The Heart Maintenance Manual

CORONARY HEART DISEASE:

No Need to Suffer

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Forward

Coronary heart disease starts with a modern, polluted lifestyle. Processed food grown by intensive farming methods leads to a severe deficiency in essential nutrients. Pollution causes toxic overload and free radical proliferation, which adds to the stress our bodies suffer. Metabolic pathways become disrupted and the immune system dysfunctions, leaving us susceptible to infections and disease.

A poor diet contributes to a rise in homocysteine and uncontrolled free radical proliferation. These attack vulnerable cells, including those that line the arteries. Inflammatory responses send out chemical messengers that attract oxidised LDL cholesterol-laden cells, which are deposited in streaks, in and around the areas of damaged arterial tissue. Blood pressure rises and the body begins to show the first signs of atherosclerosis. This is the beginning of coronary heart disease and doctors have reported that these first signs have been found in schoolchildren.

The evidence that coronary heart disease is preventable is overwhelming. However, it is still the Number One killer in the industrialised world.

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The Heart and How it Works

After conception, the heart goes through a series of dramatic changes, apparently following the evolutionary track of man. In the first stage, the foetal heart resembles that of a fish and is little more than a tube. The next stage forms two chambers, resembling an amphibian's heart. Then a third chamber develops, similar to the heart of a reptile. In the final stage, the third chamber separates into two, and it becomes a recognisable four-chambered human heart. Amazingly, over 500 million years worth of evolutionary development in just a few weeks.

The outside structure of the heart contains three layers of tissue: the pericardium, the myocardium, and the endocardium. The pericardium itself has two layers: an outer fibrous sac that guards against over distension; and a double inner layer in which pericardial fluid is secreted between the membranes to allow a smooth rhythm as the heart beats. The Myocardium has just one layer of cardiac muscle tissue, which is found only in the cardiac area. Its structure allows the atria and the ventricles to contract in a coordinated manner. The myocardium is strongest at the apex, where it is needed the most, and is particularly muscular around the left ventricle, the part of the heart that works the hardest. The endocardium forms the lining of the myocardium and consists of a thin sheet of ultra smooth cells that allow the even flow of blood through the heart. These are the same type of endothelial cells that line the blood vessels.
Inside the heart, a muscular wall called the septum separates the left and right sides into two separate pumps. Each side of the heart has two chambers, an atrium and a ventricle. A valve called the mitral valve connects the left atrium to the left ventricle, and the tricuspid valve connects the right atrium and right ventricle. The deoxygenated blood in the venous system passes through the superior and inferior venae cavae into the right atrium, the tricuspid valve opens and the blood flows into the right ventricle.

As the heart pumps, the blood is forced up through the pulmonary valve into the pulmonary artery. On leaving the heart, the pulmonary artery divides into two, carrying the blood to the left and right lung capillary beds. The waste carbon dioxide from the blood is excreted and oxygen is absorbed. Two pulmonary veins from each lung transport the newly oxygenated blood back to the heart where it enters the left atrium. The mitral valve opens and the blood passes into the left ventricle. As the heart pumps, the blood is forced up through the aortic valve and into the main artery of the circulatory system, the aorta. Think of a central heating system where the water is constantly circulated over 1,000 times a day, with the aid of a pump, and you will have some idea of the workings of your own cardiovascular system.

In infancy, the growing heart requires a larger amount of oxygen than that of an adult. A two-year old will have a heart rate of approximately 120 beats a minute, and an eight year old will have slowed to ninety beats a minute. When adulthood is reached, the heart will have stabilised to about 70 beats per minute.

An adult heart weighs approximately 300 grams, less in a female and more in a male. From birth to death, the size and shape of a person's heart corresponds similarly to the size and shape of their own clenched fist.

During the lifetime of an average person, the heart beats over two and a half billion times. Like a fine tuned machine, if this remarkable engine is fuelled and serviced correctly, it is capable of providing all the power needed to maintain life for well over a hundred years, and probably more.

The Blood Vessels

At the top of the heart are a series of large blood vessels. These are referred to as the coronary arteries and veins. The arteries take the oxygen-rich blood away from the heart out of the upper part of the left ventricle. The exception to this rule is the pulmonary artery, which transports the deoxygenated blood from the upper part of the right ventricle to the lungs. The veins transport the deoxygenated blood from the body to the heart. The exception to this rule is the four pulmonary veins, which carry oxygen-rich blood from the lungs to the left atrium of the heart. Although the size of the different blood vessels varies considerably, from the arteries to the capillaries through to the veins, they all have the same single layer of endothelial cells lining their inner surfaces and are each supported by an underlying extracellular matrix. The vessels have about 100 different enzymatic systems that maintain their suppleness and most important functions, which allow the oxygen and nutrients to permeate freely through the linings and into the surrounding tissue and heart muscle. Protection of these enzymatic functions are maintained and even enhanced by the careful selection of a nutrient-rich diet.

> It has been estimated that there are approximately 62,000 miles of blood vessels in the adult human body.

The Arteries

The arteries carry blood away from the heart. An artery is made up of three layers: the *Tunica adventitia,* an outer layer of fibrous tissue; the *Tunica media,* a middle layer of strong, elastic, smooth muscle tissue; and the *Tunica intima,* a smooth inner layer of endothelial cells. If the endothelium is damaged, the immune system immediately engages its repair mechanism,

but, in an unbalanced system, where vital co-factors are missing, this malfunctions and eventually results in lesions, fatty streaks, building up in the artery walls. This is the first sign of atherosclerosis, the most significant from of arteriosclerosis (coronary heart disease). The whole atherosclerotic process is a series of complex chain reactions between the various toxic and protective factors that occupy the bloodstream and vessel walls.

Damage to the endothelial cells can be caused by:

1. Free radical activity.
2. High blood pressure.
3. Oxidised lipids in the blood stream.
4. Heavy metal contamination.
5. Toxic chemicals introduced from the environment.
6. The 'grating' action of too much homocysteine in the bloodstream.
7. Adverse chemical reactions involving excess serum glucose and amino acids.
8. Bacterial toxins.
9. Viruses.
10. Immune response.
11. Inflammatory response.

The arteries give two vital indicators of cardiovascular health, the pulse and the blood pressure. An artery expands and contracts in time with the heartbeat, helping to pump the blood around the body. A pulsating artery that is close to the surface, in the neck or the wrist, is used to measure the pulse-rate. The blood pressure is also calculated from the blood flowing through the arteries. If the arteries and arterioles are in good condition, the blood pressure is usually normal; if they are constricted, pressure builds up as the heart works harder to pump the blood around the body. The blood pressure naturally increases when exercising or when excited or nervous and decreases when resting or asleep. If it is consistently too high or too low it may signify an increased risk of heart disease.

The Capillaries

Capillaries, often referred to as the *primary exchange vessels*, form a vast network of tiny microscopic blood vessels that connects the smallest arteries (arterioles) to the smallest veins (venules). Their walls are constructed of endothelial cells and pericytes, which allow gases, nutrients and waste to pass through, but not normally blood or plasma. They feed the body's billions of cells and allow waste to pass back through into the blood-stream. The waste-rich blood travels from the capillaries into the venous system and back to the right side of the heart and into the lungs to be re-oxygenated.

The Veins

The veins carry the blood back to the heart. The blood pressure in the veins is lower, so the blood has to be moved along by a series of valves. The valves stop the back flow of blood and allow it to flow in one direction only. The walls of the veins are much thinner than the arterial walls, because they are not required to transport the blood at such a high pressure.

Coronary Heart Disease

Coronary heart disease is the number one killer in the United Kingdom and the United States of America. It kills more people per year than all the cancers put together. It affects at least 40% of the population, which means 1 in 2·5 people in the UK and USA will have their lives blighted or cut short by a preventable disease. The fact that coronary heart disease can be prevented and even reversed by natural methods is not widely known, simply because there is no profit in it. However, there is something we can do about it… we can find out about our own risk factors and take the necessary steps to make sure that we do not add to the statistics.

For decades, scientists have told us that heart disease is due to the amount of fat and cholesterol that is added to our diets. They said butter was bad for us, eggs were even worse; we should switch to margarine and limit our fat intake.

The result…

The food industry has grown fat on supplying us with low-fat and non-fat, supposedly, healthier foods.

Did this make any difference to the levels of heart disease or obesity?

Not an iota!

It has been established, in epidemiological studies, that when children were given a balanced, nutritious diet, including: butter, eggs and full fat milk, incidences of heart disease in later life decreased.

In 1957, Dr. Norman Jolliffe, Director of the Nutrition Bureau of the New York Health Department and author of several orthodox books and scientific papers, founded the Anti-Coronary Club, in which 814 businessmen in their forties and fifties were given the so called 'Prudent Diet'. Club members used corn oil and margarine (polyunsaturated fats) in place of butter; processed, carbohydrate-rich breakfast cereals in place of eggs; and white meat in place of red. Club members were compared with a control group of a similar age and health status, who ate a diet high in

cholesterol…eggs for breakfast and meat three times a day. The results of Dr. Jolliffe's experiment were published in 1966, in the Journal of the American Medical Association, and although his members had a lower cholesterol level, there were eight deaths due to heart disease; there were none in the group that ate a nutritious, balanced diet including eggs, butter and meat. Dr. Jolliffe died in 1961 from vascular thrombosis, which was 'explained' as a complication of diabetes.

So why are we given the wrong information?

It is solely because an average government minister has no idea about healthcare. They are merely civil servants who, one day, are overseeing our transport system, the next, managing healthcare for the nation. They rely on committees, quangos and professional lobbyists that are often employed either by the pharmaceutical cartels and associated medical and scientific bodies or representatives of the food industry, to give information on health and lifestyle. It is like asking Bill Gates which brand of software would make their computers more efficient and then expect him to be impartial. These are the very people who have a vested interest in making sure that we do not take charge of our own health and well-being. Every time someone decides to take a more natural approach to combating disease, by alternative medicine or healthier eating, it depletes profits.
Is it any wonder that natural healthcare is lobbied against with such ferocity?

At the turn of the 20th Century, there was a very low incidence of coronary heart disease. This was a time when families were consuming a huge amount of fat by today's standards. A favourite at that time was 'dripping sandwiches'. Butter and eggs were also in plentiful supply. Over a hundred years ago agriculture was sustained by using natural resources. Meadows were a mixture of grass and flowers (we now call weeds). Animals were naturally reared. There was no need for weed killers, antibiotics, pesticides

or any other chemicals to be pumped into the food chain. The processed food and chemical industries were mere twinkles in the eyes of the industrialists and nearly everybody had access to a supply of fresh, nutrient-rich foods. The difference now is that refined sugar and chemical flavourings replace saturated fat, in what is commonly referred to as 'health food'. Over-cooked, processed foods contaminate our diets. Chemical farming depletes the nutrients in the soil. Factory farmed animals are force-fed grains, drugs and, in some cases, other species to provide us with a readily available source of cheap, denatured meat. Furthermore, there are hundreds of synthetic chemicals and toxic metals that come into contact with our food, all the way down the chain, from before it is grown to when we eat it. These synthetic chemicals and heavy metals are in the bloodstream of every one of us. Is it any wonder that the majority of the aging population are suffering from a reduced quality of life and an increase in degenerative diseases? Put the wrong fuel in your car and see how far you get.

It is in this tangled web of big business and science that the key to heart disease really lies. It was never about the amount of fat we consumed. Saturated fat is, and always has been, a secondary factor in heart disease. From the mid 1940s, two scientists by the name of Rinehart and Greenberg, at the University of California, wrote and subsequently published several papers on the arteriosclerotic effects of a prolonged synthetic diet fed to primates who were deficient in vitamin B_6.
This showed a clear link between low vitamin intake and a hardening of the arteries.
Twenty years on, Dr. Kilmer McCully, a Harvard pathologist, studied several cases of children and young adults who had died of cardiovascular disease while suffering from a genetic illness called homocystinuria, which is characterised by an abnormal build-up of homocysteine in the bloodstream. McCully had studied medicine, pathology, chemistry and molecular biology, and was well versed in genetics. He had worked with the famous

geneticist Guido Pontecorvo and the DNA expert, James Watson. He put forward his hypothesis that because of the elevated level of homocysteine, this must be associated with the early onset of arteriosclerosis. McCully also supported this theory with animal experiments. Unfortunately, for the millions that have died since, the only action taken was McCully was asked to leave his Harvard post. One cannot help theorising that maybe it had something to do with how much the vast pharmaceutical-led cholesterol-lowering industry was worth. This was the one big problem with the new homocysteine theory… homocysteine could be successfully lowered using natural nutrients (vitamins B_6, B_{12}, folic acid and betaine citrate), which meant there was no profit in it. It only saved lives. Undeterred, McCully left Harvard and joined the Veterans Administration (VA) Medical Center in Providence, R.I., where he continued his work on homocysteine. Hundreds of studies have since confirmed that McCully was right and it is now tentatively accepted, by the majority of healthcare practitioners, that a raised homocysteine level can cause arteriosclerosis.

Another link to coronary heart disease was also discovered in the 1950s. Dr. Denham Harman, from the Donner Laboratory of Medical Physics at Berkeley, University of California, first proposed the free radical theory. He went on to demonstrate that feeding antioxidants to mammals extended their life spans.

Harman suggested that we should reduce our calorie intake to decrease the incidence of disease. Again, a sound theory was dismissed only to be confirmed decades later.

Although homocysteine and free radical damage are important, they are not the whole story. There have been hundreds of studies that show people with diabetes are more prone to heart disease, but do not have a particularly high level of homocysteine. Adults with diabetes have cardiovascular death rates about 2 to 4 times higher than those without diabetes. Approximately 2 out of 3 adults with diabetes die of heart disease. Chronic high blood sugar is associated with narrowing of the arteries, a sharp increase in

triglycerides, a decrease in 'good' HDL cholesterol, high blood pressure and heart attacks. It is worth noting that the incidences of diabetes and coronary heart disease have risen with the rise of the processed food industry.

Chromium deficiency, an essential trace mineral, is implicated in both the onset of diabetes and heart disease. A poor dietary intake of chromium is linked to higher blood cholesterol levels and therefore increased risk of arteriosclerosis. There is a wide geographical variation in chromium levels in soil, and population studies suggest that the prevalence of diabetes and heart disease is lower in areas where chromium intakes are relatively high. The concentration of chromium within the body also declines as we get older; this is possibly linked to a marked increase in type II diabetes and heart disease in the aging population. The more sugar we eat the more we need chromium to help insulin deal with the excess. Both refining and processing depletes chromium in our food, so there is a severe shortage in the western diet. Modern farming methods also deplete chromium in the soil along with two other essential minerals, selenium and magnesium.

Selenium is an active co-factor to the antioxidants the body makes naturally; and it has been shown to help stop aluminium absorption. A severe selenium deficiency can weaken and damage heart muscle tissue. People living in geographically low selenium areas have a lower plasma selenium level and an increase in the risk of heart disease, atherosclerosis, platelet aggregation, as well as higher risks of other degenerative diseases.

Magnesium is another essential mineral that is in very low supply in the modern westernised diet. It is interesting that incidences of death from ischemic heart disease are higher in soft water areas where magnesium is very low. In addition, an abnormally low concentration of magnesium in myocardial tissue has been found in cases of sudden death from heart disease. In 1958, a South African physician and his colleagues, Dr B Malkiel et al., reported that magnesium injections were saving the lives of patients suffering from acute myocardial infarction (AMI). A year later, the

results were replicated in a similar study. These two landmark studies were ignored, even though magnesium had previously been shown to control life-threatening arrhythmias. Many other studies, that followed the correct protocols for magnesium administration, have confirmed its efficacy in treating risk factors associated with heart disease, including high blood pressure. In 2002, the 'magnesium in coronaries' (MAGIC) trial, claimed to end the debate and the use of magnesium in cases of AMI. But, as some doctors have later pointed out, the protocol for the trial indicates that there was up to a 6-hour time lapse for the administration of the intravenous magnesium, by which time the damage could have already been done.

Considering all these factors, it seems that a trace mineral deficiency joins a high homocysteine level and free radical activity to assist the onset of heart disease. If you add this to how our lives have changed since the end of the First World War, when heart disease really started to rise, you will begin to see that an increase in degenerative diseases, such as heart disease, was inevitable.

1. The way our food is grown, cooked and processed has changed radically in the last ninety years. RESULT: nutrients, good fats and vitamins depleted; bad fats and refined sugar substantially increased; free radical activity increased.

2. Synthetic chemicals: flavourings, preservatives, colourings, are added to many processed foods as a matter of course. RESULT: free radical activity increased; hormones unbalanced; eventual immune system dysfunction.

3. Supermarkets have vast storehouses of 'fresh' foods sourced from all over the world, which is no longer fresh when we buy it. RESULT: vitamins and antioxidants, that fight free radicals, decreased in fresh fruit and vegetables.

4. Intensive farming depletes valuable minerals in the soil and adds chemicals to the food chain. Animals are fed on grains and other species. RESULT: minerals decreased; toxic metals increased; free radicals increased; bad fats and other diseases increased in farm animals; pharmaceutical drugs added to food chain.

5. Hydrogenated vegetable oils replace saturated fat. Margarine is polyunsaturated fat turned into cheap, twisted molecules of trans fatty acids, which are as far from natural as any food can get. However, top brands were marketed as the new 'Health Food'. Research has shown that trans fatty acids, or any heated polyunsaturated fats can cause heart disease and other diseases. RESULT: free radical activity increased; a drastic shortage of essential fatty acids, which in itself can lead to arterial damage and other complications.

6. A sedentary lifestyle is another important factor. Regular aerobic exercise beneficially affects most aspects of the risk factors of heart disease. Again, it is something that has completely changed since the 1920s. RESULT: BMIs increased; bad LDL cholesterol increased, high blood pressure increased.

7. Low-fat diets have been marketed as THE best way to lose weight, but recent research has shown that cutting all fat from a diet decreases HDL cholesterol and increases triglycerides, an unhealthy balance that could lead to heart disease and diabetes. RESULT: a lower level of good cholesterol (HDL-c); a higher level of triglycerides = higher risk of heart disease and stroke.

8. A diet high in refined sugar and white flour contributes to increased triglycerides. Triglycerides are derived from fatty food, but the body also converts excess carbohydrates

to triglycerides, which increase the stickiness of the blood. RESULT: Higher triglycerides = higher risk of heart disease and stroke.

9. Pollution is much more widespread than it was eighty years ago. RESULT: a sharp increase in levels of toxic chemicals and heavy metals = an increase in free radical activity and damaged immune function.

Orthodox medicine can give pain relief. It is brilliant at delaying symptoms. It was able to completely manage infections and infectious diseases. It has the ability to cut out, graft on, and even replace parts that do not work. But go to your normal GP and ask about preventative healthcare and you will probably just get a piece of paper saying exercise more, stop smoking and cut down fat and alcohol. There was never any profit in people taking preventative health measures, so they were conveniently side-lined. If less people get sick, it means that less people will be using the drugs and services of the medical 'industry'. It is not hard to see why science mixed with big business tries to suppress the truth. Businesses exist to make money - it is a fundamental fact. The tragedy is that big business has had free reign over the welfare of people's health for nearly a century, and millions are dying needlessly as a direct result. We urgently need a radical shift towards the integration of orthodox and natural medicine.

Peer-reviewed studies have not actually pinpointed one proven cause of arteriosclerosis. When scientists, like McCully, have found a link that goes against current thinking it is effectively silenced for decades. However, studies are now pointing to a combination of conditions, including: homocysteine, lipoprotein(a) and 'MCP-1', oxidised LDL cholesterol, pollution, heavy metal contamination, stress, inflammatory response (C-RP), fatty acid imbalance and low nutrient intake. All of which can be prevented by modifying our lifestyles.

The drugs prescribed for coronary heart disease (aspirin, beta-blockers, lipid-lowering drugs, and angiotensin-converting enzyme [ACE] inhibitors, etc.) have side-effects that can be debilitating. Integrated medicine could replace a large number of these drugs with a more natural, lower risk, integrated therapy. A doctor could give therapeutic doses of vitamin E and vitamin C to dissolve blood clots after surgery and facilitate healing. EPA and DHA fish oils, screened and guaranteed to be pure, along with arginine, could replace aspirin. Inositol hexaniacinate, which does not deplete coenzyme-Q_{10} from muscles, including the heart, could be given in place of lipid lowering drugs that do. Coenzyme-Q_{10}, magnesium, carnitine and taurine could be medically used to support heart function.
Integrated medicine is the only way forward if we are going to combat the diseases that are afflicting us in the Twenty-first Century. In an ideal world, everyone should be able to attend a clinic that tests for vitamin and mineral deficiencies and heavy metal contamination, both at serum and tissue levels. Everyone should have a regular vitamin and mineral profile and a supplement program designed specifically to counteract personal deficiencies. Until that happens, we have to take charge of our own preventative healthcare. We have to find out what we need to keep ourselves healthy.

Atherosclerosis

Atherosclerosis, a major form of arteriosclerosis, is a slow, progressive disease, the start of which has been found in children. In some cases the disease progresses rapidly by the age of 30. In others, it does not become life threatening until over 60 years of age. There are many different theories about how it actually begins. The most popular belief is that it starts with a free radical attack, which damages vessel walls and oxidises LDL cholesterol (LDL-c) in the bloodstream. Oxidised LDL-c molecules, especially those with lipoprotein(a) attached, are easily absorbed

by circulating white blood cells (monocytes - part of the immune system), particularly those with a chemoattractive protein-1 coating (MCP-1). These enter and attach to, whilst trying to repair, a damaged vessel wall. When LDL-c is absorbed into monocytes they develop into macrophages (phagocytes, which can form into harmful foam cells). These and many other intra- and extra- cellular components (collagen, platelets) are pulled into the damaged site, attracted by secretions (adhesion molecules or cytokines) from the cells of damaged vessels. Smooth muscle cells from the medial layer migrate through the *intima* (endothelial cells) and proliferate in the presence of inflammatory responses (chemical messengers), themselves trying to block the damage. As the unstable cholesterol-filled plaque builds up a sudden rupture can occur, triggering the formation of a blood clot inside the artery, which may rapidly block blood flow to tissues lower down or it may break off, causing a blockage or massive tissue damage, leading to a stroke or a heart attack.

However, if there is no rupture and the fibrous plaque continues to build up, it can eventually harden, trapping pooled blood and constricting blood vessel(s), this starts to slow down arterial blood flow, depriving major organs and peripheral regions of oxygen and nutrients. Eventually blood flow is stopped and a massive heart attack occurs.

This often-fatal progression is greatly increased by oxidative stress, excess homocysteine, synthetic chemicals, pollution, heavy metals, a fatty acid imbalance, low nutrient intake and chemicals released by emotional stress.

The most common dietary sources of damaging oxidants are vegetable frying oils, processed meat products, over-cooked or burnt foods, smoked foods, dried dairy and dried egg products (often added to baby foods), margarine, and any food with rancid or over-heated fats.

Oxidised food derivatives entering the bloodstream pose a direct threat to vessel endothelia. However, the endothelia do possess strong defence mechanisms, supplied by antioxidant and prostaglandin (prostanoids) protection, the latter of which originates from the fatty acids in cell membranes. The cells themselves also carry ascorbic acid, tocopherols, antioxidants, antioxidant enzymes, and other co-factors. But, if all these are depleted by a westernised diet, or if pollution and toxic chemicals convert them into poisonous substances, the whole protective mechanism breaks down and disease quickly occurs and progresses.

Under optimal conditions, where the required nutrients and co-factors are present, there is a complex yin-yang equilibrium, a delicate balance, which produces optimum health. The unbalancing of this system is where the potential for every degenerative disease starts and this is the very thing that is not addressed, or even acknowledged, by orthodox medicine.

Cause and Effect of CHD

Free Radicals

Free radical activity starts with the body's natural respiratory and metabolic processes. When oxygen is used to 'burn' food for energy, highly reactive molecules called free radicals are produced in the mitochondria matrix of our cells. To counteract this, the body naturally produces antioxidant enzymes to keep them at a reasonable level. We do need some free radicals to assist in several vital bodily processes. However, the more we eat and exercise the more we need antioxidant protection. Deep fried foods, hydrogenated oils, overcooked (burnt) and processed foods, cigarette smoke, water and air pollution, heavy metals, toxic chemicals and toxins also create free radicals. When these are added to the ones the body makes naturally, it can result in overexposure, which leads to 'oxidative stress', a condition in which the body's natural defences are swamped. It is these additional free radicals that cause the damage. If DNA, which forms the body's genetic code, is attacked, cancer may occur. If free radicals attack the cells that line the vessel walls, the start of coronary heart disease begins. Just one single free radical can produce reactions involving thousands of damaged molecules, increasing the free radical population until the reactions burn out or are quenched by antioxidants.

It is very important to include some antioxidant-rich foods with every meal. If a person eats just toast and fish and chips for any length of time, there would be no additional antioxidants or co-factors introduced into a severely undernourished system. Sooner or later, degenerative disease would be inevitable.

Over population of free radicals, also known as oxidative stress is implicated in many degenerative diseases, including: cancer, heart disease, arthritis, strokes, Alzheimer's disease, Parkinson's disease, macular degeneration and cataracts.

The body naturally produces antioxidant enzymes such as superoxide dismutase (SOD), glutathione peroxidase, and methionine reductase, which quench free radical activity. However, production of these enzymes declines, as we get older. These can also be taken in supplement form, but are not adequately absorbed into the system. The best way to ensure that the body constructs these antioxidants is to make sure that all the co-factors are present in a healthy balanced diet - with a good percentage of fresh organic vegetables and colourful fruits. The building block nutrients needed include the minerals: manganese, zinc, and copper for SOD; selenium and magnesium for glutathione peroxidase manufacture.

Antioxidants are also obtained from food, but only if the food is fresh and not denatured by processing or over-cooking. The most well known nutrients that act as antioxidants are: beta-carotene (a precursor of vitamin A), vitamins C and E, and the mineral – selenium. Other free radical scavengers include: EDTA, alpha lipoic acid, coenzyme-Q_{10}, tocotrienols, quercetin, resveratrol, and other polyphenols, most of which are substances found in plants. Herbal extracts such as ginkgo biloba, bilberry, turmeric (curcumin), grape seed and pine bark extracts also act as potent free radical scavengers.

Homocysteine

The body makes homocysteine as it metabolises methionine, an essential amino acid found in meat and dairy products, and to a lesser extent in wheat, sweet corn, quorn and soya beans. Like cholesterol, homocysteine performs a vital function, and if the correct co-factors are present, it converts to other important substances including cysteine, an essential amino acid. If a person eats too much animal protein, without adequate supplies of B_6, B_{12} and folic acid, homocysteine is denied its co-factors and accumulates, instead of breaking down. A high concentration of homocysteine in the blood damages blood vessel walls, laying the foundation for heart disease. It also encourages oxidation of lipids,

and helps to bind lipoprotein(a) to fibrin, which causes platelets to stick together. Although men seem to be at greater risk from an elevated level of homocysteine, woman who have gone though the menopause also have an increased risk. Alzheimer's disease and other degenerative diseases have been linked to the build-up of homocysteine.

Homocysteine can be reduced by:

1. B_6, B_{12} and folic acid convert homocysteine to other important amino acids and co-factors.

2. Trimethylglycine (TMG), found in supplement form as betaine citrate or betaine aspartate, detoxifies homocysteine by donating a methyl group and reduces TMG to dimethyl-glycine (DMG), which can have an energising effect on the body. TMG can be given in conjunction with B_6, B_{12} and folic acid.

3. Pyridoxyl-5-phosphate, can be given to people who cannot convert vitamin B_6 to its active co-enzyme form.

Regular aerobic exercise, at least three times a week, can help to lower homocysteine. This can be walking, power walking, swimming, etc.
The homocysteine level within the body increases, as we get older. A decrease in stomach acid and/or a slowing down of vital enzymatic functions in metabolic pathways may account for this. To compensate, a practitioner could prescribe the more metabolically active forms of the essential vitamins: Pyridoxyl-5-phosphate (B_6), 5-methyltetrahydrofolate or folinic acid (B_9) and methyl- cobalamin (B_{12}).

