THE SCIENCE BEHIND THE DIET

PART ONE: THE LIVER

Why is the liver important?

The liver is the largest organ in the body and it plays a vital role, performing many complex functions which are essential for life. Your liver serves as your body's internal chemical power plant. While there are still many things we do not understand about the liver, we do know that it is impossible to live without it, and the health of the liver is a major factor in the quality of one's life.

Some important functions of the liver are:

- to convert the food we eat into stored energy, and chemicals necessary for life and growth;
- to act as a filter to remove alcohol and toxic substances from the blood and convert them to substances that can be excreted from the body;
- to process drugs and medications absorbed from the digestive system, enabling the body to use them effectively and ultimately dispose of them;
- to manufacture and export important body chemicals used by the body. One of these is bile, a greenish-yellow substance essential for the digestion of fats in the small intestine.

One of the best kept secrets to weight loss is maintaining the liver!
Bile, which is synthesised and secreted by the liver helps the liver break down fats. Bile cannot do its job if it lacks the nutrients needed to make bile salts or if it is thickened with chemicals, toxins, excess sex hormones, drugs and/or heavy metals.

One of the primary ingredients of bile is LECITHIN. Also fresh lemon juice and water is a great bile thinner.

Cranberry juice, water and psyllium provide nutritional support for the liver.

Protein helps the liver to function and helps to renew damaged liver cells. L-Carnitine (found in beef and lamb) protects the liver from toxins.

Flaxseed oil – attracts and binds to the oil soluble poisons in the liver and it also stimulates bile production.

Garlic and onion encourage bile secretion and aid liver function.

Lipotropic substances decrease fat storage rate in liver cells and accelerate fat metabolism. Dandelion root, milk thistle, turmeric, Oregon grape root are some of these.

Dandelion stimulates the liver to produce more bile to the gallbladder whilst causing the gallbladder to contract and release its stored bile – thus assisting in fat metabolism.

Inositol – helps prevent excess fat buildup.

Cruciferous vegetables such as broccoli and cabbage are very high in sulforaphane, a substance your liver uses in converting toxic waste into non-toxic waste for elimination.

Milk thistle – is a “wonder supplement” for supporting the liver. It can regenerate cells even in people with liver cirrhosis.

The active liver-protecting ingredient in milk thistle is known as silymarin.

Silymarin is a powerful antioxidant, and seems to block toxins and possibly reduce inflammation of the liver. Some evidence suggests
it may enhance protein synthesis in the liver, and help repair liver damage.

Milk thistle is most closely associated with treating ailments of the liver and digestive system, but it has shown promise in treating a number of other ailments as well. These include gallstones, high cholesterol, allergies, and even skin cancer. Milk thistle is known to be a powerful antioxidant, and it's those antioxidant properties which may be responsible for the protective and healing effects of the herb.

It is thought that milk thistle has the ability to speed up elimination of toxins from the body, due to its effect on the liver and bile secretion.

Milk thistle is available in a wide variety of preparations and forms, including tablets, soft gels, capsules, and tinctures. People using milk thistle to treat liver ailments are often advised to take a standardized extract of 400 to 600 mg every day, ingested in three equal doses

**CONCLUSIONS**

To help lose weight and fight disease it is important to keep the liver healthy.

To do this we need to include in this diet:

- 200mg milk thistle x 3 times per day
- Dandelion x 1,000mg per day
- Lecithin and Inositol x
- L-Carnitine x 1g per day
- Garlic and onion
- Broccolli and cabbage
- Sufficient Protein @ 1g per 1lb lean bodyweight (take your ideal weight and use that for the calculation)
- Gingeroot
- Flaxseed oil ~ lemon juice and water ~ cranberries
WHAT IS THE LYMPHATIC SYSTEM?

The lymphatic system is one of our body’s most important defenses against infection. Lymphatic vessels are much like tiny vessels and extend throughout the body.
The lymphatic system is vital to health:

- it provides a route for absorption of nutrients
- it gathers fats, excess fluid, body wastes and other materials removing them from the cell spaces and carrying them to the blood for eventual elimination.

In other words – it is the body’s waste disposal system. If it doesn’t work properly or it becomes overloaded it will deposit its “waste” in fat cells. This is how you get cellulite! It also means that excess hormones can end up being dumped in fat cells; entering the body again and causing further hormonal imbalances.

It is also important for PCOS and weight loss then to keep the lymphatic system in good working order!

Let’s talk about the eliminative organs, such as the bowel, kidneys, lungs, lymph system, or skin, for example. When a foreign substance is present, the body’s first reflex is to expel or eliminate it. When this elimination is suppressed by any means such as taking pharmaceutical drugs, for example, some of the foreign matter gets pushed back into the system. As elimination is blocked, the very substances the body is trying to eliminate become stored within the body, causing any number of disease symptoms. the body then becomes toxic. When this happens, the degenerative disease process begins

**Symptoms of a congested lymphatic system**

Many people have badly congested lymphatics and don’t even know it. At this time in our country the lymphatic system is the most over-looked system of the human body.

In Europe stimulation of the lymph flow is the fourth most commonly prescribed medical treatment. Most U. S. healthcare practitioners seldom consider the lymphatic system’s critical role in preventing illness or its importance to the over all healing process. Some of the organs that are part of the lymphatic system are
lymph nodes and lymph veins, the tonsils, adenoids, appendix and the spleen and you know what happens to those parts of the body whenever surgeons get close to them.

Swollen glands, with which most of us are familiar, are symptomatic of blocked lymph nodes, which indicate a breakdown in the mechanical functioning of the lymphatic system.

Other examples of congested lymphatics are:

**Allergies**
Heart disease
Loss of Energy
Fibrocystic disease – important to note for PCOSers
Chronic fatigue – important to note for PCOSers
Multiple Sclerosis
Edema
Inflammation – important to note for PCOSers
**High blood pressure** – important to note for PCOSers
Viral infections
Bacterial infections
Low back pain
Loss of Energy – important to note for PCOSers
**Cancer**
Ear or balance problems
**Arthritis**
Headaches
Cellulite – important to note
Excessive sweating
Obesity – important to note for PCOSers

**Moving your lymph to help detoxify the body**

The lymphatic system is not connected to the heart, therefore it has to rely on some other activity to create the necessary "pumping action" it needs to circulate. The most important ways of increasing lymphatic circulation are:

1) massage and
2) vigorous **exercise** (don’t turn off just yet!)

The lymphatic system is filled with millions of one-way valves, which allows the lymph fluid to flow in only one direction - usually upward away from gravity.

Almost anything which can stimulate the movement of lymph fluid inside the lymph vessels is beneficial, but the most efficient way to stimulate the flow of lymph fluid is by REBOUNDING on a mini-trampoline. The up and down rhythmic bouncing causes all of the one-way valves to open and close simultaneously, increasing lymph flow as much as 15 times. Rebounding is a highly beneficial form of exercise.

When you are bouncing on a rebounder the G-force at the top of the bounce is effectively non-existent as, for a moment, your body takes on the total weighlessness of an astronaut in space. Then, when you come down again onto the elastic mat, the effective pull of gravity is suddenly increased to two or even three times the usual G-force on earth. This puts the parts of your body under rhythmic pressure.

The kind of cellular stimulation the body receives from this continual gravity/non-gravity exposure stimulates the elimination of wastes from your cells into the interstitial fluid to be carried away through the lymph system and eliminated from the body. Increased oxygen is also brought to the cells to stimulate metabolism. This encourages the steady detoxification of your whole system. The texture of your skin improves, your energy levels rise and sometimes within only a few days, your body begins to look younger and feel better.
CONCLUSION

Lymph friendly things to be added to this diet include:

- dry skin brushing and/or massage
- daily rebounding
Fibre is essential in eliminating excess hormones. Fibre binds toxins and excess hormones so that they are eliminated from the body and not reabsorbed.

**Fibre** will bind the excess estrogen caused by PCOS and help to eliminate it. It can act as a “double whammy” with the lymph system to help get rid of toxins and excess hormones to help create a more balanced hormonal environment.

**Estrogen Dominance**

Causes fat gain, bloating, water retention. Excess estrogen also changes the way your body metabolises tryptophan which is the precursor to serotonin. Serotonin deficiency can lead to depression, food cravings and weight gain.

Low Progesterone can also often be seen in the PCOS syndrome.

Low progesterone levels can cause your body to burn fewer calories – you may not produce enough progesterone because:

Zince and B6 deficiencies

Lack of ovulation

Stress is causing your body to turn progesterone into cortisol.
Another way to help eliminate estrogens is to use \textbf{phytoestrogens} in the diet. Flaxseed is one of the richest sources of phytoestrogenic lignans. By binding to estrogen receptors and interfering with enzymes that convert various hormones to estrogen. Soy is another useful dietary source of phytoestrogens – but should be used in moderation.

Another cause of excess estrogen can be caused by hormones, toxins and chemicals found in our food. You can eliminate the hormones found in meat and dairy by choosing organic products where possible.

To get rid of pesticides and chemicals in food you can use a food bath.

Use 1 teaspoon of clorax (sodium hypochlorite) in one gallon of water.

Place the food in the bath, then remove, place in clear water for 10 minutes, dry and store. It actually also helps to keep food fresher for longer as it oxygenises the food before storage!

- Leafy vegetables – soak for 15 minutes
- Root/fibrous vegetables – 30 minutes
- Fruit – 30 minutes
- Poultry, fish, meat and eggs 20 minutes
- The bath also removes parasites and bacteria from the food.

EFAs are precursors to hormone-like prostaglandins – they regulate every body function at the cellular level. EFA is the building block for production of hormones.
CONCLUSIONS

To help eliminate excess hormones the diet needs to include:

- Sufficient fibre
- Flaxseed and/or moderate amounts of soy (soy increases progesterone activity and helps to prevent excess estrogens but it can, if used excessively affect the thyroid) using soy a couple of times per week should be safe and beneficial
- Organic dairy and meat where possible
- Clorax bath where appropriate
- Zinc and Vitamin B6
- Ensure the diet is rich in omega-3s
- Eliminate stress to avoid progesterone turning into Cortisol
PART FOUR: THE HEART AND DIABETES

Type 2 diabetes is normally preceded by decades of slowly increasing insulin, blood sugar and belt-size.

