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## Fertility Enhancement: A Pre-Conception Nutritional Approach

by Chris D. Meletis, ND

[Editor's Note: Chris D. Meletis, ND is co-author of the book *Enhancing Fertility: A Couple's Guide to Natural Approaches*.]

The inability to conceive a child is one of the most heartbreaking situations a couple can endure. Unfortunately, due to reduced sperm counts, exposure to environmental estrogens and a variety of other modern day factors, more and more couples are struggling with infertility. In the U.S., an estimated 14 percent of couples have infertility problems and an estimated 10.2 percent of women between the ages of 15 to 44 (roughly 6.2 million women) experience some type of impaired fertility. The number of women with infertility problems is projected to reach 7.7 million by the year 2025.<sup>1</sup>

Infertility can occur equally in men as in women, with 30 percent of infertility attributable to men and 30 percent to women, while another 30 percent is attributed to both partners and the remaining 10 percent is related to unknown factors. Other statistics indicate the annual incidence of male infertility is at least 2 million cases, which equates to an incidence rate of approximately 1 in 136 men in the U.S.<sup>2</sup>

Infertility in general is defined as the inability to become pregnant after one year of unprotected intercourse, but 4.5 million couples in the U.S. do not conceive at their first attempt. Women in their 20s are usually advised to be more persistent and have greater leeway, waiting more than a year before seeking medical consultation.

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## Salivary Hormone Testing: The Key to Resolving Hormonal Imbalances

by Sherrill Sellman, ND

As we journey through the seasons of our lives, hormone levels will vary according to age, nutritional status, stress, and underlying health issues. Steroid hormones, such as progesterone, estradiol, estrone, estriol, testosterone, DHEA and cortisol play vital roles in the maintenance of good health. Therefore, an accurate measurement of hormonal levels is essential to monitor physiological changes as well as to offer a diagnostic assessment.

While men, especially during andropause, are able to receive important information about their hormonal status through salivary testing, reliable testing

of hormones is especially important for women. The many physiological and emotional symptoms that occur with PMS, infertility, perimenopause, and menopause reflect significant hormonal shifts, imbalances, and fluctuations. Hormone testing also is important in revealing some of the hidden causes of hormonal imbalances addressed in my previous article, such as adrenal exhaustion.

Since steroid hormones play such a vital role in the maintenance of optimal health, knowledge of an imbalance in any one or

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# Fertility Enhancement

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Couples in their mid to late 30s, on the other hand, are advised to seek help if they have not been successful within a year.

The first step is to determine which partner is infertile and/or whether it is a combined effect of suboptimal fertility of both partners. This article will offer strategies that both genders can apply to enhance their ability to conceive.

## Causes of Female Infertility

There are multiple reasons for infertility in females. Ovulatory dysfunction, resulting from the aging process, is an important cause of infertility as well as anovulatory cycles, amenorrhea (absence or suppression of menstruation), luteal phase defects, premature ovarian failure, polycystic ovarian syndrome, and high prolactin levels. Furthermore, anatomical problems in the structure or function of the fallopian tubes from past abdominal or pelvic surgery and past infections (pelvic inflammatory disease) prevent eggs from properly traveling through the tubes.

Another factor that affects a female's ability to conceive is uterine growths such as fibromas, myomas and leiomyomas (uterine fibroids), which negatively affect implantation of the fertilized egg. Additionally, endometriosis, where fragments of endometrial tissue may be carried upward through the fallopian tubes and

become implanted there and elsewhere in the pelvic area, is a common cause of female infertility.

Alcohol<sup>3</sup> as well as certain medications, such as hormones, antibiotics, antidepressants, pain medications, and aspirin and ibuprofen when taken at midcycle,<sup>4</sup> also can impair conception as can medical conditions such as inflammatory bowel disease, celiac sprue, epilepsy, thyroid conditions, and diabetes.<sup>4</sup>

Exposure to environmental chemicals is another aspect to investigate when considering the causes of female infertility. Increasing evidence indicates environmental exposure to chemicals, radiation, and infections on germ cells affects fertilized eggs, and hormonal balance as it relates to implantation and development.<sup>5</sup> Second hand cigarette smoke, which contains cadmium, a toxic metal known to have negative effects on fertility, presents an additional problem.<sup>6</sup>

In addition to following the nutritional supplement regimen I outline below, I recommend taking a hair analysis test, which can offer insights into a woman's exposure to toxic, fertility-altering metals. Taking an organic acid metabolic profile test also will offer insights as to individual nutritional needs and environmental exposures.

Caffeine consumption<sup>7</sup> is another important factor since studies show a decreased incidence of miscarriage in women who avoid caffeine during pregnancy. Furthermore, dramatic weight loss, especially when accompanied by excessive physical activity, can predispose a woman to irregular menstrual cycles and disturbed ovulatory patterns.<sup>8</sup> Rapid weight loss is known to lower progesterone levels, slow follicular growth, and inhibit the luteinizing hormone surge, disallowing ovulation.<sup>9</sup> Additionally, less intense weight loss may also depress hormone levels to an extent that an insufficiently sized corpus luteum fails to sustain an early pregnancy. Weight loss also mobilizes body fat that contains toxins and thus increases exposure to chemicals that have been previously stored in fatty tissue.<sup>10</sup>

## Causes of Male Infertility

The primary causes of male infertility entail problems with spermatozoa production or delivery that may result from

certain types of hormonal dysfunction. Trauma or anatomical defects in the reproductive system and other illnesses also can all lead to infertility. For example, factors that affect male infertility may include: 1) Cryptorchidism, a failure of one or both testes to descend, which can impair spermatogenesis; 2) Cystic fibrosis, which may cause an absence of sperm, vas deferens, or seminal vesicles; 3) Ductal obstruction, caused by repeated infection, inflammation, or a developmental defect; 4) Hemochromatosis, a metabolic disorder that causes iron deposition in the testes; 5) Hormone dysfunction, caused by a dysregulation in the hypothalamic-pituitary-gonadal axis; 6) Retrograde ejaculation, an anatomical defect involving the muscles and nerves of the bladder neck and 7) Varicocele, which can alter testicular temperature affecting spermatogenesis.

Like in women, use of certain pharmaceutical and recreational drugs can cause infertility in men. Drugs used to treat hypertension, arthritis, and digestive disease, and chemotherapy drugs are associated with sperm production problems and infertility. Sexually transmitted infections and sickle cell anemia also are associated with fertility problems in men and systemic diseases such as a high fever, infection, kidney disease, or metabolic disorders can impair spermatogenesis.

Environmental factors can have an equally devastating effect on fertility. Chemical exposure and environmental toxins and lifestyle habits such as smoking,<sup>11</sup> alcohol consumption,<sup>12</sup> dietary factors (insufficient nutrition), oxidation, and even wearing brief-style underwear,<sup>13</sup> which hold the testes closely to the body, can all have a role to play in infertility.

Several reports have detailed the occurrence of decreased sperm counts in men who reside in developed countries over the last 50 years. The results of these reports have given birth to the theory that this trend may be the result of increased environmental exposure to estrogen-like compounds, a theory validated in a number of investigations.<sup>14-16</sup>

## Nutritional Interventions to Enhance Female Fertility

Strategies can be employed in women to optimize the chances of conception. Folic

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*The information in this newsletter is not intended to provide personal medical advice, which should be obtained from a medical professional, and has not been approved by the U.S. FDA.*

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**TABLE 1. Nutritional Support for Female Fertility Enhancement**

Folic Acid	Promotes good cervical health and, together with other B vitamins, helps support proper hormone levels.
Iron	Low iron levels linked to a more difficult time conceiving; important for the new blood supply to the developing fetus. Ferritin and complete blood count should be tested prior to supplementation.
Vitamin C	Assists with healthy ovulation and menses.
Prenatal Vitamin Formula	In a human, placebo-controlled trial, increased conception rates.
Tribulus Terrestris	Assists in producing productive ovulatory cycles.
Chasteberry (Vitex agnus castus)	Inhibits prolactin, normalizes luteal phase defects, and may increase the chances of becoming pregnant in women with relative progesterone deficiency.
Natural Progesterone Cream	Low levels of progesterone are linked to infertility; progesterone supplementation in animals restores reproductive function; Human studies and clinical experience indicate progesterone can improve the outcome of pregnancies.

acid can be used for maintaining proper cervix health by preventing cellular oxidative damage. Folic acid interferes with the activity of human papilloma virus (HPV) infection, a leading cause of abnormal pap smears and cervical cancer.<sup>17</sup> B vitamin deficits may be relatively common today as a result of certain medications (oral contraceptives) or lifestyle factors (inadequate intake of vegetables and fruits). Inadequate B vitamin levels may predispose a person to altered hormone levels.<sup>18</sup>

Iron may prove to be another important preconception nutrient. One report demonstrated that women with lower iron levels could improve their fertility when supplemented with this mineral.<sup>19</sup> Physiologically, this makes sense, as a woman with insufficient amounts of iron will not be able to respond to the high demand for this nutrient once conception has been achieved and a new blood supply is being created for the developing baby. Prior to supplementing with iron, a woman should be tested to determine the actual iron needs of her body by measuring (ferritin) and complete blood count (CBC) levels.

Known for its multiple health effects, vitamin C may assist certain populations in achieving pregnancy. One study showed that women taking a fertility agent known as clomiphene with no results were then able to have a menses and ovulate following supplementation with 400 milligrams of vitamin C.<sup>20</sup> Another study, showed that when supplemented with vitamin C and E, laboratory animals were able to ovulate more frequently when supplemented

in comparison to other non-supplemented animals of similar age.<sup>21</sup>

Prenatal vitamins should be taken not only during pregnancy, but prior to it as well. A study evaluating the supplementation of multivitamins during a 28-day preconception period demonstrated a significantly increased rate of conceptions among women who supplemented pre-conceptually in comparison to women given placebo in the same time period. This difference registered as a 5 percent decreased time to achieve conception among those supplemented.<sup>22</sup> Additionally, these researchers demonstrated a significantly higher occurrence of multiple births among the supplemented group in comparison to both the placebo group as well as the entire population from which the study groups were taken.<sup>23</sup>

Botanicals can work with the nutrients mentioned above to enhance hormonal health in females. Tribulus terrestris is useful in assisting in producing productive ovulatory cycles. A concentrated form of tribulus standardized to 45 percent steroidal saponin content was demonstrated to assist women in achieving ovulatory cycles when dosed at 250-500 milligrams three times per day for 3 months.<sup>24</sup>

Vitex agnus castus (Chasteberry) may have prolactin-inhibiting effects, and has been used in women experiencing sterility due to secondary amenorrhea and luteal insufficiency. The herb has normalized luteal phase defects, and may increase the chances of becoming pregnant in women

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## The President's Desk

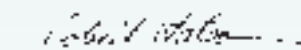
### Naturally Solving the Healthcare Crisis

At a time when healthcare costs are escalating, it's particularly heartening to hear the results of a new study about dietary supplements. The study, commissioned by the Dietary Supplement Education Alliance (DSEA), found that strategic use of certain nutritional supplements could save a staggering \$24 billion in healthcare costs over the next five years.