In 1994, a placebo-controlled clinical study of 100 men with hyperhomocysteinemia found that when individual doses of 650 mcg folic acid (B_9), 400 mcg vitamin B_{12}, 10 mg vitamin B_6, or a combination of the three nutrients, were given daily for six weeks,

the most effective was the combination of all three working synergistically together to reduce homocysteine.
Homocysteine is measured from blood taken after a 12 hour fast. Levels of 5 to 15 micromoles per litre of blood are considered normal. However, studies reveal that a homocysteine level above 6.3 causes a sharp, progressive risk of heart attack (the American Heart Association's Journal, Circulation. November 15, 1995. 92:2825-30). Further concentrations are officially classified as either moderate (16-30 micromoles per litre), intermediate (31-100 micromoles per litre), or severe (greater than 100 micromoles per litre). Research has found that these classifications are woefully misleading and anyone with a score of 10 should take dietary steps to reduce their homocysteine level. In fact, an increase of a mere 5 micromoles/ litre would raise the probability of coronary heart disease by 240%.

Heavy Metals

Heavy metal toxicity is frequently the result of long term, low-level exposure to pollutants that are abundant in our environment (water, air, food, and numerous chemical consumer products). Exposure to heavy metals is associated with many chronic diseases. They can oxidise fats in the bloodstream and greatly increase free radical proliferation, which also makes us more susceptible to atherosclerosis and other diseases. Several sulphur-based amino acids are known to be heavy metal chelators; they bind the metal ions, helping the body to safely eliminate them. These include: glutathione, methionine, taurine, cysteine and cystine.

Heavy Metals that Cause a Threat to Health can be Found in:

Air Pollution
Amalgam Fillings
Antiperspirants
Canned Foods
Cookware
Cosmetics
Fish and Seafood
Industrialised Areas
Medications
Old Paint
Pesticides
Tobacco Smoke

Drinking Water	Utensils
Fertiliser	Vaccinations

Recent research has found that even low levels of lead, mercury, cadmium, aluminium and arsenic can cause a wide variety of health problems.
Everyone on the planet is exposed to some sort of heavy metal contamination. As we get older, the load gets heavier and our systems struggle to cope. Heavy metal exposure is inevitable in a modern, industrialised, hi-tech society. The problem is that doctors are failing to recognise that an accumulation of these contaminants are damaging our health. Routine diagnostic testing and the elimination of these toxic substances should be an integral part of a normal healthcare regime.

Aluminium (al)

Aluminium is a naturally occurring metal that has been used in many industries for decades. It is the most abundant metal and third most abundant element in the earth's crust. Acid rain can dissolve aluminium compounds in soil and rock, increasing the level in soil, seawater and freshwater sources. This also increases the levels in farm animals, fruit, vegetables and fish. Today, aluminium is routinely used in: aluminium foil and dishes, antacids, antiperspirants, baking powder, baking utensils, buffered aspirin, canned acidic foods and drinks, construction materials (the automotive, aviation and electrical industries all use aluminium compounds), cookware, cutlery, dental cements, dentures, food additives, leather tanning preparations, lipsticks, prescription and over-the-counter drugs, anti-diarrhoeal agents, haemorrhoid medications, vaginal douches, vaccines, processed cheese, paints, toothpaste, fireworks and "softened" and normal tap water etc. Unfortunately, this is just the tip of the iceberg. Aluminium accumulates in human and animal tissues, most notably the brain,

heart, liver, lungs, muscles, bones, and once it has been absorbed, it is quite difficult for the body to remove it by its own

eliminatory processes. It can also be directly absorbed through the gastrointestinal tract from food and drink, and into the lungs from breathing polluted air. There are many incidences of death due to heart disease among aluminium smelter workers. Side effects of aluminium toxicity include: frequent headaches, abnormal heartbeat, depression, fatigue, unsteadiness, speech impediments, behavioural problems in children, numbness in hands and feet, memory loss and birth defects. Kidney patients on dialysis are exposed to very high levels of aluminium, which can lead to 'dialysis dementia'. Recent research suggests that it is implicated in the progression of Parkinson's disease, Alzheimer's disease and varying degrees of dementia.

Aluminium screening tests can be carried out on: blood, urine, faeces, hair and fingernails.

Lead (pb)

Lead is a very common heavy metal, especially in the industrialised world. It can accumulate in human and animal tissues and even a low level is toxic. There is no metabolic pathway for the body to rid itself of lead and it can collect in bone and teeth for many years. It also circulates in the blood, and can build up in major organs including the heart and the brain.
It is known to compete with calcium, and interferes with many calcium assisted metabolic processes. Nutritional deficiencies of iron, calcium, zinc, copper and protein, together with a high fat intake, can result in greater lead absorption. Phylates, natural compounds, from green leafy vegetables, such as spinach and swiss chard, can help to bind lead for easier elimination.
Recent research in Australia has shown that the lead, accumulated in skeletal bones, leaches during pregnancy and lactation, and mothers can pass it on to their offspring. This means that even if children today are exposed to less environmental lead, they may

still have a high blood concentration passed on to them in the womb.

Early symptoms of lead exposure include: mild fatigue, irritability, lethargy, behavioural problems, and abdominal discomfort, but these can also be symptoms of other disease conditions. As levels build up it leads to poor concentration, joint pains, headache, tremors, abdominal pain, vomiting and weight loss. At higher levels, more symptoms become apparent, including: severe colic, paralysis, fits, coma and it can even be fatal. Children are particularly vulnerable to lead exposure because their bodies absorb more than adults, and a developing nervous system is more sensitive to the damaging effects. Learning abilities are often adversely affected. There is also a possibility that even a low level of lead could be a factor in attention deficit and hyperactivity disorder (ADHD).

Air polluted with lead is a health risk in industrialised areas. Although, lead added to petrol products and paint has largely been eliminated, there is a still a danger from old paintwork and wood. Cheap, imported, candles may also pose a problem; lead is used for making the wicks stand upright in the wax, and can leach into the atmosphere when burnt. Old water pipes and soldered pipes can pollute the water system, so it is best to have an efficient water filter. In some areas of Scotland, where the water is naturally acidic, there is a problem with lead exposure. Scotland has the highest rate of heart disease in the UK. It would be interesting to see if this is linked.

Lead is used in the production of brass, lead solder, ammunition, bearing weights, containers, ceramics, glass, some oil products, badge and jewellery enamelling, etc.

Normal exposure is through contaminated drinking water and polluted air. There is an increased occupational hazard with industrial workers in the smelting, alloying, casting, refining sectors, plumbers and people in the pottery, glass and stained glass industries.

Mercury (Hg):

Mercury is the most toxic, non-radioactive, metal on the planet and is the second most common cause of toxic metal poisoning. It is a silvery heavy metal that is liquid at room temperature and can be cut with a knife in its solid state. Mercury occurs in three main forms: elemental mercury, inorganic salts and organic mercury compounds. Once released into the environment, it accumulates and will remain there, it cannot be fully broken down.

Elemental mercury is found in: thermometers, barometers, fluorescent light bulbs, blood pressure monitors, dental amalgam fillings, electrical switches, some latex paints, etc. It is sometimes used when extracting gold from ore and in the manufacture of chlorine gas and caustic soda. It is considered the least toxic form because it is not easily absorbed into the bloodstream. However, elemental mercury vaporises if exposed to air, and becomes an odourless, colourless gas. Over eighty percent of inhaled mercury vapour is absorbed and can cross the blood brain barrier or the placenta. Mercury vapour that reaches the kidneys is carried to every part of the central nervous system as a lipid-soluble gas. Brief exposure to the vapours can result in dizziness, tremors and memory loss. Its metabolites can inhibit vital enzyme functions, and affect cell membranes and neurotransmitters in the brain. Elemental mercury is also known as metallic mercury, liquid mercury, liquid silver and quicksilver. The American Dental Association has admitted that, in the face of overwhelming evidence, mercury vapour can leak from dental amalgam fillings and some states have now ceased using it. In 1994, Sweden announced a total ban on amalgam fillings in young adults. Denmark, Germany and Austria have followed suit. In Switzerland and Japan, the dental schools no longer teach the use of amalgam in dentistry. There may also be a link to autism in some children. If you add up the exposure a pregnant woman has, it does seem likely. When a woman becomes pregnant, she is offered free dental work, the increase in amalgam fillings at this time, coupled with mercury in the MMR and other vaccinations, could substantially increase

the mercury load within a child's system. Mercury toxicity is especially dangerous for pregnant women, because a foetus can easily develop serious neurological and development problems. After decades of denying that there was ever a problem it was

finally announced in August 2004, that mercury would be taken out of UK vaccines for very young children.

Inorganic mercury occurs when elemental mercury is combined with other substances such as: sulphur, chlorine, or oxygen. Inorganic mercury is also known as mercuric chloride, mercuric iodide, mercuric nitrate, mercuric sulfide (cinnabar), yellow or red mercuric oxide, ammoniated mercury, mercurous chloride (calomel), and mercurous acetate. It is used in various disinfectants, creams, teething powders, cosmetics, paint pigments, antiseptics, laxatives and diuretics.

The organic form occurs when mercury is combined with carbon. The most common form of organic mercury is methyl mercury, which is produced primarily by small organisms exposed to inorganic mercury in water and soil. Some forms are highly soluble in water and very dangerous. This is a problem in landfill sites, which are known to emit mercury compounds into the environment. Bacteria in human intestines have the ability to convert inorganic mercury to an organic form. We can also absorb the organic compounds directly through the skin and it can be ingested when we eat contaminated foods. Organic mercury is known to bio-accumulate as it passes up the food chain, because each organism is unable to process and eliminate it effectively. It is found in high quantities in fish, shellfish, and can often be found in fruit, vegetables, farm animals and chickens - especially those who have been fed fish meal, processed grains and dairy products. Once inside the body it can spread to all the tissues, accumulating mainly in the blood, liver and the brain.

New research has identified that it can reach the brain via the nerves and accumulates over many years. It also affects the kidneys and the immune system, accelerates heart disease and is classed as a carcinogen. Disease causing micro-organisms including, *Candida*

albicans flourish in a system with mercury overload. Why was it ever used in thimerosal-containing vaccines, some medicines, insecticides, antiparasitics, fungicides, pesticides and skin preparations?

Mercury toxicity in industrial workers has sometimes been fatal. Death by severe poisoning is caused by shock, cardiovascular collapse, acute renal failure, and severe gastrointestinal damage. Most reported cases of poisoning from organic mercury compounds are a result of the ingestion of contaminated fish or grains. Intravenous DMPS, oral DMSA and EDTA have been used to combat mercury poisoning with very good results.

Not only do our bodies have to cope with these heavy metals, there are other toxic metals that are regularly absorbed into our systems. Most notably arsenic, and also cadmium, which is available in cigarette smoke and through occupational (in the herbicide and battery making industries) and environmental exposure. Cadmium interacts with calcium in the skeletal system and competes with zinc in several metabolic pathways.

EDTA has been found to chelate and remove the majority of circulating and embedded heavy metals within the body.

Vitamin C Deficiency

Humans are amongst a small number of animals lacking an enzyme that naturally manufactures vitamin C within their own bodies. In 1992, Dr Matthias Rath, and twice Nobel Prize winner Dr Linus Pauling, suggested that heart disease starts with a vitamin C deficiency. Their paper 'A Unified Theory of Human Cardiovascular Disease', suggests that in times of food scarcity, such as in the Ice Age, where there was little available vegetation, primitive man was dying from scurvy; a fatal disease characterised by the disintegration of connective tissue. One of the symptoms of scurvy is vascular bleeding. The arteries, which are under immense pressure, start to leak, and blood loss followed by heart

failure occurs. With the fate of the human race in the balance, the theory is that their bodies naturally compensated for this by developing the ability to send fats (cholesterol) to block the damaged arterial sites. However, when these lipids combine with the other substances, such as apoprotein and fibrinogen, which

are also attracted by a response to injury, a dangerous combination occurs and fibrous plaque is formed, which builds up in and around the damaged artery. This theory is greatly supported by the fact that animals that do not lack the vital vitamin C converting enzyme do not have extensive plaque build-up in their arteries.

Cholesterol, Fact and Fiction

Cholesterol is a type of fat (lipid) that the body makes and distributes in lipoprotein-coated particles, with other lipids, via the bloodstream to the cells. Cholesterol is used in the cell membrane and to make other vital substances, including certain hormones. It is found in animal foods: eggs, liver and kidneys, but it is mainly manufactured in the human body by the liver. A healthy person has the capability to regulate his or her own cholesterol level by manufacturing more cholesterol if none is introduced in the diet or less if it is. Cholesterol is a vital component of a healthy body, we would die without it.

There are four main forms of Cholesterol:

1. Very low-density lipoprotein cholesterol (VLDL-c) is a precursor of IDL-c.
2. Intermediate-density lipoprotein cholesterol (IDL-c) is a precursor of LDL-c.
3. Low-density lipoprotein cholesterol (LDL-c), also known as the ‘bad’ cholesterol. LDL-c carries cholesterol from the liver to the cells. Oxidised LDL-c is implicated in arteriosclerosis.
4. High-density lipoprotein cholesterol (HDL-c), referred to as the ‘good’ cholesterol, returns excess LDL cholesterol to

the liver to be broken down. At least 20% of cholesterol in the body should be HDL-c.

To determine overall cholesterol levels, four readings are taken:

1. Total cholesterol
2. LDL cholesterol
3. HDL cholesterol
4. Triglycerides

HDL cholesterol removes LDL cholesterol from the blood stream; so to protect the cardiovascular system a balance between the two is needed. A blood test can measure the levels of apolipoprotein-A (ApoA I&II) and apolipoprotein-B (ApoB) to determine the balance of good and bad cholesterol.
Cholesterol levels are measured in millimoles per litre of blood, usually shortened to mmol/l. Levels can vary in an individual from day to day or at different times of the day. Therefore, a series of readings should be taken and the average used. In the USA, cholesterol is measured in milligrams per decilitre, which is shortened to mg/dL. A cholesterol level of 5 mmol/l is approximately equal to 200mg/dL. (The mmol/l of LDL-c can be converted to mg/dL by multiplying by 40).

It is generally considered necessary for adults, over the age of 21, to have a cholesterol check (lipoprotein profile) every five years. Particularly if there is also high blood pressure, smoking or passive smoking, excessive alcohol consumption, a BMI over 25 (women) 26 (men) or a family history of paternal heart problems before the age of 55 or maternal before the age of 65. The average cholesterol level in the UK is 5·5 (with a LDL-c total of 3·5 mmol/l); in undeveloped countries, LDL-c is much lower. Research has recently shown that with a low homocysteine level and an adequate supply of antioxidants, cholesterol cannot do any damage.

An inherited abnormally high cholesterol level (Familial hypercholesterolaemia) is found in around 1 in 500 people in Europe and North America, which makes it the most common potentially lethal genetic disorder. Sufferers of familial hypercholesterolaemia, have higher cholesterol levels from birth, and need to be monitored from an early age.

Excess saturated animal fat in the diet can increase the liver's production of cholesterol, but a total absence of fat lowers HDL (good) cholesterol and raises triglycerides. Unrefined polyunsaturated fat tends to lower LDL-c, unless it has been hydrogenated, heated to a high temperature or is stale, then it helps to create oxidised LDL cholesterol and can damage endothelial cells that line the cardiac system.

Triglycerides are made in the body from saturated fat or excess calories from refined carbohydrate-rich foods, i.e. potatoes, sugar, white rice, white bread, alcohol, etc. Excess triglycerides are stored on the body as fat. Triglyceride concentrations circulating in the blood are tested, even though they do not cause atherosclerosis, as such, a high level can signal a predisposition towards diabetes and a cholesterol imbalance. A high level of triglycerides means a high level of VLDL cholesterol, which is often associated with an abnormally low HDL cholesterol level. A triglyceride level exceeding 2.0 mmol/l is considered high.

There is growing evidence that elevated Lipoprotein(a) levels greater than 25mg per decilitre (dL) are associated with an increased risk of coronary heart disease. The laboratory ranges for Lp(a) are reported as: ideal <10 mg/dL, normal 10-19 mg/dL, borderline 20-24 mg/dL, and elevated >25 mg/dL.

Lipoprotein(a) also known as Lp(a), bound with ApoB, which coats LDL cholesterol, should also be tested, because it is very 'sticky' and is a factor in delivering the oxidised LDL particles to damaged arterial sites, which causes atherosclerotic build up. It may also make the blood sticky. Researchers have found that there is a significant divide, where people have very high levels or have low

levels. A high level of lipoprotein(a) can be an inherited trait, and high levels in the blood give a 70% increase in risk of suffering a heart attack.

Because Lp(a) is most likely inherited from a parent, special diets do not have any real effect and the cholesterol lowering drugs, available today, cannot lower it. In 1988, Professor Carlson et al. demonstrated that high levels of nicotinic acid, a B-complex vitamin, lowered Lp(a) coated LDL-c. Unfortunately, nicotinic acid at the required dose of 3g-6g has many undesirable side effects. However, *Inositol hexaniacinate*, (6 molecules of nicotinic acid and one of inositol) is very well tolerated at 4g and has been found to work more effectively than nicotinic acid.

Despite the fact that mainstream doctors seem to think otherwise, a low cholesterol level, on its own, does not mean a lower risk of heart disease. A homocysteine level higher than 10 and Lp(a) levels must be monitored and effectively treated if lives are to be saved. It is no longer acceptable to ignore natural treatments just because there is no profit in them.

To monitor coronary heart disease susceptibility in the population, homocysteine, Lp(a) and heavy metal levels should be measured, and everyone who needs it should have a nutritional protocol to help lower them.

Lowering Cholesterol Naturally

In the 1950s, scientists discovered that plant sterols and stanols (hydrogen-drenched sterols) lowered LDL cholesterol. This led to the manufacture of a series of cholesterol-lowering drugs. However, because there is not enough profit in plant-based medications, these were phased out and replaced by synthetic drugs that could be patented to make huge profits. Cholesterol management is worth billions of dollars each year to the pharmaceutical industry, so it is little wonder that they are 'pushed' with such relish.

In the UK, statins can now be bought over-the-counter in pharmacies and consequently there have been an abundance of free cholesterol checks, as chemists compete for business. It should be remembered that statins may cause depression and other side effects. Remember, a regular medical check-up will be necessary.

Forty years on, the food industry has decided to utilise the initial research and add plant based sterols and stanols to selected foods. As a result, there is a variety of cholesterol-lowering foods available at very inflated prices.
Phytosterols are very similar to cholesterol, they also have a similar function. Plants make phytosterols, just like animals make cholesterol; they are a key component in the membranes of cells, and in hormone and vitamin synthesis. It may seem that something so chemically similar to cholesterol would be counterproductive, but there is just enough difference in the chemical make-up for the body to treat them differently. The body can absorb high quantities of cholesterol, but only absorbs about 5% of phytosterols. Receptor cells in the intestines grab the phytosterols as if they were cholesterol molecules and attempt to pull them into the blood-stream. The phytosterols block the receptors so that they cannot take up cholesterol. This results in less cholesterol being absorbed and more being expelled from the body through the natural eliminatory processes.

A diet rich in fruit, vegetables, whole grains and cold-pressed olive oil, provides a small amount of phytosterols. High fibre diets naturally lower bad cholesterol, as does losing weight. Exercise has also been found to lower LDL-c and triglycerides, whilst increasing HDL cholesterol.

High Blood Pressure

Over 600 million people worldwide suffer from high blood pressure (16 million in the UK). Over 50% of people aged over 60

have high blood pressure, but because it does not cause noticeable symptoms, many may not even be aware of it.
If blood pressure is consistently high, it is known as hypertension. Over 90% of people with high blood pressure have no known physical cause; this is referred to as essential or primary hypertension.
There are a number of circumstances that leads to hypertension in susceptible people; these include: stress, poor diet, obesity, lack of exercise, and being exposed to high levels of pollution. A number of women taking the birth control pill or HRT have high blood pressure and may not even know it. It can also be an indicator of arteriosclerosis or kidney disease.
Blood pressure monitors measure the force of the blood against an artery wall. It is interpreted by the amount in millimetres (mm) the pressure of the blood causes the mercury (Hg) in the monitor to rise. Digital and air monitors work on the same principle. The first, higher, number is taken in the systole (active) stage and is known as the systolic number. The second number is taken in the diastole stage when the heart relaxes and is shown underneath the higher number, this is known as the diastolic number. People with low blood pressure, lower than 110/70 mmHg, may tire easily and feel faint when in a hot room or when drinking alcohol. Normal blood pressure can range from 110 to 140 millimetres over 70 to 90 millimetres, with 135/85 mmHg considered to be an optimum level for adults over 18.

The blood pressure also naturally increases with age -

35+ years blood pressure up to: 140/90 mmHg
50+ years blood pressure up to: 140/95 mmHg
without any serious cause for concern.

People below 50 years of age with blood pressure over 140/90 mmHg are generally considered to have high blood pressure. A high systolic blood pressure i.e. 170/90 is considered to be in need of medical treatment.

There are no real symptoms of a rise in blood pressure, it has to be measured by a GP or with a DIY kit available from pharmacies or mail order companies. If there is hypertension, a person may experience any of the following symptoms: morning headache (usually at the back of the head), dizziness, loss of concentration, fatigue, breathlessness, palpitations or ringing in the ears. Anyone with these symptoms should have a medical check-up.

Hypertension that goes undetected over the course of a few years could cause the heart to enlarge and become weak through over-work. An enlarged heart eventually results in blood backing up in the lungs, a major cause of heart failure. If the arterioles and venules are opened up to allow the flow of blood, the blood pressure decreases. After a few months, it is possible for the heart to return to its normal size. Hypertension can also accelerate arteriosclerosis, especially in diabetics; if not treated it could lead to a heart attack.

Hypertension can also cause other serious health problems, including: narrowing of the blood vessels in the kidneys and subsequent kidney failure, or blisters (aneurysms) on the inside of blood vessels of the brain, leading to strokes. People with hypertension and diabetes have a significantly increased risk of suffering heart disease, stroke and other related problems. There is also an increased risk of suffering problems with leg veins, and eye complications leading to blindness.

What Can You Do to Lower Essential Hypertension?

1. The medical route: Make an appointment with your GP, who will discuss the various drugs available. Make sure that you are aware of the side effects and how they will affect you; this is vital for very high blood pressure. Talk to your doctor and work out a plan that could include some natural ways of reducing your blood pressure.

2. If blood pressure has been checked and, with medical advice, it is agreed that it can be lowered naturally, many risk factors can be targeted by a few simple adjustments to lifestyle:

a. **Losing weight**: if body mass index is above 25 (women) or 26 (men), and high blood pressure is evident, one of the best ways to manage it is to lose weight. In fact, choosing a diet high in colourful fruit and vegetables and low in animal protein and animal fat, should also naturally lower weight.

b. **Anxiety, stress and anger**: can cause high blood pressure and deplete vital B vitamins and some minerals, such as magnesium. They also cause palpitations and a rise in homocysteine, a major contributor to coronary heart disease. It would be beneficial for people prone to stress and anger to learn a relaxation technique.

c. **Salt**: a high sodium intake, with little or no potassium, has been shown to increase blood pressure. Only 2g or less of sea salt should be used per day. Instead, use herbs and spices to provide flavouring. Look at the labels on processed, commercial or canned foodstuffs and limit the ones that contain 140g of sodium or more per serving. Bacon and processed meats can have a high sodium content. Sodium intake needs to be balanced with potassium. NB: Potassium chloride, a salt substitute, may reduce vitamin B_{12} absorption.

d. **Sugar**: a diet high in refined sugar increases triglycerides, which cause platelets to stick together, damaging arteriole walls and eventually hardening arteries. Diets high in refined carbohydrates (white sugar, white flour, etc.) can cause the liver to produce more cholesterol. It also decreases immune system activity. Cut down on sugar and refined carbohydrates.

e. **Caffeine**: can lead to ventricular fibrillation, an increase in homocysteine, and possibly a heart attack. People that drink at least six cups of coffee a day increase their risk of heart disease by 120%. More than two cups of coffee, strong tea, cola or caffeine containing drinks a day increase the risk of high blood pressure. If you already have high blood

pressure, all caffeine containing drinks should be stopped and filtered water consumption gradually increased.

f. **Alcohol**: in excess, has been shown to increase homocysteine and raise blood pressure. Even though red wine can protect the heart, more than 1-2 glasses of wine a day is not advisable. If high blood pressure has been diagnosed, initially cut out alcohol altogether. Avoid a tendency towards binge drinking.

g. **Smoking and passive smoking**: significantly increases the risk of heart disease. As soon as smoking is stopped, the body starts to 'heal' and the risk of heart disease can diminish almost to the level of someone who has never smoked. Nicotine boosts the fatty build-up on arterial walls causing vasoconstriction and decreased blood flow, increasing the likelihood of cardiovascular disease. Women smokers are nine times more likely to die from coronary heart disease than non-smokers. Deaths from coronary heart disease are 70% higher in smokers. Smoking also greatly increases free radical activity and premature aging.

h. **Diet**: Start today, substitute processed or high sugar/ chemically sweetened foods for more natural alternatives. Dark green leafy vegetables and colourful fruits help to lower high blood pressure. It is well known that a vegetarian diet is associated with lower blood pressure; Seventh-day Adventists are strict vegetarians; they abstain from caffeine, alcohol and tobacco. They also suffer from 84% less coronary heart disease than the general population. We cannot all be vegetarians, but we can keep animal protein and fat to a minimum. We can increase our intake of fruit and vegetables, including green leafy vegetables, sprouted seeds, and whole grains, including buckwheat and oats.

i. **Supplements**: we should all supplement our food to DRV level, to ensure that we have an adequate intake of essential nutrients. Magnesium, selenium and chromium have been depleted in the soil by modern farming methods. It is a very low percentage of people, in the western world today, who can boast that they eat their organic vegetables raw or par-cooked within a few minutes of them leaving the ground, but that is what is needed to get near to the published amount of available nutrients in fruit and vegetables. Calcium, Vitamins B_6, C, and coQ_{10} are particularly helpful.

j. **Chemical and heavy metal poisoning**: lead water pipes, canned foods, cooking utensils, dental amalgam fillings, city dwelling, eating fish, smoking, etc. can all increase levels of heavy metals within the body. This in turn can lead to a rise in blood pressure and other health problems. There is an urgent need for people to select their foods carefully and make sure that they consume some natural antioxidant and chelating nutrients. Oral EDTA can be taken to significantly reduce toxic metal overload.

k. **Exercise**: twenty minutes of aerobic exercise, at least three times a week, can help to lower blood pressure, reduce LDL cholesterol and decrease a high homocysteine level. If already on prescribed medication for heart disease, it is best to obtain the approval of a healthcare provider, before choosing your ideal type of exercise.

Regular blood pressure checks are necessary while trying to lower blood pressure naturally. If natural methods do not work within three months, medical advice is essential.

Researchers, at the Kyorin University School of Medicine in Tokyo, have shown that calpis, a Japanese fermented milk, can significantly bring down high blood pressure.

3. The best Complementary Route for high blood pressure that needs medical attention is to find a medical herbalist or clinical nutritionist who will monitor your progress and help you to lower your blood pressure naturally. Certain herbs and nutrients are very helpful for lowering high blood pressure:

- **Herbs:** dandelion: add young, fresh leaves to salads or drink organic tea. Nettle: drink nettle tea.
- **Arginine:** 2g of arginine given 3 times per day can significantly reduce high blood pressure. Strict practitioner guidelines should be followed. See page 104-105.
- **Aromatherapy:** Lavender or chamomile oils are beneficial.
- **Cayenne pepper:** A half to one teaspoon, stirred into a glass of tepid water and sipped is said to help to bring down high blood pressure.
- **Magnesium:** take supplements as directed on packet.
- **Hawthorn** *(Crataegus oxycantha)*: standardised extract available in supplement form.
- **Fish oil:** supplements, screened and free from pollution, are better if taken with fat-soluble antioxidants i.e. vitamin E.
- **Garlic:** add garlic to diet, wherever possible.
- **Lecithin Supplements:** granules added to breakfast cereals or capsules.
- **Methyl – Sulphonyl - Methane (MSM):** organic sulphur crystals, tablet or capsule form.
- **Nuts:** walnuts and almonds added to diet can help to lower the risk of high blood pressure.
- **Oral EDTA** supplements have been shown to help to lower high blood pressure.