Smart nutrition can first prevent obesity and then diabetes and eventually heart disease.

High levels of insulin cause several problems: one of them is high blood pressure. One of the roles of insulin is to assist the storing of excess nutrients. Insulin plays a role in storing magnesium. But if your cells become resistant to insulin, you can't store magnesium so you lose it through urination. Intra-cellular magnesium relaxes muscles. What happens when you can't store magnesium because the cell is resistant? You lose magnesium and your blood vessels constrict. This causes an increase in blood pressure.

Insulin also causes the retention of sodium, which causes fluid retention, which causes high blood pressure and congestive heart failure.

A recent study(1) showed that overweight children with high levels of insulin in their blood are also likely to have high levels of homocysteine, a substance which appears to raise the risk of heart disease, stroke, and birth defects

Women with PCOS have a consistent elevation of plasma total homocysteine concentration suggesting they have significantly increased long-term risk of coronary artery disease.

So, high levels of insulin can cause diabetes and high levels of homocysteine which can cause heart disease.

We already know that to prevent diabetes we need to reduce our insulin levels. So how can we also lower our homocysteine levels?

Studies have already shown that NAC may significantly lower homocysteine levels. Add to that the antioxidant effect in reducing
plaque that can clog arteries, and it's clear why NAC is regarded as a potentially useful tool in fighting heart disease and preventing strokes and heart attacks.

Beyond heart and respiratory health, researchers believe that further studies may show NAC to provide preventive benefits for vision health. Because both the macula and the lens of the eye have been shown to respond favourably to a boost in antioxidant activity, it's theorised that NAC supplements may help prevent age-related macular degeneration and cataracts.

Homocysteine levels may be effectively lowered when folate is taken with vitamins B-6 and B-12; a combination referred to as "folate therapy." The idea behind this therapy is simple. This set of nutrients prompts the metabolism of homocysteine (an amino acid), which brings the level down.

It's obviously a good idea to try to incorporate folate-rich foods into your diet, especially because this important nutrient has also been shown to reduce the risk of colon cancer, hip fracture, and birth defects (when folate levels are sufficient in women of childbearing age).

According to the US Food and Drug Administration (FDA), these foods deliver high folate concentrations:

- Chicken Liver: 3.5 oz. contains 770 micrograms (mcg)
- Braised Beef Liver: 3.5 oz. contains 217 mcg
- Lentils: 1/2 cup (cooked) contains 180 mcg
- Asparagus: 1/2 cup contains 132 mcg
- Spinach: 1/2 cup (cooked) contains 131 mcg
- Kidney Beans: 1/2 cup contains 115 mcg
- Orange: A medium size contains 47 mcg

The recommended dose of folate is 1.6 mg per day, although he believes that a dosage closer to 5 mg is better for those who want to address cardiovascular problems.
Unfortunately, folic acid is only available in very low doses of 0.8 mg (800 mcg) because of the conventional medical dogma that folate can mask a vitamin B-12 deficiency if you take too much folate and zero B-12. "So... take more B-12. Problem solved! 1 mg of B-12 per day in sublingual form.

To get the most out of folate, 100 mg per day of B-6 is necessary, as well as 400-500 mg of magnesium per day to make the B-6 more effective.

A number of important studies have concluded that B vitamins (folic acid, B6 and B12) and vitamin E neutralise oxidative damage that contributes to heart disease.

But two recent studies, published just days apart, have provided striking new evidence of the ways that the cardiovascular system is protected by vitamin B supplements and dietary sources of vitamin E.

I'll begin in Italy where a team of researchers at the A Cardarelli Hospital in Naples "borrowed" subjects from a large 4-year study designed to investigate the causes of chronic diseases in women.

The A Cardarelli team enlisted a group of 307 women between the ages of 30 and 69 to find out how middle-aged women (their words, not mine) would respond to antioxidant vitamins in relation to carotid atherosclerosis - the formation of plaque in the two main arteries on either side of the neck, and a marker that suggests artery disease may be present elsewhere in the body.

The test began with a high-resolution ultrasound of each woman to detect early signs of plaque build up in the carotid arteries. Clinical interviewers then used an exhaustive questionnaire to determine each subject's dietary habits, as well as medical history, drug use and personal habits, such as smoking and alcohol consumption.

None of the women took vitamin supplements, which was one of the criteria to qualify for the study. After the questionnaire was completed, blood samples were taken from each subject over a 6-month period to measure their levels of the antioxidant vitamins E and A.
Of course, I've already tipped my hand about the results, so it will be no surprise that the researchers observed that women who had higher levels of vitamin E in their diets were far less likely to show early signs of carotid atherosclerosis.

In addition, women who had low levels of dietary vitamin E were determined to be at high risk of developing plaque in their arteries.

The report notes that the dietary sources of vitamin E came from fresh vegetables, legumes and a high intake of monounsaturated fatty acids from olive oil. A more specific list of the primary food sources of vitamin E, include: dark green leafy vegetables, avocados, whole grains, nuts, dried beans, seafood, eggs, and organ meats such as liver and kidney.

Omega-3 fatty acids have been shown to play a part in keeping cholesterol levels low, stabilizing irregular heart beat (arrhythmia), and reducing blood pressure. Researchers now believe that alpha-linolenic acid (ALA), one of the omega-3s, is particularly beneficial for protecting against heart and vessel disease, and for lowering cholesterol and triglyceride levels. An excellent source of ALA is flaxseed oil, sold as both a liquid oil and a semisolid margarine-like spread.

Omega-3 fatty acids are also natural blood thinners, reducing the "stickiness" of blood cells (called platelet aggregation), which can lead to such complications as blood clots and stroke.

Studies of large groups of people have found that the more omega-3 fatty acids people consume, the lower their overall blood pressure level is. This was the case with the Greenland Eskimos who ate a lot of oily, cold-water fish, for example. Also your body is less effective in using insulin when omega-3 fats are missing.

What about Sodium and it’s role in blood pressure and heart health?

GLA induced prostaglandins are connected to a metabolic process referred to as ATPose. ATPose is also known as the sodium pump – a biochemical process necessary to keep the right amount of potassium inside cell walls and too much sodium out!
GLA is found in evening primrose oil.

**Sodium**

How much sodium should you have? Experts suggest that 3,000 mg would be a good target for healthy adults.

People with high blood pressure are often advised to eat less sodium. Salt is the most usual source of sodium: one teaspoon has 2,325 mg of sodium. Use less salt in cooking and at the table, but also go easy on prepared foods that have sodium added. Canned soups, frozen dinners, cured meats and luncheon meats, chips, crackers, dill pickles, and sauerkraut are examples of foods that can have high amounts of sodium per serving.

The sodium content of a serving of food will be listed on the new food label as the number of milligrams of sodium in a serving and percent daily value.

<table>
<thead>
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<th>If the label says:</th>
<th>then the amount of sodium per serving is:</th>
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<tbody>
<tr>
<td>Low sodium</td>
<td>140 mg or less</td>
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<tr>
<td>Very low sodium</td>
<td>35 mg or less</td>
</tr>
<tr>
<td>Sodium free or salt free</td>
<td>5 mg or less</td>
</tr>
<tr>
<td>&quot;Light in sodium&quot; or &quot;Lightly salted&quot;</td>
<td>50% less than usual product</td>
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<tr>
<td>Reduced sodium</td>
<td>75% less than usual product</td>
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<tr>
<td>Unsalted or no salt added</td>
<td>None added but may contain sodium</td>
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You can also buy low sodium salt if you absolutely need to have your salt!

One way of avoiding too much sodium in the diet is to avoid prepacked foods!

In a study in Warwick, a group of women who exercised for six months had a significant drop in their homocysteine levels. They also reduced their waist-to-hip ratio, meaning that their bellies got
smaller. In contrast, there was no change in the non-exercising group.

**Red Grapefruit**

Eating a red grapefruit a day could reduce cholesterol by 15 per cent and triglycerides by 17 per cent and protect against heart disease.

Researchers from the Hebrew University's Hadassah Medical School performed both in vitro and human studies on the antioxidant effects of red and white grapefruits.

Grapefruits and other citrus fruits are known to contain high concentrations of antioxidants like vitamin C, and polyphenols, especially flavonoids. The new study claims to be the first to look at different grapefruit types and their influence on humans who suffer from high blood cholesterol (hyperlipidemia) and hardening of the arteries (atherosclerosis), both of which play major roles in heart disease.

The in vitro studies measured antioxidant activity in terms of radical scavenging activity, beta-carotene linoleate models, and oxygen radical absorbance capacity (ORAC). Red peeled grapefruits scored 15 per cent higher on the beta-carotene test, and 10 per cent higher for radical scavenging.

For the human trial, 57 post-operative bypass patients with high triglyceride levels in the blood (hypertriglyceridemia) were divided into three groups. The standard anti-atherosclerosis diet of two groups was supplemented by one Israeli Jaffa red or white grapefruit for 30 days. The third group ate the standard diet and was considered the control group (CG).

The standard anti-atherosclerosis diet consisted of 66 per cent energy intake from carbs, 25 per cent from protein and 9 per cent from fat. "The results of the investigation in humans have shown that a generally accepted antiatherosclerosis diet supplemented with fresh red or blond grapefruits positively influences the serum levels of total cholesterol and low-density lipoprotein [bad] cholesterol (LDL-C)," said lead researcher Shela Gorinstein.
“However, only a diet supplemented with red grapefruits was effective in significantly lowering the level of serum triglycerides,” said Gorinstein

CONCLUSIONS

For heart health the diet needs to:

- Reduce insulin levels
- Include foods rich in folate; Vitamin E and Omega 3 fatty acids
- Dietary sources of vitamin E fresh vegetables, legumes and a high intake of monounsaturated fatty acids from olive oil, dark green leafy vegetables, avocados, whole grains, nuts, dried beans, seafood, eggs, and organ meats such as liver and kidney.
- Include GLA in the form of evening primrose oil
- Include Exercise to increase insulin sensitivity and reduce homocysteine levels
- Possibly include folic acid, Vitamin B6, Vitamin B12, Vitamin E and fish oil in the supplements
- Aim to reduce sodium intake to 3,000mg per day
- Include red grapefruit
PART FIVE – HAIR

Those with male pattern baldness may increase hair growth by taking a preparation containing saw palmetto (Serenoa repens) and beta-sitosterol (a compound found in many edible plants), according to a new study in The Journal of Alternative and Complementary Medicine (2002;8:143–52).