Some of the key findings of the report included:

- The appropriate use of calcium with vitamin D for the Medicare population could result in a potential avoidance of approximately 776,000 hospitalizations for hip fractures over five years, which would result in an estimated net cost reduction of approximately \$16.1 billion.
- If just 11.3 million of the 44 million American women of childbearing age who are not taking folic acid began taking 400 mcg of folic acid per day, neural tube defects could be prevented, saving as much as \$344,700,000 in the first year. Over five years, taking into account the cost of the supplement, \$1.4 billion could potentially be saved.
- Daily intake of approximately 1,800 mg of omega-3 fatty acids by people over age 65 could reduce the occurrence of coronary heart disease to the extent that it would result in a potential five-year savings in health care expenditures of \$3.2 billion. Approximately 374,301 hospitalizations and associated physician fees also could be avoided.
- Daily intake of 6-10 mg of lutein with zeaxanthin could save an estimated \$3.6 billion over 5 years by helping people with age related macular degeneration avoid dependency.

The report is an update of research conducted by The Lewin Group in 2004 and 2005 that included a systematic literature review of the most rigorous scientific research available. It affirms that nutritional supplements are a cost-effective way to improve overall health. If health insurance companies, the federal government and the conventional medical establishment would recognize this fact, this country's health care crisis would be well on its way to being solved.



**Robert Watson**  
President/CEO

## Fertility Enhancement

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with relative progesterone deficiency. In women with hyperprolactinemia, Vitex suppressed prolactin release, lengthening luteal phases and improving progesterone synthesis in women after 3 months of using the herb.<sup>25</sup> In one study, 120 women with polymenorrhea (abnormally frequent menstrual cycles), oligomenorrhea (scanty or infrequent menstrual flow) and corpus luteum insufficiency were treated with a standardized extract of Vitex for 6 months. Sixty percent of these women had sought conception assistance previously. During the study progesterone levels increased from an average of 6.4 nanograms per milliliter to 9.3 nanograms per milliliter while 64 percent of the women's cycles became normalized and 29 percent became pregnant.<sup>26</sup>

As mentioned above, chasteberry increases the chances of becoming pregnant in women with relative progesterone deficiency. Therefore, a logical approach is to use natural progesterone cream in conjunction with chasteberry and the other nutrients mentioned above to enhance female fertility. Progesterone is made in the ovaries of menstruating women, by the placenta during pregnancy, and in smaller amounts by the adrenal glands. About 20-30 mg of progesterone are produced per day during the luteal phase of the menstrual cycle and up to 300-400 mg are produced daily during pregnancy. During the third trimester of pregnancy, women secrete 20 times more progesterone than during the last two weeks of their normal menstrual cycle. Low progesterone levels are associated with infertility and progesterone supplementation in animals restores reproductive function.<sup>27</sup>

In a randomized, double-blind study of women with inadequate luteal phase and an increased risk of miscarriage prior to 12 weeks of pregnancy, vaginal administration of progesterone reduced pain and the frequency of uterine contractions and improved the outcome of pregnancies in many of the subjects.<sup>28</sup> Moreover, clinical experience indicates an increased rate of conception when women who have had difficulty conceiving use natural progesterone.

**TABLE 2. Nutritional Support for Male Fertility Enhancement**

Zinc	Low zinc levels have been associated with low serum testosterone concentration and seminal volume. Infertile males have low levels of seminal plasma zinc.
Antioxidants (Selenium, Vitamins A, C and E)	Improve sperm motility and increase chance of conception; decrease oxidative damage to spermatid DNA.
Glutathione	Has positive effect on sperm motility.
CoQ10-H <sub>2</sub> <sup>™</sup>	CoQ10 increases sperm motility in infertile men, improves fertilization rates.
Arginine	Precursor of compounds involved in sperm motility.
Carnitine	Plays role in development of healthy spermatozoa; increases sperm count and motility.
Panax Ginseng	Decreases levels of fertility-impairing prolactin; increases sperm count and motility.
Pygeum africanum	Affects prostatic secretions, which assist spermatid survival outside of the body; beneficially affects prostatic fluid pH, thereby improving sperm motility.

### Strategies to Enhance Male Fertility

In males, one of the primary focuses of enhancing fertility is to assist the body in producing healthy sperm. A number of nutrients and botanicals influence this critical function. Low zinc levels have a negative effect on serum testosterone concentration and seminal volume,<sup>29</sup> while seminal plasma zinc concentration are significantly correlated with sperm density, possibly contributing a positive effect on spermatogenesis.<sup>30</sup> Infertile males have lower levels of seminal plasma zinc, which was associated with reduced levels of zinc in the blood.<sup>31</sup>

In one study, researchers studied zinc's effects in infertile male smokers by investigating the mechanism of the zinc-cadmium relationship in the testes of laboratory animals.<sup>32</sup> Smokers have increased seminal cadmium levels, decreased sperm count, motility and morphology. In this animal study, zinc was able to improve sperm quality and it increased seminal levels of interleukin-4 yet also decreased TNF-alpha and IFN-gamma. When a zinc-deficient diet was fed to the animals, this allowed for cadmium accumulation in the testicles in similar amounts to that seen in animals supplemented with cadmium.

Researchers have hypothesized that zinc improves sperm parameters through a membrane stabilizing effect as an antioxidant as well as its effect on cellular and humoral immunity by decreasing anti-sperm antibody levels.

Because free radicals are involved in male infertility, antioxidants need to be

included in any male fertility-enhancing protocol. Elevated levels of reactive oxygen species (ROS) are known to comprise sperm function and viability (damage of spermatid nuclear DNA); this oxidative stress is derived from excessive production of ROS and or impaired antioxidant defense mechanisms in the semen.<sup>33</sup>

Antioxidants important to sperm health include selenium and vitamins A, C and E. In a study of 69 infertile men treated with placebo, selenium or selenium in combination with vitamins A, C, and E for three months, both selenium groups showed significant improvements in sperm motility.<sup>34</sup> Additionally, 11 percent of the antioxidant-treated men impregnated their partners during the study period.

Another study of men with low sperm counts with decreased motility experienced an increase in both of these parameters after 6 months of supplementation with vitamin E combined with selenium.<sup>35</sup> These benefits were reinforced in an additional study where vitamin E reduced concentrations of a marker of lipid peroxidation damage known as malondialdehyde (MDA) and increased sperm motility, resulting in a 21 percent pregnancy occurrence during the course of the study.<sup>36</sup>

Vitamin C also tops the list of conception-assisting nutrients in males. Decreased levels of vitamin C have been linked to infertility and increased oxidative damage to spermatid DNA. In one astonishing study, vitamin C supplementation resulted in a 140 percent increase in sperm count in infertile male smokers, and at the end

of the 60-day study every vitamin C-supplemented subject had impregnated their partner while no placebo subjects were successful in this regard.<sup>37-38</sup>

The antioxidant glutathione is an equally important part of sperm antioxidant defense and glutathione supplementation has been repeatedly shown to have a positive effect on sperm motility. Glutathione and selenium are essential for a specific protein in sperm that is responsible for motility.

In one interesting study, glutathione was supplied in a dose of 600 milligrams, and administered intramuscularly for two months. In comparison to a placebo, the treatment group showed a statistically significant effect on sperm motility, specifically in the percentage of sperm demonstrating forward motility.<sup>39</sup>

Other antioxidants that play an important role in sperm health include: 1) coenzyme Q10, which protects against reactive oxygen species in the spermatic membranes, significantly increases motility in infertile men, improves fertilization rates, and increases sperm count and motility;<sup>40</sup> 2) Arginine, a precursor of several compounds thought to play a role in sperm motility<sup>41</sup> and 3) Carnitine, which plays several roles in the development of healthy spermatozoa and has been shown to increase sperm count and motility.<sup>42</sup> CoQ10-H<sub>2</sub><sup>TM</sup> is an ideal form of CoQ10 since it is more bioavailable than other forms of this nutrient.

Two botanicals—Panax Ginseng and Pygeum africanum—further enhance the effects of the above antioxidants. Panax Ginseng, well known for its energy enhancing effects, appears to have some impact on sexual function as well. A group of patients treated with an extract of ginseng had an increased number of sperm and improved motility.<sup>43</sup> Also noted in this study was an increase in total and free testosterone and a decrease in fertility-impairing prolactin. Pygeum africanum may affect male fertility due to its effects on prostatic secretions. An important part of the ejaculate, these secretions assist spermatic survival outside of the body. Sperm motility is affected by the pH of prostatic fluid, and some studies indicate Pygeum can beneficially affect prostatic fluid pH.<sup>44</sup> as well as support the health of subjects with prostatitis and benign prostatic hyperplasia (BPH).<sup>45</sup>

## Conclusion

There are many causes of infertility among both men and women. Combining the nutritional supplement regimen recommended above with removal of negative influences such as exposures to environmental toxins, alcohol and cigarettes, can have fairly dramatic results. Although not a cure all, adopting these measures will serve to greatly increase the chances of successful reproduction.

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## Salivary Hormone Testing

*Continued from front page*

more hormones can help to illuminate the cause of health problems.

The conventional approach for testing hormones requires a blood test, which measures the hormones found in blood serum or blood plasma content. While a blood test has been the most common way to test hormones, it is now realized that it is not giving the whole story.