Avoid: broom, ephedra, excess ginseng, shepherd's purse, rosemary etc. These herbs are known to increase blood pressure.

Researchers in Florida suggest that regular use of a simple breathing technique can help to reduce high blood pressure.
1. Inhale for a count of 7 and hold for a count of 3.
2. Exhale for a count of 12 and hold for a count of 3.
3. Repeat 20 - 30 times per session, try to do one session every day, but at least three times per week.
(NB: 1 count should equal approximately 1 second)
See practitioner before trying any new breathing technique.

Additional Causes of Heart Disease

- With the body undernourished by a westernised diet and constantly having to fight pollution and stress, the immune system is stretched beyond its limits. Immune dysfunction is inevitable. The bacteria and viruses we have in our vascular tissues can cause infectious processes that result in hypercoagulability, also known as 'immune system activation of coagulation' (ISAC), which has been implicated in causing heart attacks. Increasing our dietary intake of garlic, ginger, bromelain, fish oil and vitamin E, along with a good nutrient-rich diet, may help to decrease the risk of these potentially fatal infections.

- Iron is a necessary mineral, but iron stores (serum ferritin) accumulate four times faster in men than in women of childbearing age. It is thought that the monthly blood loss depletes serum ferritin to a beneficial degree, so that women are less predisposed to heart disease than men. Older women, without a monthly blood loss, lose this protective factor. Chelation therapy can eliminate some of the free iron circulating in the bloodstream. Also, choosing to become a blood donor has the same effect and depletes stores of serum ferritin. It has been found that regular blood donors have a decreased incidence of heart disease and cancer.

Chelation Therapy

In 1893, a Swiss-French chemist, later to become a Nobel laureate, Alfred Werner, first hypothesised that metals could bind with organic compounds. He went on to describe the mechanism of what is now known as chelation (*key-lay-shun*), from the Greek, to grab like a crab's claw, which aptly describes how certain molecules can surround and bind metal ions. In 1934, a German chemist first synthesized an amino acid compound called ethylene-diamine-tetra-acetic acid (EDTA) as a substitute for citric acid. The compound, in part, is similar to the molecular structure of vinegar. In 1941, Frederick C. Bersworth, from Clark University in Worcester, Massachusetts, patented a different process for manufacturing EDTA. Since 1945, a British antilewisite substance, known as 2,3-dimercaptopropanol, dimercaprol or BAL, was used as a chelating agent. Although it had more side effects than EDTA, it was used as a chelating agent for battery factory and paint industry workers who, during WWII, had been exposed to high concentrations of lead, mercury, poisonous gases, and even radiation. The first general use of EDTA, in clinical medicine, was by Charles Geschickter, M.D. and Martin Rubin, M.D., in 1947, at Georgetown University in Washington. It was found to be very successful in treating lead poisoning and as an anticoagulant. Later, it was also used for snake venom poisoning and digitalis overdose. During this time, it was discovered that those who had been through chelation therapy, not only recovered, they also had lower incidences of heart disease and related problems.

In 1955, Dr. Norman Clarke, Director of Research of Providence Hospital in Detroit, Michigan, published a favourable report on intravenous EDTA to dissolve 'metastatic calcium' (i.e. unwanted calcium deposits) in arteries (atherosclerosis), joints (arthritis), kidneys (kidney stones), and the bony ossicular system in the ears (otosclerosis). His subsequent reports involved the successful treatment, with EDTA, of angina pectoris and occlusive vascular disease. Hundreds of positive studies have been completed that

show EDTA is an effective biological approach to gradually reverse most forms of arteriosclerosis. It helps to detoxify and restore blood flow throughout the entire arterial system, eventually clearing the micro as well as the macro blood vessels. It is interesting that as soon as the patent for EDTA ran out, it was effectively dropped from mainstream medicine, except in cases of heavy metal poisoning, with some doctors calling for a total ban on its use in the treatment of heart disease.

Today, EDTA is still an FDA approved method of treating heavy metal contamination, but not for the treatment of heart disease. Fortunately, doctors who have studied the research with an open-mind are able to use it, because it is officially recognised as safe.
However, there is still much debate on how chelation therapy actually works within the body. It has been proposed that the binding of ionic calcium releases a hormone into the bloodstream, mobilising unwanted ectopic calcium from the arteries and joints (there have been no cases of EDTA induced osteoporosis reported, which confirms that it does not leech calcium from the bones). Whereas some believe the primary therapeutic action is its ability to significantly reduce free radical proliferation. In addition, it has been effectively shown to decrease platelet aggregation, which helps to stop blood clots forming. It is probably a working combination of all these mechanisms, together with its protective effect on cell membranes and enhancement of mitochondria activity.

A recent review of the published data finds that Intravenous EDTA chelation therapy benefits cardiovascular symptoms in more than four out of five patients (Kidd, 1999). There is no denying that lives have been saved - even those due to have amputations, through loss of blood flow to a limb, have been spared surgery, because chelation therapy has restored the circulation (Hancke and Flytlie, 1993).

The American College for the Advancement in Medicine has published a position paper on EDTA chelation therapy it states:

> **'This therapy has been safely and effectively utilized by physicians throughout the nation and hundreds of thousands of patients have received demonstrable benefit from it. It consistently improves blood flow and relieves symptoms associated with the disease in greater than 80% of the patients treated'.**

The majority of doctors who offer IV EDTA chelation therapy are in America and Germany. In the UK, there are just a handful of private clinics offering the treatment, which can cost between £2,000 and £3,000, depending on severity of symptoms. No mainstream doctor offers EDTA for heart disease on the NHS. It is a catch-22 situation - even though hundreds of studies have shown that chelation therapy can increase the blood supply to both the heart and peripheral regions, there have been no convincing large-scale, double blind trials. Conducting these trials is very costly and no pharmaceutical company would fund a study where it had no chance of recouping the expenditure later in sales, no matter how many limbs or lives it would save. In fact, if chelation therapy were to be taken on by mainstream doctors, it would cost the medical 'industry' many millions of dollars in lost revenue and no 'business' would allow that to happen without a fight. So, until someone puts people's lives before profit margins it will remain an accepted 'alternative' treatment for patients suffering from vascular diseases such as arteriosclerosis, angina, reduced peripheral blood flow, intermittent claudication, diabetic neuropathy and gangrene, and cerebral vascular disease including stroke.

Thousands of doctors in America and Europe are treating their patients with EDTA and are reporting some remarkable results**.**

Intravenous EDTA

After several tests to establish whether EDTA chelation therapy would safely and effectively benefit the patient, it is given in a series of intravenous infusions of an iso-osmolar standardised solution over 1.5-4 hours. The EDTA compound normally used for removal of lead is calcium-EDTA salts; magnesium-disodium-EDTA is routinely used for coronary artery disease, but it can depend on the practitioner's evaluation of the patient. The treatment is given on an outpatient basis, over a period of six-eight months. It consists of: 1.5g to 3g of EDTA in 500–1500ml of a carrier solution, which may include a sodium bicarbonate buffer, local anaesthetic and heparin. Other ingredients such as vitamin B-complex, vitamin C, and potassium are sometimes added, depending on the patient's needs. With the blood and extracellular fluid at 7.4 pH, EDTA readily binds with excess ionic calcium and other metals such as: lead, copper, iron, zinc, arsenic, mercury, cadmium, chromium and electrolytes that are circulating around cells, and excretes them via the body's own elimination processes.

This has a number of good effects:

1. It greatly reduces free radical proliferation, which can slow down cell damage and the oxidation of LDL cholesterol.

2. It helps to protect cell membranes, enhancing mitochondria activity. Benefiting the heart and the whole body.

3. It can reduce platelet stickiness and improve peripheral blood flow. A subtle reduction of hyper-coagulability (possibly through lowering the number of soluble fibrin monomers or adhesion molecules) may be one of its understated benefits.

4. It helps to partially remove unwanted ionic calcium deposits from the areas of arterial calcification. With the reduction of serum calcium, parathyroid hormone is released and indirectly helps to strengthen bones.

5. The removal of calcium and subsequent nutrient supplementation helps to restore flexibility to arterial walls.

6. It can reduce high blood pressure.

7. It can help to control cardiac arrhythmias in some people.

8. It improves calcium and magnesium balance.

9. Impotence can be reversed, if it was caused through lack of blood flow.

10. It can restore memory loss, if caused through lack of blood flow to the brain.

11. Eyesight can be improved, if damaged through lack of blood flow.

Periodic blood and urine screenings should be carried out to ensure that kidney and other functions are efficiently coping with the EDTA detoxification.
For those who have coronary artery disease, a series of thirty or more infusions may be given along with booster infusions every month or so. Studies have shown that many degenerative diseases, including: Alzheimer's disease, Parkinson's disease, macular degeneration, rheumatoid arthritis and diabetes, have benefited from EDTA chelation therapy.

Even though improvement in conditions is usually found, it must be stressed that EDTA is not a magic cure for all cardiovascular and other diseases. Many additional factors can predispose susceptible cardio patients to heart attacks.

- There are different types of plaque, arteriosclerosis has a harder type of plaque (containing more calcium) than atherosclerosis, which contains more lipids. The lipid containing plaque may need other compounds that strip the lipids as well as the heavy metals, perhaps choline and inositol would help.
- There is growing evidence that C-reactive proteins (C-RP), which are a non-specific marker for acute inflammation, could be used as a marker for heart disease. It is not yet known whether they add to the formation of atherosclerosis by attracting LDL-cholesterol or other substances to the inflamed vessel.
- Infections should also be taken into consideration, they have been found in people that have had heart attacks: ***Chlamydia pneumoniae*** and ***Helicobacter pylori*** and viral agents including *Herpes simplex* virus and *cytomegalovirus*, which may explain why garlic, ginger, vitamin C, lysine and bromelain have such a good therapeutic effect.

For EDTA therapy to work, patients must be committed and willing to make changes to their attitude and lifestyle. Most notably diet and stopping the habits that led to the treatment, such as smoking, over-eating, heavy drinking and extra stress. They should have a strict nutritional protocol. Exercise should be started and gradually increased to a therapeutic level. Complementary therapies do work, but on a different basis to orthodox medicine. Given the right environment and stimuli (enzyme co-factors, etc.) the body has a remarkable capacity to heal itself. This is what doctors of integrated medicine utilise as the primary factor in their healing protocols.

The sodium and calcium salts of EDTA are used to bind unwanted metals, which often find their way into foods during harvesting and processing. These metals can cause premature spoilage by initiating the oxidisation of fats contained within food. EDTA is part of a class of additives known as sequestrants, approved by the Food and Drug Administration (FDA) in America, to be generally recognised as safe (GRAS). Sequestrants react with the trace metals by binding them and thereby preventing unnecessary decomposition of the foods. Unfortunately, they also bind essential nutrients, such as: zinc, chromium, selenium etc., which are necessary for good health.

Contraindications

- In the early days, when one dose of 5-10 grams of EDTA was given, up to five times a week, some people experienced kidney damage. When the dose was reduced to 3 grams, and the doses were spaced over a longer period, the side effects were greatly reduced. In 1994, doctors reported that a dose of 1.5 grams x 20+ over a period of three to six months was more effective in treating peripheral vascular function.
- Anyone with a serious illness, or on prescribed medication, must follow strict medical advice.
- Chelation therapy, in any form, should not be given to patients who are receiving radioactive implants.
- Chelation therapy may adversely affect electrolyte balance. Your practitioner should provide a good ionic mineral supplement. On the day of the treatment, some people may experience side effects, such as: headache, aches and pains, dizziness, nausea or fever.
- Some people may have a chemical intolerance to EDTA.
- Patients with acute lead encephalopathy or those on renal dialysis should not undergo EDTA chelation therapy.
- It has not yet been proven safe for women who are trying for a baby, who are pregnant or for nursing mothers.

Oral EDTA

In 1975, Dr. Kurt Donsbach, the President of the National Health Federation, started lecturing on the benefits of oral EDTA and formulated his own brand of supplements. Unfortunately, many others started selling a form of the supplement that claimed to clear the arteries of plaque, with less than the required amounts of the active ingredients, and the entire industry was plunged into disrepute. Today, oral EDTA is approved by the FDA only for the treatment of lead toxicity. It also has the potential of providing a convenient and affordable method of improving health, with several doctors now promoting the most effective formulations.
Although the majority of practitioners, who advocate using IV EDTA, denounce oral treatment as ineffective, oral chelation therapy should not be dismissed. It is a good treatment for heavy metal toxicity, and seems to be a safe, preventative treatment for coronary artery disease. This is supported by many case studies showing patient improvement in blood circulation, with anti-inflammatory, anti-platelet and anti-coagulant benefits.

Researchers in the 1950s found that only 5% of oral EDTA was actually absorbed into the system. The rest worked in the intestines to bind and then elimitate toxic metals. The therapeutic dose, based on studies, appears to be 1,000mg per 16 kilos of body weight. Because EDTA is likely to remove essential minerals, such as zinc, manganese, chromium, magnesium, selenium and electrolytes, along with the toxic metals, a good ionic trace mineral supplement must also be taken in between doses of EDTA. With EDTA at this high dosage level, it would also be wise to monitor kidney function by checking the serum creatinine level at regular intervals. A doctor may be willing to do the tests or, for a fee, a private clinic would do them. The testing kits are also available by mail order.

Taking 1000mg (1g) of EDTA per day for one year, would give a similar benefit to 10 x 2g intravenous doses, and be much more cost

effective. Garlic, bromelain, vitamin C and lysine supplements would also complement the chelating process.

Oral EDTA does have some pros and cons:

Pros

- It is FDA approved for heavy metal chelation, with many practitioners claiming that it is beneficial as a preventative measure for coronary heart disease.
- It is a safe, non-invasive treatment.
- It costs less than IV EDTA.
- It can be taken at home, in most cases without the need for a medical practitioner.
- The majority of people who have tried it say that it has improved their quality of life.

Cons

- It is not adequate for people who need urgent chelation therapy.
- It can be a much slower treatment, taking up to, and even over, two years, in some cases.
- An easily absorbed mineral supplement must be taken in between doses to replace the lost minerals and electrolytes.

For oral EDTA to work effectively, it does need a higher than average level of commitment, and the ceasing of the habits that led to the problems is essential. A mainly high-fibre vegetarian diet is recommended, with plenty of fresh organic fruit and vegetables, freshly sprouted seeds and pulses, fresh pressed apple juice, fish oils with antioxidants, and organic whole grains; all of which contain fibre and additional nutrients to assist the body in eliminating toxic compounds. Meat can be eaten, but not exceeding 100g per day would be the most beneficial. It is important to drink at

least 6-8 glasses of filtered water, during the course of a day, to help remove the bound metals via the kidneys.

Contraindications

- Because EDTA is very efficient at 'grabbing' essential metals as well as toxic metals, an easily absorbed ionic mineral supplement is important, taken in between doses of EDTA.
- People with a serious illness, on prescribed medication, kidney or liver dysfunction, under-active thyroid, pregnant, breastfeeding, should not take oral EDTA therapy without strict medical advice.
- Those already diagnosed with heart disease, will need medical advice before and during supplementation with EDTA.
- EDTA may affect insulin requirements in diabetics.

Bypass Surgery v angioplasty v chelation

Bypass surgery remains the most scientifically proven way to manage severe coronary artery disease, such as triple vessel disease or poor left ventricle function. Replacement vessels can be taken from the mammary or lower limb areas and grafted on, to replace a length of occluded artery. Cardiac ischemia and angina are significantly improved following a bypass operation. The death rate at about 5% is low, but varying degrees of cognitive complications are seen in around 75% of patients. This could be more effectively managed with an integrated orthomolecular medical approach.

Angioplasty is more suitable for single and some cases of double vessel disease, where there are no complications. A catheter containing a surgical device is inserted into an artery, normally in the groin, and moved up to compress or remove the partial occlusion, either with a balloon, laser or a tool similar in shape to a tiny corkscrew. The success of an angioplasty depends on the integrity of the vessel wall and the ability of the surgeon not to damage the delicate endothelial cells. The use of a 'stent', to strengthen the artery wall, has become a popular choice of treatment. At present, there can be short-term and long-term complications. If endothelial cells are damaged, turbulent blood flow can cause further damage at the vulnerable site, or elsewhere along the vessel, which means that the benefits of an angioplasty may only last a few months. If the angioplasty severely damages the artery, a bypass operation is offered as the best chance of survival. However, in recent years the success rate has improved dramatically and in many cases the need for a remedial bypass operation has been reduced.

Both a bypass and an angioplasty, if successful, restore immediate blood flow to the heart muscle and allow the heart to recover and protect itself against further damage. Nevertheless, there is no guarantee that the new artery will not become occluded by the body's own repair mechanism. A bypass or an angioplasty does nothing to halt progression of occlusions in any part of the arterial network. The underlying causes of plaque formation are not addressed by the mere replacement of a length of artery or removal of a blockage. If high homocysteine, toxic metal, free radical, triglyceride, lipoprotein(a) and/or LDL-c levels, have not been lowered, and if stopping smoking, excessive drinking or dietary and exercise modifications are not undertaken, further surgery would be inevitable. Patients having to undergo two or even three bypass operations are becoming increasingly common.
In parts of Europe, the use of intra-arterial radiation administered by radioactive pellets is being studied. It is claimed that because

this stops the 'repair mechanism' of the cleaned or new artery the incidence of further occlusion is minimised. Although this suggests that scabs or further blockages are prevented, stopping natural healing processes may have wider implications to the overall health of the patient. Once radiation is applied to the artery(ies), no complementary treatments will work.

Chelation therapy: there have been many studies suggesting that chelation therapy should not be ignored in the treatment of coronary heart disease. In 1988, Dr Olszewer and Dr Carter reported on the treatment of 2870 patients with EDTA. Over 93% of the patients who suffered from narrowed coronary arteries showed good to excellent improvement; 97% of those with narrowed leg arteries also showed improvement and 60% of patients with narrowed brain arteries showed improvement in their circulation.

In 1993, Dr C. Hancke and Dr K. Flytlie, in Denmark, reported that of 65 patients with atherosclerosis (awaiting bypass surgery) who were given a course of intravenous EDTA chelation therapy, only 7 needed a bypass. Likewise, of 27 patients who were scheduled for leg amputations, only 3 needed the surgery after a series of EDTA infusions.

Also in 1993, Dr T. Chappell and John Stahl, PhD. published a meta-analysis of data on 22,765 patients, which was compiled from 19 published studies on IV EDTA therapy. They found that 87% had decreased cardiovascular symptomatology based on objective testing, which indicated a high positive relationship between IV EDTA therapy and improved cardiovascular function. Next, they looked at unpublished 'file drawer' data on 1241 patients from 32 clinicians. Various objective measurements demonstrated improvement in 1086 with an overall statistical correlation coefficient of 0.88 or 88%. This data shows the results were similar and provided an additional confirmation of the effectiveness of EDTA chelation therapy.

It is clear that there is an urgent need for more clinical trials. Integrated EDTA chelation therapy is far less invasive, with fewer

side effects, than the accepted orthodox treatments. It deals with the biochemical causes of disease rather than the ineffective 'quick fix' treatment of symptoms. EDTA may eventually prove to be a viable intervention therapy and even a substitute for bypass surgery and angioplasty in many cases of coronary heart disease.

Analyse Your Own Risk

This is an analysis of your lifestyle, everyone is different and the risks listed may be of greater potential to cause heart disease for the individual than the score indicates. Please use this as a guideline only to make yourself aware of the risk factors. It should not be used for diagnosis, if you have any concerns about your health, you must see your GP.

Risk 1: Sedentary lifestyle — SCORE 4

✓ **ACTION:** Start taking gentle exercise; consult your doctor for advice on which exercises would be safe for you.

Risk 2: Obesity — SCORE 3

BMI over 26 (men), over 25 (women)

✓ **ACTION:** Take the necessary steps to lose weight and start taking gentle exercise.

Risk 3: Clinical Obesity — SCORE 8

BMI over 30

✓ **ACTION:** Take urgent steps to lose weight and start taking gentle exercise with your doctor's advice.

Risk 4: Currently Smoke or Chew Tobacco — SCORE 8

Risk 5: Have smoked in the last 2 years — SCORE 2

Have you smoked in the last 2 years? The more recently you have smoked the more detrimental is the effect to your health.

✓**ACTION:** Stop smoking and passive smoking now. Make sure that your diet is high in nutrients.

Risk 6: Family history of heart disease — SCORE 8

If you have a family history of heart disease your doctor should be informed and your health should be monitored.

✓ **ACTION:** If you have a family history of heart disease it is important to work with your doctor and have the necessary tests so that he can assess your risk early on.

Risk 7: High systolic blood pressure SCORE 10

If your systolic blood pressure is higher than 140 mmHg you have a greater risk of heart disease and stroke.

✓ **ACTION:** Talk to your doctor, medical herbalist or clinical nutritionist and take the necessary steps to lower your blood pressure.

Risk 8: Low nutrient, high-fat, junk food diet SCORE 10

✓ **ACTION:** Take control of your eating habits and start modifying your diet to include the right type of fat and at least 3 servings of fresh fruit and 5 servings of vegetables.

Risk 9: High Stress Lifestyle SCORE 5

✓ **ACTION:** Take time out to relax. Try relaxation techniques to help you wind down.

Risk 10: More than 2 units of alcohol per day SCORE 3

✓ **ACTION:** Cut your alcohol intake to 2 glasses of red wine per day for men, or 1 glass of red wine per day for women.

Risk 11: Age over 50 (men) 59 (women) SCORE 2

✓**ACTION:** It is never too late to take charge of your eating and exercise habits.

Risk 12: High Cholesterol Level SCORE 3

If your cholesterol level is over 5 mmol/l or 200 mg/dL

Risk 13: VERY High Cholesterol Level SCORE 5

If your cholesterol level is 7.5 mmol/l or 300 mg/dL

✓ **ACTION:** It is never too late to take charge of your eating and exercise habits both can help you to lower your LDL cholesterol. See doctor for cholesterol management info.

Risk 14: Diabetes SCORE 10

✓ **ACTION:** Work with your doctor to ensure that you are closely monitored. Modify your diet and supplement regime to stop all unnecessary fluctuations in blood sugar.

Risk 15: Waist to Height Ratio SCORE 5

If your waist size in centimetres is greater than half your height in centimetres the greater your risk of cardiovascular disease.

✓ **ACTION:** Look at your diet and start eating healthier, begin gentle exercise, building up slowly, your doctor will advise.

Risk 16: Gum Disease SCORE 2

Researchers have found that people with gum disease have a 25% increased risk for heart disease, with elevated blood levels of fibrinogen (clotting factor) and C-reactive protein (inflammatory) as opposed to those with healthy gums.

✓ **ACTION:** Have regular dental check-ups.

Risk 17: Do You Live in a Busy Town or City SCORE 2

✓**ACTION:** You will be subject to more stress and pollution than someone who lives in the countryside. Perhaps a relaxation technique or an ioniser would help. It is very important to have a diet rich in antioxidants.

NOW ADJUST YOUR LIFESTYLE AND TAKE THE ADVANTAGES AWAY FROM THE RISKS

Advantage:	**You have stopped smoking**	**MINUS 4**
Advantage:	**Your BMI has returned to 26 (men) / 25 (women)**	**MINUS 4**

Advantage: Your diet is high nutrient MINUS 5

Advantage: You live in the countryside MINUS 2

RESULTS:

0-6 – Congratulations, your risk of suffering from coronary heart disease is minimal. However, do not become complacent – keep up the good work and if you start having symptoms go and see your doctor.

7-20 – You need to take some ACTION, start by adjusting your lifestyle, and if you have not had a medical check-up recently it may be wise to do so.

21-50 – Try to make some big adjustments to your lifestyle and go for a medical check-up. Take ACTION ACTION now…you have a good risk of suffering from coronary heart disease.

51-90 – You have a very high risk of suffering from coronary heart disease. Go and see your doctor for a medical check-up as soon as possible. It is imperative that you make some big lifestyle changes. ACTION ACTION ACTION.

THE MEDICAL CHECK-UP

One of the first signs of coronary heart disease is chest discomfort, it may be pain or just a tightness that radiates across the area. Many people put it down to indigestion and dismiss it. As soon as you feel pain or discomfort in the chest area or pain in your left arm, even in your jaw, or a tightness in your throat, either when exercising or relaxing, go for a medical check-up. If you feel overly breathless after exercising or dizzy, go for a check-up.
Better to be safe than sorry… IT COULD SAVE YOUR LIFE.

It is suggested that at the first signs of discomfort, of what you think is a heart attack, take an aspirin and call for an ambulance. Remain calm, try to relax until help arrives

- **If you suspect that you have coronary heart disease (CHD), a medical practitioner can initially carry out a series of non-invasive tests to determine if you have CHD. These are easy to do and do not initially involve invasive techniques.**

The initial tests would probably involve a series of blood tests and your blood pressure will be taken. If these are in the high risk category your GP will refer you for further tests including: a resting EKG, treadmill stress test, CT coronary calcium scoring, echocardiogram, nuclear medicine scan, and if these point to heart disease then an invasive coronary angiography may be needed.
See A-Z of Cardiology Terms (page 150) for more information.

The sooner you have the relevent tests the better will be your chance of survival and living a normal life.

Risk Factors and Ideal Levels	
Total Cholesterol mmol/L (x 40 = mg/dL)	Ideal Range = 4.5 (if less than age 70) Ideal Range = Up to 7.5 (if older than age 70) **High Risk: over 7.5**
HDL Cholesterol	Ideal Level =Above 1.25
HDL Cholesterol %	Ideal Level = 25>% of Total **High Risk = Below 14%**
LDL Cholesterol	Ideal Level = Below 2.5 **High Risk = Above 3**
Triglycerides (TG)	Ideal Level = Below 2.5 **High Risk = 4.5>mmol/L**
Lipoprotein(a)	Ideal Level = Below 10 mg/dL **High Risk = 25> mg/dL**
C-Reactive Protein (C-RP) mg/dL	Ideal Level = Below 1mg/dL **High Risk = Above 3/ Below 10**
Homocysteine - Micromoles/L	Ideal Level = Below 8.0 **High Risk = Above 10**
Ferritin	Ideal Range = 20-50 ng/ml **High Risk = Above 250 ng/ml**
Fibrinogen	Ideal Range = 150-300 mg/dL **High Risk = 400> mg/dL**
Blood Glucose (8 Hour fast)	IdealRange = 60-85 mg/dL **High Risk = <40 or 90>mg/dL**
Insulin (8 hour fasting)	Ideal Level = 2-4 MicroUnits/ml **High Risk = 10> MicroUnits/ml**
Haemoglobin (A1C)	Ideal Range = Below 6% of total
White Blood Count (WBC)	A WBC of 8.5 can be a high-risk marker for heart disease.

Attaining Optimum Health

Where Should I Start?

1. Find your ideal BMI using the chart below.
2. Work out your ideal calorie intake, and if you need to lose weight, adjust your calories accordingly.
3. Learn how to adjust your diet to reflect a more heart-healthy lifestyle.

Calculate your Body Mass Index

To calculate your Body Mass Index (BMI): Divide your weight in kilos (kgs) by your height in metres. Your Body Mass Index (BMI) should be between 20 - 25 (women) or 21 - 26 (men).