Male pattern baldness is a hereditary condition that most often affects men, but may affect women as well. Hair loss often starts with a receding hairline and continues in a horseshoe pattern, leaving hair on the sides and back of the head mostly unaffected. Although the exact reason that such hair loss occurs is not clear, some studies suggest that excessive conversion of testosterone to another hormone called dihydrotestosterone (DHT) may be an underlying cause.

Conventional medicines used to treat male pattern baldness are designed to block the conversion of testosterone to DHT. Topical application of minoxidil (Rogaine®) and taking oral finasteride (Propecia®) have been shown to inhibit this conversion and to increase hair growth, but both medications have been linked with several adverse side effects.

Saw palmetto and beta-sitosterol have been shown to block the production of DHT but this is the first study to demonstrate that these compounds also help with hair loss -- and without causing significant side effects.

In the new study, 19 men between the ages of 23 and 64 years with mild to moderate hair loss were given either a placebo or a supplement containing 400 mg of a standardized extract of saw palmetto and 100 mg of beta-sitosterol per day. After about five months, hair growth in 60% of the men taking the herbal combination had improved compared with their initial evaluation. In contrast, only 11% of those receiving the placebo improved.
Your hair ultimately reflects the overall condition of your body. If your body is healthy and well nourished, your hair will be your shining glory.

If you are having any health problems or suffering from any nutritional deficiencies, your hair may stop growing or show damage.

If your body is in good health, you can maximize your genetic growth cycle through taking the proper blend of amino acids and B-vitamins.

It is also important to include B-6, biotin, inositol and folic acid in the supplemental program. It has been found that certain minerals including magnesium, sulfur, silica and zinc are also very important toward maintaining healthy hair.

Beta-carotene is also essential to hair growth. This is because beta-carotene is converted to vitamin A as the body needs it, helps maintain normal growth and bone development, protective sheathing around nerve fibers, as well as promoting healthy skin, hair and nails.

Beta-carotene is found in green and yellow vegetables and fruits.

**Protein Is Important**

Since hair is protein, a diet that is too low in protein may cause some thinning in hair or a retardation in the growth cycle. The converse is true, If you eat a protein-rich diet it will often result in improved hair growth.

Some nutritional experts suggest the dietary utilization of calves liver, brewer's yeast, wheat germ and a daily dose of two tablespoons of granulated lecithin to maximize hair growth, strength and beauty.

Other good food sources for protein include fish, eggs, beans and yogurt. Soy protein has also been found to be helpful in stimulating hair growth.
CONCLUSIONS

To help with PCOS induced head hair loss the diet needs to include:

- Saw Palmetto x 400mg per day
- 100mg of beta-sitosterol per day
- Folic Acid and B Vitamins
- Lecithin
- Sufficient protein
- Green and yellow vegetables and fruits
- Magnesium and Zinc
- Sulfur containing foods – cruciferous vegetables such as broccoli and cabbage
Insulin and aging

Centenarians, people who have lived over 100 years, don't have much in common. Many are smokers, for example. They come from all over the world without a favoring any geographic location in particular.

However, there are 3 consistent blood metabolic indicators of all centenarians which are relatively consistent: low sugar, low triglycerides, and low insulin. All 3 are relatively low for age. Among these 3 variables, insulin is the common denominator. The level of insulin sensitivity of the cell is one of the most important markers of lifespan.

Controlling your insulin levels is one of the most powerful anti-aging strategies you can possibly implement. Sugar and grains cause your body to produce insulin and high insulin levels are the single largest physical cause of accelerated aging. If you want to slow down aging and be healthy then you need to change your grains for greens.

Insulin resistance is the basis of all of the chronic diseases of aging, cardiovascular disease, osteoporosis, obesity, diabetes, cancer, all the so-called chronic diseases of aging.

High levels of insulin can also cause inflammation which leads to disease and even early skin ageing.

Women with PCOS have been shown to have higher than normal levels of inflammation – probably due to high insulin levels though there is some question as to whether high inflammation levels lead
to hormone disruption which lead to high insulin levels. It’s another case of which came first?

**Let’s look at PCOS and inflammation:**

Women with PCOS are prone to inflammation. They also develop heart disease, diabetes, high blood pressure, asthma, thyroid disorders and other diseases caused by chronic inflammation at an alarming rate. Women with PCOS have high numbers of “markers” (C-reactive proteins) in their blood that indicate inflammation. These C-reactive proteins or CRPs are a more reliable indicator of heart disease than high cholesterol levels alone.

Inflammation is the body’s immune response to irritation or infection. When your skin is red or itchy, you can see the inflammation. However, chronic internal inflammation is a silent killer. In an attempt to fight the inflammation, your immune system may attack your thyroid or other organs. It may stop using insulin properly. Or it may try to repair the inflammation such as when your arteries are inflamed and the body tries to patch the problem with arterial plaque, causing the arteries to harden and leading to heart disease.

Finally, researchers have linked this chronic inflammation with the genes that seem to cause PCOS in Mexican-Americans (Mexican-Americans, Southeast Asians, and Native Americans all get PCOS at a higher rate than non-Hispanic Caucasian women). Other studies have shown that chronic inflammation is behind obesity, heart disease and diabetes. Taken with the other studies, I see this as a very, very hopeful sign that the cause of PCOS can finally be treated. Obviously, these genes are not going away, but research seems to show that if you treat the inflammation then you can prevent insulin resistance, diabetes and heart disease.

**Inflammation and Ageing**

Sugar and high-glycemic carbohydrates create inflammation on a cellular level throughout your body. If you eat a large quantity of
refined carbohydrates that converts to sugar in your bloodstream
the sugar triggers an insulin response in the body.

Elevated blood sugar causes a number of chemical reactions in the
body that create inflammation. For starters, blood sugar reacts
with minerals in our body, such as iron and copper, creating free
radicals which then attack the lipid bilayer membranes of our cells.
This results in a cascade of proinflammatory chemicals, causing
further damage and accelerated ageing.

Sugar causes inflammation in several ways. When blood sugar
goes up it creates free radicals that oxidize fats.

But you don’t have to be diabetic to experience an inflammatory
response from sugar. Even a healthy body is damaged by sugar in
a phenomenon known as glycation. When foods rapidly convert to
sugar in the bloodstream they cause browning, or glycation of the
protein in your tissues. Glycation is a process long known to
discolour and toughen food in storage. Glycation can occur in
skin as well creating detrimental age-related changes to collagen –
and that means deep wrinkles!

When glycation occurs in your skin, the sugar molecules attach
themselves to the collagen fibers where they trigger a series of
spontaneous chemical reactions. These reactions culminate in the
formation and gradual accumulation of irreversible cross links
between adjoining collagen molecules. This extensive cross-
linking of collagen causes a loss of skin elasticity.

**Skin elasticity is very important to overweight PCOSers –
it’s that skin elasticity that will help to reduce the amount
of excess skin after reaching your ideal weight!!!**

Eating a diet which includes lots of protein, limited processed
foods and lots of vegetables to include antioxidants can go a long
way to avoiding skin damage.

Protein is the basic material of life. The body could not grow or
function without it.

If aging and aging skin are characterized by the breakdown of our
cells, the antidote to aging is cellular repair.
Protein is essential to cellular repair. The building blocks of our cells are composed of amino acids. As protein is digested it breaks down into amino acids that are then used by the cells to repair themselves. Without adequate protein our bodies enter into an accelerated aging mode.

Dr Perricone in his book the Perricone prescription states:

“In my practice, I have often seen chronic, low-grade, long-term protein starvation lead to a loss of face and body skin tone in my female patients. Their breasts start to sag and show early signs of stretch marks. Within a matter of weeks of starting a diet rich in high quality protein the skin starts to firm up on the face and body, and there is a visible lifting and improvement in skin tone and texture.”

**Fats and Skin**

Fats and oils provide essential anti-inflammatory and antioxidant protection.

Polyunsaturated fatty acids, like those found in salmon, play a crucial role in the bodily process in which dietary fats are our major cellular energy source. Polyunsaturated fats also control the passage of compounds into and out of our cells.

Wild cold water fish – including salmon, mackerel and trout – have the highest levels of omega-3 fatty acids. In their natural environments, these fish eat omega-3 rich plankton and later pass it on to us. The colder the water the higher the level of omega-3 in the plankton.

Many people are critically deficient in these fatty acids and are aging rapidly and poorly as a consequence. These physical and psychological changes have been particularly dramatic in women who have spent years on a low-fat diet.

A lack of essential fatty acids also causes depression and skin problems.

**The Anti-Inflammatory Miracle of Olive Oil**

Extra virgin olive oil is one of the most powerful anti-inflammatory foods in existence.
Although olive oil has only a small amount of the essential fatty acids, it contains about 75% of a nonessential monounsaturated fatty acid called oleic acid that helps to ensure that omega-3 fish oils penetrate the cell membrane. If you think of the cell plasma membrane as the door to the cell then consider oleic acid as the key to that door.

Oleic acid is a member of the omega-9 family. In addition to the enhancing the absorption of essential fatty acids, oleic acid can be incorporated into the cell plasma membrane to help maintain fluidity.

The small amounts of essential fatty acids found in olive oil, along with oleic acid, perform a variety of anti-inflammatory miracles, an entire spectrum of services. For starters, a deficiency of linoleic acid can lead to eczema; hair loss; liver problems; kidney problems and erratic, confused thinking.

The anti-inflammatory antioxidants and fatty acids found in extra virgin olive oil provide a crucial defence against the oxidative effects that accompany aging, the human equivalent of rusting.
MORE ON FATS

Fat burning fats

Gamma-linolenic acid (GLA) as evening primrose oil works via the prostaglandin pathways to mobilise the metabolically active fat known as brown adipose tissue. Brown adipose tissue is an insulating fat found deep within the body that surrounds your vital organs such as the kidneys, heart, and adrenal glands.