So, what kind of testing would provide the most dependable information about hormone levels and why? Substantial clinical and scientific research has shown that saliva testing, which has been used in scientific testing for decades, is a highly accurate way to assess hormone levels.

### The Messages in Saliva

Saliva, which is produced by salivary glands located under the tongue and along the sides of the mouth, comprises a complex mixture of mucins, electrolytes, antibodies, and enzymes. It also contains steroid hormones, which are able to pass freely through the membranes of the salivary gland into the saliva by passive diffusion.

Saliva tests are more useful than blood tests because they measure the bioavailable (free) hormone in the blood.<sup>1</sup> It is this bioavailable form of hormones that actually has an effect on the tissues.

Some of the common imbalances identified through this form of testing include: 1) estrogen dominance; 2) estrogen deficiency, progesterone deficiency or excess; 3) androgen (testosterone) and DHEA excess or deficiencies and 4) Cortisol excess or deficiency.

Another advantage of this testing is its ability to provide an insight into underlying health conditions such as compromised adrenal function, inflammation, blood sugar imbalances and microbial stressors. This becomes an invaluable diagnostic tool not only to measure hormone levels and ratios but also as a means to evaluate hormonal risk factors for hormone dependent diseases such as breast or uterine cancer. In addition, it can provide a basis for correcting imbalances through diet, exercise, nutritional support, or hormone supplementation.

### Saliva Testing 101

When the various glands manufacture the steroids, they are released into the bloodstream bound to carrier proteins. Only a small fraction (1 to 5 percent) of a given amount of steroid hormone breaks loose from the carrier protein in the bloodstream and is free to enter target tissues. This free or unbound hormone is what we want to measure, since it is active

***“In addition to its superior accuracy, saliva collection is convenient and can be done at home.”***

or bioavailable to the target tissues such as the breast, uterus, brain, and skin. Many scientific studies have shown a strong correlation between steroid hormone levels in saliva and the amount of hormone in the blood that is bioavailable.

Another benefit is the ability to more accurately reflect the uptake and response of topical hormone supplementation delivered through the skin in creams, gels, or patches.<sup>2</sup> When steroids are delivered topically, serum testing grossly underestimates bioavailable hormone levels and is not reflective of either tissue uptake or response. Saliva hormone levels, on the other hand, closely parallel tissue uptake of the hormone.

Through transdermal delivery, hormones can enter the blood stream, bind to red blood cells and then be rapidly transported to tissues of the body.<sup>3-5</sup> Standard blood tests measure the amount of hormones in the serum, or watery part of the blood. However, the majority of hormones found in serum have been inactivated and are on their way out of the body. Active (bioavailable) hormones are carried on the red blood cells and these are what matters. The active hormones are filtered into your saliva.

One of the most significant studies that demonstrated these discrepancies showed that topical applications of estradiol, progesterone, or combinations of these hormones to women's breasts dramatically elevated hormone levels in tissue. Despite

the 100 fold increase of hormones in the breast they did not find any change in the plasma or the serum of the blood.<sup>6</sup>

In order for blood tests to show an increase in hormone levels, extremely high amounts of topical hormones must be used. This has led to the practice of using excessive amounts, particularly of estrogen, progesterone, or testosterone, which can further exacerbate hormone imbalances.

Thus, by measuring hormones in saliva it is possible to determine not only how much hormone is bioavailable but also, even more significantly, how much is entering tissues throughout the body.

### Other Benefits

In addition to its superior accuracy, saliva collection is easy, can be done at home and at one's convenience. It merely requires spitting into the supplied tubes, which are then mailed back to the lab.

The hormones in saliva are exceptionally stable and can be stored at room temperature for up to a week without affecting the accuracy of the result. This offers maximum flexibility in sample collection and shipment.

### Conclusion

Saliva hormone testing is more convenient, less stressful, more effective, and more representative of bioavailable fraction of hormones in blood than serum testing. When steroid hormones are delivered topically, saliva provides a more realistic and accurate reflection of tissue hormone uptake and biological response.

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# Estrogen Balancing for Women and Men: Why Females *and* Males Should Consider Phytonutrient Support

by Nieske Zabriskie, ND

**E**strogen is a hormone typically associated with female health. Estrogen, however, also plays a lesser-known role in male health. The increasing level of environmental estrogens such as estrogen-mimicking pesticides along with a tendency for males to convert testosterone into estrogen, indicates that a discussion about balancing estrogen levels in the body is equally important to both sexes.

In men, the conversion of testosterone to estrogen plays a role in the development of prostate cancer. This tendency was demonstrated in animal models, where the addition of estrogen to testosterone significantly increased the incidence of prostate cancer. In addition, testosterone and other androgens may increase prostate cancer progression. This evidence suggests that it is the conversion of androgens to estrogens by aromatase that may be a causal factor in cancer initiation and that testosterone induces tumor promotion after the initial insult. This same study also showed that estrogen caused DNA damage in prostate cells, which can lead to the development of cancer at the exact location of the damage.<sup>1</sup> Furthermore, the active testosterone metabolite 5-alpha-dihydrotestosterone, which cannot be aromatized to estrogen, is not known to induce prostate cancer, supporting a critical role of estrogen in prostate carcinogenesis.<sup>1</sup>

In women, a substantial amount of research has shown that estrogen metabolism is strongly associated with hormone-related cancers such as breast cancer. Estrogen, via its binding to the estrogen receptor, plays an important role in breast cancer cell proliferation and tumor development.

Estrogen can be metabolized through either beneficial or harmful biochemical pathways. The optimal pathway breaks down estrogen into 2-hydroxyestrone. Metabolizing estrogen via this pathway decreases hormone related cancer risk. The

other pathway metabolizes estrogen to the carcinogenic products 16-hydroxyestrone and to a lesser extent 4-hydroxyestrone. An elevated ratio of these metabolites to the preferential 2-hydroxyestrone metabolites in women is associated with increased risk of invasive breast cancer.<sup>2</sup>

In both men and women, hormone balance is also related to the function of the aromatase enzyme. This enzyme is found in adipose tissue, muscle, breast tissue, ovaries, brain, the prostate and malignant breast tumors. Aromatase is the rate-limiting step in estrogen metabolism. This enzyme converts the androgens testosterone and androstenedione to the estrogens estradiol and estrone. In post-menopausal women, aromatase in adipose tissue is the primary source of circulating estrogens.

Modulation of hormone levels and activity is an important avenue for overall health. Therefore, in this article, I will discuss select phytonutrients that research indicates can favorably affect estrogen and androgen metabolism.

## **Indole-3-carbinol (I3C) and Diindolylmethane (DIM)**

Cruciferous vegetables of the Brassica genus include cabbage, broccoli, cauliflower, radishes, parsnips, kale, and Brussels sprouts. Increased intake of cruciferous vegetables has been shown to decrease overall cancer risk.<sup>3</sup> One of the constituents found in these vegetables, indole-3-carbinol (I3C), has been widely studied as a potential chemo-preventative and chemotherapeutic agent. It increases estrogen metabolism via the beneficial 2-hydroxylation pathway in humans from 29 percent to over 45 percent.<sup>4</sup> Increasing the 2-hydroxylation pathway decreases the activity of the other, more harmful pathways. Furthermore, 2-hydroxylation end products decrease cell proliferation and increase apoptosis, or programmed cell death, which are important in the pre-

vention of cancer. I3C also increases the expression of the well-known breast cancer suppression gene BRCA1. Additionally, I3C inhibits the activation of estrogen receptors by estradiol, which may prevent estrogen-enhanced cancers.<sup>5</sup>

I3C also protects against cervical cancer. Estrogen promotes development of cervical cancer in cells infected with high-risk human papillomaviruses (HPV). I3C and 2-hydroxyestrone inhibited the estrogen-increased expression of the HPV

*“The conversion of testosterone to estrogen plays a role in the development of prostate cancer.”*

cancer-promoting genes.<sup>6</sup> Evidence also demonstrates that I3C is a potent scavenger of free-radicals,<sup>7</sup> highly reactive species that cause damage in the body and lead to aging, degenerative diseases, and cancer.

I3C is acid-catalyzed in the stomach into diindolylmethane (DIM). DIM is believed to be the active beneficial constituent in I3C and cruciferous vegetables. Both I3C and DIM induce biochemical pathways to metabolize potential carcinogens. I3C has been shown to decrease the proliferation of numerous forms of cancer including breast cancer, prostate cancer, endometrial cancer, colon cancer, and leukemia. Animal studies have shown that long-term administration of I3C decreased spontaneous breast tumor development by 50 percent and endometrial tumors by 24 percent. Additionally, animal models show that supplementation with I3C prior to exposure of a known carcinogen decreased the devel-

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# Vision: The Fifth Component to Healthy Aging

by Chris D. Meletis, ND

In the January newsletter article, *Five Critical Components to Healthy Aging*, I touched upon the five most important ways individuals can stay healthy throughout their lives. In February, I began a five-part series to address each of these components in more detail and have already addressed the first four components: cardiovascular, bone and joint, blood sugar and cognitive health. In this final installment, I will discuss vision and the three diseases that are the leading causes of blindness: cataracts, macular degeneration and glaucoma.

Like most aspects of health, the state of our eyes is linked to the state of our bodies as a whole. Researchers clearly illustrated how ocular health affected the overall state of the body when they conducted a study on the risk of death in women with cataracts. In 1,318 non-diabetic women, the subjects who had cataracts at the study's start had a greater risk of dying from cardiovascular, respiratory, and other non-cancer causes of death compared to subjects who were cataract free. In fact, women with cataracts had a death rate of roughly 40 per 1,000 compared to 25 per 1,000 in women without cataracts.<sup>1</sup>

Scientists have unearthed similar findings on glaucoma. In a study of 3,654 people aged 49 to 97 years, having glaucoma was associated with an increased risk of cardiovascular-disease-related mortality, especially in patients under 75 years of age whose glaucoma was previously diagnosed prior to the study and who were using topical timolol.<sup>2</sup>

## Factors Influencing Eye Health

A number of factors can determine to what extent our eyes survive the aging process. I touched upon some of these factors in other installments of this *5 Components* series, but they are equally relevant to ocular health. The factors most often associated with the risk of developing degenerative eye diseases are exposure to ultraviolet light, free radical damage and low antioxidant status, homocysteine

levels, impaired blood sugar control, low omega-3 intake and circadian rhythm.