(Convert lbs to kgs, multiply the pounds by 0.45)
(Convert inches to metres, multiply the inches by 0.025)

For example: A woman 10 stone and 5'6'' (66") tall would convert:
10 **x 14** (stones to lbs) = 140lbs **x 0.45** (lbs to kgs) = 63kgs.

66" (height) **x 0.025** (inches to metres) = 1.65 (metres)
Take 63 (kgs) DIVIDE BY 1.65 then AGAIN DIVIDE BY 1.65 = 23.140495 (on calculator) = 23 BMI.

Now you try! - fill in the box below:

Take my weight____ kgs and divide by my height_____ metres

then divide again by my height_____metres = my actual BMI___

But imagine she needed a BMI of 22. How much weight does she need to lose? This is a simple case of working it out on your calculator again:
All you do is: 22 (Ideal BMI) x her height x height again.
Height is 1.65 metres. So for example: 22 x 1.65 and then again x 1.65 = 59.895 kgs, which is her target weight for a BMI 22.

Now minus this from her actual weight: 63 kgs - 59.895 = 3.105 3kg.

So, she needs to lose approx. 3kgs to bring her BMI to 22. OR Convert those back to pounds: 3.105 (kgs) divide by 0.45 = 6.9 lbs.
So she needs to lose approx. 7 pounds for her optimum 22 BMI.

Now you try - fill in the box below to calculate your ideal BMI

My Ideal BMI:___ x _____(height) x _____(height): =

__kgs my target weight. Then take my actual weight: __kgs

- minus_____kgs (my target weight) = *_____kgs

I now know that I need to lose *_____kgs or_____lbs

CALCULATE IDEAL CALORIE INTAKE

For every 3500 excess calories taken in over a period of time, 450g of weight is gained. Conversely, if 3500 calories are used up in exercise, 450g of weight will be lost.

To lose weight, a person must take in less calories than their body needs. Only then will the body start to burn the stored fat. This means that if a person uses 2500 calories per day, and only 2000 calories are eaten, in one week 450g of weight will be lost.

To calculate your ideal calorie intake, take your ideal weight and times by 29 if you are sedentary, 33 if you are moderately active, and by 37 if you are very active.

For example: a woman whose ideal weight is 60 kg and who is moderately active should find her ideal calorie intake by taking 60, times by 33, which equals 1980. If this woman would like to loose weight to become her ideal weight, she needs to take in less than 1980 calories, but still maintain a high nutrient diet. By eating 1480 calories per day, she could lose 450g per week.

Now you try:

Take ideal weight_____ kgs and times by _____ (29 if sedentary, 33 if moderately active or 37 if very active) = _____
I now know that my ideal calorie intake will be less than this if I am to loose weight.

- People over 50 years of age require fewer calories to maintain ideal body weight, but need more nutrients to compensate for absorption problems.
- Every person is different the above figures are approximate and should be used as a guideline only.

What Should I Eat for a Heart Healthy Diet?

- 10% (100 calories per 1000) of your daily calorie intake should come from the crossover protein/carbohydrate section of foods (unless there is an allergy to legumes): beans, sweet corn, amaranth, quinoa, buckwheat, lentils, legumes, chickpeas, sprouted legumes, cows milk, etc.

- 15% (150 calories per 1000) of your daily calorie intake should come from protein: quorn, soya, cottage cheese, white meat, unpolluted fish, liver, heart, ostrich, kangaroo, game, etc.

- 30% (300 calories per 1000) of your daily calorie intake should be from fat. But, if heart disease has been diagnosed, only 11g should be from animal source saturated fat (this equates to approximately 20g of organic butter per day). Grass-fed, organically reared animals tend to give a higher percentage of good fats than factory farmed animals that are fed an artificial diet. On no account should margarines and trans fatty acids be eaten. The main fat source should be a monounsaturated fat, especially for cooking. For oils that can be used for salad dressings etc. are: hemp seed oil, flaxseed oil, and walnut oil.

Coconut oil/butter contains a vegetable form of saturated fat, but can be used for cooking. It does not break down into harmful by-products, like vegetable fats do when heated. Saturated fats from vegetable sources are healthier than saturated fats from intensively-farmed animal sources.

If sunflower oil is used, it must be cold pressed and not heated in any way. Unprocessed nuts, sunflower seeds, pumpkin seeds should be included in this total.

NB: If you have heart disease or a medical condition you should always take your doctor's advice on your fat and protein intake.

- 45% (450 calories per 1000) of your daily calorie intake should be from complex carbohydrates. Brown rice, millet, oats, flaxseeds, sprouted seeds, fruit, fruit juices, vegetables and vegetable juices; honey can also be included in this total. Try to limit potatoes to 1-2 times per week, cut down on processed/ refined wheat products, and ban refined sugar altogether.

Nutrients for a Healthy Heart

Micronutrients: vitamins, minerals and trace elements are organic substances that are vital to good health and well-being. Most nutrients are provided by a fresh food diet, but can also be taken in supplement form. Only three vitamins can be manufactured in the body: vitamin D from sunlight; biotin - a metabolite of methionine and cysteine (amino acids); and vitamin K_2 (Menaquinone) in healthy intestinal flora.

Micronutrients are not sources of energy like macronutrients (carbohydrates, fats, and protein), but they do serve as essential chemical partners for the enzymes involved in the body's metabolism, cell production, tissue repair, and other fundamental processes. Many scientists now believe that a disruption of these metabolic pathways, probably through lack of critical co-factors, is the main cause of degenerative disease; and even a marginal deficiency of some of these micronutrients may play a major role in the pathogenesis of coronary heart disease.

It is not recommended to take high amounts of one particular vitamin or mineral, not only because of toxicity concerns, but also because there may be ratio problems. If a higher dose of one nutrient suddenly occurs, there could be a serious unbalancing of the delicate harmony in many metabolic pathways. Vitamins and minerals can be helpful co-factors to each other or antagonists, preventing each other from being absorbed into the system. This is why smaller doses of complementary nutrients, over the course of 12 hours, are always preferable to one large input of the whole day’s supplement program. It is also advisable to contact a medical practitioner if taking prescribed medication. Many nutrients interact with drugs, especially if taken together. It is worth remembering that the healing properties of a nutrient are dependent on the relevant co-factors being present. No one single nutrient has been found to be curative of any one medical condition, unless linked to a specific deficiency. It is a delicate balance of nutrients

that is needed to activate the body's own defence systems against disease.

The amount of each vitamin and mineral required was given as a Recommended Daily Amount (RDA). This was set by the Department of Health in 1979 and based on an average amount that was used to prevent common diseases, which afflicted people in the 19th Century and before, such as scurvy and rickets. These were replaced in 1991 by Dietary Reference Values (DRVs), which are standard intakes of nutrients – they can be used for guidance, but not exact recommendations. They show the amount of an individual nutrient that a group of people, of a certain age range, and sometimes sex, needs.

Other standards are:

1. **Dietary Reference Intake (DRI)**: is used in USA.

2. **Recommended Daily Intake (RDI):** the amounts sufficient, or more than, for the nutritional needs of practically all healthy people in a population.

3. **Daily Value (DV):** is the percentage of the amount of a nutrient believed to be needed in the daily diet. On food labels, it is based on one serving size for a person who takes in 2000 calories a day.

4. **The Estimated Average Requirement (EAR):** is the amount adequate for 50% of all people.

5. **Reference Nutrient Intake (RNI):** the amount of a nutrient (EAR + 2 Standard deviations), which is sufficient for almost all individuals (97·5%). By definition, RNI exceeds the requirement of most people, and habitual intakes above RNI are deemed almost certainly adequate.

6. **Lower Reference Nutrient Intake (LRNI):** the amount of nutrient or energy (EAR minus 2SD), which is sufficient for

only a few individuals (2·5%). Habitual intakes below the LRNI by an individual will almost certainly be inadequate.

7. **Adequate Intake (AI):** is an amount that will be used if there is insufficient data to calculate the EAR.

8. **Safe Intake (SI):** this is used when there is not enough evidence to set an EAR, RNI or LRNI. The safe intake is the amount judged to be enough for almost everyone, but below a level that could have undesirable effects.

9. **Tolerable Upper Intake Level (UL):** is the maximum dose likely to be safe in nearly all healthy adults, who are not on prescribed medication (usually used in USA).

10. **Suggested Optimal Nutritional Allowances (SONA)**, these are higher than the DRV or DRI. Usually referred to by nutritionists.

Vitamins

Vitamin A

Vitamin A is a fat-soluble vitamin. It is available preformed as: retinol (A_1), available from animal sources and oily fish; 3, 4, dehydroretinol (A_2) available mainly from fresh water fish; and Hydroxyretinol (A_3) recently isolated in certain animals that feed on carrion. The excess of preformed vitamin A is stored in the liver as retinyl palmitate and accumulates in the body. The precursor (vegetable source) of vitamin A is called provitamin A, beta-carotene being the most well-known carotenoid with retinol activity equivalent (RAE); alpha-carotene, gamma-carotene and beta-cryptoxanthin also have RAE, although not as potent. The body converts carotenoids with RAE into retinal, then into retinol or retinoic acid, when it needs to, but only if the liver is not damaged and there is an adequate supply of fat and bile salts.

There have been a number of toxic reactions, including birth defects from the synthetic form of vitamin A, 13-cis retinoic acid, which is regularly used to treat acne *vulgaris*.
Vitamin A palmitate (easily absorbed without dietary fat intake) and *vitamin A acetate* are synthetic forms of vitamin A, found in supplements and in foods that have been fortified. These forms are also preformed and ready for the body to use.

Preformed vitamin A: RNI: 600µg women, 700µg men (UK); DRV: 800µg (EU); DRI: 900µg men, 700µg women (US).

The upper intake level (UL) for long-term use of preformed vitamin A is hotly debated, with 1500µg being the most likely amount, it was considered to be 3,000µg (UK), but recent research suggests that this may be too high. People with impaired liver function or the elderly should not consume more than the DRV without practitioner guidance. Incidences of adverse reactions to natural retinol are usually from intakes of 50,000iµs per day, over a prolonged period. The symptoms include peeling and redness of the skin, disturbed hair growth, lack of appetite and vomiting. It is generally considered that women of childbearing age should not consume more than 1500µg of natural retinol per day, without practitioner guidance. Carotenoids are not considered toxic, but an excessive intake can give the skin a reversible orange tinge.

Preformed vitamin A is found in liver, beef, fish oils, dairy products, cod liver oil (retinyl palmitate), egg yolks, butter, and fortified foods. Provitamin A carotenoids are found in coloured fruit and green leafy vegetables, red palm oil, carrots, squash, amaranth, apricots, mangoes, papayas, seaweed, blue green algae, tomato, etc. For maximum absorption a small amount of fat needs to be consumed with foods containing beta-carotene.

Vitamin A is needed for immune system function, gene expression, epithelial cell maintenance (lining of major organs, including the heart), reproduction, embryonic development, healthy skin, thyroid gland, bones, and eyesight. Vitamin A seems

to lessen a measles attack and other viral illnesses. Beta-carotene helps the body to fight free radicals.

The following is a guideline for converting the different types of vitamin A into 1µg of retinol needed by the body: (1µg = 1mcg). NB: Provitamin A conversion is not exact, there are many factors involved and may vary from person to person.

1. 1 RAE (Retinol activity equivalent) = 1 RE (Retinol Equivalent) = 1µg retinol = 1mcg retinol =12µg dietary beta-carotene = 6µg of supplemental beta-carotene = 24µg alpha-carotene = 24µg beta-cryptoxanthin = 2·4µg of beta-carotene in oil = 3·333iµs of retinol (1iµ = 0.3µg) = 0·00349µmol retinol = 1·15µg retinyl acetate = 1·83µg retinyl palmitate.
2. 1iµ vitamin A activity = 0.3µg retinol = 3.6µg dietary beta-carotene = 7.2µg alpha-carotene or beta-cryptoxanthin.

Researchers in Indonesia and the Netherlands have found that vegetarians from developing countries, who do not consume retinol from animal sources, need 21µg of beta-carotene from vegetables and fruits for 1µg of retinol equivalent. This means that to get adequate supplies of beta-carotene from our food we may need to consume double the set recommendations listed above for 1µg of retinol equivalent.

Contraindications

- Pregnant women, or women likely to become pregnant should consult their midwife before taking any preformed vitamin A supplements.
- Individuals with liver disease, hyperlipidemia, or heavy drinkers must have practitioner guidance before taking preformed vitamin A supplements.
- Vitamin A can accumulate in the body to produce toxicity, in some people, even at a low dosage level. Side effects

include: headache, fever, vomiting, blurred vision, hair loss, liver damage and aching bones.

- Colchicine and cholestyramine, antacids and mineral oil laxatives may inhibit vitamin A absorption.
- Diabetics, people with impaired thyroid function and young children, have difficulty in converting beta-carotene to vitamin A internally.
- Smokers should only take beta-carotene supplements with practitioner guidance.
- High doses of vitamin A should not be taken with broad-spectrum antibiotics.
- Minocyclin, prescribed together with vitamin A, is a well-established treatment for acne vulgaris. Both medications have been implicated as a possible cause of pseudotumour cerebri.

Vitamin B Complex

Vitamin B is a complex of eight, officially recognised, water-soluble vitamins that assist the body in converting carbohydrates to glucose. They are essential in the metabolism of macronutrients. They play an important role in promoting the health of the nervous system, skin, hair, eyes, mouth, and liver. Sources of the B complex include: whole grains and brewer's yeast. However, healthy Intestinal flora is needed for optimum absorption and utilisation. In 2003, an additional B vitamin was claimed to have been discovered, pyrroloquinoline quinone (PQQ), it acts as a redox co-factor in the metabolism of lysine, an essential amino acid that is broken down within the body. PQQ can be supplied by the diet from vegetables and meat. In an animal model (murine) a deficiency led to fragile skin, poor growth, reduced immune response and a difficulty to reproduce. There are at least nine other B vitamins that are not officially recognized.

Vitamin B_6

The B_6 group is composed of three naturally occurring compounds–pyridoxine (PN), found in animal and plant sources, pyridoxamine (PM), and pyridoxal (PL), both found in animal sources only. Pyridoxine hydrochloride is the commercially available form of vitamin B_6 retailed in the UK; it must be correctly stored, because it slowly degrades when exposed to light. The metabolically active co-enzyme form of B_6 is Pyridoxyl-5-phosphate (P5P).
Pyridoxine (B_6) has been shown to maintain healthy nerve and muscle cells and aids in the production of DNA and RNA, the body's genetic material.

A Low intake of pyridoxine is associated with a high level of homocysteine and a higher risk of heart disease. It is necessary for the absorption of vitamin B_{12}, the utilisation of magnesium, the production of red blood cells and the manufacture of prostaglandins. It also helps to relieve symptoms of premenstrual syndrome (PMS) in some women.

In addition to other B complex vitamins, pyridoxine is an 'anti-stress' vitamin, it helps to boost the immune system and improve the body's ability to endure stress. It is also essential for normal brain development and function, assisting the manufacture of brain chemicals called neurotransmitters.

DRV: 2mg (UK); 2mg (EU); DRI: 2mg (US).

The upper safe limit is 100mg. The dose becomes therapeutic at 50mg. Over 200mg per day has been shown to cause nerve problems, tingling and loss of sensation in peripheral regions, which is reversed when B_6 is ceased. Practitioner guidance is needed for higher levels; although researchers have suggested that symptoms are caused by the lack of necessary enzymes that convert pyridoxine to P5P, which is the form the body needs, so unconverted pyridoxine accumulates in the bloodstream and exhibits side effects, such as tingling etc.

Symptoms of B_6 deficiency include dermatitis, muscle weakness, nervousness, irritability, depression, difficulty concentrating, and short-term memory loss. A deficiency has been implicated in rheumatoid arthritis, osteoporosis, eating disorders, diabetes, attention deficit disorder (ADD) and attention deficit, hyperactive disorder (ADHD) etc.

Dietary sources of vitamin B_6 include: chicken, turkey, liver, egg yolks, blackstrap molasses, salmon, nuts (peanuts, walnuts), sprouted seeds, soya beans, lentils, avocados, bananas, brown rice, sunflower seeds, wheat germ, whole-grain flour, green leafy vegetables, brewer's yeast, etc. It must be noted that researchers have suggested that vitamin B_6 from vegetable sources may not be adequately absorbed by the body.

Contraindications and Indications

- Birth control pills and HRT deplete vitamin B_6 and raises homocysteine, which may account for the rise of heart problems in women. More women are now dying of heart disease than any type of cancer.
- If on prescribed drugs, or are pregnant, a practitioner should be consulted before taking B_6.
- Vitamin B_6 can adversely affect certain medications i.e. L-dopa, a medication for Parkinson's disease, and certain drugs, including: isoniazid, phenytoin, theophylline and phenobarbitone.
- Smoking, a known risk factor for heart disease, also depletes vitamin B_6, and smokers generally have lower levels of folic acid and vitamin B_{12}, which is needed for homocysteine metabolism.
- Alcohol can interfere with B_6 absorption.
- B_6 cofactors include: zinc, magnesium, and vitamin B_2.
- If a regular dose of 50mg of B_6 is suddenly ceased a 'rebound' deficiency, with symptoms, may occur. It is better to gradually taper off regular high doses of B_6.

Folates, Folic Acid and Folinic Acid (vitamin B_9)

Folates belong to the B-complex of vitamins and are classed as vitamin B_9. Oral folates are available in two supplemental forms: folic acid and folinic acid. Folinic acid, or calcium folinate, is a more bio available form, and has been shown to cross the blood-brain barrier, and may be of help to central nervous system disorders where folic acid is of little use. However, folic acid is very well absorbed by the body; it reduces homocysteine and neural tube defects, and is positively indicated in alleviating many other related disorders.

DRV: 200mcg (UK); 200mcg (EU); DRI: 400mcg (US)

Women trying for a baby, pregnant or lactating women should take additional folic acid, up to 400mcg, or as obstetrician advises. The Upper safe limit, for healthy adults, is 1000mcg.

Dietary folates are a complex mixture of folate compounds, which are easily destroyed by cooking and processing. Many foods contain folates, including: green leafy vegetables, sprouted seeds, liver, kidneys, brewer's yeast, asparagus, avocados, beans, broccoli, cauliflower, chickpeas, cottage cheese, egg yolk, nuts, soybeans, carrots, oranges, unprocessed whole-wheat grains.

For optimum results, Folic acid should be taken as part of a vitamin B-complex, which allows it to metabolise more efficiently within the body. 650mcg to 1mg (depending on severity) of folic acid has been used successfully to decrease homocysteine, a leading cause of heart disease.

Contraindications

- High doses of retinol, and pancreatic enzymes may affect folic acid absorption.
- Several drugs can interfere with absorption: anti-convulsants, antacids, oral contraceptives, HRT and alcohol coincide with low tissue concentrations of folates.

- Supplementing with folates may mask a vitamin B_{12} deficiency; vitamin B_{12} should also be taken.
- Epileptics should seek medical advice before taking folic acid supplements.
- Anyone taking prescribed medication should consult his or her doctor before taking folates in supplement form.

Vitamin B_{12} (Cobalamin)

Most B_{12} supplements consist of either cyanocobalamin or hydroxycobalamin, which are actually precursors of the bio-active forms of vitamin B_{12}. The two main bioactive co-enzyme forms are: adenosylcobalamin (sometimes called: cobamamide, cobinamide, or dibencozide) and methylcobalamin. For the body to use the supplement forms of B_{12} it needs several extra metabolic steps, which require many more co-factors and enzyme activity.

DRV: 1mcg (UK); 1mcg (EU); DRI: 2.4mcg (US)

There is no evidence of any side effects with higher levels of $B_{12,}$ up to 3mg (but cyanocobalamin should not be given in high doses).

An unhealthy lifestyle with a high level of protein and refined carbohydrates, including potatoes, may substantially increase the body's need for B_{12}. Tobacco, alcohol, caffeine, laxatives, mercury, and some drugs reduce the body's capability of absorbing B_{12}.

The human body cannot manufacture B_{12}, so it must be introduced through diet or supplements. Injections of B_{12} can be given to people whose digestive tracts cannot absorb sufficient supplies; this may be due to surgery, bowel disease or a hereditary problem. Processing, over-cooking and storage may decrease the amount of B_{12} available in food. It has been shown that just 50% of $B_{12,}$ consumed from food, is absorbed into the system of a healthy person. People over 50, who characteristically have lower absorption capabilities, may benefit from B_{12} supplements in the

more readily available bio-active form. Lower levels of B_{12} can affect the central nervous system, causing: anaemia, especially pernicious anaemia; muscle weakness; mood swings; depression; forgetfulness; and a burning sensation on the tongue.

In the 1950s, *Herpes zosta* (shingles) was treated with B_{12} injections. A low level of B_{12} has been implicated in several disease protocols: Parkinson's disease, nervous breakdown, schizophrenia, multiple sclerosis, dementia, anorexia, etc.

Vitamin B_{12} is found in liver, kidney, meat, poultry, fish, eggs, dairy products and some fortified breakfast cereals (check the label). Vegetables, fruit, nuts, beans and seeds do not naturally contain vitamin B_{12}, although deeply fermented food (that has been subjected to bacterial activity), such as tempah and miso, may have some content. Spirulina *spp.* (blue green algae) is known to contain a Pseudovitamin B_{12}.

Contraindications

- Antibiotics destroy the gut flora that may provide extra B_{12} and assist in its absorption. During and after a course of antibiotics *lactobacillus spp*., or other friendly bacteria, should be taken.
- Some prescription drugs may inhibit the absorption of $B_{12.}$
- Alcoholics may have a raised serum level of B_{12}, but a dangerously low tissue level.
- Heavy metals in the body can stop B_{12} functioning properly.
- Potassium chloride, found in salt substitutes, may hinder the absorption of $B_{12.}$

Vitamin C

Vitamin C is a ubiquitous water-soluble vitamin, present in almost all plants and animals. It is not officially classed as an antioxidant,

but it does act like one and is a very effective neutraliser of free radicals. It is sensitive to heat, air, water, storage and alkaline substances, such as antacids and bicarbonate of soda.

Vitamin C comprises of two inter-convertible compounds: L-ascorbic acid (commonly called ascorbic acid in supplement form), and its oxidised derivative — L-dehydroascorbic acid. Ascorbic acid is a purified fraction usually derived from corn syrup. Vitamin C was first isolated in 1928, by Albert Szent Gyorgi, in animals and in 1932 in lemons. It was found that it worked better when synergistically combined with bioflavonoids, which are found in many fruits and vegetables. The most effective type of bioflavonoid is from the white pith of citrus fruit.

Most animals manufacture vitamin C internally from glucose. However, humans, apes, fruit bats, guinea pigs and some species of birds and fish, lack the crucial enzyme and cannot manufacture it in their bodies so they must have a vitamin C-rich diet. It is thought that evolution robbed us of this crucial enzyme, when thousands of years ago our ancestors had a diet that was so rich in vitamin C it was no longer needed. Unfortunately, our diets now are so devoid of nutrients that the average person is lucky to absorb 60mg of vitamin C a day from diet alone. When researchers took the average intake an animal makes naturally and equated it to a 70kg male, they found that he would need to introduce, on average, 5,400mg of vitamin C into his daily diet. However, when subject to stress, infection or disease, the amount of vitamin C an animal makes quadruples, to fight the illness.

Dr Linus Pauling, twice Nobel Prize winner, claimed that coronary heart disease is caused by a chronic vitamin C deficiency.

Vitamin C has many essential functions within the body: the formation of collagen (skin and joints); growth; tissue repair; wound healing; formation of certain hormones; absorption of iron; quenching free radicals; an anti-histamine; a weak chelating agent; and a co-factor in many metabolic pathways,

i.e. combining with lysine to form carnitine. Several studies have shown that vitamin C, either alone or in combination with other

nutrients, significantly inhibits LDL-cholesterol oxidation. This effect is most consistent when vitamin C is combined with vitamin E and vitamin A, but it has also been observed when vitamin C is used alone.

Major sources of natural (whole) vitamin C are: acerola fruit, rosehips, fresh citrus fruits, papaya, mango, blackcurrants. Most fresh fruit and vegetables have some content.

Hundreds of positive studies have concluded that vitamin C is a safe, effective vitamin that enhances well-being and helps the body to combat certain illnesses. However, there have been many column inches in the national newspapers, implying that it can also cause cancer. The research papers from which the concern originated have been widely denounced by researchers who regularly work with natural compounds, and know that vitamin C works differently in the body (in vivo) than in a test-tube (in vitro). The conclusion is that there is nothing in the current data to stop the general-public from taking Vitamin C supplements.
The Recommended Daily Allowance (RDA) for vitamin C is based on the amount needed to treat scurvy, which has initial symptoms of irritability, bleeding gums, loose teeth and muscle aches.

DRV: 60mg (UK); 60mg (EU); DRI 60mg (US)

Smokers should take 30-60mg more per day. The upper intake level (UL) of vitamin C is 2000mg (2g) per day. In the UK it is stated by the Food Standards Agency that 1000mg per day is unlikely to cause any harm in a healthy adult. Most complementary practitioners treat degenerative disease with up to 10-15 grams of intravenous vitamin C per day. Maximum absorption of oral vitamin C is best achieved by taking small amounts at regular intervals. A large oral dose of vitamin C can cause diarrhoea in some people, although complementary practitioners usually advise taking vitamin C to bowel tolerance (approx. 5g) on the first couple of days of a viral infection, such as a cold or influenza. Gyorgi, the scientist who first discovered vitamin C, recommended 1g per day.

This can be divided into 2 x 500mg doses, one in the morning and one in the evening. Overall, it has been found that people who regularly consume a diet rich in vitamin C have a better quality of life and lower blood pressure.

Contraindications

- Anyone with serious health problems, on prescribed medication or who are pregnant, should consult their GP before taking high doses of vitamin C.
- The elderly, the young, people with ulcers, sensitive stomachs, or arthritis should take the gentler calcium ascorbate (buffered), a low-acid form of vitamin C.
- It is not advisable for people with kidney stones to take a high level of oral ascorbic acid.
- It is possible that ascorbic acid dilutes the effect of tricyclic anti-depressants.
- Various drugs may increase the need for vitamin C, including cortisones, aspirin and birth control pills.
- Vitamin C interferes with copper absorption.

Vitamin E

Full spectrum vitamin E is made up of eight naturally occurring isomers, divided into two groups: tocopherols and tocotrienols. Each group has four forms: alpha, beta, gamma and delta. Research suggests that full spectrum vitamin E is the form needed to protect against degenerative disease and provide maximum benefits to health. Studies have found that full spectrum vitamin E is 40-60 times more effective than d-alpha-tocopherol. The commercially available natural supplement form is d-alpha-tocopherol or alpha tocopheryl succinate, and is a fraction of full spectrum vitamin E. Tocopheryl acetate and dl-alpha-tocopherol are both synthetic forms and should be avoided for therapeutic applications. The value of vitamin E in preventing heart disease has been known for nearly 60 years, as documented by Evan Shute, in his book: 'The Heart and Vitamin E,' first published in 1956. It has also been

confirmed by a number of studies, particularly one at Cambridge University which found that taking a minimum of 400iμ of vitamin E each day, reduced heart attacks in patients who already had heart disease by 77%. However, a recent study has found that taking 400iμ of alpha tocopheral on a regular basis is not advisable for people suffering from diabetes or blood vessel diseases.

DRV: 10mg (UK); 10mg (EU); DRI 15mg (US)

Because vitamin E is fat soluble, it needs to be taken with a meal containing some fat, or taken with fish oil supplements. If taken on an empty stomach up to 64% may be excreted.

Converting iμ to *mg*	
Natural	1 iμ = 0.671 mg d-alpha tocopherol
	1 iμ = 0.861 mg d-alpha tocopheryl succinate
Synthetic	1 iμ = 1 mg dl-alpha tocopheryl acetate
	1 iμ = 0.91 mg dl-alpha tocopherol

The Upper intake level considered safe is 1000iμ. No official data exists for the level of tocotrienols that should be taken. Studies suggest that 50-200mg has been found to be therapeutic, so perhaps a lower level of 10mg-20mg could be considered protective.