EFAs are precursors to hormone like prostaglandins and they regulate every body function at the cellular level:

EFAs:

- Carry fat soluble vitamins A, D, E, and K through the bloodstream
- Activates the flow of bile
- Helps your body conserve protein
- Is the building block for production of hormones
- Is a precursor for serotonin which controls cravings and elevates your mood

Two of the most important types of fat are the polyunsaturates omega-3 and omega-6. ALA (Alpha-linolenic acid is the lading omega-3. It is found in cold water fish, such as salmon, tuna and cod and their oils; in oils made from flaxseeds, walnuts, and in wheat germ, sprouts and leafy greens.

Omega 3 fats raise your metabolism, help flush your kidneys and lower your triglyceride levels. These fatty acids also increase the activity of carnitine to help your body burn fat better.

Omega-6 fat linolenic acid can be found in evening primrose oil, borage oil and blackcurrant seed oil. The omega-6 fatty acids stimulate your thyroid, raise your metabolism and activate your brown adipose tissue to burn fat.
CLA or conjugated linoleic acid is produced by cows and other grazing farm animals from lineoleic acid in the grass they eat. It comes into our food supply via meat, whole milk, and full fat dairy products.

CLA works by reducing the body’s ability to store fat and promotes the use of stored fat for energy.

**Fats and PCOS**

**Fat**

While high fiber diets seems to be prudent, simply advocating low-fat diets might not be the best suggestion for all insulin resistant subjects. Research indicates the type of fat consumed might be an important consideration. While available information suggests a diet lower in saturated fats might be an advantage, evidence also suggests diets rich in monounsaturated fats might be of benefit, particularly for type 2 diabetic people with insulin resistance.

A diet higher in monounsaturated fat appeared to provide an advantage over a fiber-rich, high-carbohydrate, low-fat diet on body fat distribution among type 2 diabetic subjects. The diet higher in monounsaturated fat generated proportional body fat loss from both upper and lower body. In contrast, the fiber-rich, high-carbohydrate, low-fat diet resulted in a disproportionate loss of lower-body fat, worsening the ratio between upper and lower body fat distribution. 49 Since evidence supports the association between obesity, abdominal body fat distribution, and insulin resistance, and because among obese men loss of weight and a decrease in the waist-hip ratio are closely associated with improved insulin sensitivity, 50 the diet higher in monounsaturated fat seems to have produced a more favorable impact on metabolism.

Parillo et al randomly assigned 10 people with type 2 diabetes to a 15-day period of either a high-monounsaturated/low-fat diet (40-percent carbohydrate, 40-percent fat, 20-percent protein, and 24 grams of fiber) or a low-monounsaturated/high-carbohydrate diet (60-percent carbohydrate, 20-percent fat, 20-percent protein, and 24 grams of fiber). Their results suggested the high-monounsaturated/low-carbohydrate diet had a more significant
impact on improving insulin sensitivity.

Some research has called into question the wisdom of recommending low-fat, high-carbohydrate diets. 53-55 Evidence suggests the macronutrient composition of the diet might play an important role in fat deposition, 56 and so might consequently influence insulin resistance. Several authors, after reviewing available scientific evidence, have suggested that low fat, high carbohydrate diets might contribute to metabolic problems, and certainly do not appear to be capable of reversing insulin resistance, obesity, or Syndrome X

More on Fat

Like cholesterol, dietary fats can be good or bad. While your body does need some fat for proper functioning, the challenge is to choose foods with the right kinds of fat and avoid foods with the wrong kinds. Two types of fat – saturated fats and trans fats – raise blood cholesterol levels, which may be harmful to the heart.

What are trans fats?

They are “partly hydrogenated” vegetable oils (also known as trans-fatty acids), used in commercially baked goods (cookies, crackers, cakes) and by most restaurants and “fast-food”chains.

Those fries, onion rings, and doughnuts that taste so good are usually made with trans fats. Trans fats are also found in most stick – but not liquid – margarines. Labels on most of these products do not indicate whether they contain trans fats. Instead, they state that the foods contain “partially hydrogenated oils,” which should be avoided. Also, labels on products containing trans fats – which some experts consider worse than saturated fats because they can increase LDL-C – may claim that they contain no cholesterol or saturated oils. But that doesn’t mean they’re heart-healthy!

Are any dietary fats good for my heart?
Two types – polyunsaturated fats and monounsaturated fats – can lower cholesterol and may be beneficial to the heart.

Q
What should I know about polyunsaturated fats?

Polyunsaturated fats tend to help your body get rid of newly formed cholesterol in your bloodstream. They are found in certain fish and in safflower, sesame, soy, sunflower, corn, and cottonseed oils. Omega-3 fatty acids a special type of polyunsaturated fat that may play a major role in preventing CHD, are found in many cold-water fish such as salmon, mackerel, and herring and, to a lesser extent, in green leafy vegetables, soybeans, nuts, and flaxseed and canola oils.

What do monounsaturated fats do for me?

Some experts consider monounsaturated fats the most desirable of all fats. They are mostly present in olive, canola, and peanut oils, in avocados, and in most nuts. If your diet is already very low in saturated fats but your cholesterol readings still are unfavorable, monounsaturated fats may help to reduce your LDL-C and raise your HDL-C.

Omega 3 Fat, Fish Oil and PCOS

Fish oil is good for PCOS because it contains essential fatty acids, or EFAs. They are "essential" because you must have them for life, and your body cannot manufacture them. You must obtain them from your diet.
EFAs serve as a highly efficient source of energy and as the primary component of cell membranes and hormones. Deficiencies in EFAs are associated with abnormal development and health problems involving the nervous, cardiovascular, and immune systems.

The two most important EFAs in human health are omega-3 and omega-6 fatty acids. The typical American consumes too much omega-6 sand not enough omega-3 fatty acids. Fish oil contains high levels of omega 3 fatty acids.
Omega 3 fatty acids are anti-inflammatory whereas some other fatty acids are pro-inflammatory. For example, arachidonic fatty acid is pro-inflammatory.

Arachidonic acid dominates the average diet (meat and dairy), and without omega 3 fatty acids, such as fish oil, this balance tips in favor of inflammation, pain, and blood vessel constriction. Women with PCOS (polycystic ovarian syndrome) have a number of symptoms that can be partially alleviated by omega-3 fatty acids found in fish oil.

- Insulin resistance
- Chronic inflammation
- Higher risk of heart disease
- High blood pressure
- High blood fats (high triglycerides)
- Higher risk of diabetes
- Depression
- Stress

The evidence for the "right fat" in the diet for PCOS rather than simply "low fat"

**Insulin Resistance.** Insulin resistance is a primary cause of PCOS. It’s not established that fish oil can directly reduce insulin resistance. However, there is one study of 12 overweight men and women who had insulin resistance. They were given DHA (a component of fish oil) for 12 weeks. 70% of the participants showed a decrease in insulin resistance.(1) In rats, insulin resistance was reduced by substituting fish oil for vegetable and animal fats in their diet.(2)

**Inflammation.** Women with PCOS have a greater tendency toward inflammation than other women. There is also an association between insulin resistance and inflammation.(3) A primary value of fish oil is that it helps to reduce inflammation.(4)

**Heart Disease.** Among women, a higher consumption of omega-3 fatty acids is associated with a lower risk of coronary heart disease.(5)
High blood pressure. Omega 3 oils may help to reduce hypertension.(6)

**High Triglycerides.** Many women with PCOS have high triglycerides, a blood fat that indicates insulin problems that could lead eventually to diabetes. Fish oil has been shown to consistently lower triglycerides.(7)

Diabetes Risk. Omega 3 oil can reduce the risk of diabetes by reducing triglycerides without impairing glucose tolerance.(8)

It improves the rate of glycogen storage and enhances insulin secretion from beta cells in the pancreas.(9,10)

Both of these actions improve glucose and insulin control.

**Depression.** Decreased omega-3 fatty acid consumption correlates with increasing rates of depression.(11)

**Stress.** Chronic stress leads to overproduction of the stress hormone cortisol, which in turn increases insulin resistance. Fish oil blunts the "stress response".(12)

All in all, omega 3 oil is likely to be beneficial to women with PCOS and ovarian cysts.

**What Are Good Dietary Sources?**

Wild, cold-water ocean fish are especially rich in omega-3 fatty acids. Good dietary sources of fish oil are: herring, cod liver, salmon, mackerel, sardines, anchovies, black cod and albacore tuna.

**Oil Supplements**

If your diet is not rich in cold-water ocean fish, you may need to take a fish oil supplement.

You have two basic choices: cod liver oil, or EPA/DHA capsules. Cod liver oil. Cod liver oil contains high amounts of omega-3 fatty acids. Cod liver oil is especially high in the omega-3 fatty acids docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). Cod liver oil also contains a significant amount of vitamins A and D. On
average, 20 milliliters of cod liver oil contains 1.8 grams EPA, 2.2 grams DHA, 15,000 IU vitamin A, and 1,500 IU vitamin D.

Cod liver oil can have a fishy taste and might cause belching, nosebleeds, halitosis, or heartburn in some people. Gastrointestinal side effects can be minimized if cod liver oil is taken with meals and if doses are started low and gradually increased.

EPA/DHA fish oil capsules. People who are concerned about their caloric intake may prefer to take EPA/DHA capsules, which has the same benefit as cod liver oil, but is much more concentrated and has far fewer fat calories. Moreover, if fish oil is disagreeable to you, you can take less of it and get the same effect by taking EPA/DHA capsules.

EPA/DHA capsules also do not contain vitamins A and D, which may be toxic in high doses for some people.
CONCLUSIONS

To prevent aging, disease and inflammation the following need to be included in this diet:

- Tonalin CLA x 1,000 mg per day
- Salmon or cold water fatty fish at least 2-3 times per week;
  - herring, cod liver, salmon, mackerel, sardines, anchovies, black cod and albacore tuna.

- Meat and full fat dairy products
- Flaxseed oil
- Evening primrose oil
- Flaxseed oil
- Walnuts
- Leafy Greens
- Extra Virgin olive oil

**Anti-Inflammatory Foods**

**Vegetables and Fruits:**

These foods are rich in carotenoids and bioflavonoids that are powerful antioxidants, preventing oxidation and inflammation. The more richly colored the fruit or vegetable, the more antioxidants it contains. Make sure every meal contains a healthy serving of fruits or vegetables. For ease of digestion, steam, sauté or juice your vegetables.