### Ultraviolet Light

Frequent exposure to ultraviolet light is associated with the development of cataracts. In animal studies, exposure to UVB radiation results in the development of cataracts and the lowering of antioxidants such as vitamin C in the eye.<sup>3</sup> Researchers also have found that solar radiation has an effect on the development of age-related macular degeneration (ARMD).<sup>4</sup> Consequently, wearing UV-blocking sunglasses will work in conjunction with the supplement regimen outlined below to ensure maximum protection.

### Free Radical Damage

Oxidation, the cell-damaging process generated by free radicals and quenched by antioxidants, is responsible for much of the damage done to our eyes as we age. Researchers at the Cleveland Clinic and Case Western Reserve University have strongly established the link between age-related macular degeneration and oxidation. They studied the small deposits called drusen that can form on the outside of cells below the retina surface. Individuals with high levels of drusen have an increased risk of developing ARMD. The researchers analyzed the drusen in eyes from 16 ARMD patients and 29 healthy subjects at least 56 years old.

The study authors pinpointed 129 different proteins in the drusen from these subjects. Some of the proteins (up to 65 percent) were found in both healthy subjects and ARMD patients, but 21 specific proteins only occurred in drusen from the ARMD eyes. The investigators then noted that some proteins found in the drusen were altered and that these alterations can result from free-radical-induced oxidation. These altered proteins were found in both healthy subjects and patients with the eye disease, but they occurred more frequently in tissue from eyes with ARMD.<sup>5</sup>

Past research has suggested that drusen

**TABLE 1.**  
Factors Influencing Eye Health



forms as a result of some signal that can affect the immune system. The researchers of this study believe that signal may be the protein alterations that occur as a result of oxidation and free radical damage. They believe their study strongly supports the hypothesis that oxidative injury contributes to the pathogenesis of age-related macular degeneration.

Oxidative stress also is believed to be a key factor in the gradual loss of lens transparency that results in cataracts. Free radicals formed in the lens result in derangement and opacification of lens fibers. Furthermore, superoxide dismutase and catalase, important antioxidant enzymes that protect against free radicals, have been found to be lower as age increases. These enzymes are also significantly lower in diabetic cataracts compared to senile cataracts, indicating that diabetics' eyes are under an especially heavy burden of oxidative stress.<sup>6</sup>

Reducing the oxidative burden that continually assaults our eyes as we age is therefore a viable way to improve lens function.

### Homocysteine

Given homocysteine's role in various other aspects of health, it's not surprising that researchers have implicated high levels of this neurotoxic amino acid in ocular conditions. Researchers have found that both aqueous humor homocysteine and plasma homocysteine levels were significantly increased in primary open-angle glaucoma (POAG), and elevation of

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# CUSTOMER CORNER

## Incontinentia Pigmenti

Dear Dr. Dean,

My daughter as a newborn developed unusual skin problems: blistering, discolorations and sensitivity to any kind of skin abrasion. We visited many doctors and even a prestigious New England medical school, all of whom had no clue as to her condition or what to do about it other than to use cortisone. We finally found a retired doctor in his 80s who reluctantly agreed to see us, and received the correct diagnosis: Incontinentia Pigmenti. Then dawn broke over the rest of the doctors.

In the next years she experienced classic symptoms: peg teeth formation, eyesight problems and lack of hair growth and thin hair. The retired physician, against the prevailing conventional wisdom we received at the time, recommended we give her high protein and vitamin supplements, which alleviated the skin problems. The only time skin problems showed was when she couldn't keep the protein supplement down due to other illness. This was a relief, as we feared life-threatening infections associated with this illness and its cousins.

As she grew into her teens the problem seemed to go away except for the residual effects of eyesight problems, thin hair and tooth formation. My daughter is in her mid 30s now and is developing problems with falling hair and lack of fingernail growth. She has high blood pressure and high cholesterol. I know the illness can affect the heart and central nervous system. I have encouraged her to go back to a good protein supplement plus supplements for her cardiovascular problems. The doctor wants her on statin drugs and Lipitor®. She has been using SSRIs for some years. Is there anything you might recommend that will help her?

Mr. S.

Dear Mr. S.,

It sounds as if your daughter is not highly motivated to continue on the path of treatment that you and she have found to be beneficial for her. Therefore, I think that we should keep any recommendations for her as simple as possible.

I recommend *Inositol Hexanicontinate (IHN)* in whatever dosage it will take to keep her cholesterol normalized (1,500-2,000 mg per day). If she chooses to continue with Lipitor, which is known to inhibit CoQ10, I recommend she supplement with at least 100 mg per day of *CoQ10-H<sub>2</sub>*™, a highly bio-available form of CoQ10 that is more effective at smaller dosages.

In addition, I recommend *Turmeric Extract* (2-3 grams per day), and *Resveratrol*, as cardiovascular support.

Hope these suggestions help.

Ward Dean, MD

## Muscle Problems

Dear Dr. Meletis,

I have in my calf muscles a sensation of vibration and slight pulsing within the muscle. You cannot feel these sensations if you place your hand on the muscle. From time to time the calf muscles will twitch all over. On the inside knee there is often a feeling of tightness. I have tried *Magnesium* for some months, also *Acetyl-L-Carnitine* with some benefits. I have also tried acupuncture with also some mild benefits. Would there be anything else I could try as I do like your products.

Thank you,  
Mr. B.

Dear Mr. B.,

You might be able to trace the beginning of these sensations to either a period of stress or an injury (even minor). This may point to a problem in your lower back, so visiting with your PCP or a neurologist might be worth your consideration.

In clinical practice, my favorite items for such presentations as you are describing are: *Lipoic Acid*, *Magnesium*, *Vitamin B12* sublingually and also a good B-complex such as *Extension B-Plex*.

Also getting a thyroid panel, electrolyte and CBC along with other common tests if you haven't already done so is a good idea. I recommend for all my patients annual blood work. In addition, if you snore or have periods where you don't breathe well at night this is worthy of close examination since odd neurological presentations as you are describing can be linked to sleep apnea.

If you are taking a statin drug to lower

cholesterol or other new medications I would visit with your local doctor to determine if your problems are a side effect of the drugs. Muscle aches (myalgias) are a known side effect of statins.

Sincerely,  
Chris D. Meletis, ND

## Hormone Test Results

Dear Dr. Dean,

I am writing on behalf of my boyfriend who had recently taken your hormone test panel as he was feeling fatigued, depressed, and had some problems sleeping. I was also concerned because he was living in the area that had high radioactivity, in the former USSR. He also has a slightly low morning basal temperature, but his blood test for thyroid is normal. His saliva tests showed high estradiol and DHEA. His test results that are marked as either too low or too high are: estradiol 3.5, ratio of PG/E2 7.4, DHEA 672.2, cortisol morning 5.0.

Could you recommend some corrective treatment for him, especially for high DHEA? In addition, he occasionally takes *Melatonin* for sleep. Is it possible that his test was affected by it?

Thank you,  
Ms. A.

Dear Ms. A.,

Due to your boyfriend's proximity to the Chernobyl accident in the USSR and the symptoms he is manifesting, I suggest the *Iodine Sufficiency Test*, which will probably reveal an iodine deficiency. If so, I suggest *Iodoral*® replacement therapy, or even treatment with thyroid replacement itself (as in *Armour*®).

To lower your boyfriend's estrogen, I recommend *BioDIM*® and *Resveratrol*. *Resveratrol* is a natural aromatase inhibitor, and will prevent conversion of testosterone to estrogen. On the chance that his symptoms are due to radiation exposure, I suggest *Oral ChelatoRx*. EDTA, in *Oral ChelatoRx*, has radioprotective properties. Potassium Iodide (in *Iodoral*) is also a radioprotectant.

I don't know of any way to lower DHEA, although correcting his other hormone imbalances may normalize his DHEA.

Hope these suggestions help.

Ward Dean, MD

# CUSTOMER CORNER

## Iodine Loading Test

Dear Dr. Flechas,

**I just did an Iodine Loading Test. My doctor's office called and said it was a normal test. So I got them to send the results. My 24-hour output was 44 mg or 88 percent. For the heck of it I Googled the test and found an article on your website about it. It mentioned that unless someone is supplementing iodine, a test of more than 90 percent can be indicative of sodium/iodide symporter defect. I am pretty close to that.**

**I do not supplement iodine; however, I am a low adrenal type and I use a lot of salt. I get my sea salt from a place in France. It is not unusual to use 1 tsp or so for a meal. I haven't done the math on that for iodine intake. Any comments on all of this? Thanks in advance for your feedback.**

Sincerely,  
Mr. M.

Dear Mr. M.,

Sea salt contains very little iodine. For a person who has as high a level of iodine on the *Iodine Loading Test* as you do, I will agree with you that the sodium/iodide symporter is defective. Dr. Abraham and I recently conducted a study where we found that taking 50 mg of *Iodoral*<sup>®</sup> two times per day for six weeks repaired a defective symporter. You should then take 50 mg of *Iodoral* per day for the rest of your life. What we do not know is how long your cells have been with low intracellular iodine. Low iodine in a cell is a promoter of cancer, hence my recommendation to take 50 mg per day for years to come. I personally have been on 50 mg per day for the last six years with no bad side effects.

Respectfully,  
JD Flechas, MD

## RNA and Candida

Dear Dr. Dean,

**I'm interested in taking RNA for anti-aging purposes such as skin elasticity, sun spots and wrinkles. As the RNA is a yeast product, will it aggravate my candida problem?**

Thank you.  
Ms. M.

Dear Ms. M.,

Although the high-potency RNA product is yeast-derived and it is a THEORETICAL possibility that it may aggravate a severe candida problem, I think that it most likely will not. The only way to know for sure is to give it a try, which is my recommendation.

For your candida, I suggest using *KandidaPlex*<sup>™</sup>, if you are not already doing so.

Ward Dean, MD

## Rheumatoid Arthritis

Dear Dr. Meletis,

**My mother has rheumatoid arthritis, has been diagnosed with high platelets and anemia and is borderline diabetic. She doesn't have much energy either. She is on prednisone, I think 7.5 mg per day. The doctor wants her to take sulfasalazine. I got her to fast for about five days while taking psyllium husk and bentonite clay, and she said she felt a lot better and her joints didn't hardly hurt at all. I have not been able to get her to fast any more, not even 1 day. Do you think the fasting would do her long-term good? Should she take the sulfasalazine? Any recommendations for her condition would be greatly appreciated.**

Mr. C.