Tocopherols are found in grains, soybeans, nuts, eggs and olive oil etc. Tocotrienols are found in the oil fraction of palm, rice bran, wheat germ and barley. Tocotrienols have also been shown to reduce the risk of stroke by reversing atherosclerosis and reducing the level of LDL cholesterol.

Contraindications

- Although a great number of people benefit from taking vitamin E (d-alpha-tocopherol), there are some people who should not supplement their diet: smokers, who are also consuming a high polyunsaturated fat diet, do not benefit from vitamin E supplements, and people who have above average levels of long chain fatty acids in their body

(carbons greater than 20). A serum fatty acid test is the only way to predict this uncommon trait.

- People with rheumatic fever should not supplement their diets with vitamin E.
- Vitamin E above 1000iμs reduces blood stickiness; high levels should not be taken with aspirin or prescribed anti-coagulants.
- High levels of vitamins, minerals and herbal supplements must be stopped at least three weeks before surgery, unless taken under medical supervision.
- Tocopherols may dampen down the effect of tamoxifen, while tocotrienols have been found to enhance it. Practitioner supervision is required.
- Palm oil tocotrienols and gamma tocopherol NOT alpha tocopherol have been shown to have the most potent anti-cancer effects.
- Diabetics and people with vascular disease must have practitioner guidance when taking vitamin E.

Researchers at the Centre for Disease Control and Prevention in America, have found that the higher the concentration of retinol (vitamin A), vitamin C, vitamin E, carotenoids, and selenium in the blood, the lower the concentration of C-reactive protein. High levels of which are associated with a number of diseases, including heart disease.

Betaine or Trimethylglycine (TMG)

TMG in the forms of betaine citrate and betaine aspartate are the types of betaine needed for lowering homocysteine and for supporting the liver. Betaine HCL, in its hydrochloride form, is an acidic compound used in digestive aids for people with low stomach acid. It should not be used primarily to lower homocysteine. Only betaine (TMG) is able to donate methyl groups to biochemical actions in metabolic pathways. A methyl group is one carbon molecule and three hydrogen molecules. They are thought to protect cellular DNA from mutation, a process that is

also assisted by antioxidants. As people age, methyl groups and natural antioxidants in the body diminish, which is probably why older people are more susceptible to degenerative disease. Regular consumption of large quantities of foods that contain methyl groups, including: beets, green leafy vegetables and legumes, are beneficial for the healthy functioning of the whole body. Choline, found in egg yolk, beef, wheat germ, whole oats, and nuts, is a major precursor of betaine.

There are no official contraindications or dosage levels for Betaine (TMG). People on medication should consult their doctor before taking supplements.

Minerals

Minerals are inorganic elements found in varying amounts in rock and soil. Plants take up the minerals in the soil or spring water, converting them into easily absorbed nutrients. Animals eat the plants, and the minerals accumulate in their organs and tissue. People can usually obtain adequate supplies from plant or animal sources, or by taking supplements and mineral water. Minerals are thought to have helped to trigger the first life forms by being washed into the sea during primeval rainstorms, creating ideal conditions for life to start.

Magnesium

Magnesium is one of the most functional metallic elements within the body. It is needed for energy production, making new cells, muscle function, endothelia health, blood clotting, nerve impulse transmission, strong bones, etc. It is also a critical co-factor in over 300 metabolic reactions and helps to balance certain hormones. It is a potent vasodilator and, along with calcium, helps to regulate blood pressure. It has been found that a very low magnesium level gives a greater risk of heart disease than having a high cholesterol level.

DRV: 300mg (UK & EURO) DRI: 420mg (males), 320mg (females) USA.

The upper intake limit (UL) for oral magnesium is 1000mg. Medically administered intravenous infusions can give up to 2500mg. A healthy person with normal functioning kidneys is unlikely to suffer from toxicity, because excess magnesium is usually excreted. However, a high dose of magnesium, taken orally, can result in diarrhoea.

Magnesium is available in over 30 forms, including: citrate, aspartate, carbonate, lactate, sulphate, glycerophosphate, orotate, glycinate, taurate, arginate, acetate, gluconate, pidolate, magnesium amino acid chelate, chloride, oxide (low absorption), hydroxide (antacids), magnesium salts of orthophosphoric acid and magnesium oxide dolomite. The most easily absorbed supplements are the chelated variety, i.e. magnesium citrate or magnesium aspartate.

When taking magnesium, it is important to distinguish between the number of milligrams per tablet or capsule of the entire magnesium complex, versus the number of milligrams of elemental magnesium or pure magnesium. For example, if a label states: 'two tablets contain 2,000mg of chelated magnesium complex with 200mg of elemental magnesium,' the important amount is the one that refers to the elemental magnesium. The other 1,800mg refers to the amino acid complex that is bound to the magnesium.

Calcium should be taken with magnesium supplements in an approximately 2:1 ratio (for example, if you have 1g of calcium per day you would need 500mg of magnesium). If there is a magnesium deficiency, it should be taken on its own, or intravenously with practitioner guidance, depending on the severity of the deficiency.

A low level of magnesium has been indicated in many disease states, including: cardiovascular disease, chronic fatigue syndrome, attention deficit disorder, asthma, migraine, hyperactivity disorders, clinical depression, high blood pressure, osteoporosis and pre-eclampsia.

People with diabetes generally have a lower level of magnesium in their bodies, compared to people with normal glucose tolerance.

Symptoms of deficiency include: listlessness, cramps, aches and pains, anxiety, abnormal heartbeat, depression, PMT, muscle weakness or spasm, bladder weakness, insomnia, nervousness and

irritability. If the magnesium level is so low that it causes symptoms, medical advice is needed.

Magnesium is found in: pumpkin seeds, millet, sunflower seeds, seaweeds, algae, green leafy vegetables, sprouted seeds, cashew nuts, almonds, soya beans, legumes, seafood, whole cereal grains, black strap molasses, etc.

Processing food greatly decreases the magnesium content.

A diet rich in unprocessed fruit, vegetables, soya, nuts, seeds and grains can boost levels of magnesium, but magnesium levels in soil have fallen within the UK and other areas in the last few decades, so it may be advisable to supplement the diet with at least 100mg of elemental magnesium. Aging, stress and several disease states increase the need for available magnesium.

The risk of heart disease is lower in hard water areas

Contraindications

- Magnesium affects some heart medications i.e. Digoxin, antibiotics, osteoporosis drugs and anti-malarial drugs. Anyone on prescribed medication must consult their doctor before taking magnesium supplements.
- Oestrogen containing drugs including: the pill and HRT, can deplete magnesium within the body.
- People with kidney dysfunction or liver problems should only take magnesium under strict medical supervision.
- A diet rich in saturated fat, sugar and processed food results in a lower magnesium level within the body.
- Potassium depleting diuretics may also deplete magnesium.
- Excess alcohol depletes magnesium within the body.

- Zinc interferes with magnesium absorption, supplements should be taken separately

Chromium

Hexavalent and Trivalent are the two main forms chromium is found in. Hexavalent chromium (VI) is much more toxic and is neither found in food or supplements, so contamination can only occur from occupational exposure. Trivalent chromium (III) has a very low toxicity, partly because only about 0·5%-10% of intake from food is actually absorbed. As the body gets older, it absorbs even less. Tissue levels of chromium also decrease with age.
Chromium is an essential mineral for carbohydrate metabolism. It is a component of a compound called the glucose tolerance factor (GTF), which works with insulin to transport glucose into cells for the production of energy. Optimal chromium intake appears to decrease the amount of insulin needed to maintain a normal blood sugar level. Because insulin is also needed for the metabolism of fats and protein, chromium is also a vital co-factor to these functions too.
Chromium has been used to treat diabetes, high cholesterol and low blood sugar (hypoglycemia) and is backed by a great deal of scientific evidence. There may also be some benefit for high triglyceride levels. Chromium has been used to increase athletic performance, postmenopausal maintenance of bone loss, and in cases of mild to moderate depression. It can also help retain muscle when on a weight reducing diet.

There is a wide geographical variation of chromium levels in the soil, which affects the level in foods, and population studies show that the incidence of diabetes and heart disease is lower in areas where chromium in the soil is relatively high.

The better-absorbed forms of chromium are: GTF chromium, which has all the co-factors present; chromium picolinate; and amino acid chelate. Also available is: Niacin bound chromium, chromium nicotinate, chromium chloride, and chromium-enriched

yeast. Chromium picolinate has received some adverse press over the last few years, mainly because it was found that it damages DNA in vitro (test tube) and in an animal model. Synthetic picolinate, in particular, causes the most adverse reactions. People with kidney or liver disease have a problem with taking chromium in its picolinate form.

There are many natural sources of chromium, including liver, brewer's yeast, egg yolk and wheat germ. Many meats: turkey, beef, ham, etc., fish: mackerel, oysters, etc., fruits, cheddar cheese, whole grains, and vegetables: broccoli, carrots, tomatoes, potatoes and spinach are all good sources, as are alfalfa, hard drinking water, brown sugar, grape juice, molasses, black pepper, thyme and sprouting seeds. Cooking food in stainless steel cookware may increase chromium levels.

There is no DRV for chromium, an intake of 25mcg-200mcg is usually available in commercial supplements, and a dose up to 500mcg is generally considered safe. A chromium supplement is best taken after a light meal with a vitamin C supplement. The adequate intake (AI) level for women is set at 25mcg and 35mcg for men.

A chromium deficiency can trigger type II diabetes, also known as non-insulin dependent diabetes mellitus (NIDDM) and insulin resistance syndrome, but lack of chromium is not the only cause. The only way to know if chromium supplementation will be beneficial is to take a blood test, to see if blood levels are deficient of chromium. Other symptoms of chromium deficiency include: high blood lipids i.e. cholesterol levels, which can lead to cardiovascular disease; and diabetes-like symptoms of glucose intolerance, weakness, depression, confusion, unexplained weight loss, thirst, hunger and frequent urination. However, if any one of these symptoms is evident a medical check-up is essential because it could also signify a more serious illness.

Diets high in refined sugars and processed foods, alcoholism, prolonged slimming regimes and pregnancy may lead to a chromium deficiency. Vomiting and diarrhoea, infection and

physical trauma appear to increase chromium requirements and strenuous exercise boosts chromium excretion, adding to the risk of deficiency when intake is marginal.

Contraindications

- People with liver or kidney disease should limit their intake of chromium supplements and not take chromium in its picolinate form (chromium picolinate).
- Anyone on prescribed medication or using chromium to treat an existing illness must have the advice of a qualified practitioner.

Selenium

Selenium is an important trace element that was considered too toxic for human consumption until 1957, when Schwartz and Foltz demonstrated that it was an essential mineral used by the body to prevent disease. The quantity of selenium found in vegetable and animal products is dictated by the soil levels of a particular geographical area.

Selenium is available in several forms, including: selenomethionine (the most readily available form), selenium yeast, selenocysteine. The inorganic forms such as selenite are best avoided, because they are more likely to cause toxicity.

Selenium is a co-factor in several metabolic pathways, including the glutathione peroxidase pathway, which has vital antioxidant functions, especially in the aging process. Selenium is also protective against high levels of toxic metals, including: mercury, cadmium, lead, and arsenic, and it can combine with sulphur to protect against aluminium toxicity.

RNI: 60µg (women), 75µg (men). LRNI 40µg (UK & EURO)
DRI: 55µg (women), 70µg (men) (USA)

The Upper intake level for UK is set at 200µg, with a short-term UL set at 750µg. The UL (USA) for selenium is 400µg per day for adults.

The therapeutic dose ranges from 100mcg to 2mg (under practitioner supervision). If higher doses of selenium are taken, extra vitamin E is needed. Additional vitamin C is also required, but not taken at the same time as selenium, because ascorbic acid can reduce selenium into an unavailable form.
Selenium deficiency is well documented, following the endemic form of dilated cardiomyopathy, found in the Chinese province of Keshan, where the soil is known to lack selenium; and in Finland, another low-selenium area, where there is an increased risk of heart disease. A selenium deficiency is also indicated in: muscle inflammation, Kashin-beck (big bone) disease; and is linked to an increase of certain types of cancer (breast, lung, prostate, skin, colon), endemic goiter, sudden infant death syndrome, multiple sclerosis, and schizophrenia.

Selenium containing foods include: eggs, garlic, onions, nuts (Brazil nuts), seafood/shellfish, offal, brewer's yeast, whole grains, brown rice and American wheat/wheat germ.

Contraindications

- High doses of selenium over 400μg should not be taken regualrly, unless under medical supervision.
- For maximum absorption, selenium should not be taken at the same time as chromium, magnesium, zinc or vitamin C.
- Very high doses of selenium (mainly inorganic) have been indicated in the following: nerve degeneration, osteoporosis, shingles, Crohn's disease, ALS/Lou Gehrig's disease, loss of hair, abnormal nails, tooth decay, garlic/ sulphur breath, cataracts, and death.

MSM (methylsulphonylmethane)

Elemental sulphur is not classed as an essential element as such, because the body can acquire all it needs from sulphur containing amino acids such as: cysteine, taurine and methionine. The amount

of sulphur is dependent on the amount of sulphur available in the soil of a geographical area.

Sulphur has been used in acne and problem skin preparations, antidandruff shampoos, and antidotes to radiation exposure. It promotes wound healing, is needed in several metabolic pathways and is used by the body to metabolise certain drugs including steroids. It can decrease vascular smooth cell growth, where an overgrowth can cause blockage of an artery.

MSM, methyl-sulphonyl-methane, is water-soluble and contains around 34% of elemental sulphur. It is one of the least toxic compounds found in nature, with about the same toxicity of water.

Sulphur containing amino acids are found in animal products and unprocessed whole grains (cereal products), corn, sunflower seeds, oats, cashews, walnuts, almonds and sesame seeds. MSM is available from: fruit, corn, tomatoes, tea, sprouting seeds, and in supplement form.

Both selenium and sulphur bind to a number of heavy, or toxic metals, with selenium being protective against cadmium, lead, mercury, and arsenic, while sulphur (on it's own, being to a lesser degree protective of the same), is also helpful to lower aluminium levels.

Contraindications

- There is no DRV/DRI for MSM, the dose usually advised is 400-1000mg per day. 500mg to 5000mg is considered therapeutic.
- MSM interferes with levels of copper, which is not always a bad thing, a good number of people have too much copper in their systems, because of copper water pipes and cooking utensils, which can promote joint degeneration.
- Where there is a copper deficiency, which is quite rare, MSM or glucosamine sulphate should only be taken under practitioner supervision.

- Sulphur is a potassium and calcium antagonist, so should not be taken at the same time.
- Sulphur containing foods and supplements such as: glucosamine sulphate, MSM, methionine, taurine, cysteine / cystine, garlic, and onions may result in bloating, flatulence and diarrhoea in some people.
- A high sulphur intake may worsen low potassium-related cardiac, or renal / genitourinary conditions, and also low calcium-related disorders, including, insomnia, anxieties, fatigue.
- Low sulphur status can result in low insulin production.
- Sulphur containing foods and selenium supplements can aggravate Crohn's disease.

Phytochemicals

There are tens of thousands of known phytochemicals, which are important to our health, and more are found each year. Scientists have only just touched the tip of the iceberg, many have little idea, or care about how helpful plant constituents are to the human race, which is why they must never succeed with genetic engineering. Interfering with the genetic make-up of the source of our well-being, for commercial gain, with little idea of the consequences is nothing short of insane.

Bromelain

Bromelain is a sulphur-containing enzyme that digests protein.
It is found in the stems of pineapple (*Ananas comosus*), along with other constituents, which may also prove to be useful in maintaining health. Its ability to block the development of inflammation and the production of kinins, which increase swelling and pain, was first found to be medically significant in 1957. The first conclusive evidence that bromelain is effective for platelet aggregation was found in 1972. Since then bromelain has shown to be useful for atherosclerosis, angina peripheral vascular disease,

immune enhancement, circulatory disorders, thrombosis, rheumatoid arthritis, cancer, and other inflammatory states and diseases.
Bromelain is not stable and can be damaged by heat and light.
There is no official DRV or DRI for bromelain. The typical dosage is between 250mg and 750mg four times daily, taken on an empty stomach (before or between meals).

Contraindications:

- Bromelain has been shown to assist the absorption of antibiotics; it may affect other drugs in the same way. Therefore, if on prescription medication, your healthcare provider should be informed of intake level.

Inositol Hexaphosphate

Inositol hexaphosphate, also known as, myo-inositol hexaphosphate and phytic acid, is a naturally occurring compound found in significant amounts in legumes, whole grains, cereals, seeds, sprouted seeds and nuts, and is the primary energy source for the germinating plant.
In human cells, it assists in a variety of functions, acting as an antioxidant and a chelating agent, preventing cell injury. It also has an anti-platelet aggregating action and a lipid-lowering effect, suggesting a useful role in the management of cardiovascular disease.

Bioflavonoids

Bioflavonoids, also known as flavonoids, are biologically active polyphenolic compounds found in most plants and have been associated with decreased risk of several age related and chronic diseases including high cholesterol and coronary heart disease. Although usually paired with ascorbic acid, their biological effects are independent of any interaction with vitamin C. They are unofficially referred to as vitamin P and have very strong antioxidant and cyto-protective properties.

The bioflavonoids listed below are divided into six subclasses based on their chemical structure: anthocyanidins, flavonols, flavones, flavanones, flavan-3-ols, and isoflavones.

1. ANTHOCYANIDINS: (cyanidin, delphinidin, malvidin, pelargonidin, peonidin, petunidin) are found in red/purple fruits such as: cherries, blueberries, elderberries, raspberries, apples and pears (mainly skins), blackberries, cranberries, red grapefruit, red/black grapes, plums, strawberries, watermelon, red wine and red onions. Oligomeric proanthocyanidins (OPCs or pycnogenols) are oligomeric flavonoids and are particularly vascular protective, they are found specifically in the bark of pine trees, grape seeds, peanut skins, hawthorn berries, cranberries, and selected tea leaves. The most potent extract is from grape seeds.

2. FLAVONOLS: (quercetin, kaempferol, myricetin, isorhamnetin, rutin) are only found in small quantities in fruit. They occur in woody plants, grains, quinoa, buckwheat, onions, cabbage, and are found in ginkgo biloba extract.

3. FLAVONES: (apigenin, luteolin) do not occur in fruit, except lemons and pummelo juice. They occur in parsley, celery seed and horsetail *spp*. Ginkgo biloba extract (Egb-761) contains 24% Ginkgo flavone glycosides (flavonoids, Ginkgo heterosides) and 6% terpenes, which accounts for antioxidant properties.

4. FLAVANONES: (hesperetin, eriodictyol, naringenin) occur mainly in the white pith and skins of citrus fruit and the herb, peppermint.

5. FLAVAN-3-OLS: (catechin, gallocatechin, epicatechin. epicatechin 3-gallate, epigallocatechin, epigallocatechin 3-gallate, theaflavin, theaflavin-3,3'-digallate, theaflavin-3'-gallate, theaflavin-3-gallate, thearubigins) occur in tea, apricots, blackberries, apples, black grapes, cherries, cranberries, wine and cocoa.

6. ISOFLAVONES: (daidzein, genistein, glycitein, aglycon, glucoconjugate and equol) most isoflavones have oestrogen-

   like properties and are called phytoestrogens. They have been positively indicated in reducing the risk of menopausal symptoms, heart disease, bone thinning, prostate problems and reduced cancer risk. They occur in soy beans, soy products (milk, miso, vege mince, tempeh, etc.) and to a lesser extent in: sprouted legumes, red kidney beans, broad beans, coffee, grain products, red clover and peanuts.

Flavonoids can also be found in supplement form and bioflavonoid enriched vitamin C supplements, several formulations use flavonoids from the sour orange *Citrus aurantium.*

Food sources of flavonoids are unprocessed vegetables, fruits, nuts, seeds, sprouted seeds, grains, roots, and plant products including: tea, wine and old malt whiskey.

Herbal Medicines

Guggal

Guggal, also known as gugulipid, is an extract of the exudate (gum guggul) of the mukul myrrh tree *(Commiphora mukul),* it contains phytosterols called guggulsterones, 75mg of which is said to be a therapeutic dose. Researchers have determined that one of the benefits of guggal is that it reduces total cholesterol levels by 22% and triglyceride levels by 25%, compared with placebo, in 70% of patients. In another study of 61 patients, it was found to decrease cholesterol levels by 11%, LDL levels by 12% and triglyceride levels by 12%.

***Inula racemosa*, also known as Pushkarmoola, is a traditional Ayurvedic botanical that has potential cardio-protective benefits. In human trials, a combination of *Inula racemosa* and *Commiphora mukul* was shown to be superior to nitroglycerin in reducing the chest pain associated with angina.**

In Ayervdia guggal has also been used as an anti-inflammatory and as an analgesic.

Contraindications

- Guggal should not be used in pregnancy.
- Possible side effects are: apprehension, restlessness, hiccups and diarrhoea, but these are usually seen in larger doses and only in some people.
- Guggal should not be taken with prescribed medication without medical advice.

Hawthorn

Hawthorn *(Crataegus oxycantha)* extract has been used for centuries, by herbalists, as a cardiac tonic and particularly for cases of hypertension. It is now considered a useful treatment for patients with all aspects of coronary heart disease. In Germany, clinical trials have shown benefit in objective signs and subjective symptoms of stage II congestive heart failure. In one multicentre, placebo-controlled, double-blind trial, which studied 136 patients, a clear improvement in the subjects receiving hawthorn, including an improvement in the pressure-heart rate was seen, while the conditions of the subjects receiving placebo deteriorated. The hawthorn group also had an improvement in their quality of life and mental well-being. The study concluded that hawthorn was an effective, low-risk phytotherapeutic form of treatment in patients with stage II cardiac insufficiency. Hawthorn is sold as a prescription medication in parts of Europe and Asia. In Germany, it has been approved and is prescribed for mild cardiac insufficiency. It is especially beneficial in cases when digitalis is not well tolerated.

Researchers have found that the therapeutic dose of an extract, standardised to contain 1·8% vitexin-4 rhamnoside, is between 100-250 mg. A standardised extract containing 18% procyanidolic oligomers is in the range of 250-500 mg daily.

Contraindications

- Hawthorn in high doses may cause a mild rash, headache, sweating, dizziness, palpitations, sleepiness, agitation, and gastrointestinal symptoms in some people.
- Hawthorn may interact with prescribed medication, practitioner guidance is advised.

Garlic

A member of the onion and shallot family, garlic *(Allium sativum)*, is a powerful herb with a reliable culinary and medical history stretching back for at least 3,000 years. Egyptian pyramid builders took it for strength and endurance. The French scientist Louis Pasteur investigated its potent antibacterial properties, and doctors in the two World Wars treated wounds with its juice.

All the healing constituents are concentrated in the most pungent part of the plant—the bulb. When the raw bulb is crushed, one of its 100> therapeutic sulphur compounds, alliin, is converted into allicin, the chemical largely held responsible for garlic's odour and healing properties. It has been found that *Allium sativum var. sativum* L. (garlic) and *Allium cepa* (shallot) are the two plants that contain the highest levels of active compounds. In addition, allicin's antioxidant properties may inactivate free radicals and assist the immune system in destroying early cancer cells. Specifically, studies have indicated that the allyl sulphides contained in garlic are potentially beneficial in preventing digestive cancers.

Garlic is also of great benefit to the cardiovascular system. It has a good effect on platelet aggregation, lessening the risk of arteriosclerosis and a subsequent heart attack; it is also thought that one of its constituents, gamma-glutamylcysteine, works as an ACE inhibitor. The latest findings indicate that the clot-busting compound ajoene, a derivative of allicin, actually discourages the development of atherosclerosis. An increasing amount of research indicates that garlic also works to lower high cholesterol by interfering with its metabolism in the liver. Various trials have

found that garlic supplements can lower LDL (bad) cholesterol and triglyceride levels whilst raising HDL (good) cholesterol. Whereas not all trials support such positive results, it may be worth trying garlic along with other cholesterol-lowering foods.

Garlic is without doubt a heart-friendly herb. This was demonstrated in a small, placebo-controlled study involving a group of 70-year-olds: those who took garlic consistently for two years were found to have a much more flexible aorta (the main artery in the body, which loses flexibility with age) than those who were given a placebo. In addition, by widening blood vessels so the blood can circulate more freely, garlic may slightly lower blood pressure.

Contraindications

- Garlic may irritate the stomach in some people.
- The conversion from alliin to allicin can occur with supplements specifically designed to dissolve in the small intestine. However, garlic oil capsules are unlikely to have significant amounts of the active ingredients.
- Supplements should be guaranteed to supply 10mg of alliin, with a total allicin potential of 4,000 mcg.
- Large amounts of garlic or garlic supplements should not be taken with blood thinning medication or three weeks before surgery.
- Large amounts of garlic or garlic supplements should not be taken in pregnancy.

Cholestin

Cholestin is a fermented product of rice on which red yeast is grown. It has been used for centuries in China and contains starch, protein, fibre and at least eight compounds that function as 3-hydroxy-3-methylglutaryl coenzyme A (HMG CoA) reductase inhibitors. The active compounds of cholestin are very similar in structure to drugs known as statins.

In a recent double-blind, placebo-controlled study, involving 83 patients with high cholesterol, those receiving cholestin had their total cholesterol levels decreased by 15%, with the LDL level decreased by approx. 22%.

Contraindications

- Periodic liver function tests are advisable when taking cholestin.
- A CoQ_{10} Supplement is advised taken a few hours after or before taking cholestin.

Antioxidants

There are three main antioxidant enzymes manufactured by the body:

Superoxide dismutase (SOD) works in the mitochondrion of each cell to counter the superoxide free radical. SOD helps prevent tissue degeneration associated with aging, as we get older the body produces less.

Glutathione peroxidase plays a role in protecting the blood cells, heart, liver, and lungs. However, its levels also decline with aging, this is associated with higher levels of disease in the elderly. The glutathione level is so precisely attuned to aging, it could be a marker of biological age.

Methionine reductase, although not as well-known as SOD, it helps defeat some particularly dangerous free radicals – especially those created when exposed to radiation. Research suggests that methionine reductase also helps deactivate free radicals created by mercury found in dental fillings.

Antioxidants could be used in many levels of heart disease treatment, for example: Inadequate levels of antioxidants in the cells of the heart can cause reperfusion (reoxygenation) injury.

Reperfusion injury occurs following restoration of the blood and oxygen supply to the heart after a period of inadequate blood supply (ischemia). Antioxidants have been shown to prevent or reduce the severity of this type of tissue damage.

In addition, there are many nutrients available from food and in supplement form that scavenge free radicals:

Vitamins: A, B2, C, E, coenzyme Q_{10}.
Minerals: copper, manganese, selenium, zinc, MSM and DMSO (*Dimethyl sulfoxide*).
Bioflavonoids: quercetin, eriodictyol, and anthocyanins: bilberries, blueberries, grapes and grape seed or leaf extract, cranberries, raspberries, and pine bark. Most colourful fruit skins, berries, and some leaves have varying concentrations of free-radical scavenging flavonoids. Red wine and old malt whiskey (in moderation) have been found to contain free radical scavenging activity.
Amino Acids: cysteine, EDTA (man-made), glutathione, methionine, and taurine.
Herbs and Spices: astragalus, cayenne, garlic, gingko biloba, green tea, white tea, black tea (without milk), milk thistle, sage and turmeric.
Combinations: alpha-lipoic acid combined with L-carnitine makes a good free radical scavenging blend.