**Cold Water Fish:**

Salmon, halibut, mackerel, tuna, trout and other cold water fish contain lots of omega-3 fatty acids. These fatty acids offset the
production of arachidonic acid, a major pro-inflammatory compound. Instead, omega-3 fatty acids favor the production of compounds that inhibit inflammation.

Eat at least 3 servings of fish every week, or take 1,000 mg of purified omega-3 oil daily.

**Flax oil:**

This oil works similarly to fish oil to help reduce inflammation. Use it in salads or in fruit smoothies, and never cook with it. It has a strong tendency towards oxidation when it is heated.

**Ginger:**

Ginger has been shown to be a powerful anti-inflammatory agent. Use it freely in your cooking or make a strong tea with it. It also helps reduce nausea and some forms of abdominal distress.

**Whole Grains, Legumes, Soy Products:**

**Skinless chicken breasts** may also be added since most of the pro-inflammatory fat is found in the skin.

**Salicylic Acid** Raisins, prunes, dates, berries, plums, apricots, cantaloupe, grapes, broccoli, spinach, orange sweet potatoes, chili peppers, green peppers, cucumber, zucchini, tomato products, whole grains, turmeric, ginger root, cayenne pepper, cinnamon, nutmeg, curry, mustard, oregano, rosemary, sage, basil, mint, thyme, bay leaves, black pepper

**Anthocyanins**

Blueberries, strawberries, cranberries, cherries

**Quercetin** Apples, onions, red wine, green tea
Curcumin Turmeric
Shogaols Ginger root

**Resveratrol**

Red wine, red grapes, grape juice, peanuts, vegetables
PART SIX: FOODS AND SUPPLEMENTS WHICH HELP INSULIN SENSITIVITY

Including as many foods and supplements into the diet which will help with insulin sensitivity must be a good thing for PCOSers.

Insulin Sensitising Foods

Fibre

The types of dietary fiber that appear to be most significant with respect to insulin resistance include oat fiber and guar gum.

A recent study confirms earlier research that a high fibre diet can effectively help control blood sugar. US researchers studied the effect of diet containing differing amounts of fibre in 13 patients with adult onset diabetes. For the first six weeks, the study participants were put on a diet with only a moderate amount of fibre - 24g daily of which 8g was soluble and 16g insoluble fibre - the diet recommended by the American Diabetes Association (ADA).

For the following six weeks the patients were then put onto a high fibre diet - 50g daily with 25g soluble fibre and 25g insoluble. The researchers then compared the effects of the diets on glycaemic control and blood fat concentrations.

The results revealed that the high fibre diet lowered blood sugar levels by 8.9 per cent more than the ADA's diet and 24 hour plasma insulin levels by further 12 per cent. The high fibre diet also lowered bloodlevels of harmful LDL cholesterol levels without affecting the more beneficial HDL cholesterol levels.

Total cholesterol levels were 6.7 per cent lower on a high fibre diet and gastrointestinal absorption of cholesterol was 10 per cent lower. The researchers stated that the improvements were attributable to the high level of soluble fibre in the diet.

Many nutrition authorities estimate that 20-35 grams of fiber daily is a desirable intake for the average individual. Note that the
amount of nutrients can vary in wheat products since the refining of grains remove part of the seed (e.g., bran, endosperm, and germ). Here are some fiber-rich sources:

1 ounce dry-roasted peanuts: 2.2 g
1/2 cup cooked broccoli: 2.2 g
1 potato with skin: 2.5 g
1 slice whole wheat bread: 2.8 g
1 cup carrots: 3.0 g
1/2 large grapefruit: 3.1 g
1 apple: 3.5 g
1 cup cooked long-grain brown rice: 3.3 g
1 cup cooked instant oatmeal: 3.5 g
3 cups air-popped popcorn: 3.7 g
1 pear: 4.3 g
1/2 cup raisins: 4.5 g
1 cup of whole wheat spaghetti cooked: 5 g
1 cup baked beans: 7.0 g
1/2 cup of chickpeas: 7 g
1 cup boiled lentils: 7.9 g
1 serving bran cereal: 11 g

Here are different sources of fiber and their uses in the body:

**CELLULOSE**: Fruit legumes, nuts, oat bran, seeds, whole grains, and vegetables. Adds bulk to stool to reduce constipation; oat bran lowers cholesterol; may help control blood sugar; helps weight loss by displacing kcalories.

**GUMS**: Algae, barley, fruits, legumes, oats, seaweed, seeds, and vegetables. Adds bulk to stool to reduce constipation; may lower blood cholesterol; helps control blood sugar; helps weight loss by displacing kcalories.

**HEMICELLULOSE**: Fruits, legumes, nuts, oat bran, seeds, whole grains, and vegetables. Adds bulk to stool to reduce constipation; oat bran lowers cholesterol; may help control blood sugar; helps weight loss by displacing kcalories.

**LIGNINS**: Woody parts of bran, fruit skins, nuts, seeds, whole grains and vegetables. Adds bulk to stool to reduce constipation;
may lower blood cholesterol; may help control blood sugar; helps weight loss by displacing kcalories.

MUCILAGES: Plant seeds and secretions. Adds bulk to stool to reduce constipation; may lower blood cholesterol; helps control blood sugar; helps weight loss by displacing kcalories.

PECTINS: Algae, barley, fruits, legumes, oats, seaweed, seeds, and vegetables. Adds bulk to stool to reduce constipation; may lower blood cholesterol; helps control blood sugar; helps weight loss by displacing kcalories.

Fat
Evidence shows that a diet rich in fish oils and monounsaturated fats are of particular benefit for insulin resistance. There is one study of 12 overweight men and women who had insulin resistance. They were given DHA (a component of fish oil) for 12 weeks. 70% of the participants showed a decrease in insulin resistance.

Vegetables
There is also evidence that the amount and range of carotenoid-like pigments in an individual's blood is inversely related to fasting serum insulin levels, suggesting a diet low in vegetables might contribute to insulin resistance.

Vinegar
Studies indicate that 2 tablespoons of vinegar before a meal—perhaps, as part of a vinaigrette salad dressing—will dramatically reduce the spike in blood concentrations of insulin and glucose that come after a meal.

Cinnamon
The active chemical in Cinnamon is MHCP or methylhydroxychalcone polymer. This has been shown to lower blood glucose levels. ¼ to 1 teaspoon per day is recommended.

Whey Protein Powder
Whey’s effects on bodyfat, insulin sensitivity, and fat burning....
Although higher protein diets have been found to improve insulin sensitivity, and may be superior for weight loss, it’s unclear if all proteins have the same effects.

One study compared whey to beef (Damien P. Belobrajdic, Graeme H. McIntosh, and Julie A. Owens. A High-Whey-Protein Diet Reduces Body Weight Gain and Alters Insulin Sensitivity Relative to Red Meat in Wistar Rats. J. Nutr. 134:1454-1458, June 2004) and found whey reduced body weight and tissue lipid levels and increased insulin sensitivity compared to red meat.

Rats were fed a high-fat diet for nine weeks, then switched to a diet containing either whey or beef for an additional six weeks. As has generally been found in other studies, the move to a high dietary protein reduced energy intake (due to the known satiating effects of protein compared to carbs or fat), as well as reductions in visceral and subcutaneous bodyfat.

However, the rats getting the whey, there was a 40% reduction in plasma insulin concentrations and increased insulin sensitivity compared to the red meat. Not surprisingly, the researchers concluded “These findings support the conclusions that a high-protein diet reduces energy intake and adiposity and that whey protein is more effective than red meat in reducing body weight gain and increasing insulin sensitivity.”

Other studies suggest taking whey before a workout is superior for preserving/gaining lean body mass (LBM) and maintaining fat burning (beta oxidation) during exercise over other foods taken prior to a workout.

**Blueberries**

Studies are also being conducted on the ability of blueberries to control type II diabetes. Type II diabetes causes a decrease in sensitivity to insulin, making it difficult for the body to properly use the insulin it produces. Preliminary data suggests that blueberries may increase sensitivity to insulin.

**Sugar Free Red Bull – or Taurine Supplements**
There have been a lot of anecdotes that sugar free red bull has helped people to lose weight.... why would this be?

It contains quite a hefty allowance of B-Vitamins which helps with energy but also 500mg of taurine per can. Taurine is an insulin sensitiser.

If you can tolerate artificial sweeteners (I can) then adding a sugar free red bull daily or even twice daily may help you with your weight loss efforts

**Taurine and weight loss...**

For years L-carnitine has been promoted as a beneficial weight loss supplement. While anecdotal evidence and research support the efficacy of L-carnitine for this purpose, the focus on L-carnitine has caused some to overlook Taurine as a supplement for weight loss.

Japanese researchers conducted a study on thirty healthy college-age students, using double-blind randomization to assign the students to a control or placebo group. Prior to the study researchers measured TC, HDL-C and plasma glucose levels in all subjects. Both groups had similar readings.

Subjects in the control group were then administered 3g of taurine per day for a period of seven weeks. Significant changes in triacylglycerol and total cholesterol levels were noted in the control group, as well as significant losses of fat body mass.

This suggests that taurine administration has a marked effect on lipid metabolism, and can therefore be beneficial to persons looking to lose body fat.

**Raspberries**

Contain potential anti-cancer agent ellagic acid.
Are rich in vitamin C.
Are a source of soluble fibers and may lower high blood
cholesterol levels and slow release of carbohydrates into the blood stream of diabetics.

**CLA**

is a potent insulin sensitizing fatty acid with strong anticarcinogenic and cardiovascular health promoting properties. One of the "pillars" of the Mediterranean Diet is, the high consumption of whole milk cheese from range/grass-fed animals. the CLA in the cheese that hallmarked that culture played a crucial role in the supreme cardiovascular health evident in the subjects studied.