Dear Mr. C.,

Your mother is lucky to have such a caring son. The fact that the fasting helped points to her overall colon health, detoxification processes and also likely food allergies. Working closely with her doctor will be important.

If she was my mom, these are the things I would consider doing. Have her take our *Food Allergy Test*, so that offending items can be avoided. However, the problem is that because she is on prednisone the results may not be fully reflective of her allergens since prednisone is immunosuppressive.

You are likely very familiar with the proposed effect of the night shade family on arthritis (tomato, potato, eggplant, peppers, tobacco, etc.). So, avoidance of these from the diet may be helpful.

Likewise, when it comes to fueling the body to meet its individual needs, I am a big fan in my clinical practice of *Organic Acid Testing*. We offer both the *Food Allergy Test*

and *Organic Acid Testing*, which are done through home collection kits.

The sulfasalazine is a tough one. I have seen many of my patients report that it really helped. So, if the goal is to see if it can help your mom feel better and the doctor is recommending it, maybe it can offset the need for the long-term prednisone.

Looking at her overall colon health also would be prudent. From a gastrointestinal health perspective, make sure that 2-3 bowel movements are had daily, which is important when dealing with arthritis. This can be achieved through the use of a fiber supplement such as *Fiber-Rite* or *Detox FiberPlex*.

There is also a substantial amount of research indicating omega-3 fatty acids from fish oil (as in our *Nordic Naturals ProOmega*) may support the health of patients with RA.

These are general ideas, since I am not aware of your mom's medical history. Working closely with a competent and compassionate health care provider to explore these and other ideas is important.

Sincerely,  
Chris D. Meletis, ND

## Cholesterol, Irritability

Dear Dr. Dean,

**My LDL is 125, HDL 30, triglycerides 179 and total cholesterol 190. I want to optimize my chemistry. I'm a vegetarian. To normalize my lipids, should I take *Gugulipid*, *Inositol Hexanicotinate*, *NKO*<sup>™</sup>, *Flax Oil* and *Phosphatidylcholine*? I'm a 48-year-old man on a limited income. I find statins risky. What other supplements do I need? Is *Extend Plus* good?**

**I'm also taking 75 mg of Effexor<sup>®</sup> for depression. How do I get rid of irritability? Any suggestions?**

Thanks,  
Mr. B.

Dear Mr. B.,

Please read some of my articles on our website about *Niacin*, the most effective lipid-lowering substance available. It's also one of the least expensive. For irritability, try *L-Theanine*, *L-Tryptophan*, or *5-HTP*.

*Extend Plus* is a good choice for a multivitamin. When taking a multivitamin, I always recommend that people work their way up. So if you have not been consuming a higher potency multivitamin, I would suggest

# CUSTOMER CORNER

starting with *Extend One* or *Extend Core* and then switching over to *Extend Plus*.

Ward Dean, MD

## Avian Flu

Dear Dr. Meletis,

The article on your website on Avian Flu doesn't mention *EpiCor*® (I suppose because it was written prior to *EpiCor*). I have two questions: 1) How would *EpiCor* fit in with the recommendations in the article on avian flu? 2) Of the recommendations in the article, which would you recommend as routine prevention, which as crisis-mode prevention, and which as things to take if you are ill?

Thanks!

Mr. B.

Dear Mr. B.,

Your question is a good one. The following can be taken in the preventive mode: *Thymic Protein A*, *Vitamin C*, *Beta Glucan* and *EpiCor*; the other supplements mentioned (*NAC*, *Mild Silver Protein*, *Larch AG*, *UniZyme*™, *Vitamin A*, *Olive Leaf Extract*, *Culturelle*®, *ImmunoMax* and *R-Lipoic Acid*) could be used when needed. If one was to try to prioritize, this would be a point of reference.

I would add that proper hydration—64 ounces of liquid per day—is essential. Also minimizing overall stress levels that decrease immune function is important. In addition, many of my patients concerned with boosting their immune systems take a *Food Allergy Test*. The rationale is that “food is your best medicine or worst enemy.” Thus, identifying the foods that truly nurture the body with the least deleterious effects is important in creating a strong health foundation.

Also, in addition to having on hand the supplements mentioned above, some patients are obtaining a prescription of *Tamiflu*® (the drug) for reserve as a worst case scenario. I am not proposing this, yet, it is becoming a somewhat common practice as part of preparedness among the vigilant.

Hope this helps you as you move forward with your preventive medicine approach. Discussing these recommendations with your personal physician is important and can also be educational for him or her as well.

Sincerely,  
Chris D. Meletis, ND

## Sjogren's Syndrome

Dear Dr. Dean,

I am a 53-year-old female who has recently been diagnosed with Sjogren's syndrome. I have severe dry eyes and dry mouth. It also seems to have affected my colon, making me very constipated. I have purchased *BioTears* and this has worked well for my eyes. I also have tried *Advanced Inflammation Control*. It does seem to help, but seems to dry out my mouth and eyes. I am going to try *Thymic Protein A*. Do you think this would be better than *Advanced Inflammation Control*? Is there something else that would help me with the dry mouth or is the *Thymic Protein* about the best? I have also tried *Evoxac*®, but this causes severe GI problems for me.

I want to try to handle this disease naturally as the prescription drugs for this disease are very toxic. I have suffered so much. I have a terribly hard time taking antibiotics for infections as the antibiotics dry me out also. The doctors are at the end of their rope with helping me with this problem. I hope you can help me.

Thank you so very much for your time.

Sincerely,  
Ms. D.

Dear Ms. D.,

I am glad to hear about your success with *BioTears*. Your idea to use *Thymic Protein A* as an “immune normalizer” is a good one. I think that this will produce beneficial effects long-term. However, for short-term symptomatic relief of your dry mouth, I suggest *Xylitol Unique Sweet*™ Gum and/or *Xylitol Mints*. These are very effective in enhancing saliva production. High-dose *Xylitol* may cause diarrhea in some people, but in your case, it may be exactly what you need to help alleviate your Sjogren's-induced constipation.

In addition, a 2003 study by Harvard Medical School researchers showed that women who suffer from Sjogren's syndrome have low levels of *DHEA*.

Another study that was not conducted on patients with Sjogren's syndrome, but rather on patients who were suffering from dry eye syndrome, found that women who

consumed higher levels of omega-3 fatty acids had a reduced risk of developing dry eye compared to women who consumed lower levels of omega-3s and higher levels of omega-6s. Therefore, I suggest you try one of our Nordic Naturals fish oil products such as *Nordic Naturals ProOmega*.

Please let me know how you do.

Ward Dean, MD

## EpiCor®

Dear Dr. Meletis,

I have been taking *EpiCor*® for two months. For how long should I take this supplement? My wife suffers from Deep Vein Thrombosis and has been taking *Sintron*® (similar to warfarin) and 100 mg aspirin for 1 year. Also she's been taking thyroxine for 1 1/2 years. Can she take *EpiCor* with these drugs? Does *EpiCor* have any contraindications with other drugs?

Thank you.  
Mr. K.

Dear Mr. K.,

*EpiCor* can be taken indefinitely. Since it confers antioxidant protection in addition to immune modulation and GI support, even after cold and flu season it is a good supplement to take daily. Research has been done on *EpiCor* and, according to the studies, it does not appear to affect CYP3A4, one of the most prevalent drug metabolism pathways. It should not interfere with either the blood thinner your wife is taking, or the thyroid medication.

On another note, there is evidence that by refining thyroid levels to a higher normal level, blood clot risk can be lessened. Indeed, there is evidence in the medical literature that when thyroid levels are truly optimized, drugs like warfarin are more effective and lower doses are sometimes possible. Obviously, this all should be done under the guidance of one's physician. I would recommend reading the articles about iodine deficiency on our website and consider having your wife take our *Iodine Sufficiency Test*. Depending on the test results, she may want to consider thyroid optimization with *Iodoral*®.

Sincerely,  
Chris D. Meletis, ND

## The Fifth Component

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aqueous humor homocysteine and plasma homocysteine was a significant risk factor for POAG and the optic nerve damage found in this disease.<sup>7</sup>

### Blood Sugar

The medical literature has widely reported upon the link between high blood sugar in diabetics and increased risk of cataract formation. It is well known that cataract incidence is higher in diabetics as compared to non-diabetics. Cataracts also mature faster in diabetics. Recently, researchers have discovered that high blood sugar plays a role in the formation of cataracts in non-diabetic subjects as well.<sup>8</sup>

While the link between cataracts and blood sugar is more widely known, the association between blood sugar and age-related macular degeneration and glaucoma is one that not as many people are familiar with. Yet, emerging research is indicating that stabilizing blood sugar levels may improve all aspects of eye health.

In one study, researchers investigated the relation between dietary carbohydrate quality, as measured by dietary glycemic index (GI) or total carbohydrate intake, and age-related maculopathy (ARM), the early form of age-related macular degeneration. They studied 1,036 eyes of 526 participants in the Nurses' Health Study who did not have a previous ARM diagnosis. The researchers concluded that the glycemic index of food consumed by the subjects was related to ARM (specifically to retinal pigmentary abnormalities), whereas total carbohydrate intake was not.<sup>9</sup>

"Our results suggest that dietary GI may be an independent risk factor for ARM," the researchers wrote.

Other studies have linked the development of increased intraocular pressure (IOP), a risk factor for glaucoma, with diabetes. A recent study found that elevated intraocular pressure is associated with insulin resistance and metabolic syndrome. After studying 943 subjects (533 men and 410 women), the researchers found positive associations between insulin resistance and intraocular pressure even after statistical adjustment for other risk factors. Intraocular pressure was higher in par-

ticipants with metabolic syndrome as compared to those who did not have metabolic syndrome. The mean intraocular pressure tended to increase with the presence of increasing numbers of components for metabolic syndrome.<sup>10</sup>

High blood sugar also amplifies the negative effects of oxidative stress on the eyes,<sup>11</sup> providing further evidence that blood sugar control, combined with antioxidant support, is a crucial aspect to eye health.