Co Enzyme Q_{10}

CoQ_{10}, also known as ubiquinone, is not officially classed as a vitamin. It is a coenzyme found in all cells of the body (hence its common name, ubiquinone). It is essential for various metabolic reactions, including oxidative respiration. Its use in heart disease stems from its antioxidant effects, its stabilization of sodium- and potassium- activated adenosine triphosphate (NaK ATPase) and its effect on calcium channels.
Two well-researched meta-analyses have shown improved ejection fractions, stroke volume, cardiac output, cardiac index and end

diastolic volume in patients taking Q_{10} supplements; each also suggested that Q_{10} may have a role in the treatment of congestive heart failure.
A 1999 study showed that 22 patients enrolled in a randomised, double-blind, placebo-controlled, crossover trial of Q_{10} experienced some improvement. The study concluded that patients with congestive heart failure may benefit from supplementation with Q_{10}. Two other similar studies concluded only slight improvement, if any.

Contraindications

- Studies have found no adverse side effects of Q_{10} at doses of 100 mg daily for six years or 200 mg daily for one year.
- Statins deplete CoQ_{10} in the liver, enough to cause liver enzyme elevations and within the muscles to cause myopathy. NB: Statins may cause depression or loss of motivation in many patients, probably due to alteration of cholesterol metabolism in the brain.

Alpha Lipoic Acid

Alpha lipoic acid, also known as thioctic acid or vitamin N, was discovered in 1951 and was categorised as a vitamin-like co-enzyme in the production of cellular energy. In 1988, it was re-discovered as having powerful free radical quenching capabilities and quite remarkably, it enhances the free radical quenching power of other antioxidants, such as glutathione and regenerates vitamins C and E so they work more efficiently. Alpha lipoic acid works as the 'ideal' antioxidant, unlike vitamins E (fat-soluble) and C (water-soluble), by performing in both fat and water areas of a cell. It can also be converted into an even more powerful 'direct' antioxidant - dihydrolipoic acid (DHLA), which has been found to decrease the severity of reperfusion injury.
Alpha Lipoic Acid is currently the subject of much research, as it is thought to be a preventive and/or treatment for many age-related

diseases, ranging from heart disease and stroke to diabetes, glaucoma, hepatitis, cataracts, Parkinson's and Alzheimer's disease, as well as declines in energy, muscle strength, brain function, and immunity. It also shows promise in the treatment of HIV and multiple sclerosis. In Germany, it is prescribed to treat those complications of diabetes that are caused by free radical activity, such as nerve damage. It is also given intravenously for acute cases of mushroom poisoning and as an antidote for any poisoning that affects the liver, such as alcohol. There is also emerging evidence that it may help decrease insulin resistance and help control blood sugar. The most exciting study found that when taken with carnitine it made aged rats appear to act as if young again. Whether the same effect can be seen in humans is still being studied.

There is no DRV for Alpha lipoic acid, but the research seems to suggest that 100-200mg is protective and 600mg per day is therapeutic.

Foods that contain Alpha Lipoic Acid include: red meat, beef-liver, beef heart, beef kidney, broccoli, spinach, tomatoes, egg yoke, peas, Brussels sprouts, brewer's yeast, rice bran.

A healthy person who enjoys a nutrient-rich diet can manufacture their own supplies of alpha lipoic acid within their body, from an 8-chain fatty acid and elemental sulphur. It can also be obtained from red meat and certain vegetables. For therapeutic antioxidant properties, it needs to be taken in supplement form.

Contraindications

- Alpha lipoic acid acts as a chelating agent. If taken long-term it may deplete electrolytes/minerals from the body.
- Some people may experience slight stomach upsets, nausea and a mild rash at higher doses, discontinue use or reduce dose to suit.
- High doses of alpha lipoic acid must not be given to people with a thiamine deficiency.

- Do not take supplements if pregnant, it is not proven to be safe in pregnancy.
- If on prescribed medication a medical practitioner must be consulted before taking supplements.
- Diabetics must closely monitor optimum insulin levels, while taking alpha lipoic acid. Some diabetics have found that less is needed.
- Until recently, alpha-lipoic acid was only available as a racemic mixture of *R*- and *S*- alpha lipoic acid, also known as *DL* alpha lipoic acid. Preparations containing only *R*-alpha lipoic acid are now available, but are typically more expensive than racemic mixtures.
- *Studies show that R*-alpha-lipoic acid seems to be more bioavailable than *S*-alpha-lipoic acid when taken orally, but more studies are needed to confirm this.

Amino Acids

Amino acids are components of protein and are split into two main groups: alpha (essential) aminos and beta (non-essential) aminos. The beta aminos are thought to be non-essential because they can be made in the body from the breakdown and utilisation of alpha aminos. However, research has found that some beta aminos are not synthesised by the body in large enough quantities when other essential co-factors, such as vitamins and minerals, are missing or when the body is under par or is genetically incapable of the task.
There are officially 20 amino acids found in protein (and unofficially as many as 28 and maybe more); 8 aminos are classed as essential for adults and must be supplied daily by the diet from animal or vegetable sources. These are: L-isoleucine, L-leucine, L-lysine, L-methionine, L-phenylalanine, L-threonine, L-tryptophan and L-valine. Another two, L-arginine and L-histidine, are classed as essential for growth in children or for adults in certain circumstances.

The body is largely made-up of fat and water; take these out of the equation and amino acids account for about 75% of the rest.

Life without proteins simply would not exist. All amino acids are essential to most bodily processes, from the workings of the brain, to the production and continuation of cells and hormones, to the repairing of body tissue and DNA, to the combating of infections, to the building and maintenance of muscles and in helping to carry vital oxygen supplies in and out of cells. In short, amino acids are imperative to the psychological and physical well-being of every-one.

Stress, a low-nutrient diet, alcohol, high activity levels, chronic disease and some drugs can interfere with the conversion of alpha aminos to beta aminos, giving rise to a shortage of beta amino acids in many crucial metabolic pathways.

Animal protein is classed as a complete protein, where all of the required amino acids are present. Vegetable protein is classed as incomplete because not all of the alpha amino acids are present. This can be compensated for by consuming protein of vegetable origin from two groups i.e. unprocessed grains and vegetables together contain the makings of complete protein. Soya and Quorn (a commercially manufactured protein), each contain the components of a complete protein**.**

Overcooking protein can destroy some of the beneficial nutrients and enzymes; a healthy diet should include some unprocessed, raw or partially cooked forms of protein.

Several amino acids are of particular benefit to a healthy cardiovascular system:

L-Arginine

Arginine is a semi-essential amino acid; it is essential in children where it stimulates the growth hormone (HGH). Studies have shown that oral arginine boosts immunity, fights cancer, promotes healing, protects and detoxifies the liver, improves thymus function, enhances male fertility and is the precursor of the beta

amino acid ornithine. Arginine is also a precursor of nitric oxide, a necessary short-lived free radical. Nitric oxide boosts male erection capabilities and is sold as Viagra™ Because of arginine's stimulating effects, it can be a useful treatment for angina pectoris, congestive heart failure, hypertension, coronary heart disease, preeclampsia, intermittent claudication, and erectile dysfunction. Practitioner prescribed arginine at 3g-6g per day, may be a viable substitute for aspirin, as a potent anticoagulant.
Foods containing arginine are: peanuts, cashews, almonds, pecans, cocoa, edible seeds and sprouted seeds. There is some content in peas, garlic and ginseng.

- Oral arginine supplements should not be taken by anyone with schizophrenia, kidney disease or a herpes simplex virus (shingles or chickenpox etc.)

L-Lysine

Lysine is an essential amino and helps with the absorption of calcium, maintaining bones and connective tissue. It is vital for maintenance of blood vessels and organs within the body. It also lessens the odds of viral growth, especially herpes simplex virus and is of particular benefit in cases of herpes infections, such as shingles and chickenpox.

Foods containing lysine include: fish, chicken, beef, lamb, milk, brewer's yeast, beans, sprouted beans. Most fruit and vegetables contain a good balance of lysine.

- Lysine supplements should only be taken to combat a specific viral infection, to treat certain atherosclerotic disorders, or in cases of a deficiency, under the guidance of a medical practitioner. A healthy individual should not take them daily as a matter of course, where adequate supplies of lysine containing foods are consumed.

L-Proline

Proline is a beta amino acid that is manufactured within the body; it is the main component of collagen and greatly supports muscle

function and skin maintenance. Dr Matthias Rath, expert in nutrition and cellular medicine, has made it his life's work to combat coronary heart disease; both he and Dr Linus Pauling have recommended the use of proline combined with lysine and vitamin C to reverse the effects of atherosclerosis.

Acetyl-L-carnitine

Carnitine is a beta amino, and can be synthesised in the liver from lysine and methionine, but only if there is a good supply of vitamin C. Acetyl-L-carnitine enhances fatty acid transportation for energy production in the mitochondria of both skeletal and heart muscle, and also protects from free-radical damage.
Animal studies have also shown that ALC reverses the age-associated decline in cardiolipin in heart tissue mitochondria. Carnitine, with vitamin C, has been found to reduce triglycerides circulating in the blood stream.
Foods containing carnitine are mainly muscle and organ meats; it is not found in vegetable sources.

- Carnitine should not be given to people with impaired kidney function. Some people may experience gastrointestinal problems and increased body odour when taking carnitine in supplement form. These problems cease when supplements are stopped.

N-acetyl cysteine

N-acetyl cysteine (NAC) is a derivative and more stable form of the beta amino, cysteine, which is a derivative of methionine.
NAC boosts glutathione production, a valuable antioxidant amino within the body, and is vital in many metabolic pathways. Vitamins C and B_6 should be taken with supplements of cysteine.

- Diabetics should not supplement their diets with cysteine.

L-Taurine

Taurine is a sulphur-containing beta amino acid that can be derived from cysteine and methionine metabolism, if adequate levels of

vitamin B_6 are present. Taurine is widely distributed in most animal (except cow's milk), but not plant, sources. It has been positively indicated in the treatment of cardiovascular disease, including congestive heart failure, high cholesterol, high blood pressure, epilepsy and other seizure disorders, macular degeneration, Alzheimer's disease, hepatic disorders, alcoholism, and cystic fibrosis. It is thought to act as a mediator in potassium/calcium balance in the heart muscle. Taurine works with zinc to combat eye problems.

Contraindications

- If taking prescribed medication a health care provider should be consulted before taking amino acid supplements.
- HCL amino acid supplements should be taken in between meals with a light snack.
- Free-form aminos are considered the most easily absorbed.
- People with impaired kidney function should consult their practitioner before taking amino acid supplements.
- Diabetics should have strict medical advice when supplementing with amino acids, especially cysteine.
- Amino acid supplementation needs good supplies of vitamin C to be therapeutic.
- D- forms of amino acids should only be taken under strict medical supervision.
- Long-term use of single amino acids is not recommended, because it could potentially cause a serious imbalance of the whole amino acid profile within the body. Conditions requiring longer use of a single amino should have practitioner guidance.

Good Fats, Bad Fats

Fat is the body's main energy source. One gram of fat has nine calories. Most people need a total fat intake of about 30% of their daily calorie intake. If more fat is taken in than can be used for energy or repair, it is converted and stored on the body for later use. Fat is also vital to brain development and maintenance, cell production, the transportation and absorption of fat-soluble vitamins (A, D, E, and K), and it helps to cushion the body's organs and maintain the body's temperature.

The only 'bad' fats are trans-fatty acids (trans fats), which are found in processed polyunsaturated oils.

The majority of fat intake should come from unsaturated fats, in particular, monounsaturated fat or Omega-9 series of fatty acids; and polyunsaturated fatty acids (PUFAs), which are split into two groups: Omega-6 and Omega-3; and to a lesser extent from saturated fatty acids. Although most fats, including some plant-derived fats, contain a combination of all three types of fatty acids, one type usually predominates. Therefore, a fat or oil is considered 'saturated' or 'high in saturates' when it is composed mainly of saturated fatty acids. Saturated fats are usually solid at room temperature. Similarly, a fat or oil composed mostly of polyunsaturated fatty acids is called 'polyunsaturated,' and is liquid; while a fat or oil composed mostly of monounsaturated fatty acids is called 'monounsaturated,' and is naturally liquid at room temperature.

Total Daily Fat Intake

Calories/day

1600 = 53 grams (g) of fat – weight reducing/low activity
2000 = 66g of fat – normal activity/women
2500 = 83g of fat – high activity/women – normal activity/men
3000 = 99g of fat – high activity/men

Saturated Fatty Acids

Saturated fatty acids are found mainly in animal products, such as milk, cream, cheese, butter and fatty meats including: lamb, beef, veal, pork, and pork products. Some vegetables also contain saturated fatty acids: avocados, palm kernel oil and coconut oil. Saturated fat from vegetable sources is deemed to be healthier than fat from animal sources. Please remember that saturated fat is a vital nutrient for a healthy body.
The liver uses saturated fats to manufacture cholesterol. However, it has also been found that the body can manufacture cholesterol even with an absence of dietary fat. Saturated fat intake should total about 5% of daily calorie intake.

Virgin coconut oil is a heat-stable oil that can be used for cooking, it has many health-giving properties and helps to increase HDL (good cholesterol). It is an excellent source of lauric acid, which helps to maintain a healthy immune system. Coconut oil also contains 8-chain fatty acids, which are precursors of alpha lipoic acid, a valuable antioxidant.

Monounsaturated Fatty acids

Omega 9 **(**-9) Essential Fatty Acids

- Oleic acid, found in high quantities in olive oil.

Monounsaturated fatty acids are found mostly in vegetable and nut oils, such as olive, groundnut (peanut), and canola. These fats appear to reduce blood levels of LDL-c without affecting the 'good cholesterol,' high-density lipoproteins (HDL-c). Only some saturated fats and monounsaturated, oleic acid, omega-9 oils (i.e. olive oil) should be used for heating or cooking. The recommended intake of monounsaturated fats is about 15 percent of total calorie intake.

Polyunsaturated Fatty Acids

Polyunsaturated fatty acids are found in safflower, sunflower corn and soybean oils. Fish oils are also high in polyunsaturated fats. Unlike the saturated fats, they may actually lower blood

cholesterol levels. However, if taken in very high levels, or are heated or processed, polyunsaturated fats also have a tendency to reduce high-density lipoproteins (HDL-c).
Polyunsaturated fats should not be used for cooking or heated in any way. They should be stored in a cool, dark place and used with about six weeks of opening. Polyunsaturated fat should account for 10% of daily calorie intake.

There are two groups of polyunsaturated fatty acids:

Omega 6 (-6) Essential Fatty Acids.

- **Linoleic acid** (LA) is found in seed oils – safflower oil, sunflower oil, corn oil, ground nut (peanut) oil, hemp-seed oil.
- **Gamma linolenic acid** (GLA) is a long chain fatty acid, needed for many metabolic processes. The body can convert linoleic acid to GLA. GLA is found in borage oil, evening primrose oil, blackcurrant oil and spirilina.
- **Conjugated linoleic acid** (CLA) is a mixture of isomers of linoleic acid, which is found naturally in dairy products and meat. Cows that are allowed to graze on pasture have around 500% more CLA in their meat and milk products. CLA is a powerful cancer fighter; weight reducer; cholesterol and triglycerides reducer; muscle growth enhancer and immune system booster.

Until recently a diet high in polyunsaturated fat omega-6, was highly regarded by the orthodox medical establishment. The 'Israeli Paradox' has been the major factor in changing this view. Israelis consume about 8% more omega-6 fatty acids than the US and about 12% more than most European countries. Israel also has a higher prevalence of cardiovascular diseases, hypertension, syndrome X, non-insulin dependent diabetes mellitus and obesity, which has been directly linked to their diet. If omega-6 vegetable or seed oils are subjected to heat or are stale, they change into poisonous substances that proliferate free radical damage within the body. No omega-6 oil, including sunflower oil, should be used

for cooking.

Contraindications

- People with epilepsy or schizophrenia should not supplement with GLA.
- People on medication should contact their healthcare provider before taking GLA.
- GLA should not be taken by pregnant women without practitioner guidance.

Omega 3 (-3) Essential Fatty Acids

- **Eicosapentaenoic acid** (EPA) found in oily fish
- **Docosahexaenoic acid** (DHA) found in oily fish
- **Alpha linolenic acid** (ALA) found in flax seed, perilla oil, hemp seed and walnuts. ALA can convert to the -3 series within the body.

Omega-3 oils have been indicated in lower rates of heart disease, cancer, rheumatoid arthritis and various other illnesses.
At present, it is thought that a 3:1 balanced mix of Omega-6 over Omega-3 should be taken daily for a healthy body and mind (7.5% of -6 and 2.5% of -3 of daily calorie total).
Hemp seed oil has the exact ratio balance thought to be the most beneficial; although some complementary doctors recommend that the ratio should be 1:1 (5% -3 and 5% -6 of daily calorie total).
Omega-3 oils must be fresh, stored correctly, and not used for cooking or heated in any way.
Fish oils should be screened and guaranteed not to contain contaminants such as: PCBs or Mercury.

Trans-fatty Acids

Trans-fatty acids, also known as trans fats, are substances that occur when polyunsaturated oils are altered through hydrogenation or partial hydrogenation, processes used to harden (plasticise) liquid vegetable oils into solid fats such as margarine and vegetable fat (shortening). One recent study found that trans-fatty acids raised

LDL cholesterol levels and simultaneously lowered HDL cholesterol levels. They are also known to greatly proliferate free radical activity. Trans-fatty acids should be avoided at all costs, they are mostly in processed foods, chips, crisps, commercially manufactured pastries, cakes, biscuits, crackers, margarines and solid vegetable fats.

In fact, heated polyunsaturated fats together with refined sugar may have a direct toxic effect on the cardiovascular system.

Cholesterol

Cholesterol is so important to a healthy body it manufactures it itself so there is always a ready supply. Cholesterol is needed in many essential bodily processes including the production of cells and hormones. When dietary cholesterol is eaten, the body produces less.

It has been found repeatedly that consuming cholesterol-rich foods, in a nutrient-rich diet, does not lead to cardiovascular disease. If a high level of cholesterol is consumed as part of a western-style diet, with heated sugars, refined (low-nutrient) carbohydrates, and over-cooked food, the culmination of this will lead to coronary heart disease.

Cholesterol-containing foods include: butter, cheese, cream, egg yolk, kidney, liver, organ meats, red meat, brain tissue.

- People with diagnosed coronary heart disease should follow their own doctor's recommendations on diet and which fats to eat.

Food labels enable the consumer to identify foods that are high in fat. All food labels are required to list the grams of total fat and saturated fat. A food with 3 grams or less of fat per serving is considered a low-fat food. Be aware that just because a food is fat free it does not mean it is calorie free! Many foods that are low in fat contain high levels of refined sugar and calories per serving. Never consume a product that is high in hydrogenated oils or trans fats.

Foods to be Eaten Every Day

Selection of fresh berries:

Blueberries, cranberries, strawberries, raspberries, blackberries, and blackcurrants. Learn to love fruit smoothies.

Two portions of fresh orchard fruits:

Apples, plums, 150g damsons, peaches, nectarines, pears,150g grapes, 150g cherries. Fresh pineapple is a valuable addition to the diet. Also exotic fruit such as: papaya, mango, guava, pomegranate, but remember imported fruit may not be fresh and will have lost vital micronutrients. Oranges can be eaten, but some people with arthritis or psoriasis may find that they aggravate the condition.

Green (leafy) vegetables:

Fresh or par-cooked spinach, cabbage, pak choi, lettuce, herbs, chives, dandelion greens, broccoli spears or seed sprouts, sunflower seed sprouts, radish sprouts, chard leaf.

Vegetables (mainly colourful ones):

Carrots, beetroot, *tomatoes and *sweet peppers (*both may aggravate arthritis and psoriasis), garlic, onions, chives, etc.

Yogurt:

Yogurt**,** yogurt drink 100ml (always choose plain bio-yogurt and add your own fruits, seeds and/or nuts, sprouted grains).

Mixed seeds and nuts:

NOT roasted or dry roasted, baked, salted, honeyed etc. almonds, brazils, hazelnuts, sunflower seeds, hemp seeds, flaxseeds, pumpkin seeds. They can be eaten whole, added to salads, breakfast cereals or can be freshly ground and added to fruit smoothies or sprinkled over porridge, muesli, yogurt, etc. or spread as nut butter (add hemp seed oil).

Whole Grains:

Brown rice, millet pasta, buckwheat, amaranth, organic sweet corn, oat porridge, etc.

Oils:

Predominantly olive oil; hempseed oil, flaxseed oil, walnut oil. Learn to love oil, spread it onto bread in place of butter or processed spreads.

Protein: (100g 2-3 times per day depending on age)

Quorn, soya, cottage cheese, and sparingly from weekly total - below: eggs, chicken, fish, etc.

Drinks

Herb teas:

Green tea, dandelion tea, nettle tea.

Water:

6-8 glasses of plain filtered water.

*If alcohol is consumed, limit it to 2 glasses red wine for men or 1 glass for women.

Foods to be Eaten Every Week

- At least 4, and up to 7, eggs per week.
- 1-3 x 100g serving of red meat (if desired). Game, venison, ostrich or kangaroo is a healthier, low-cholesterol alternative.
- 3 servings of oily fish (preferably from unpolluted waters, do not eat fish that live close to the shore, or shellfish. Avoid tuna, swordfish, king mackerel; they are most likely contaminated with PCB's and heavy metals making them detrimental to health). This also applies to fish oil supplements, which should be screened and guaranteed to be safe, and this must be stated on the label. Vegetarians can obtain omega-3 from flaxseed, hemp or walnut oils.
- 3 servings of protein: i.e. white meat, poultry, chicken, etc.

- Treats: 1-2 servings: flapjacks, carrot cake, whole-food tea breads, Ice creams etc. Homemade or organic have the least additives. If you do not have to watch your weight or if you are quite active, 1-2 portions of these per day is acceptable.
- Only 1-2 servings of unpeeled potatoes should be eaten per week (but cutting them out altogether is okay). Substitutes, such as yams or grains can be eaten. New potatoes are healthier than old ones. Try yams, brown rice, whole-wheat pasta products, kamut, amaranth, buckwheat, quinoa.
- At least 3 servings of broccoli, cabbage, collard greens, Brussels sprouts, etc.
- At least 4 servings onions or garlic.

Try to cut out refined white sugar altogether and limit added sea salt to 2g per day.

Dairy products should also be kept to a minimum if heart disease is already diagnosed, or if your diet is not as nutritious as it should be. Try almond milk, soya milk, oat or rice milk, but make sure that you are getting an adequate supply of calcium. Some vege milks are enriched with calcium.

Twelve Daily 'MUST' Eat Foods for a Healthier Heart

Colourful Fruit

If you think that you can skip a portion of fruit by taking a vitamin pill, think again. There are at least 150 anti-carcinogens, redox agents, and other valuable phytochemicals present in each fruit. Most are essential for good health.

Food Tips: *Add fresh fruit to salads.

*Learn to love fruit smoothies. They are quick, easy and taste great. Try adding yogurt and 5ml ground flax seeds, before liquidising.

- It is vitally important that at least two portions of fresh orchard fruits and one portion of fresh berry fruits are eaten every day.

These can be in the form of whole fruit, fresh pressed fruit juice or fresh fruit smoothies.

- Fresh fruit is best eaten as a starter or a snack, eating it at the end of a large meal can result in bloating.

Garlic & Onions

Garlic and onions have many valuable sulphur-containing compounds, most notably alliin, allicin (when crushed), and diallyl disulphide. Garlic also contains carbohydrates, vitamins A, B complex, C and E, lipids, proteins and trace minerals.
Garlic is very beneficial to the cardiovascular system, lowering serum cholesterol and increasing HDL-C. Garlic has been shown to decrease blood pressure, particularly diastolic, via a vasodilatory action. It also decreases blood stickiness as well as possessing effective anti-inflammatory properties.

Food Tips: * Add crushed garlic to yogurt and pour over barbecued meat.

*Lightly stir-simmer onions with matchstick vegetables.

*Slice onions thinly and sprinkle with a teaspoon of sugar. Leave for a few minutes then wash well in a sieve under running water. This will take the characteristic bitterness away, and they can be used raw in salads.

- For maximum protection, one clove of garlic should be eaten every day.

Ginger

Ginger (*Zingiber officinale*) is a very beneficial plant with many biologically active ingredients, including ginerol and gingerol analogues such as shogoal. Other constituents include, ginger protease, capsaicin, and several sesquiterpenes. It has been used for

centuries in many healthcare systems including: Chinese and Japanese medicine and Ayurveda.
Ginger has many benefits for the heart, including the capability of reducing blood pressure and blood stickiness, decreasing the heart rate, balancing blood sugar, increasing the HDL cholesterol level and it has a potent anti-inflammatory action.

Food Tips: * Place rhizome in a re-sealable bag and freeze, finely grate as needed from frozen, return to freezer after use.

* Add finely grated to: drinks, herb teas, fruit smoothies, muesli, snacks, sandwiches, garnishes, soups, gravy, and desserts etc.

- Do not use excessively in pregnancy. A small amount is said to help with morning sickness, but a large amount has not been proven safe in pregnancy. It should not be eaten with meal.

Ginger is very easy to grow, even on a kitchen windowsill, and you will have a ready supply of fresh ginger when you need it. Just fill a plant pot with free draining soil and plant a rhizome (be aware that it is vital to obtain an active, organic, rhizome. Some super-market bought ones will be denatured). Keep it moist, but not too wet and watch it grow. When the rhizomes have nearly filled the pot just place root-ball onto newspaper and cut as many as you need, then re-pot with new compost and allow to grow again.

Green Leafy Vegetables

Green leafy vegetables are excellent sources of complex carbohydrates (the kind the body needs), dietary fibre, beta-carotene, chlorophyll, magnesium, iron and many compounds with anti-oxidant activity. They are low in fat and high in vitamins and minerals. They also contain phytochemicals that lower the risk of cancer and other diseases.

Pickled vegetables (onions, cauliflower, gherkins, cabbage, etc.) may help stop fluctuations in blood sugar, when eaten with foods containing white flour or refined sugars.

Recent research strongly suggests that eating more fruit and vegetables can significantly reduce the risk of suffering an ischaemic stroke (the type caused by reduced blood flow to the brain). In fact, it is indicated that people who eat 5-6 servings of fruit and vegetables each day are 31% less likely to fall victim to this type of stroke than those eating fewer than three servings a day.

Food Tips:

* Try unusual leaves such as: baby dandelion leaves, baby beetroot leaves (chard), nasturtium leaves, they are full of the good phytonutrients the body needs.

* Shred a selection of green leaves and lightly stir-simmer them in olive or virgin coconut oil with a teaspoon of water, drain and serve.

* Add raw to sandwiches between the fillings i.e. egg and chopped baby spinach leaves; cheese, chopped chives and a few baby dandelion leaves.

* Add leaves to a thin slice of meat, top with cream cheese and roll up.

* Chop finely and add to sandwiches.

* A fresh green salad with yogurt dressing is very beneficial eaten as a starter to a cooked meal.

* For a quick sandwich filling mix low-fat cream cheese with diced mixed leaves and a diced slice of chicken and sweet corn kernels. Sprouted seeds can also be added.

Some countries recommend that at least 10 servings of fruit and vegetables should be eaten daily. Ideally, these ought to be a mixture of raw and par-cooked, with a good selection of green leaves, colourful fruits, fresh berries, pineapple, legumes, especially sprouted beans or sprouted seeds and red/purple/orange vegetables.

Fish oil

Oily fish contains many nutrients and essential fatty acids of the omega-3 group, which are essential for a healthy heart.
Unfortunately, most fish are contaminated with heavy metals and PCBs. It is generally considered that fish from the Antarctic Ocean are relatively free of pollution. Most people need oily fish 3 times a week, but it probably is not safe to eat from contaminated waters more than 1-2 times a week, if that. The best way to ensure that enough EPA and DHA are safely consumed, especially by the elderly, the sick, in pregnancy and children, is to purchase supplements that have been screened and guaranteed to be pure. If it does not state as much on the label, you can virtually guarantee that the oil is not free of pollutants. 300mg of Omega-3 fatty acids is the basic daily supplement dose.

- Fish oil is a polyunsaturated oil, and should be used within the expiry date stated on the label. Stale oil must be discarded.

