton



### *Dunaliella salina* whole dried biomass

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- Supports healthy skin, eyes, immune function, vitality and natural detoxification.

Natural multi-nutrient supplement



# Açai Premium Fresh



### Pure freeze dried, raw, wild harvest, Açai berry powder

- Nature's richest source of bioflavonoid antioxidants
- Extremely high ORAC value

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