**Conjugated Linoleic Acid (CLA) Supplements May Speed Weight Loss**

A double-blind, randomized, placebo-controlled study, published in the December 2000 issue of the Journal of Nutrition found that CLA reduces fat and preserves muscle tissue. According to the research project manager, an average reduction of six pounds of body fat was found in the group that took CLA, compared to a placebo group. The study found that approximately 3.4 grams of CLA per day is the level needed to obtain the beneficial effects of CLA on body fat.

Dr. Michael Pariza, who conducted research on CLA with the University of Wisconsin-Madison, reported in August 2000 to the American Chemical Society that "It doesn't make a big fat cell get little. What it rather does is keep a little fat cell from getting big." Pariza's research did not find weight loss in his group of 71 overweight people, but what he did find was that when the dieters stopped dieting, and gained back weight, those taking CLA "were more likely to gain muscle and not fat." In a separate study conducted at Purdue University in Indiana, CLA was found to improve insulin levels in about two-thirds of diabetic patients, and moderately reduced the blood glucose level and triglyceride levels.

Increases metabolic rate -- This would obviously be a positive benefit for thyroid patients, as hypothyroidism -- even when treated -- can reduce the metabolic rate in some people.
Decreases abdominal fat -- Adrenal imbalances and hormonal shifts that are common in thyroid patients frequently cause rapid accumulation of abdominal fat, so this benefit could be quite helpful.

Enhances muscle growth -- Muscle burns fat, which also contributes to increased metabolism, which is useful in weight loss and management.

Lowers cholesterol and triglycerides -- Since many thyroid patients have elevated cholesterol and triglyceride levels, even with treatment, this benefit can have an impact on a thyroid patient's health.

Lowers insulin resistance -- Insulin resistance is a risk for some hypothyroid patients, and lowering it can also help prevent adult-onset diabetes and make it easier to control weight.

Reduces food-induced allergic reactions -- Since food allergies can be at play when weight loss becomes difficult, this can be of help to thyroid patients.

Enhances immune system -- Since most cases of thyroid disease are autoimmune in nature, enhancing the immune system's ability to function properly is a positive benefit.

CLA is a supplement, and does not require a prescription. It is available at health food stores, and at online outlets like Drugstore.com. Experts recommend that you use a patented name brand, as some brands have inconsistent or insufficient amounts of CLA contained in them.

The brand used in testing was "Tonalin" brand CLA, which comes in 1000 mg capsules. To obtain the level determined to be effective in the testing -- 3.4 g, or 3400 mg, per day -- you would need to take 4 of these capsules a day, with meals.

**CHROMIUM**

Dr. Cefalu reported on an animal study, in which he found that chromium picolinate supplements given to obese rats resulted in a
50% improvement in insulin sensitivity and glucose tolerance, compared to controls. C

200 micrograms of chromium as chromium picolinate per day, may not be enough to see an effect on insulin sensitivity. The ideal amount would be 1,000 micrograms per day.

If you give chromium to people with high blood glucose, then blood glucose will go down. If you give it to people with low blood sugar, both insulin and blood glucose improve.

**NAC**

N-Acetyl Cysteine Improves Insulin Resistance in Women with Polycystic Ovary Syndrome

Women with polycystic ovary syndrome (PCOS) and associated elevations of insulin levels may benefit from taking supplemental N-acetyl cysteine (NAC), according to a study in Fertility and Sterility (2002;77:1128–35).

In this preliminary study, 31 women with PCOS were given 1.8 to 3 grams per day of NAC for five to six weeks. Blood measurements for glucose and insulin were taken before and after a glucose tolerance test, both at the start of the study and at the end of the treatment period. No dietary modifications were made during the study.

Initial measurements showed that 14 of the 31 women had normal insulin levels, while the remaining 17 had abnormally high levels of insulin. Women with high initial insulin levels who took NAC had a significant reduction in insulin levels following the glucose tolerance test and also showed improved insulin sensitivity. On the other hand, those with initially normal insulin levels had no improvement in any measurement. This suggests the benefit of NAC in women with PCOS may be restricted to only those women who already have high insulin levels to begin with.

NAC is an amino acid that has commonly been used as a treatment to break up mucus in the lungs. It is also a precursor to
glutathione, a powerful antioxidant in the body, which has been shown in other studies to improve insulin sensitivity.

Some physicians recommend taking NAC on an empty stomach, so it does not compete with other amino acids in food for absorption. People taking single amino acids should also make sure they eat adequate amounts of protein, to prevent upsetting the balance of amino acids in the body. In addition, some doctors recommend that long-term supplementation of NAC (more than a few weeks) be accompanied by 15 mg of zinc per day, because preliminary evidence suggests that NAC might deplete these minerals.

**Calcium**

A lack of calcium has often been attributed to PCOS. In fact, future research suggests that calcium may soon form part of a treatment for PCOSers.

Calcium is involved in egg production in the ovaries. Calcium is also important to weight loss.

**Calcium may become a dieter's best friend**

The Tennessee team used mice that model human patterns of obesity. The animals had been genetically engineered to express in their fat cells a gene called agouti, which normally operates in human but not mouse fat cells. This gene strongly influences whether a fat cell burns energy-containing molecules or converts them to fat.

Michael B. Zemel, who directs the university's Nutrition Institute, and his colleagues put these mice onto a low-calorie diet for 6 weeks. Their meals contained just 70 percent as much energy as the rodents would normally choose to eat. One group received a diet that was also deficient in calcium. Its calcium content, adjusting for species differences, is "almost exactly what American women are consuming," Zemel notes, "about 500 milligrams per day." That's well below the recommended daily allowance of 1,300 mg calcium.

The calorie-restricted mice lost 8 percent of their body fat and 11
percent of their weight.

Zemel's group again restricted the food but boosted calcium intake of another two groups of the mice. Each received the mouse equivalent of a human dose of 1,600 mg calcium per day. Mice getting this as a carbonate supplement lost 42 percent of their body fat and 19 percent of their weight. Those that consumed the extra calcium as nonfat dry milk—substituted for an equal amount of dietary protein—lost 60 percent of their body fat and 25 percent of their weight.[/b]

A fourth group, receiving twice as much dairy-derived calcium, showed little extra benefit, Zemel notes.

These differences occurred even though all of the low-calorie groups got the same exercise and mix of dietary fat, protein, and carbohydrates. The results show that varying dietary calcium alters the animals' metabolism, says Zemel. Among the dieting animals, core body temperature—a measure of basal energy use—fell during the low-calcium diet but climbed with the high-calcium chow.

Under low-calcium conditions, the Tennessee scientists find, the agouti gene directs calcium channels to open. "That turns out to be a bad thing," Zemel says, because it activates fat synthesis while suppressing fat breakdown.

Zemel's group is now testing whether a 6-month augmentation of dietary calcium will offer similar weight-loss benefits to obese women.

When endocrinologist Robert P. Heaney of Creighton University in Omaha, Neb., first learned of preliminary data by Zemel's group last year, "I thought they made sense—but I still had a degree of skepticism," he says. So, he reanalyzed data from five calcium-supplement trials he had conducted in people over the years.

"And in all five," he says, "we found a significant weight effect that we had ignored." These data, to be published soon, show that women consuming the least calcium weighed the most.
Ironically, Zemel says, among weight-conscious teens, "the first thing they jettison from their diet is dairy." This choice, he suspects, is "moving them farther from their goal, not closer."

**Vitamin D**

Over the past 30 years, numerous studies have established a role for calcium in egg maturation and normal follicular development. PCOS is characterized by hyperandrogenic chronic anovulation (lack of ovulation) due to excess androgens (masculinizing hormones), ovarian theca cell overgrowth, and arrested follicular development.

Vitamin D plays a crucial role in calcium absorption and regulation. A study conducted at Columbia University investigated whether vitamin D and calcium dysregulation contribute to the development of follicular arrest in women with PCOS, resulting in reproductive and menstrual dysfunction.

They studied 13 women who had chronic anovulation, hyperandrogenism and vitamin D insufficiency. Nine had abnormal pelvic sonograms with multiple ovarian follicular cysts. All were hirsute, two had hair loss, and five had acanthosis nigricans.

Vitamin D combined with calcium supplementation resulted in normalized menstrual cycles within 2 months for seven women. Two became pregnant and the others maintained normal menstrual cycles. These data suggest that abnormalities in calcium balance may be responsible, in part, for the arrested follicular development in women with PCOS and may contribute to the pathogenesis of PCOS.

Two other recent studies have shown that vitamin D deficiency may be a contributing factor to insulin resistance and diabetes, both of which are problems for women with PCOS. These and other studies suggest that vitamin D plays a role in the secretion, and possibly the action, of insulin. People with diabetes tend to have lower vitamin D levels.
Magnesium May Help PCOS

Women with PCOS are known to have a high incidence of insulin resistance and glucose intolerance, and tend to be at eventual high risk for hypertension, diabetes and cardiovascular disease. Optimal intake of magnesium has been shown to be helpful for all of these health problems. In addition, magnesium is needed for more than 300 biochemical reactions in your body. So you can imagine how important it is.

Magnesium is found in green vegetables, nuts, seeds and some grains. Although it is present in many foods, it usually occurs in small amounts. As with most nutrients, daily needs for magnesium cannot be met from a single food. Eating a wide variety of foods, including at least 3-5 servings of vegetables daily, helps to ensure an adequate intake of magnesium. If you find yourself relying on processed foods, you may need to take supplemental magnesium.

CONCLUSIONS

To assist with insulin sensitivity the following should be included in the diet:

- Magnesium
- 1,000mg Vitamin D
- 1,600mg calcium per day – by a mixture of supplements and full fat dairy products
- 2g NAC per day plus Zinc
- 1,000mcg Chromium GTF per day
- 500mg taurine
- 1,000mg tonalin
- 50g fibre per day
- 100-120g protein per day
VEGETABLES

There is also evidence that the amount and range of carotenoid-like pigments in an individual's blood is inversely related to fasting serum insulin levels, suggesting a diet low in vegetables might contribute to insulin resistance. It appears that an inadequate intake of fruits and vegetables can result in a suboptimal intake of antioxidants and phytochemicals and an imbalanced intake of essential fatty acids. Through different mechanisms, each nutritional alteration can promote inflammation and disease.