### Low Omega-3 Intake

Another factor associated with poor eye health is low intake of omega-3 fatty acids. Animals raised on omega-3-fatty-acid-rich diets had a 13 to 23 percent decrease in intraocular pressure. This lower IOP in the omega-3 diet group was associated with a significant increase in outflow facility and a decrease in ocular rigidity.<sup>12</sup>

Human studies have found that primary open-angle glaucoma patients have reduced blood levels of the omega-3 fatty acids docosahexaenoic and eicosapentaenoic acids compared to their healthy siblings who did not develop the disease. Additionally, there is evidence of decreased optic nerve blood velocity and increased red blood cell aggregability in primary open-angle glaucoma, factors thought to be influenced by these fatty acids.<sup>13</sup>

Other studies have associated higher dietary intakes of omega-3 polyunsaturated fatty acids with a reduced incidence of nuclear cataract.<sup>14</sup> The link also is strong for an association between high consumption of omega-3 fatty acids and a reduced risk of age-related maculopathy (ARM)<sup>15</sup> and a reduced risk of developing dry eye syndrome.<sup>16</sup>

### Circadian Rhythm

Diurnal variations in intraocular pressure are more pronounced in people with glaucoma, leading scientists to believe that a connection exists between intraocular pressure and the body's circadian rhythm. Because melatonin levels peak around 2 a.m., a time when intraocular pressure is on a downward trend, researchers have studied melatonin's effect on intraocular pressure.<sup>17</sup> Less than 1 mg of melatonin has lowered pressure within the eyes of healthy people,<sup>18</sup> but there is only a limited amount of research on the effects of melatonin on people who have glaucoma.

## Naturally Bolstering Eye Health

An appropriate nutritional regimen can ensure our eyes remain healthy as we age as well as provide support for damage that's already been done. First, as mentioned above, it's important to address blood sugar issues by eating a low-glycemic diet and by supplementing with the nutrients and botanicals I recommended in *Blood Sugar Control: The Third Component to Healthy Aging*. Additionally, obtaining nourishing sleep and supplementing with melatonin can help support eye health. Furthermore, supplementing with the homocysteine-lowering vitamins B6 and B12 along with folic acid and betaine will help address this potential factor. As already mentioned, increasing our omega-3 fatty acids intake through supplementation with fish oil is an equally important way to protect vision.

Antioxidants, of course, are another critical component to any vision-supporting regimen. During aging, vitamin C levels in the eye lens decrease; however, taking vitamin C prevents this decrease<sup>19</sup> and is linked to a lower risk of developing cataracts.<sup>20</sup> In the Nurses' Health Study, vitamin C supplementation for a period of 10 years or longer resulted in a 77-percent lower incidence of early lens opacities and an 83-percent lower incidence of moderate lens opacities.<sup>21</sup> Diets high in lutein, a carotenoid antioxidant, also appear to reduce the risk for developing cataracts.<sup>22</sup>

Low lens levels of glutathione, one of the most important antioxidants in the body, are thought to play a role in the free radical damage that occurs in various eye diseases. N-acetyl cysteine (NAC) is known for its ability to increase glutathione levels and improve eye health. In an vitro model of cataract formation, NAC has slowed the oxidation of lens proteins. In the same experiment, vitamin B6 also inhibited lens protein oxidation, leading the researchers to report, "This study explains the cause of early cataract development and the potential benefit of supplementation with vitamin B6 and NAC in the prevention of the development of cataract among the diabetic population."<sup>23</sup>

In mice deficient in glutathione and cysteine in the lens, administration of N-acetyl cysteine (NAC) raises lens glutathione and almost completely prevents cataract development.<sup>24</sup>

The bioflavonoid quercetin serves as another way to strengthen ocular health. Quercetin is a potent inhibitor of aldose reductase, which is blamed for the genesis of human cataracts. Quercetin also has inhibited lens opacification in a lens organ culture model of cataract, where the cataract was caused by oxidative stress.<sup>25</sup> Other studies also have shown that quercetin prevents oxidation-induced opacity.<sup>26</sup>

Bilberry extract also has demonstrated some interesting actions in a number of animal and in vitro studies. In one study, researchers fed rodents bred to develop early senile cataract and macular degeneration either a control diet, a diet supplemented with bilberry extract, or vitamin E. At three months, more than 70 percent of the control rats developed cataracts and macular degeneration. Supplementation with bilberry extract, however, completely prevented impairments in the lenses and retina. Vitamin E alone had no significant effects, but both the bilberry and vitamin E decreased lipid peroxides in the retina and serum of the animals.<sup>27</sup>

Another strong antioxidant shown to defend against free radicals in the eye is grape seed extract. In a number of animal studies, grape seed has stopped the development of lens opacities. In one study, researchers injected one group of 10 rodents with a substance that triggers the development of cataracts. In another group of animals, the study authors also fed the rodents oral grape seed extract along with the cataract-inducing agent. The third group served as saline-injected controls.

All of the rats given only the cataract-inducing agent developed cataracts between stage 6 and stage 3 and had significantly lower glutathione levels and higher levels of a marker of free radical damage compared to grape seed fed animals and controls. In the group fed grape seed extract along with the cataract-producing agent, only 5 of 10 eyes developed cataracts between stage 3 and stage 2 and no cataracts occurred in the remaining 5 animals. The difference between mean cataract stages in the group injected with the cataract-inducing agent and the group also fed grape seed extract

was significant.<sup>28</sup>

The scientists concluded, "Routine consumption of grape seed proanthocyanidin extract in the form of food or dietary supplement may offer a prophylactic measure against onset and progression of cataract."

In animal models of glaucoma, ginkgo biloba also has been found to exert a protective effect. In rodents with chronic moderately elevated intraocular pressure, ginkgo biloba extract provided a neuroprotective effect on retinal ganglion cells.<sup>29</sup> Glaucoma is a serious disease and any botanicals should be used in conjunction with standard treatments recommended by the patient's ophthalmologist.

A regimen designed to support vision would not be complete without a mention of lipoic acid. In both in vitro studies and animal models, lipoic acid has prevented the formation of both diabetic and non-diabetic cataracts.<sup>30-31</sup>

Researchers have studied a host of other nutrients for their ability to influence eye

*Continued on page 16*

**TABLE 2. A Complete Supplement Regimen for Healthy Aging Based on the Five Components Series**

	Cardiovascular	Bone & Joint (Osteoporosis)	Bone & Joint (Osteoarthritis)	Blood Sugar Control	Cognitive Enhancement	Vision
Oral and IV Chelation	X					
Nattokinase/Serrapeptase	X					
Turmeric	X					
CoQ10-H <sub>2</sub> <sup>™</sup>	X					
Methyl Caps (B6, B12, Folate, Betaine)	X	X			X	X
Osteoflavone Complex		X				
Strontium		X				
Natural Progesterone Cream		X			X	
Nutri-Joint			X			
GluControl <sup>™</sup> (Goat's Rue, Cinnamon, Bitter Melon, etc.)				X	X	X
Optimum D				X	X	X
Xylitol				X	X	X
Melatonin				X	X	X
Relora <sup>®</sup> and Sensoril <sup>™</sup> (Cortisol Control)				X	X	
Extension IQ					X	
Extension Vision						X
Omega-3s (Fish Oil)	X					X

# Neptune Krill Oil™ Part II: Lowering Inflammatory Markers

by Tina Sampalis, MD, PhD

This is part two of a three part series about a novel source of omega-3 fatty acids known as Neptune Krill Oil™. In the first part of the series, I discussed Neptune Krill Oil as a source of a powerful antioxidant known as astaxanthin, the way Neptune Krill Oil's fatty acids are bound to phospholipids, and Neptune Krill Oil's role as a lipid-lowering agent.

In this installment, I will discuss Neptune Krill Oil's ability to reduce inflammation and lower levels of the inflammatory marker known as C-reactive protein.

Inflammation is an immune response that occurs after bodily injury. This inflammation response to injury is non-specific, that is, it's identical regardless of whether we're exposed to a harmful organism such as bacteria, a foreign body, ischemia (deprivation of blood flow), physical trauma, ionizing radiation, electrical energy or extremes of temperature.

Inflammation is a double-edged sword. We need a limited amount of inflammation for the healing process to continue, and inflammation is often a normal part of the body's immune response. However, excess inflammation or chronic inflammation can be detrimental to our health.

C-reactive protein (CRP) is thought to be one of the main culprits behind inflammation. Elevated CRP levels are associated with acute bacterial, viral and other infections, pulmonary tuberculosis, rheumatic diseases (rheumatoid arthritis, polymyalgia rheumatica and giant cell arteritis), heart attacks, hypertension, inflammatory bowel disease, and cancer. Researchers also have found elevated CRP levels in patients with systemic lupus erythematosus (SLE), obesity, diabetes, uremia, sleep disturbance, chronic fatigue, high levels of alcohol consumption, low levels of physical activity, and depression. In addition,

physical exertion and hormone replacement therapy are linked to elevated CRP.<sup>1,2</sup>

CRP is thought to be the reason why even dental infections are linked to heart disease. Periodontitis triggers an inflammatory and immune response with a rise in C-reactive protein (CRP) levels and levels of inflammatory IgA-class antibodies in response to dental pathogens. In patients

*“Patients using NKO experienced a nearly 31 percent drop in CRP levels.”*

with gum disease, the prevalence of cardiovascular disease seems to be highest in those individuals in whom periodontitis coexists with elevated CRP levels. Research also indicates this relationship between high CRP levels and cardiovascular disease also applies to other chronic low-grade infections.<sup>3</sup>

### **NKO and Inflammation**

Neptune Krill Oil supports proper anti-inflammatory responses in the body through a mechanism still being investigated. Researchers have speculated that NKO is able to act as an anti-inflammatory by inhibiting inflammatory mediators such as prostacyclin, thromboxane, and leukotrienes produced by cells in response to inflammation.

Neptune Krill Oil's potential to affect these inflammatory mediators may be the reason it has shown such great promise in reducing inflammation. In one randomized, double-blind, placebo-controlled study, my colleagues and I investigated NKO's effect on patients with joint pain and stiffness

associated with osteoarthritis.<sup>4</sup> Subjects diagnosed with cardiovascular disease, rheumatoid arthritis, or osteoarthritis and who had high levels of C-reactive protein (greater than 1.0 mg/dl) were eligible to participate in the study. Ninety subjects were randomly assigned to either Neptune Krill Oil 300 mg per day or a placebo. Patients also were able to consume 325 mg tablets of acetaminophen if needed for pain.