Herbs

Fresh culinary herbs are the most underrated health food there is. They are full of vital nutrients and phytochemicals, including: vitamins, trace minerals, iron, antioxidants, chlorophyll, and volatile oils. Most herbs have beneficial anti-microbial properties and greatly benefit digestion.

Food Tips: * Finely chop and add to plain bio yogurt, pour over meat and fish. Experiment with different tastes, try adding the following to

yogurt for a quick and easy sauce: lemon balm and grated ginger with fish; parsley, a touch of horseradish and black pepper with beef; basil, a touch of tomato puree and chopped chives with pork; pineapple mint with lamb. The flavours you can add to different dishes are endless.

* Add herbs to fruit smoothies.

* Chop herbs and pour on just boiled water, add a slice of lemon and honey (to taste) and drink as a tea; or allow to cool, add ice cubes and fruit juices and drink as an iced tea… delicious.

Nuts

Once shunned because of their high fat content, it is now known that nuts contain many essential nutrients, minerals, vitamins, amino acids and essential fatty acids. The type of fat in nuts is utilised by the body, and can help to balance good cholesterol levels; it is rarely stored as surplus to requirements. A 30-60g portion of mixed, 'raw,' not roasted or processed nuts should be eaten every day, as part of a balanced diet.

Food Tips: *Mix nuts with whole with dried raisins or mixed dried fruits i.e. apple, etc.

*Freshly ground nuts can be added to breakfast cereals, fruit smoothies, or mixed with yogurt; added to dips, salads, and finely ground and spread onto sandwiches in place of butter.

*Nut milk is available from supermarkets, but it is easy to make your own: To make nut milk, soak 1 cup of almonds for 24 hours, but change and discard the water regularly. Place 3 cups of filtered water in a blender

and add the soaked/drained and washed nuts, blend until smooth, sieve (keep the grounds for cooking or freeze to use later), and store milk, covered in refrigerator for up to 3 days. Add sprouted flaxseeds or sesame seeds before liquidising, experiment with different tastes, honey, stevia, or concentrated apple juice can be used to sweeten the 'milk' if necessary.

*One of the best nut milks is made from cashew nuts, no need to strain, the nuts blend completely into the liquid and it tastes delicious. Pour the milk over breakfast cereal, use in tea etc.

*Nut oils, such as walnut oil can be added to milk shakes, salads, breakfast cereals, etc.

▪All nut oils must be unrefined and not heated in any way. For maximum health potential, nuts should be stored whole in the refrigerator and used or freshly ground as needed.

Pineapple

Fresh pineapple contains many vital enzymes, including bromelain, that assist digestion, and have an anti-inflammatory action, which helps to maintain good health. Try to add one fresh pineapple to weekly diet.

▪The core is tougher than the flesh, but it is edible, chew well to release the valuable enzymes.

Food Tips: *Cut the top and bottom from the pineapple and discard. Cut pineapple into quarters, slice the core from each quarter and store. With a sharp knife, cut the skin from the

flesh. If there is any skin left on the flesh, either cut with kitchen scissors or sharp knife. Store, covered in a refrigerator for up to 4 days.

*The core is where the majority of the enzymes are stored. If it is difficult to chew, liquidise and strain. Drink the juice 30 minutes before meals.

Sprouted Seeds

The first recorded use of sprouted seeds was by a Chinese Emperor nearly 5,000 years ago, bean sprouts are still very popular in China today. Sprouted seeds are actual 'living' food, they are nutritious, taste fresh, and are very healthy. They are an excellent source of digestible protein, live enzymes, fibre, chlorophyll, vitamins, minerals, good fats and antioxidants. In short, a super food; an inexpensive way to gain optimum nutrition. They can also be dried and eaten as a snack.

Most edible seeds can be sprouted:

Grains – wheat, rye, corn, quinoa, barley, oats, millet, sesame, flaxseeds, sunflower seeds.
Herbs – caraway, alfalfa, fenugreek, clover, cress, purslane, dandelion, dill, lemon balm, basil, chives, parsley, celery, fennel, carrot, garlic cloves.
Legumes/Beans – haricot beans, mung beans, black-eyed beans, chickpeas, pinto beans, soya beans, whole lentils.
Vegetables – carrots, beetroot, kale, radish, broccoli, lettuce, most green leafy vegetables.

- DO NOT USE: Tomato seeds, chilli seeds, sweet pepper seeds, apple seeds, tree seeds, ornamental flower seeds, red kidney beans, broad beans, marrow seeds, or pumpkin seeds (unless given with instructions saying suitable for sprouting).

- Be careful where you buy your sprouting seeds, you must not use seeds that are for animal feed or seeds for garden use, they may contain contaminants or have been loaded with chemicals. Unlabelled seeds available from market stalls should be avoided as they may have been obtained from animal feed suppliers.

- Beans should always be soaked for 24-hours before sprouting (with 2-3 water changes) and should be sprouted for at least 4 days, then should be lightly stir-simmered before eating. Red kidney or broad beans must not be used. * alfalfa must be sprouted for at least 7 days, and allowed 2 days of sunlight.

Food Tips: *Sprouted seeds are very versatile and can be added to most meals: Sprouted wheat has a sweet, fresh flavour and can be added to breakfast cereals, porridge, soups, stews, salads, etc.

*Soya bean seeds should be soaked for 24 hours, water changed every 12 hours, and then grown until they are about 6mm long. Lightly stir-simmer.

Spices

Most spices were used for culinary and medicinal purposes in the ancient world over four thousand years ago, and were prized on par with precious metals. Today, we barely acknowledge their existence. Many spices are anti-microbial and have very good benefits for health, even when eaten sparingly.

- **Allspice:** (pimento or Jamaican pepper) has a lovely warm clove-like aroma, add it to sauces, apple pie, fruit smoothies, etc. It is a good digestive aid and contains antioxidants.
- **Cardamom seeds:** digestive aid, antiseptic, anti-gripe.

- **Caraway seeds:** anti-microbial, anti-colic, good for heart-burn.
- **Cayenne:** is a good stimulant, anti-microbial, good for circulation, and helps to lower high blood pressure.
- **Cinnamon:** balances blood sugar, assists insulin, is an anti-microbial, helps digestion, and is good for bone health.
- **Cloves:** are a stimulant, anti-microbial, digestive aid, they assist insulin action, and are antiseptic.
- **Coriander:** is a good digestive aid, it is a stimulant and helps to balance blood sugar.
- **Cumin:** is a good digestive aid and has antioxidant properties.
- **Fennel seeds:** are a digestive aid, gently warming for delicate stomachs, anti-inflammatory, and a vitamin K antagonist (so should not be eaten with green leafy vegetables or food containing vitamin K).
- **Fenugreek:** is a natural lubricant for the colon, it helps indigestion, is a mild anti-platelet aggregator, balances blood sugar and has anti-inflammatory properties.
- **Nutmeg:** is a digestive aid, anti-stress spice, anti-inflammatory, and a pain reliever.
- **Turmeric:** is a relative of ginger and contains curcumin. It is usually seen in curry powder, where it gives the characteristic yellow pigment. It helps to lower cholesterol, is a good digestive aid, liver tonic, anti-inflammatory, and anti-microbial agent.

Whole Grains

Whole grains and wholegrain products, that are rich in nutrients and phytochemicals, have been found to be beneficial in many population-based studies. They are known to be protective against cancer, cardiovascular disease, LDL cholesterol, ischemic stroke,

diabetes and obesity if eaten regularly, with up to three servings per day being the most beneficial.
They are high in vitamins, trace minerals, dietary fibre, rutin, antioxidants, oligosaccharides, phenolic compounds, phyto-oestrogens, lignans, stanols and sterols. And, because the health benefits appear to outweigh the sum of the isolated nutrients, researchers believe that there is a strong underlying synergistic effect that could not be duplicated by taking supplements.

To get three servings of whole grains per day choose three of the following: dark brown bread, wholegrain (unprocessed) breakfast cereals, wholegrain pasta products, buckwheat, bulghur wheat (burghul), sorghum, sprouted millet, quinoa, amaranth, brown rice, popcorn, sprouted wheat, barley, rye or sprouted rye.

Food Tips: *Add cooked whole-wheat pasta or buck-wheat to salads or stir-fries; or mix with yogurt and add a selection of fresh chopped vegetables such as: baby dandelion leaves, sweet corn kernels, small red/black grapes, chopped chives, chopped tomatoes, sweet pepper, finely diced celery, flaked almonds etc. mix and serve as a light lunch or supper.

* Easily digestible 3-day-old sprouted wheat berries are bursting with nutrition, sweetness and flavour. Try them mixed with yogurt and fruit or stir them into coleslaw or pasta dishes.

Remember: White (refined) carbohydrates have had all the goodness: vitamins, nutrients and fibre removed.

Fibre is only found in complex carbohydrate containing foods, which are of plant origin, such as whole-grains, fruits, vegetables, beans, nuts, and seeds. Some fibres are soluble in water and others are insoluble. Most plant foods contain some of each kind.

- Foods containing high levels of soluble fibre include: dried beans, oats, barley, apples, citrus fruits and potatoes.

- Foods high in insoluble fibre include: Wheat bran, whole grains, seeds, brown rice and the skins of fruit and vegetables.

Yogurt

Good bacteria, as supplied by natural bio yogurt, are essential to good health and well-being. Mixed strains of lactobacillus and bifidobacterium are needed to keep the bad bacteria in check, for the absorption of essential nutrients, for good digestion and for the health of the colon (bowels).

A diet high in fresh fruit, vegetables, whole grains and fermented milk has been shown to reduce LDL-Cholesterol and C-reactive proteins, and most importantly of all to cut the risk of suffering from coronary heart disease.

Fermented milk has long been associated with good health and longevity. Now science may have discovered the link that helps to prove this. Researchers in Sweden have found evidence that suggests eating yogurt with foods containing high levels of refined carbohydrates such as sugar or white flour, appears to stop the characteristic rapid fluctuation in blood sugar levels that is associated with damaging our health.

A carton of yogurt is more easily digested, contains less sugar (because it turns to lactic acid) and has more protein than a glass of milk.

Food Tips:

* Add a plain bio yogurt to cooked pasta with chopped vegetables and diced chicken, for a quick and nutritious dinner.

* Combine bio yogurt with a selection of fruits and sprouted grains for a healthy snack.

* To make a quick sauce for barbecued/ grilled meat or fish. Just add freshly chopped herbs to yogurt and pour over meat.

* Make your own yogurt drink, by simply whisking in fresh pressed fruit juice.

The French Paradox

The French have always eaten a large amount of fat, yet their rate of heart disease is one of the lowest in the industrialised world. Many people equate this to the amount of red wine they drink and, to a certain extent, this may be correct. Red wine certainly contains many antioxidants including: quercetin and epicatechin. Grape skins, most notably *Vitis vinifera*, *labrusca*, and *muscadine* grapes, also contain a compound called resveratrol. It has been shown to act as a strong antioxidant, it inhibits lipid peroxidation of low-density lipoprotein (LDL) in the blood, and reduces platelet aggregation. Resveratrol is a phytoalexin, a class of phyto-antibiotic compounds produced as part of a plant's natural defence system against disease; so the more stress a vine is in, the higher the quantity of resveratrol in the skins of the fruit or the leaves. This means that grapes grown in a cooler climate have a higher concentration of resveratrol. The other factor is the length of time the grape skins are fermented, the longer the skins are left in the wine, the greater is the concentration. Peanuts and mulberries also contain some resveratrol content.

However, the French paradox may also be attributed to the basic French diet, which overall contains smaller portions than UK or USA diets. And, even though the French love their sugary and saturated fatty foods, they also consume a large amount of fresh vegetables, pate and liver products. Fresh green leafy vegetables contain folates, and liver is a rich source of vitamin B_{12}, B_6 and folates, so not only do the French have plenty of antioxidants, they have a rich source of the very vitamins that lower homocysteine - a marker for heart disease. The French diet also has copious amounts of fresh onions and garlic, both of which contain a good amount of selenium and sulphur containing antioxidants.

The lower rates of heart disease and cancer the French enjoy are a testament to the healthiness of their normal diet. Another factor may be that French children are taught valuable lessons in nutrition and the importance of fresh foods, right through their school years; lessons that are sadly lacking in British schools.

The Mediterranean Diet

The important aspects of the Mediterranean diet are high intakes of whole grains; fresh, colourful vegetables; antioxidant-rich olive oil; an abundance of garlic; freshly picked herbs; fresh seafood; and locally grown fruit. Wine is taken with food in moderation. Meat and poultry are also eaten in moderation, with poultry more frequently served than red meat. Animal fats in the form of butter, cream and lard are not included in the diet; and, in fact, goat's and sheep's products are quite common in the areas around Greece and Italy.

Again, healthier diets seem to be loaded with fat; a huge 40% of total daily calories is from fat in the traditional Mediterranean diet, yet still cardiovascular disease is substantially lower. Olive oil, the main fat source, is a monounsaturated fatty acid. It does not raise LDL cholesterol like saturated fats or processed omega-6 fats do, and it seems to have a good effect on the HDL (good) cholesterol. It is also loaded with valuable antioxidants and phytosterols, which are retained when the oil is fresh pressed and drizzled 'raw' over bread, salads and other foods. The Mediterranean people eat fish a few times per week, increasing the amount of omega-3 fatty acids. They eat red meat sparingly. The emphasis is on fresh, locally grown, seasonally correct produce, which is packed full of vital micronutrients.

The Eskimo Diet

The Inuit people, often referred to as Eskimos, of Greenland have baffled scientists for decades, ever since it was found that they suffered far less degenerative diseases, yet their diet was very rich in fat, with little fresh fruit and vegetables. Researchers discovered that these Arctic people had much better health on their very high-fat diet than Westerners. Their triglyceride and cholesterol levels were low and they were less likely to suffer from depression, rheumatoid arthritis, psoriasis, asthma, heart problems or stroke. Again, it is the omega-3 fatty acids that appear to contribute to this

medical anomaly. The fatty acids are now known to switch off a newly discovered enzyme, 'cyclooxygenase-2' that causes most of the pain and inflammation of arthritic conditions and may contribute to other degenerative diseases.
Eskimos eat whale meat, seal blubber and fresh fish; these are packed full of the micronutrients their bodies need. In comparison our factory farmed animals invariably are fed on synthetic vitamin-enriched grain meal, and are pumped full of antibiotics, with little regard for the animals well-being, natural diet or habitat. This results in the meat being low in micronutrients and high in bad fats. No wonder we have a problem with health!

Where have we gone wrong?

In the UK and USA, many believe that a low-fat diet is good for every adult. Unfortunately, this is not the case, it is the type of fat that we eat that causes the problem. Quantity is a secondary factor. Our mental and physical well-being relies on a good supply of unprocessed essential fatty acids: Omega-3, Omega-6 and Omega-9, along with some saturated fat.
Our bodies have changed little in the last 40,000 years, but our diets certainly have. Our ancestors thrived on a diet that was fresh, nutritious and suited their needs. The more we eat factory farmed; chemically processed foods, packed with additives and stale, low-nutrient fruit and vegetables, the more we poison our systems and make ourselves susceptible to disease. If you add genetically engineered food to this equation (i.e. vegetables that have had their delicate micronutrient balance artificially altered) there will be major health risks for our children's generation.

So How Do You Get a More Nutritious Diet? ...Sprout Your Own Fresh Greens.

It is time to take care of your own health and well-being. Growing your own sprouted salad is very easy (even children can do it) and it will provide a daily supply of fresh, organic, nutrient-rich vegetables, without the need for a garden. Sprouted seeds are much

more nutritious, due to the burst of enzyme activity as they sprout. This breaks down the stored proteins into easily digestible amino acids, peptides and carbohydrates, they are also packed with micronutrients including: vitamins, minerals and antioxidants.

All seeds contain anti-nutrients as a safeguard against the seed being eaten before it has had a chance to grow. Soaking the seeds and subsequently washing every night and morning helps to diminish these compounds as the seed grows. As long as correct hygiene is maintained, alfalfa seeds are sprouted for at least 7 days and beans are not eaten raw, sprouting seeds are as safe as growing any vegetables, only you won't need a garden or have to wait months for your produce.

Guidelines

1. You must make sure that you obtain your seeds for sprouting from a reliable source. Seeds that have been produced for animal feed may be cheaper, but they are not suitable to use for sprouting. You should also buy untreated seeds, from a health food Shop - Do not use Packet Seeds produced for garden planting these will have been treated with chemicals.

2. Only seeds from edible plants should be used. Tree seeds or ornamental plant seeds may have toxic compounds that can be dangerous. Do not try to sprout seeds from plants that only the fruits can be used i.e. do not sprout sweet pepper seeds, tomato seeds, apple seeds etc. Do not sprout almonds for longer than a 24-hour soak (usually used to make nut milk, and the soaking water should be discarded).

3. The seeds must be handled with the same hygiene standards that you would any fresh food. Hands must be washed and utensils sterilised, before you begin. The seeds should be washed and initially soaked in ordinary tap water to reduce the contamination by salmonella or E. coli bacteria that may be present on some of the seeds. They can be washed with a specific bio antibacterial fruit wash that is available in good

supermarkets or health food shops.

4. Alfalfa seeds can be used, but they must be sprouted for at least 7 days to deplete the natural insecticide the seeds contain (Do not eat alfalfa to the exclusion of all other seeds, there is a wide variety of seeds available). Do not eat alfalfa with vitamin E supplements, they fight!

5. Sprouting packs are available in numerous varieties with full instructions. If you cannot find these: mix half a tablespoon of organic fenugreek seeds, fennel seeds and/or mustard seeds to make your own blend.

6. Whole, green lentils and chickpeas can also be sprouted and are delicious raw or stir-simmered. Sunflower seeds are wonderfully nutritious and have a very nice taste in salads. Wheat berries and grains have a lovely sweet flavour. Broccoli sprouts have been found to have much more of the natural cancer fighting chemicals than a comparative weight of broccoli spears.

7. Beans have toxic compounds that stop them from being eaten raw. A 24-hour initial soaking and sprouting for at least 4 days, greatly diminishes this problem. Stir-simmering them cuts the risk completely. Sprouted beans are much more nutritious, tasty and do not contain the compounds that cause bloating and wind. NB: red kidney beans and broad beans should not be sprouted.

Sprouting Instructions:

- Take a 300g empty (coffee) jar, discard lid.

- Wash and soak well, it must be thoroughly cleaned and allowed to dry. You can sterilise the jar by pouring in some cold water and microwave on high, to bring water to the boil, leave in microwave to cool. Or place the dry jar in a cold oven and then turn the oven to (350^{o}F, 180^{o}C, Gas 4) leave for a few minutes, turn the oven off and allow to cool in oven. Or you can sterilise

with a sterilising fluid (available from chemists or home brewing supplies).

- Wash the seeds in a sieve and soak overnight in lukewarm water to encourage germination. Bean seeds should be soaked in tap water for 24 hours, rinsing every 12 hours.

- In morning, drain off water through a sieve and rinse in luke-warm water, drain well. Any water left in the jar may result in mouldy seeds. It is a good idea to 'prop' the jar up, with neck down for a few minutes, so all the water drains completely away. Or, use a Sprouting bag, now available in health food shops, they allow the seeds to be hung up over a sink to drain freely.

- Put seeds into the jar and secure a piece of fine mesh or muslin over the top, put in a warm place, but not in direct sunlight, the airing cupboard is suitable. Ventilation and a level temperature of 15-20^{o}C / 60-70^{o}F is needed.

- Every night and morning rinse the seeds by pouring lukewarm water through the mesh or bag while carefully turning to rinse thoroughly, but take care not to damage the delicate seeds or 'sprouts', then turn upside down to drain completely - If left too wet the seeds become mouldy, return each time to the airing cupboard or suitable place.

- The sprouts should be ready in 3-4 days, except alfalfa seeds, which need at least 7 days (for greener sprouts introduce more light on the last day or two), they will have increased their volume by 4-6 times and be fully sprouted.

- When ready, give them a final rinse and store in the refrigerator (for up to 6 days), in a container lined with absorbent kitchen paper.

Start a new jar every day to ensure a fresh daily supply. They can be eaten raw in salads, sandwiches or lightly stir-simmered. They

are delicious dehydrated (dried), and make a very tasty trail mix. They are very nutritious and contain more vitamins, protein and live enzymes than the equivalent weight of the adult plant.

Grains and beans (sprouted soya beans taste like young succulent peas) may also be sprouted in this way, but must be soaked for 24-hours with the water changed regularly and the beans lightly stir-simmered with olive oil and water. Ask in your local health food shop for their range of sprouting seeds and equipment.

Try this recipe for yourself, but be warned you may not want to eat anything but 'living' foods again.

Sprouted Beans on Toast

Lightly 'sweat' 4, skinned and chopped, large tomatoes and 1 onion in a little olive oil, (over a low heat) until just tender. Add 2 teaspoons tomato concentrate and a quarter teaspoon of Jamaica pepper (allspice) or to taste, and a teaspoon of concentrated apple juice or half a teaspoon of honey. Allow to cool, and liquidise until smooth. Stir-simmer 2-3 tablespoons of sprouted haricot beans in a little olive oil and water for 2-3 minutes, add the tomato mixture and stir over a low heat until heated through. Simmer for 5 minutes. Serve on a slice of whole-grain toast.

NB: freeze tomatoes first and run under cold water to remove skins.

DIET – CHOOSING HEALTHIER OPTIONS

Most people say that they would love to eat healthier, if only they had the time. The majority of schools do not even bother to teach pupils how to cook a meal. I know, I have a daughter, who so far has been shown how to cook four different types of scones and two different types of shortbread! Where is the nutrition in that? When she was asked to bring in ingredients to cook pizza they were listed as: 1 pizza base, tomato puree and cheese, plus a topping of choice. All she needed to do was spread everything on the base and cook it. Is this a proper grounding in nutrition for our children? Of course it isn't, it's a whole generation of heart problems waiting to happen.

This chapter is for people who believe that it takes too long to eat healthier.

Just by swapping a few items or ingredients in your normal routine you can start making your food a lot healthier for yourself and your family.

Normal Choice:	**Swap For:**
ALCOHOL:	1-2 small glasses of red wine is acceptable, red grape juice can be substituted.
BISCUITS:	1-2 Wholegrain biscuits are the better option, but avoid any with hydrogenated oils and a high salt content. Try to limit biscuits to 2 per day.
BUTTER:	Chickpea spread*, curd or cream cheese can be used as a substitute for butter or margarine containing hydrogenated oils and trans-fats. 20g of butter per day is

acceptable, this gives the 11g limit of saturated fat, more if a person has a high activity level. Drizzle a good fruity olive oil over the bread in place of butter.

***Chickpea Spread**: Liquidise 1-tablespoon cooked chickpeas, 1-tablespoon 'white' cooked beans i.e. butter beans, soya beans, etc. and 1-dessertspoon sweet corn (optional), season to taste or add a pinch of miso before liquidising. Add a dessertspoon of flaxseed or hemp seed oil and liquidise to a smooth paste. This can be used in place of butter or low fat spread. For a lunch or snack dish spread liberally onto wholemeal bread or pile onto a baked jacket potato. This can also be made with sprouted beans, but they should be stir-simmered and cooled before liquidising.

CAKES: Wholemeal teacake, currant bun, carrot cake or look for cakes with less fat and refined sugar. Have a smaller portion, so that your total fat intake is lower. If you need to lose weight, eat fruit instead of cakes.

CHEESE: Cottage cheese, Edam, Jarlsberg, soya cheese. Remember that most hard cheeses contain rennet, which like gelatine (from the bones), is extracted from the carcasses (stomach membrane) of cows, or is a chemical substitute. Most cheeses have a high content of saturated fat. Try buffalo mozzarella, and fresh Parmesan for pizza.

CRACKERS: Wholegrain rice cakes, crisp breads, Matzo

etc. in moderation. There is increasing evidence that crackers contain a high amount of acrylamide, which can be very detrimental to health. Avoid brands with hydrogenated fats. Do not eat crackers every day.

CREAM: Low-fat Crème fraiche, bio yogurt, buttermilk, or low-fat extra-light cream cheese. Only the Crème fraiche can be used for cooking, the yogurt and buttermilk can be used, but they will curdle at high temperatures. Single cream can be used in moderation; it has a lower fat content than double cream. NB: Organic cream in moderation has a higher CLA content.

FISH & CHIPS: Take one potato per person, cut into thick chips. Simmer in water for 5 minutes or until just firm. Drain and gently place on a non-stick baking tray, spray/brush with olive oil or virgin coconut oil and beaten egg white, sprinkle with an all-purpose low-salt seasoning (optional) or sesame/poppy seeds. Bake in a hot oven (400^{o}F, 200^{o}C, Gas 6) for approx. 10 minutes, turn over carefully, spray with olive oil and return to oven for another 10-20 minutes, until just lightly browned. Serve with a large salad and oven baked fish or choice of grilled meat or stir-simmered egg.

FRUIT YOGURT: Always add your own fresh fruit to a plain bio yogurt. It is much healthier with less sugar added. It can be liquidised for the strained yogurt effect. Add whole or ground

flaxseeds or sprouted wheat berries for more fibre and nutrients.

FRYING: Stir-simmer your food, add 1-teaspoon olive oil or virgin coconut oil and 1-2 tablespoons water, heat until it bubbles, add food, baste (flick over food) with a heat-proof spatula and simmer. Remember to keep topping up the water or it will burn, do not leave unattended. Suitable for most foods i.e. eggs, onions, stir-fry, sealing meat etc. **NOT SUITABLE FOR BREADED OR BATTERED FOODS** (which can be grilled or oven cooked).

ICE CREAM: Frozen yogurt, sorbets, water ice, small choc-ice. Or make low fat custard, sweetened with honey and apple concentrate, freeze for 2 hours (or until frozen) breaking up the ice crystals every 30 minutes, by beating with a strong fork. Add nuts or fresh chopped fruit to the final beating.

MAYONNAISE: Use a small, plain bio-yogurt with seasoning – a dash of Worcester sauce or crushed garlic etc. Or try this tasty recipe: 50ml buttermilk or bio yogurt with 5ml, or less, mild mustard & seasoning, mix well, add a dash of sweetener (optional) – it is very nice! You can also mix mayonnaise 50/50 with yogurt and a dash of mild mustard.

MILK: Skimmed milk, oat milk, rice milk, soya milk, etc. Nut milk can also be used. Check calcium levels to make sure you are getting an adequate amount. Cashew nuts make an

excellent milk or cream, liquidise in 3-4 parts water or apple juice to 1 part nuts for milk or 1:1 for cream. Grind well and it may not even need straining.

OIL DRESSINGS: Use a vinaigrette, yogurt or mix 1 teaspoon each of cider vinegar & flaxseed oil, add diced herbs (optional), shake well and pour over a green leafy salad, but do not store. Add walnut oil, flaxseed oil or hempseed oil to salads.

ROAST POTATOES: Take 1 small yam each, clean the skin well and cut into quarters. Par-boil for approx. 7 minutes or until just firm. Place on an oven-proof dish, spray with oil or brush olive oil on sparingly. Sprinkle with a pinch of herbs (optional) and bake in oven (do not add to meat pan) for 30-minutes or until lightly browned and cooked. You can substitute carrots, parsnips, etc. and cook by the same method.

NB Olive oil in a spray container can be purchased from supermarkets, most brands can be unscrewed to allow you to re-fill with your own oil. Always use olive oil or virgin coconut oil for cooking. If you need to heat the oil in any way, it is much healthier than the refined sunflower or frying oils commercially available.

SALAD CREAM: 2 tablespoons 'bio' yogurt, one drop of Worcester sauce (optional), 1 teaspoon mild mustard, quarter teaspoon apple juice concentrate or honey (optional), mix and serve. Will keep up to 3 days, covered, in

refrigerator.

A very nice herby dressing is made by mixing 2 tablespoons bio yogurt with chopped mint. Any chopped fresh herb can replace the mint i.e. dill, basil, chives or parsley etc. Sweeten as above (optional). Use with salads, meat or fish.