Pigmented plant compounds appear to be important anti-inflammatories and antioxidants, and people who eat more of them have a decreased risk of cancer. Plant pigments are mostly polyphenolic, meaning they are multiphenol-containing molecules, and include chlorophyll, carotenoids and bioflavonoids.

Green plants contain particularly large amounts of chlorophyll, which is a detoxifier and possibly an anticancer agent. Foods rich in chlorophyll include chlorella and other blue-green algae, beet greens, bok choy, collards, dandelion greens, kale, mustard greens and nettles. These greens--among the most nutritious of all plants or plant parts--also contain other diverse nutrients and healthy constituents. The blue-green algae family has a high chlorophyll content and has been credited with immune-enhancing effects including stimulation of phagocytosis and enhanced response to tumors and microbes. Chlorella powder, specifically, may reduce side effects of chemotherapy for some patients and may possess direct anticancer activities.

Orange, yellow and red-orange foods are rich in carotenoids such as beta-carotene, lutein and lycopene. These constituents are antioxidants and anticancer agents due to several different mechanisms.

More than 600 carotenoids occur naturally, but carotenes are the most widely known. Carotenes seem to offer protection against lung, colorectal, breast, uterine and prostate cancers.
which destroy oxygen free radicals in lipids, enhance immune response and protect cells against UV radiation.9 Foods rich in these flavonoids include apricots, carrots, citrus fruits, squash and tomatoes in addition to many green foods.

The anthocyanidins are a type of complex flavonoid that produce blue, purple or red colors. Foods rich in these phytochemicals include beets, blackberries, blueberries, cherries, purple and red grapes, and purple cabbage. **Anthocyanidins support connective tissue regeneration and are anti-inflammatory; they promote blood flow and reduce cholesterol, in addition to being antioxidants.**10 Anthocyanidins seem to stabilize and protect capillaries from oxidative damage11 and have been shown to stabilize connective tissue, promote collagen formation, improve microcirculation and help protect blood vessels from oxidative damage.12,13 Thus, by eating these antioxidant pigments, some believe cancer risk can be reduced because the antioxidants protect against damage and help repair connective and vascular tissues.

Procyanidins are the precursors to anthocyanidins, and are comprised of smaller units including catechins and epicatechins. Catechins are simple flavonoids that are abundant in **green tea.** Several Japanese studies show that tea consumption is protective against breast and other types of cancer.14,15

Detoxifying, stimulating and spicy sulfur compounds are present in a variety of colorful foods including broccoli, garlic and pineapple. Sulfur-containing compounds in plants are believed active, or at least protective, against cancer because many pathogens are deterred by sulfur.

The crucifer family--which includes broccoli, brussel sprouts, cabbage, cauliflower, mustard greens, radishes and turnips--has many sulfur-containing compounds as well as indoles, a subclass of phytonutrients that binds chemical carcinogens and activates detoxification enzymes, mostly in the gastrointestinal tract.16 **Indoles and related compounds may promote metabolism of carcinogens**17 as well as improve estrogen balance, which could reduce the risk of estrogen-related cancers such as breast cancer.18
The lily family includes garlic (*Allium sativum*) and onions (*A. cepa*), both of which also contain sulfur compounds. Studies have shown the sulfur compounds diallyl disulphide and diallyl trisulfide—two of the active agents in garlic oil—and S-allyl cysteine—found in crushed garlic—to inhibit tumor metabolism and enhance immune response.19-21 Allyl sulfides also enhance glutathione S-transferase enzyme systems, which are biochemical pathways involved in the liver's detoxification of carcinogenic substances. Allium species also have immune-enhancing actions that include promotion of lymphocyte synthesis, cytokine release, phagocytosis and natural killer-cell activity.22

Several animal studies have shown that garlic and onions prevent cancer and inhibit the progression of existing cancers, especially stomach and gastrointestinal cancers.23 Garlic appears particularly effective in reducing the risk of N-nitroso-induced cancers.24 N-nitroso compounds, also known as nitrosamines, are potent carcinogens formed within the intestines as a result of bacterial degradation of nitrates and nitrites, two common food chemicals used in the processing of ham, sausages and other meat products.

All forms of garlic have been shown to have some medicinal activity. Which one is best or most effective remains to be proven. Different forms may be better suited for some people.

Pineapples contain bromelain, a sulfur-rich proteolytic enzyme that has been investigated for antitumor effects. U.S. and French research shows oral bromelain can reduce cancer in animals. Some documented cases show cancerous tumors regressing as a result of bromelain therapy. Bromelain may also have antimetastatic effects. It has been examined in vitro to both oppose leukemia by promoting the normalization of blood cells and to reduce metastasis in lung-cancer cells.25,26
PUTTING THE DIET TOGETHER

Starting Calories – 1200-1600

**Protein:** 100g-120g of protein per day to be divided by amount of meals per day. One portion to be from fish, two portions from dairy or whey and the other portions from meat/eggs/vegetable protein.

**Vegetables – to eat as many vegetables and salads as possible.** Do not count carbs in vegetables and salads!!!!

This should make up the biggest part of the diet. At least 2lb (1,000g) of vegetables or salad should be eaten each day. One way of getting extra salad in would be to start each evening meal with a raw salad dressed with apple cider vinegar and a spoonful of flaxseed oil.

Or to make vegetable soups to go with lunch each day.

Include as many anti-inflammatory fruits and vegetables as possible, cruciferous vegetables, and insulin sensitising foods. (As listed previously).

**Fruit** – to include fruit as and when desired but on average at least 2 portions per day Include red grapefruit at least a couple of times per week.

**Oil** – 2 teaspoons of flaxseed and 1 tablespoon olive oil per day

**Nuts and Seeds** – at least one portion per day – you can use nuts in yoghurts, or sprinkle a tablespoon of pumpkin or sesame seeds over salads or in soups.

**Beans/Legumes** – as and when required

**Liquid** – 2 x cups of warm water with fresh lemon
2 x glasses of diluted unsweetened cranberry juice with one teaspoon each glass of psyllium
A further 8 glasses of liquid – water, tea, coffee, unlimited sugar free beverages

**Carbohydrates** – to eat as many wholegrain carbs rather than processed carbs as possible but to include carbs in any available calories after other macronutrients included, such as crackers, bread, potatoes, sweet potatoes, rice, pasta etc.

Once the day’s calories have been consumed if still hungry only veggies/salad should be eaten.

Unlimited sugar free drinks.

One day per week – free meal – one meal per week should be kept free for takeaway/pizza etc.

To start each evening meal with a raw salad dressed with apple cider vinegar and a teaspoon of flaxseed oil

**SUPPLEMENTS**

- 200mg milk thistle x 3 times per day
- Dandelion x 1,000mg per day
- Lecithin and Inositol x 1 capsule each per day
- L-Carnitine x 1g per day
- Include GLA in the form of evening primrose oil
- Multi vitamin including folic acid, Vitamin B6, Vitamin B12, Vitamin E
- Aim to reduce sodium intake to 3,000mg per day
- Saw Palmetto x 400mg per day
- 100mg of beta-sitosterol per day
- Tonalin CLA x 3,400 mg per day
- Chromium x 1,000mcg per day
- 3g NAC
EXERCISE

If you hate exercise it may be that your body is being sapped of its natural vitality by dieting or some other physical imbalance. Sometimes people don’t exercise because they don’t have the energy. Beginning by eating better can often give them the energy they need to get up and get moving again.

Try this following exercise:

*Imagine you’re in a lovely, long meadow leading to some low curving hills near the ocean. Do you feel like walking along the trail, running across the field, sitting on a bench enjoying the view, riding a bike, or taking a nap in the high grass and flowers nearby?*

Did you think about which choices would burn the most calories? If you did, then try again after taking several deep breaths. This time imagine you will burn just as many calories no matter which choice you make. So you can choose what you honestly want to do or not to do.

This can often highlight what it is that your body needs right now. It may be that your body needs to begin by getting enough rest and recuperation while you start to make your nutritional changes.

However, if you want to exercise but just can’t find the time then you probably don’t have an energy problem.
Ask yourself, is it really that I don’t have the time, or do I choose not to make the time? If you think exercise means a big production of dragging yourself to a crowded gym and sweating it out on a stationary bike as you stare at a wall, then no wonder you are avoiding exercising. When exercise is a pleasure, it’s easier to find the time for it.

**Your exercise may be too stressful for you**

Sometimes people feel too tired to exercise at the start of a diet, but they force themselves anyway. Usually they feel worse afterwards: more tired, drained, sometimes emotionally “down” too.

**Burn Fat Not Sugar** - when you exercise there are three ways you can use energy: you can call on glycogen or sugar stored in the muscles, you can call on glucos - sugar stored in the blood; or you can call on free fatty acids which you get either from triglycerides stored in the body or from burning fatty tissues via the mitochondria.

Which route you use to feed your movements depends on the intensity of the effort you are making in your exercise. Using exercise to enhance body ecology and thereby both to decrease cellulite and to rejuvenate demands low intensity. Why? because low-moderate intensity isotonic movement develops red not white muscle fibre and burns fat best. It utilizes free fatty acids first and only second does it turn to muscle glycogen as food. That is exactly what you are after in breaking down cellulite as well as in shedding ordinary fat from the body. You want to stimulate the mitochondria of your cells to release fatty acids, turning them into energy and enhancing metabolic processes at a cellular level. If you are overweight this will mean you get maximum support for the burning of stored fat and for turning flabby low energy tissue into firm strong muscle.

If you go the other way with exercise, pushing yourself to the limit you will defeat your efforts - as aerobic exercise increases, more white fibres develop and the burning of glycogen becomes more important than the burning of fat. At 80% of your exercise limit glycogen supplies twice the energy that fat free fatty acids do. At
100% it supplies virtually all. Pushing yourself to your limits only make worse the disturbances in your body's ecology which produced cellulite in the first place. It also produces large quantities of lactic acid creating acidosis, which increases your bodily pollution (which is why a few top women athletes can't shift their cellulite). So exercise to banish fat needs to be rhythmical and continuous, using large muscle groups and performed at an intensity and frequency that increases your heart output only to 60% of maximum heart rate - never more.