At baseline, and 7, 14 and 30 days after treatment, researchers measured blood C-reactive protein (CRP) levels. We also evaluated the extent of joint pain, flexibility and stiffness by asking the subjects to answer questions on the WOMAC questionnaire. The Western Ontario and McMaster University Osteoarthritis Index (WOMAC) assesses the efficacy of treatment effects in patients with osteoarthritis. The result indicated that Neptune Krill Oil could cause a drop in CRP levels. Patients treated with NKO experienced a reduction from a mean CRP measurement of 2.49 mg/dl at baseline to 1.72 mg/dl at the end of the 30-day study—what amounted to a nearly 31 percent drop in CRP levels. Placebo-treated patients, in contrast, experienced a rise in mean CRP levels from 2.87 mg/dl at baseline to 3.59 mg/dl after 30 days.

WOMAC scores also improved with NKO treatment, indicating that Neptune Krill Oil was having an effect on joint pain and stiffness. WOMAC pain scores, which at baseline were a mean of 3.39 in the NKO-treated group, fell to a mean of 2.09 after 30 days. In the placebo group, pain scores remained virtually unchanged during the study. WOMAC stiffness scores also declined in the Neptune Krill Oil group. At baseline, the mean stiffness score of patients in the NKO group was 3.45. By 30 days, this score had declined to a mean

of 2.10 in the NKO group. The placebo group experienced a slight rise in stiffness scores from a mean of 2.85 at baseline to 2.97 after 30 days.

The NKO-treated group also experienced a lessening in functional impairment (i.e. an increased ability to move). The mean WOMAC functional impairment score decreased from a mean of 3.34 at baseline to 2.14 after 30 days in the NKO group. The placebo group experienced only a slight improvement in functional impairment from a mean of 2.98 at baseline to 2.78 after 30 days.

As a result of these findings, my colleagues and I concluded: "Successful demonstration of an enhanced effect may provide a basis for clinical use of Neptune Krill Oil in patients with inflammatory disease."

### **Astaxanthin as Anti-Inflammatory**

One major component of Neptune Krill Oil, a carotenoid called astaxanthin, also has demonstrated anti-inflammatory properties. It is thought to influence inflammation by inhibiting inflammatory mediators known as NF-kappaB and tumor necrosis factor-alpha (TNF-alpha).

In one study, researchers induced uveitis intraocular (eye) infections in rats. They then injected varying doses of astaxanthin into the animals. Over the disease duration, the researchers measured the expression of inflammatory cytokines and chemokines in animals who had been given astaxanthin and animals that remained untreated.

Rats injected with astaxanthin showed a significant decrease in the number of infectious cells in the anterior chamber of the eye. In addition, there was a significantly lower concentration of inflammatory mediators such as TNF-alpha and prostaglandin E2 in the aqueous humor of the eye. Moreover, even early stages of uveitis were suppressed by injection of astaxanthin. The number of activated NF-kappaB-positive cells was lower in iris-ciliary bodies of the eye treated with 10 or 100 mg per kg astaxanthin at 3 hours after inoculation with the infection.<sup>5</sup>

According to the researchers, "These results suggest that AST reduces ocular inflammation in eyes with EIU by down-

regulating proinflammatory factors and by inhibiting the NF-kappaB-dependent signaling pathway."

Researchers often use the substance carrageenan to induce edema in animal experiments. In one study, they used carrageenan to induce inflammation of the paws in rats. Then they administered astaxan-

***“One major component of NKO is thought to influence inflammation by inhibiting inflammatory mediators.”***

thin. Astaxanthin significantly inhibited the carrageenan-induced inflammation.<sup>6</sup>

A synthetic form of astaxanthin, Disodium Disuccinate Astaxanthin, also has been shown to lower levels of C-reactive protein.<sup>7</sup> In addition, this synthetic form has reduced injury to rabbit hearts after researchers occluded the animals' arteries.<sup>8</sup>

Although the above study investigating astaxanthin and heart health was conducted with a synthetic form of astaxanthin, it would be interesting to see the results of similar studies using the natural form of this carotenoid, as I suspect the results would be similar.

### **Conclusion**

Neptune Krill Oil as a whole as well as one of its main components, the carotenoid astaxanthin, have exerted anti-inflammatory effects. These properties indicate that NKO may assist anyone seeking to support joint and heart health or who wants to maintain healthy levels of C-reactive protein.

Next Month: I conclude my three-part Neptune Krill Oil series with a discussion about how astaxanthin inhibits H. Pylori in animals, and how NKO can support women with PMS, dysmenorrhea (painful menstruation) and breast tenderness. I will also

discuss NKO's ability to increase feelings of well being and improve skin health.

*Tina Sampalis MD, PhD*

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# The Fifth Component

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health. The amino acid carnosine has emerged as a vision-supporting supplement with an ability to delay cataract formation. Its mechanism of action may be by protecting lens protein against cross-links and DNA damage and/or antioxidant effects.<sup>32</sup>

## Conclusion

Preserving vision through consuming the proper nutrients and making the correct lifestyle choices is vital to healthy aging. Maintaining our vision as we age is part of a broader approach that takes into consideration cardiovascular, bone and joint, blood sugar and cognitive health. I encourage you to read all six installments of *The Five Components to Healthy Aging*, beginning with the overview that appeared in the January newsletter, and to view Table 2 in this article, which summarizes the nutrients we have discussed in each article of the series.

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# NUTRITION REVIEW

## Arginine Important for Heart Health

The amino acid arginine may help the heart recover after ischemia, a new study has found.

It is thought that nitric oxide influences heart ischemia. In addition, nitric oxide may play a role in the damage that can occur during reperfusion, where blood flow is reinstated to a previously ischemic area. Because arginine increases the production of nitric oxide, the current study investigated arginine's effects on ischemia

and reperfusion in rabbit hearts.

The researchers divided the hearts into a number of groups, including hearts from animals with high cholesterol, hearts from animals treated with L-arginine and a control group. During early ischemia, the nitric oxide release decreased markedly in the rabbits' hearts, even those treated with L-arginine. After reperfusion, nitric oxide release increased above baseline in control, L-arginine and hypercholesterolemic groups. However, hearts treated with L-arginine, even though they had similar nitric oxide release to the other groups,

recovered better from the ischemia and reperfusion than hearts from the controls or hypercholesterolemic animals.

The study authors concluded, "Improved function after L-arginine treatment appears to be independent of effects upon NO release."

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# Estrogen Balancing

Continued from page 7

opment of breast tumors by 70-90 percent.<sup>8</sup> Studies on human breast cancer cell lines show that DIM inhibits the growth of both estrogen-dependent and estrogen-independent cancer cells by approximately 60 percent. This study also showed that DIM binds to the estrogen receptors in these cells, inhibiting the binding of estradiol.<sup>9</sup> Other evidence shows that I3C decreases both the growth of blood supply to cancer cells and the spread of the cancerous cells locally and that it protects the liver from carcinogens.<sup>10</sup>

***“In animal studies, long-term administration of I3C decreased spontaneous breast tumor development by 50 percent and endometrial tumors by 24 percent.”***

Another interesting property of DIM is that it exhibits anti-androgenic activity. Research shows that DIM inhibits dihydrotestosterone (DHT) from binding to androgen receptors in androgen-dependent human prostate cancer cells, decreasing the induction of DNA synthesis. DIM also decreased levels of prostate specific antigen (PSA). This protein is frequently measured to evaluate prostate cancer risk. Additional research has shown that DIM induces cell-cycle arrest and apoptosis in prostate cancer cells as well as by regulating several genes.<sup>11</sup>

## Resveratrol

Resveratrol is a natural polyphenol found in high concentrations in red grape skins, berries, and peanuts. It is found in high concentration in the diet in red wine and red grape juice. Resveratrol is widely studied due to its antioxidant, anti-inflammatory, anticancer and anti-aging properties.

Studies with resveratrol indicate that this polyphenol inhibits the activity of aromatase in breast cancer cells, a particularly important fact considering aromatase is expressed at a higher level in breast cancer tissue than in surrounding healthy tissue. In fact, resveratrol inhibits the conversion of estrogen and decreases the synthesis of the aromatase enzyme, thus indicating that it may support the health of individuals concerned about breast cancer.<sup>12</sup> Research also shows that red wine extracts reversed aromatase-induced increased tissue size and other neoplastic changes in breast tissue.<sup>13</sup> Research indicates that resveratrol also is effective at preventing several stages of carcinogenesis. It decreases tumor initiation, promotion, and progression, and induces apoptosis in many types of cancer cells.<sup>14</sup>

## Conclusion

Balancing estrogen levels is essential for optimizing overall health in both women and men. A substantial amount of research is being done to identify potential phytonutrients—such as indole-3-carbinol (I3C), diindolylmethane (DIM) and resveratrol—that may modulate estrogenic activity. These phytonutrients provide exciting new avenues to pursue in the regulation of hormonal health.

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5-HTP .....	CP5765
Acetyl-L-Carnitine .....	CP4911
Advanced Inflammation Control ...	CP1625
Beta Glucan .....	CP5043
BioDIM® .....	CP8085
BioTears .....	CP2029
CoQ10-H <sub>2</sub> ™ .....	CP6300
Culturelle® .....	CP9182
Detox FiberPlex .....	CP1510
DHEA .....	CP6361
EpiCor® .....	CP1490
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## Forskolin Important for Bladder Health

Forskolin, an extract from the coleus plant, may stop urinary tract infections by reducing the number of intracellular *E. coli* bacteria.

The superficial bladder epithelium is a powerful barrier to urine and also serves as a regulator of bladder volume. However, during UTIs, *E. coli* bacteria can adhere to the bladder epithelium.

Duke University Medical Center researchers injected forskolin into the bladder or administered it intravenously in mice infected with *E. coli*. In animals given forskolin, more than 75 percent of the *E. coli* bacteria in the superficial bladder epithelium were expelled from the animals' bodies. Forskolin also appeared to render the microbes more vulnerable to antibiotic treatment.