Just as working too hard is counterproductive so is working too long. Exercise done properly will energize, not exhaust you. If an hour after a session you feel a lot of fatigue that is a sure sign you have been pushing too hard. Your body has probably been burning sugar rather than fat and in the process producing clinkers of waste. There is no ideal time limit for this exercise; it all depends upon your current fitness level. 15 minutes may be all you need to start off with; others may need 60 minutes; remember; if you are energised not fatigued it is the right amount for your body. If you exercise in this way you will begin to experience an abundance of life force and creativity and it is the start of caring for yourself!

**When you exercise correctly for your body you should feel more energetic and full of vitality.**
EXERCISE – SO YOU HAVE TO DO IT!

Better to work SMART – what is the best type of exercise for losing fat and gaining cardiovascular fitness?

Number 1 – Pre breakfast Moderate Intensity Cardio

You should consider getting up early and doing cardio before you eat your first meal - even if you're not a "morning person." Early morning aerobic exercise on an empty stomach has three major advantages over exercising later in the day.

Early in the morning before you eat, your levels of muscle and liver glycogen (stored carbohydrate) are low. If you eat dinner at 7 p.m. and you eat breakfast at 7 a.m., that's 12 hours without food. During this 12-hour overnight fast, your levels of glycogen slowly decline to provide glucose for various bodily functions that go on even while you sleep. As a result, you wake up in the morning with depleted glycogen and lower blood sugar - the optimum environment for burning fat instead of carbohydrate. How much more fat you'll burn is uncertain, but some studies have suggested that up to 300% more fat is burned when cardio is done in a fasted, glycogen-depleted state.

So how exactly does this work? It's quite simple, really. Carbohydrate (glycogen) is your body's primary and preferred energy source. When your primary fuel source is in short supply, this forces your body to tap into its secondary or reserve energy source; body fat. If you do cardio immediately after eating a meal, you'll still burn fat, but you'll burn less of it because you'll be burning off the carbohydrates you ate first. You always burn a combination of fat and carbohydrate for fuel, but depending on when you exercise, you can burn a greater proportion of fat relative to carbohydrate. If doing cardio first thing in the morning is not an option for you, then the second best time to do it would be immediately after weight training. Lifting weights is anaerobic (carbohydrate-burning) by nature, and therefore depletes muscle glycogen. That's why a post lifting cardio session has a similar effect as morning cardio on an empty stomach. The second benefit you'll get from early morning cardio sessions is what I call the "after burn" effect. When you do a cardio session in the morning,
you not only burn fat during the session, but you also continue to
burn fat at an accelerated rate after the workout. Why? Because
an intense session of cardiovascular exercise can keep your
metabolism elevated for hours after the session is over. If you do
cardio at night, you will still burn fat during the session, so you
definitely benefit from it. However, night time cardio fails to take
advantage of the "after burn" effect because your metabolism
drops like a ton of bricks as soon as you go to sleep. While you
sleep, your metabolic rate is slower than any other time of the
day.

Burning more fat isn't the only reason you should do your cardio
early. The third benefit of morning workouts is the "rush" and
feeling of accomplishment that stays with you all day long after an
invigorating workout. Exercise can become a pleasant and
enjoyable experience, but the more difficult or challenging it is for
you, the more important it is to get it out of the way early. When
you put off any task you consider unpleasant, it hangs over you all
day long, leaving you with a feeling of guilt, stress and
incompleteness (not to mention that you are more likely to "blow
off" an evening workout if you are tired from a long day at work or
if your pals try to persuade you to join them at the pub for happy
hour.)

You might find it hard to wake up early in the morning and get
motivated to workout. But think back for a moment to a time in
your life when you tackled a difficult task and you finished it.
Didn't you feel great afterwards? Completing any task, especially a
physically challenging one, gives you a "buzz." When the task is
exercise, the buzz is physiological and psychological.
Physiologically, exercise releases endorphins in your body.
Endorphins are opiate-like hormones hundreds of times more
powerful than the strongest morphine. Endorphins create a natural
"high" that makes you feel positively euphoric! Endorphins reduce
stress, improve your mood, increase circulation and relieve pain.
The "high" is partly psychological too.

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HIIT

Or more specifically – guerrilla cardio!

Putting Guerrilla Cardio to the test

"... 8 very hard 20-second intervals with 10-second rest periods may be one of the best possible training protocols."
—Izumi Tabata, Ph.D., National Institute of Health & Nutrition, Tokyo, Japan

To test the effectiveness of this brief but brutally intense regimen, Dr. Tabata and colleagues pit it against a moderate-intensity endurance program commonly prescribed by advocates of the so-called “fat-burning zone.”

In the moderate-intensity group, subjects riding exercise cycles were asked to pedal at 70 percent of VO2 peak for an hour a day, five days a week. VO2 peak and anaerobic capacity were measured before and after each training session for the duration of the six-week study.

A second group also exercised five days per week—only, these folks weren’t afforded the luxury of pedaling along at such a leisurely pace.

After a short warm-up, this group was made to carry out eight sets of 20-second maximum-intensity sprints on an exercise cycle (170 percent of VO2 peak—were’ talkin’ intense, folks!) with only 10-second rests between each bout.

Again, VO2 peak and anaerobic capacity were determined before, during and after the training.

The results, in some respects, weren’t too surprising—in others, they were earth-shattering. As to be expected, the moderate-intensity endurance-training group experienced a rather significant increase in VO2 peak (about 10 percent), but, also not surprisingly, this regimen had
absolutely no effect on anaerobic capacity.

On the other hand, the high-intensity interval-training group experienced a stunning 14 percent increase in VO2 peak and a 28 percent increase anaerobic capacity. These kind of scientific results coupled with the realworld examples of the Japanese speed skaters show this protocol as the most efficient and effective path to total fitness (and consequently, fat loss),

**GUERRILLA CARDIO**

Involves beginning with a warm up and then fast sprinting at top speed for short bursts followed by slow walking “rest” periods:

**Minutes 1-4:**
Warm-up @ 50% of perceived maximum effort followed by:

**Minute 5:**
Sprinting for 20 seconds  
Rest for 10 seconds  
Sprinting for 20 seconds  
Rest for 10 seconds

**Minute 6:**
Sprinting for 20 seconds  
Rest for 10 seconds  
Sprinting for 20 seconds  
Rest for 10 seconds

**Minute 7:**
Sprinting for 20 seconds  
Rest for 10 seconds  
Sprinting for 20 seconds  
Rest for 10 seconds

**Minute 8:**
Sprinting for 20 seconds  
Rest for 10 seconds  
Sprinting for 20 seconds  
Rest for 10 seconds

**Minutes 9-12:** Cool-down @ 50% of perceived maximum
WEIGHT TRAINING

Resistance training will not only help to burn calories it will also develop muscle and help to eliminate excess skin after weight loss!

Beginners should use 8-10lbs weights and follow this programme:

Day One

Chest, Back and Triceps

Bench press x 2 x 10 reps
Bent over rowing x 2 x 10 reps
Triceps press x 2 x 10

Day Two

Shoulders and Biceps

Shoulder press x 4 x 10 reps
Shoulder flyes x 2 x 20 reps
Bicep curls x 4 x 10 reps
Concentrated bicep curls x 2 x 20 reps

Day Three

Legs and Abs

Squats, lunges or ballet moves with leg weights
Crunches, ab roller or ballet moves for the abs

e.g.
Open legged squats x 2 x 20 reps
Close legged squats x 2 x 20 reps
Deadlift x 2 x 20 reps
Crunches x 4 x 20 reps

You can find lots of information on movements here
http://www.exrx.net
PERFORM LOW INTENSITY CARDIO AFTER WEIGHTS/HIIT

Whilst too much cardio can utilise muscle for energy there is some evidence to show that following a weights routine or a session of HIIT with some low intensity exercise such as walking/yoga/ballet/swimming could result in more fat loss.

Here's why........

There is evidence to support the recommendation that some low-intensity aerobic work may be beneficial for fat loss following a bout of high-intensity exercise. The rate of appearance of free fatty acids (FFA) and plasma FFA concentrations increases abruptly with the cessation of exercise at 85% VO2max (i.e. 90-95% maxHR). This is interesting because of the fact that plasma FFA concentrations are relatively low during this intensity of exercise, and as such, are not a significant source of energy during HIIT or the like. But, the actual source of fuel during exercise isn't necessarily the most important factor to consider. During high-intensity exercise, the blood flow is redirected such that a very high percentage of it is going to the active musculature. Obviously, increased metabolism demands increased blood flow. In this case, there is less blood flow to fat and, even though the rates of lipolysis may not slow down, the release of fatty acids into the bloodstream is blunted.

Once you're done with the high-intensity exercise, blood flow is redistributed throughout the body, and those fatty acids that were essentially trapped in the fat are now free to roam in the plasma as FFA. Depending on the duration of your high-intensity bout of exercise, you may very well have returned your body to a hormonal environment mimicking the fasted state. Add on top of that the above-mentioned abrupt increase in plasma FFA and the elevated concentration of catecholamines from the intense exercise, and you are now the happy owner of a first-rate fat-burning furnace.

Following HIIT with low intensity work allows you to 'use' up the newly released FFAs for energy.
PUTTING THE EXERCISE PLAN TOGETHER

The idea is to work up to the exercise challenge week by week – bit by bit as your fitness allows and then when you can manage the programme it will need to be changed/increased etc.

Monday

Day One of weight training programme followed by 30-40 minutes walking

Tuesday

Pre breakfast cardio – either walking, moderate running or an exercise video. The idea is to work up to 40 minutes per time

Afternoon/Evening: Guerilla cardio followed by 30 minutes walking or low intensity exercise

Wednesday

Pre breakfast cardio

Afternoon/Evening - 15 minutes rebounding followed by 30 minutes walking or low intensity exercise or stretching exercises

Thursday

Pre breakfast cardio

Afternoon/Evening – Day Two of weight training programme followed by 30-40 minutes walking/low intensity exercise

Friday

Pre breakfast cardio

Afternoon/evening – Guerilla cardio followed by 30-40 minutes walking/low intensity exercise
**Saturday**

15 minutes rebounding am followed by 30-40 minutes walking or low intensity exercise

Evening: free

**Sunday**

Pre breakfast aerobics

Afternoon/evening – Day Three of weight training programme followed by 30-40 minutes low intensity exercise such as walking.