Past studies have found that bladder infections recur because some of the *E. coli* remain in the bladder even after treatment. The bacteria avoid the effects of the antibiotics by hiding in the bladder lining and begin multiplying again. According to the researchers of the current study, forskolin's ability to expel the bacteria from the bladder epithelium may help prevent recurrent infections.

### Reference:

Bishop BL, Duncan MJ, Song J, Li G, Zaas D, Abraham SN. Cyclic AMP-regulated exocytosis of *Escherichia coli* from infected bladder epithelial cells. *Nature Medicine*. Published online April 8, 2007.

## Diindolylmethane's Role in Female Health Investigated

Scientists have investigated a new mechanism of action by which the cruciferous-vegetable-derived diindolylmethane (DIM) can lower the risk of breast and ovarian cancer.

According to the new study, DIM, a breakdown product of cruciferous vegetable digestion, may interfere with the CXCR4/CXCL12 axis, known to play a central role in the spread of breast and ovarian cancer.

Primary cancer cells express very high levels of the CXCR4 chemokine receptor on the surface of their cells, and the organs

to which these cancers spread secrete high levels of the CXCL12 chemokine ligand. The attraction that occurs between the receptor and ligand draws cancer cells to various organs, causing the spread of the disease. This chemical attraction is linked to the development of more than 23 different types of cancer.

Researchers exposed breast and ovarian cancer cells to pure DIM and found that it decreased the levels of the CXCR4 and CXCL12 proteins in a dose-dependent manner. The researchers also created a model of cancer metastasis by placing the cancer cells in one end of a compartment and watching how the cells moved toward CXCL12 at the other end of the compartment. In this model that shows how cancer cells migrate to other areas of the body, the cells degrade the extracellular matrix in the upper compartment in order to move toward CXCL12 in the lower compartment. However, exposure with DIM stopped the cancer cells from moving by approximately 80 percent.

The researchers also investigated the soy component genistein and found that it had similar effects against CXCR4 and CXCL12.

### Reference:

Hsu EL, Hankinson O. A novel mechanism for the chemoprotection by 3,3-diindolylmethane (DIM) and genistein for breast and ovarian cancers. Annual Meeting of the American Association for Cancer Research, April 2007, Abstract 4217.

## Zinc Improves Immunity, Reduces Oxidative Stress in Seniors

Researchers have found that healthy seniors who supplement with zinc experience a reduced rate of infections and oxidative stress.

Zinc deficiency, cell-mediated immune dysfunction, susceptibility to infections, and increased oxidative stress all have been observed in subjects older than 55 years. Zinc also has been found to have anti-inflammatory and antioxidant activity.

In the current randomized, double-blind, placebo-controlled trial, researchers determined whether zinc would have an effect on the incidence of total infections in healthy

elderly subjects. They also investigated if zinc would have an effect on oxidative stress markers, and on the generation of tumor necrosis factor, a group of white blood cells known as cytokines responsible for inflammation that are linked to everything from psoriasis to heart failure.

Fifty healthy subjects of both sexes ages 55 to 87 years and inclusive of all ethnic groups were recruited from a senior center for the study. The zinc-supplemented group received 45 mg zinc per day orally for 12 months. Researchers documented the incidence of infections during the supplementation period as well as the generation of inflammatory cytokines, T helper 1 and T helper 2 cytokines, and oxidative stress markers. The plasma concentrations of zinc were measured at baseline and after supplementation.

Compared with a group of younger adults, at baseline the older subjects had significantly lower plasma zinc, higher generation of inflammatory cytokines and interleukin 10, and higher plasma oxidative stress markers and endothelial cell adhesion molecules. Endothelial cells are the cells lining the arteries and the increase in adhesion molecules signifies that increased build up and inflammation was occurring in the arteries of the subjects. However, in subjects supplemented with zinc, the incidence of infections declined. In addition, the generation of tumor necrosis factor and plasma oxidative stress markers were significantly lower in zinc-supplemented subjects compared to the placebo group.

The researchers concluded, "After zinc supplementation, the incidence of infections was significantly lower, plasma zinc was significantly higher, and generation of tumor necrosis factor and oxidative stress markers was significantly lower in the zinc-supplemented than in the placebo group."

It should be noted that consuming zinc at levels too far above 50 mg per day can lower immunity.

### Reference:

Prasad AS, Beck FWJ, Bao B, Fitzgerald JT, Snell DC, Steinberg JD, Cardozo LJ. Zinc supplementation decreases incidence of infections in the elderly: effect of zinc on generation of cytokines and oxidative stress. *American Journal of Clinical Nutrition*. March 2007;85(3):837-844.

## Kelp Supplements May Contain Arsenic

A new study has found that kelp supplements may be contaminated with arsenic.

Individuals consume kelp supplements to increase their iodine intake. However, research now indicates that kelp supplements may be contaminated with heavy metals.

Researchers decided to investigate the arsenic levels in kelp supplements when a 54-year-old woman was referred to the University of California, Davis, Occupational Medicine Clinic. The woman had a 2-year history of worsening alopecia and memory loss. She also reported having a rash, increasing fatigue, nausea, and vomiting, disabling her to the point she could no longer work full-time. A thorough exposure history revealed that she took daily kelp supplements. A urine sample showed a high arsenic level. A sample from the woman's kelp supplements contained 8.5 mg/kg (ppm) arsenic. Within weeks of discontinuing the supplements, her symptoms resolved and arsenic blood and urine levels were undetectable.

This case history led the researchers to evaluate the extent of arsenic contamination in commercially available kelp. They analyzed nine samples randomly obtained from local health food stores. Eight of the nine samples showed detectable levels of arsenic higher than the FDA tolerance level of 0.5 to 2 ppm for certain food products.

### Reference:

Amster E, Tiwary A, Schenker MB. Case Report: Potential Arsenic Toxicosis Secondary to Herbal Kelp Supplement. *Environmental Health Perspectives*. April 2007;115(4).

This study indicates that *Iodoral*<sup>®</sup>, a natural iodine supplement, may provide a safer way to consume iodine. Compared to kelp, *Iodoral* also contains more nourishing quantities of iodine.

## Black Cohosh May Improve Breast Health

Black cohosh, an herb often used to support the health of women undergoing menopause, may reduce the risk of developing breast cancer by more than 60 percent, a new study has found.

Black cohosh has been a popular alterna-

tive to hormone replacement therapy (HRT). The literature reports that black cohosh may be effective in treating menopausal symptoms, and that it has anti-estrogenic, antiproliferative and antioxidant properties.

Due to the fact black cohosh contains phytoestrogens, researchers conducted an epidemiological study to see if women who consume black cohosh supplements have a reduced breast cancer risk. They studied 949 breast cancer cases and 1,524 controls. The researchers gathered information about the use of supplements like black cohosh through questionnaires.

After adjusting for potential confounding factors, the study authors determined that the use of black cohosh was associated with a 61 percent reduction in breast cancer risk.

Previously, concerns had been raised about breast cancer patients taking black cohosh supplements because one study reported that black cohosh might interact with chemotherapy by increasing or decreasing the cell-killing activity of chemotherapy drugs. The researchers of the current study hope that their results will encourage researchers to study black cohosh farther to see if it can help prevent breast cancer as well as to determine its safety and efficacy in patients who already have breast cancer.

### Reference:

Rebeck TR, Troxel AB, Norman S, Bunin GR, DeMichele A, Baumgarten M, Berlin M, Schinnar R, Strom BL. A retrospective case-control study of the use of hormone-related supplements and association with breast cancer. *Int J Cancer*. 2007 Apr 1;120(7):1523-8.

## Green Tea Component May Improve Joint Function in Autoimmune-Impaired Subjects

According to a new study, epigallocatechin-3-gallate (EGCG), a main component of green tea, may inhibit inflammation associated with joint damage in subjects with rheumatoid arthritis. The study results indicate that the tea extract may suppress inflammatory mediators in the connective tissue of people with rheumatoid arthritis.

To reach this conclusion, the study authors focused on synovial fibroblasts (cells that line the tissue surrounding the joint capsule) from rheumatoid arthritis patients. These fibroblasts were cultured in a growth medium and incubated with

EGCG. The researchers then added the pro-inflammatory cytokine interleukin-1 beta (IL-1beta) to the culture medium. IL-1beta, an immune system protein, is thought to be involved in rheumatoid arthritis joint destruction.

When untreated cells were stimulated with IL-1beta, a cascade of events occurred that resulted in production of the bone-destructive molecules interleukin-6 (IL-6) and cyclooxygenase-2 (COX-2). However, when the cells were incubated with EGCG the production of IL-6 and COX-2 did not occur.

The scientists plan to conduct animal studies to determine if EGCG provides similar effects in vivo. If so, then the scientists plan to see what effect EGCG might have in humans with rheumatoid arthritis.

### Reference:

Ahmed SU, Pakozdi A, Koch A. *Experimental Biology* 2007, Washington, D.C., April 29, 2007.

## Customer Comments

To whom it may concern:

I wanted to write to tell you how thrilled I am with your BioDIM<sup>®</sup> product. I had struggled with estrogen dominance for nearly 5 years. It had gotten to a point that it was nearly debilitating and nearly cost me my marriage. I finally found a naturopathic doctor a year and a half ago who was incredibly helpful. After a year of trying numerous things that helped, but never was really enough, he suggested BioDIM. I can tell you that after the first month I was feeling tremendously better and now 5 months out it's miraculous! Now I have a few days once in a while that I don't feel so good instead of having a few days once in a while that I feel good.

The icing on the cake was when my doctor called yesterday to give me my latest saliva test results. Five months ago my estrogen was at 6.6 and now it is down to 1.2-within the normal range. Praise God and your company!!

Thank you, thank you! I have a life again and I'm enjoying it.

Mrs. B.

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- Forskolin Important for Bladder Health
- D-Indolylmethane's Role in Female Health Investigated
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- Kelp Supplements May Contain Arsenic
- Black Cohosh May Improve Breast Health
- Green Tea Component May Improve Joint Function in Autoimmune-Impaired Subjects

**Fertility Enhancement:**  
A Pre-Conception Nutritional Approach



**Salivary Hormone Testing**  
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**Estrogen Balancing for Women and Men:**  
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**Customer Corner**

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