SALADS: Please do not just have lettuce and tomatoes. Experiment: add sprouted seeds, sprouted wheat (it is deliciously sweet and is more easily digested than normal wheat), cooked pasta, baby spinach leaves, baby beetroot leaves (chard). In winter when you want something warm, make a 'hot salad' with: matchstick carrots, yam, butternut squash, courgettes; sweet corn, scallions, garlic chives, sprouted wheat or lentils and stir simmer until heated through.

SAUCE / GRAVY: Omit cream and butter, thicken with cornflour, arrowroot or pureed vegetables i.e. carrots, tomato puree, or use a low-salt soup - heat & pour half fat mushroom soup over meat or veg. Chickpea spread can also be used as a thickener for soups or sauces, stir well to avoid lumps. Miso or Vecon™ can be used as a concentrate for flavouring where necessary, but they can have a high salt content, so use sparingly.

SUGAR: Half a teaspoon of honey or 1-teaspoon apple juice concentrate (for bringing out the flavour in dishes and for herb teas etc.) The herb 'stevia' (powdered leaf from Brazil/ Japan) is now available in a bottle, add a few

drops to sweeten drinks and sauces etc. PLEASE NOTE: In UK, refined stevia is banned for use, but it is still a functional food in Japan and can be obtained via the Internet from America.
Canderel™ (also known as Nutra-sweet™ and Aspartame etc.) should not be added to hot drinks or cooked. DO NOT heat it in any way. This is very unhealthy, it breaks down into toxic compounds. Honey may be used instead, it is sweeter than sugar, but is not low calorie.

SWEETS:

1) Frozen red/black seedless grapes. Just pop a few washed grapes into a freezer bag and freeze. Whenever you are hungry chew 4-6 (still frozen) and drink a glass of water.
2) 3-4 Sugar-free mints or boiled sweets.
3) Dried apricots or prunes, in moderation no more than 5 per day.
4) Raisins: 30g per day only.
5) Sugar-free chewing gum, this may be especially beneficial when hunger pangs strike, just chew the gum until they pass – studies show that it is also good for your teeth. Try to drink a glass full of water too.
6) A good tip, (especially in an office environment, where the sweet trolley is a regular visitor: take a small plastic box, with a lid, fill with small fruits: cherries, kumquats, black grapes, green grapes, fresh pineapple, etc. place on desk or in refrigerator at home and dip in as necessary!

ADAPTING ANY RECIPE

It is easy to adapt any type of recipe or even your own favourite recipes, just change items/ingredients as listed.

Cooked Breakfast: Place one small teaspoon of olive oil in a frying pan with 2-tablespoons of water. Heat until the water bubbles, turn down the heat until simmering. Crack an egg into the pan and gently baste with a spatula to cook, add more hot water when necessary, as the water will tend to boil dry. It takes a little practice but soon you will be producing eggs that look and taste like fried eggs! Serve with 1 grilled rasher lean bacon, 1 grilled vegetarian or turkey sausage (optional.)

Try to limit this to a once a week treat, because of the salt content of the bacon and sausages.

Frying/Sauté/ Sealing Foods: Stir-simmer by adding a splash of olive oil (not more than 1 teaspoon per person) to the frying pan, add some water, heat and stir or baste the food appropriately. Keep topping up with hot water as necessary, do not allow to boil dry, do not leave unattended (do not use for breaded and battered foods). Also, grill foods using spray olive oil, rather than frying (do not spray oil near a naked flame).

Roast: Spray the food lightly with olive oil and add water & soy sauce, miso or stock, cover and bake in the oven (you should check the pan

often to ensure there is sufficient water).

Oil: Where oil is called for in a recipe to moisten foods i.e. grain salad, either use just 2-teaspoons per person of flaxseed or hemp seed oil and/or moisten with yogurt. Keep only 1 day in refrigerator (covered). For leafy salads, use a small amount of crushed garlic in live yogurt. Or see below.
It is possible to make a clear 'runny' gel (for dressings, not cooking) that does actually resemble oil, but it does take some practice to perfect it. Take vegetarian gel or agar agar and make up as instructed on the packet, but use approx. twice the amount of water, when set it should be quite liquid (This needs practice to get the water ratio right). Season and/or add fresh chopped herbs, fold/pour into the food with a teaspoon of sesame oil.
NB: Supermarkets now stock a 'ready jelly' that is neutral in flavour, just add chopped herbs etc. and add a small amount of water (optional) whip well to remove lumps and stir into rice or grain salad in place of the oil.
A water-soluble apple pectin that gels water is also now available, this can be used as above.

Cream Sauce: Thicken with cornflour or arrowroot, boil/ cook before adding half-fat crème fraiche or yogurt, sparingly, or it will curdle. Always use skimmed organic milk and/or yogurt towards the end of cooking, do not boil. Single cream in sauces is a healthier alternative to double cream. Cream on desserts can be replaced by natural bio

yogurt, cashew cream, crème fraiche, of fresh fruit sorbet.

Butter: For cooking - use olive oil. For spreading: 20g butter per day is allowed or spread on fresh pressed olive oil, just like the Italians do. For sauces or dips, fresh buttermilk has a lovely buttery taste, fermented or treated buttermilk tastes more like yogurt (it can still be used). Spreading sandwiches with organic cream cheese can be an option.

Cheese sauces: Use cheese sparingly, add herbs or chopped chives to increase the taste, or substitute grated low fat Parmesan, the stronger taste means that less cheese will be needed to give the sauce/dish a 'cheesy' taste.

Coleslaw: It is very easy to make your own and it is a great way to get children to eat cabbage. Grate white cabbage into a large serving bowl, grate 1-2 carrots, add a handful of chopped chives (snipping a handful with kitchen scissors is easier than chopping them) and some sweet corn kernels. Either add mayonnaise, or 50:50 mayonnaise and yogurt, or just bio yogurt with a dash of hemp seed oil, a pinch of mild mustard and some black pepper (optional). Combine all ingredients and use as an accompaniment to grilled, barbecued, or stir-simmered foods. Alternatively, eat on jacket potato or in wholemeal sandwiches. Coleslaw made with mayonnaise will keep for 24 hours, covered in the refrigerator, but if made with yogurt, eat on same day.

Pasta Sauce: It is easy to make a quick pasta sauce. Just mix bio yogurt with freshly chopped herbs or chives and pour over freshly cooked whole-wheat pasta. Add diced chicken or ham, sweet corn and freshly diced vegetables of choice, to make a lunch or supper dish.

Muesli Porridge: Grind a few tablespoons of muesli, with a couple of teaspoons of flax seeds, in a coffee grinder, tip into a pan, add milk, soya or nut milk and gently heat until thick ened, try not to boil. This is a great way of eating muesli; the raisins grind down giving it a pleasant sweetness. Whole oats and raisins can be ground and cooked using the same method.

Hot Side Salad: During winter, a cold salad is not very appetising, but accompanying meat or fish with a hot salad is both appealing and nutritious. It is also very simple to do.
Choose any suitable vegetable and cut into matchsticks. Beetroot, Carrot, Kohlrabi, Sweet corn kernels, onion, spring onion, even pickled onions, broccoli stems, small broccoli florets, cauliflower florets, courgette, aubergine, sprouted lentils, sprouted sunflower seeds, sprouted green lentils. Basically any choice of vegetables that can be cut into matchsticks and stir-simmered can be used.

How to Effectively Reduce Salt Intake

Research has shown that people with heart disease and high blood pressure should limit sodium intake to 2,000mg per day (2g) or less.

1. Every day, reduce salt in cooking, if you keep doing this, eventually you will cut out salt altogether without noticing. Salt is an acquired taste it is not a necessary condiment.
2. Do not put a saltcellar on the table. Use black pepper or other spices to add flavour to your food. A small amount of sea salt is better than refined table salt.
3. Do not eat foods high in salt (over 140mg each serving). Foods that list salt in the top five ingredients on the label should be avoided. Remember: cured, smoked and processed meats always have a high sodium content. Avoid: ready-made foods, packet mixes and instant (just add water) products. Cheese and butter also have a high sodium content.
4. Low sodium or unsalted foods are readily available.
5. Use more fresh fruits, sprouted seeds and par-cooked vegetables, they taste wonderful and do not need added salt.
6. If you have to use canned foods, either choose a low salt variety or rinse them in a sieve under running water to reduce the brine content.
7. Do not use a low-sodium – high potassium salt substitute with every meal containing meat. It may stop you absorbing vital amounts of vitamin B_{12}.
8. Try sesame salt as a salt substitute: Sprout sesame seeds for 3 days, drain onto kitchen paper, place on greaseproof paper and 'dry' in a very low (just warm) oven for a few hours. When cool grind 4 parts sesame seeds with 1 part sea salt and use in place of salt on the table at mealtimes. Store in airtight container.

Cut Down Stress Before it Cuts Down You

First choose a mantra…

HI-HEEM AH-HOOM AH-EEM

Whenever you feel stressed out, sit down in a comfortable chair and take three long, deep breaths.

1. Listen to your breathing, in....out… in....out.... in....out.... all you hear is your breathing.
2. Breathe out and imagine a white mist going out of your body through your feet, right down to the centre of the earth.
3. Breathe in and imagine the white mist going up through your head to the centre of the universe.

Do this 3-4 times.

Another method is to use the image of a tree; the mist goes through your body down through your roots, then up through your body into your branches.

Now start to repeat your mantra over and over in your head; for example: say HI as you breathe in and HEEM as you breathe out: HI-HEEM … HI-HEEM … HI-HEEM … HI-HEEM whenever thoughts enter your head, acknowledge them and then return to the mantra: HI-HEEM … HI-HEEM … HI-HEEM … HI-HEEM. The thoughts will still come, but every time you find them taking you off track, just bring yourself gently back to the mantra: HI-HEEM … HI-HEEM…

This works on the principle that your mind is like a deep sea, on the seabed are thousands of air bubbles, these are your thoughts and worries. As you start to relax the air bubbles rise to the surface and you stay awake thinking about things. But, if you can interrupt these bubbles by bringing your mind back to the mantra, they just pop as they rise to the surface and disappear. It is important that as soon as you find yourself aware of your thoughts to just bring

yourself back to the mantra: HI-HEEM … HI-HEEM … HI-HEEM … HI-HEEM.

Remember that your thoughts rising and taking over your concentration are a normal factor of winding down, do not try to fight them, but as soon as you are aware that you are thinking about something, just breathe in with HI and out with HEEM …HI-HEEM … HI-HEEM until you are back to the relaxing rhythm.

Do this for 20 minutes each session, every time you feel stressed. You will soon find how easy it is to relax.

It takes a little time to get used to the technique, but once you have mastered it, you will really notice the difference to your stress levels.

It is even possible to fall asleep by this method, just repeat the steps above when you are in bed.

MAKE YOUR OWN ANTI-INSOMNIA TAPE

Are you too stressed to sleep? Then make your own tape and play it at bedtime to help you to get to sleep. All you need is a blank tape or a recordable CD and a recorder with a microphone. Then record this script onto the tape. Remember to speak slowly and gently.

"My feet are getting warmer and warmer, the warmth is spreading through my feet as they sink back into the bed. I feel the warmth spreading and growing.

The warmth is spreading up my legs, into my knees. My knees feel warm and heavy, so heavy they are sinking into the bed.

The warmth is spreading up my legs and into my body, I feel the warmth spreading and growing. I'm so warm and relaxed my whole body just melts into the bed.

I feel the warmth spreading and growing it's spreading up into my hands and into my arms. I feel the warmth spreading and growing, it's spreading up my body into my chest and up into my neck and shoulders I feel the tension draining away from my shoulders as

they sink back into the bed. My whole body is warm and heavy, so heavy it's sinking back into the bed.

I feel the warmth spreading and growing, it's spreading up my neck into my head. My head feels warm and heavy, so heavy it's sinking back into the pillows.

I'm going to count to 10, with each count I'm going to go deeper and deeper to sleep. 1 ..… 2 …..… 3 …..… 4 ……..5 … deeper and deeper now ...6 ..... 7….. 8 …….. 9 …….. 10.

I'm walking in a beautiful forest, the birds are singing, it's a lovely day. As I walk, deeper and deeper, I notice the trees, they are tall and green, I feel so safe and protected by the tall green trees. As I walk, deeper and deeper, I come to a clearing, and lie down in the warmth of the sun… deeper and deeper … deeper and deeper … deeper and deeper…

Whisper this next part repeatedly to the end of the tape:
I feel happy, healthy and contented, my body is healing itself.
I feel happy, healthy and contented, my body is healing itself.
I feel happy, healthy and contented, my body is healing itself.
I feel happy, healthy and contented, my body is healing itself.
I feel happy, healthy and contented, my body is healing itself.
I feel happy, healthy and contented, my body is healing itself.
I feel happy, healthy and contented, my body is healing itself.
I feel happy, healthy and contented, my body is healing itself.
I feel happy, healthy and contented, my body is healing itself.
I feel happy, healthy and contented, my body is healing itself.
I feel happy, healthy and contented, my body is healing itself.

The tape is now finished, the first part should be heard clearly, the whispered part should be just audible, because it is speaking directly to your subconscious mind, it should not be so loud that you hear it clearly. Every night play the tape to help you to get to sleep. Remember, with subliminal tapes or therapy, you need to ensure no negative words/statements are used. Only EFT uses negative loaded statements. See below.

Emotional Freedom Technique (EFT)

Distressing memories can cause a disruption in the body's normal electrical system. EFT works by acknowledging your problem, accepting yourself with the problem and then letting it go; all this while tapping 5-7 times on a particular point to heal the electrical disruption. First repeat a phrase relevant to yourself, some are listed below, but it can be anything from - I hate spiders to my mother never loved me, i.e. whatever happened that caused a problem in your life. First: say your phrase 3 times while tapping the karate chop (KC) point on the side of your right or left hand, about 1cm below the bottom of your little finger, with all 4 fingers of your other hand. Next, do the listed tap points 5-7 times with the tips of your index and middle finger of your other hand, while saying the phrase once each time. Start tapping: between eyebrows (EB); on outer side of each eye (SE); under each eye (UE); under nose (UN); on chin (Ch); 2cm below collarbone, in middle (CB); Under arm, 9cm below armpit (UA); (on the same hand you tapped your KC point) on outside edge of thumb at base of nail to the side (Th); on side facing thumb of index finger, at base of fingernail (IF); side of middle finger (the side closest to thumb) at base of fingernail (MF); on ring finger (RF), same as MF, on inside of little finger (BF), same as MF; the last point is the KC point where you tapped 3 times initially. For the next part, find your gamut point, which is on back of hand at midpoint, 1cm below base of little finger and ring finger. Next, you must do the 9 actions while continuously tapping the gamut point with 3 fingertips of your other hand and saying the phrase for each action. 1. Eyes closed. 2. Eyes open. 3. Eyes hard down to the right. 4. Eyes hard down to the left. 5. Roll eyes round in a wide circle to the right. 6. Roll eyes round in a wide circle to the left. 7. Hum 2 lines of a song. 8. Count to five. 9. Hum 2 lines of a song. Remember to say phrase and tap, while doing all 9 points. Then repeat all the tap points one more time, from EB right through to KC as listed above.

Listed below, are some causes of stress later in life: Keep repeating only one phrase that is relevant to yourself at each tapping place - EB to KC.

***Even though I'm not happy, I deeply and completely accept myself.**
***Even though I work too hard, I deeply & completely accept myself.**
***Even though I feel stressed, I deeply and completely accept myself.**

Emotional Freedom Technique (EFT) has some remarkable effects on stress and stress related issues. It really does work.

See: www.emofree.com for free details and download book.

A-Z of Cardiology

Ablation: A procedure used to correct certain types of arrhythmias. Radio frequency energy is used to destroy the affected areas that are causing the abnormal rhythm.
ACE: angiotensin-converting enzyme.
ACEIs or ACE inhibitors: drugs that inhibit angiotensin-converting enzyme (ACE).
Aerobic exercise: physical activity that increases the heart rate.
Albumin levels: decreased albumin levels are a factor that could indicate a relative protein deficiency and excess of carbohydrates. This may be a marker for heart disease.
Alpha blocker: a vasodilator, used to treat high blood pressure, especially for men who have hypertension and also prostate disease.
Aneurysm: a weak spot of an artery wall that has stretched or ballooned out and is filled with blood blisters. It can also be a damaged artery with blood pooling between the layers of the blood vessel walls.
Angina: Angina pectoris or angina is a recurring pain or discomfort in the chest. It happens when some part of the heart does not receive enough blood. It can feel like a heaviness, a burning sensation, sometimes there is also a discomfort in the left arm or jaw.
Angiogenesis: the development of blood vessels.
Angiogenic growth factor: used in investigational treatments for patients with severe coronary and peripheral vascular atherosclerosis.
Angiogram: a picture produced by angiography.
Angiography: an x-ray of blood vessels. Dye is injected into the vessel using a catheter that can be passed through the artery into the heart, which allows the blood vessels to be seen while the heart pumps. Can be used to identify blockages and other problems interfering with the flow of blood, for example: in the legs, heart, or brain. Also known as an arteriography. The pictures seen are called angiograms or arteriograms.
Angioplasty/Balloon angioplasty: a procedure to open clogged arteries. A catheter, with a balloon tip, is positioned in the narrowed coronary artery. It is inflated and deflated, then removed, to compress plaque and improve blood flow.
Angiotensin converting enzyme (ACE): an enzyme that causes inactive angiotensin I, to be converted to active angiotensin II, also known as kinase II.

Angiotensin-converting enzyme inhibitors (ACEI): agents used in the treatment of mild-to-moderate hypertension, congestive heart failure, myocardial infarction, and diabetic nephropathy. Their mechanism of action involves blocking the enzyme that converts angiotensin I to angiotensin II (ACE), thus reducing the availability of angiotensin II.
Angiotensin II: a potent vasoconstrictor and growth-promoter. It is indicated in causing high blood pressure and angina.
Angiotensin II receptor blockers: a new class of antihypertensive agents; their mechanism of action involves the blocking of certain angiotensin II receptors.
Ankle-Brachial Index (ABI): is found by taking the ankle systolic blood pressure and dividing it by the arm systolic blood pressure. A normal index is 1. Below 0·9 may indicate some form of cardiovascular disease. (This does not work with all people, for example: diabetics should not take this test).
Ankle pressure is taken with the cuff just above the ankle. If a stethoscope is used it should be placed just below the cuff on the inner side of the ankle, directly behind the anklebone.
Anticoagulants: drugs used to prevent formation of blood clots that can become lodged in arteries. Arginine is a natural anticoagulant.
Antidiuretic hormone: a hormone that decreases the excretion of urine (i.e. retains water in body) and also causes contraction of smooth muscle in arteries; also referred to as vasopressin.
Antihypertensive medication: a drug that is intended to reduce blood pressure.
Antiplatelet agents: a type of anticoagulant drug therapy that prevents the formation of blood clots by preventing the accumulation of platelets that form the basis of blood clots. Aspirin is a common antiplatelet. Natural antiplatelets include: vitamin E, fish oil, ginkgo biloba and garlic.
Antithrombotic: a type of anticoagulant drug therapy that prevents the formation of blood clots by inhibiting the coagulating actions of the blood protein thrombin. Warfarin was a commonly prescribed antithrombotic before it was phased out.
Aorta: large artery (of the elastic type) that is the main trunk of the arterial system. Loses elasticity with age.
Arrhythmia: an arrhythmia or a disrhythmia is an irregular heartbeat either too fast or too slow. Most people have had a 'fluttering' feeling, fast heartbeat, or their heart skipping a beat. This is very common and in the majority of cases is nothing to worry about. But, if it happens

regularly you should consult a doctor. Persistent or prolonged arrhythmias can be dangerous and require medical attention.

Arterioles: small arteries.

Arteriography: see angiography.

Arteriosclerosis: a general term for the thickening and the hardening of arteries. Its development is accelerated by high blood pressure. Can result in loss of blood flow to major organs.

Artery: usually a blood vessel that carries oxygen-rich blood from the heart to the body. An artery close to the heart is called a coronary artery.

Atheroma: the fatty, 'porridge-like' lesions that build-up on the inside of arteries, leading to atherosclerosis.

Atheromatous plaques: lesions associated with atherosclerosis; these lesions form from fatty substances and fibrous tissue and lead to the narrowing and hardening of arteries.

Atherosclerosis: a type of arteriosclerosis, where lesions of oxidised cholesterol, fats, and other substances build up in the walls of arteries. The soft fatty plaque is vulnerable to inflammation, infection and causes high blood pressure. It may break off, causing a blood clot, heart attack or stroke. Considered the most significant form of arteriosclerosis.

Atria: upper cavities or chambers of the right and left sides of the heart; singular is 'atrium'.

Atrial fibrillation: a condition in which the two small upper chambers of the heart, the atria, quiver instead of beating effectively. Although atrial fibrillation is not in itself considered life-threatening, it does give an increased risk of blood clots and stroke.

Automatic implantable (cardioverter) defibrillator: a device used to correct serious ventricular arrhythmias that can lead to sudden death. The defibrillator is surgically placed inside the patient's chest, from where it monitors the heart's rhythm and quickly identifies serious arrhythmias. With an electrical shock, it immediately disrupts a deadly arrhythmia, restoring a normal heartbeat.

Autonomic nervous system (ANS): the motor division of the peripheral nervous system that supplies nerve fibres to smooth muscle, cardiac muscle, and glands

AV nodal re-entry tachycardia (AVNRT): rapid heartbeat caused by an abnormal pathway at the AV node.

AV Node: Atrio-ventricular node of the heart; a group of specialized cells located between the atria and the ventricles which slows down each electrical impulse before it passes through to the ventricles.

Baroreceptors: stretch receptors located within the cardiovascular system that detect changes in blood pressure and transmit this information to the central nervous system.
Basal Body Temperature: a test of your core body temperature to determine if thyroid is under active.
Basophils: white blood cells that work to destroy parasitic infections.
Beta-adrenergic blocking agents (beta-blockers): a class of drugs that can be used at the start of treatment for hypertension, angina, and to treat cardiac arrhythmias (abnormal heart rhythms). They block the action of adrenaline; a hormone that naturally makes the heart beat faster. They also block an enzyme called renin, which is involved in several pathways in the production of Angiotensin II.
Blood lipids: the collective name for all the fatty substances in the blood, including cholesterol and triglycerides.
Blood pressure: is the amount of force, per unit area, exerted by the blood against the walls of the arteries. Usually, blood pressure is expressed in two numbers, such as 120/80, and is measured in millimetres of mercury (mmHg) that is displaced by pressure.
Blood vessel: a term for a tube conveying blood, which may be used to describe an artery, capillary, vein, or sinus.
Blood viscosity: is a measure of the thickness of 'stickiness' of blood, which reflects the number of circulating blood cells, among other factors.
Blood volume: amount of blood circulating in body.
Body mass index (BMI): a measurement of a person's weight relative to their height, this gives a more accurate assessment of whether a person is overweight.
Bolus injection: a drug injected directly into a vein.
Brachial pulse: the pulse (rhythmical dilation of an artery, produced by the increased volume of blood that enters a vessel with cardiac contraction) that can be felt over the brachial artery (an artery extending from about the level of the shoulder to the elbow)
Bradycardia: decreased heart rate; usually defined as a heart rate of less than 60 beats per minute.
Bradykinin: produced from bradykinogen under direction of the enzyme kallikren; bradykinin is an endothelium-derived substance/hormone that causes vasodilation and release of nitric oxide and prostacyclin
Bruits: a harsh or musical, intermittent sound heard with a stethoscope; an indication on physical examination of abnormal blood flow and/or lesions or plaques in blood vessels

Bypass surgery: in a coronary artery bypass operation, a blood vessel, usually taken from the leg or chest, is grafted onto the blocked artery, bypassing the blocked area. If more than one is blocked, a bypass can be done on each artery. The blood can then avoid the obstruction and supply the heart with enough blood to relieve chest pain and eventually help to repair damaged heart muscle.

Calcium antagonists: another term for calcium channel blockers

Calcium channel blockers: drugs that inhibit the excessive accumulation of calcium in heart cells and allow ATP (energy) production. It helps to open up blood vessels and is used in cases of hypertension and angina. There are different types of CCBs, which also slow down the heart rate.

Cardiac or Cardio: relating to the heart, from the Greek *kardia* for 'heart'.

Cardiac catheterisation: is a test used to examine the coronary arteries, using a fine tube the catheter is inserted into an artery or vein of a limb and passed into the arteries of the heart.

Cardiac hypertrophy: the thickening of the heart wall is a major risk factor for heart failure. It can be caused by an overload in blood pressure or volume in the heart ventricle called mechanical loading.

Cardiac output: amount of blood pumped out of the ventricle in one minute.

Cardiovascular disease: any disease of the heart and blood vessel system, such as coronary heart disease, heart attack, high blood pressure, angina (chest pain), and rheumatic heart disease.

Cardioversion: a procedure that rapidly restores a person's heart rate to a normal rhythm by delivering a shock of electricity directly to the heart. Can be used in the treatment of arrhythmia.

Carotid Arteries: two arteries that supply oxygen and blood to the brain.

Catheter: a long, fine tube passed into the body especially designed for withdrawing or injecting fluids into the body or to perform a specific function, such as angioplasty. Usually made of rubber, glass, metal or plastic.

Cerebrovascular diseases: diseases of the brain and its main blood vessels. In cases of stroke, the loss of blood flow results in sudden loss of function of part of the brain.

Cholesterol: a waxy substance produced by the body and present in some foods. The body needs cholesterol for healthy cell membranes, bile and for manufacturing hormones. When too much cholesterol circulates in the

blood, it can become oxidised, causing atherosclerosis. Blood cholesterol refers to the cholesterol circulating in the bloodstream; dietary cholesterol is the cholesterol consumed in food.

Clauss assay: a test in which fibrinogen is converted to fibrin, then timed to determine how long it takes a clot to form. A better test has now been developed: see Functional Intact Fibrinogen.

Clinical trials: an internationally recognized research protocol designed to evaluate the efficacy or safety of drugs, vaccines, or other therapeutic agents, and to produce scientifically valid results

Coagulation test: see platelet aggregation test.

Coarctation of the aorta: constriction of the aorta; a cause of secondary hypertension

Compliance: a measure of the ease with which a structure such as an artery can be stretched

Congestive heart failure (CHF): a serious condition in which the heart is unable to pump enough blood to supply the body's needs. CHF occurs when excess fluid starts to leak into the lungs, causing
breathing difficulty, fatigue, weakness, and sleep problems. High blood pressure is the number one risk factor for CHF.

Constrict: becoming narrowed or squeezed.

Contractility: vigour of heart-pumping action.

Cortisol: also known as hydrocortisone, cortisol is a steroid hormone that represents the most powerful glucocorticoid produced by the adrenal gland; actions include promotion of the formation of glucose from fats and proteins as well as anti-inflammatory effects.

Coronary: refers to the heart, i.e. coronary arteries are the arteries that supply blood to the heart muscle.

Coronary angiography: see angiography.

Coronary artery: Blood vessel (artery) close to the heart.

Coronary artery disease (CAD): a modern term for coronary heart disease (CHD).

Coronary heart disease (CHD): the most common form of heart disease. It is caused by a narrowing of the coronary arteries. CHD claims up to 125,000 lives in the UK per year.

C-reactive protein (C-RP): is now recognised as a potential indicator of heart disease. It is measured by a simple blood test in mg/dL. The test is non-specific, but the high-sensitivity C-reactive protein test (hs-CRP), helps to better determine heart disease risk. A result below 1 is the ideal; 1 to 3 merits some concern, but is not classed as serious; above 3 is a

cause for concern because it means a person's risk of a heart attack is at least doubled. A level higher than 10 is sometimes attributed to an infection or tissue damage somewhere in the body, and not necessarily to arterial inflammation.

Creatinine: a metabolite of creatine (an amino acid), is measured in blood or urine tests to see how the body metabolises energy. It is excreted through the kidneys, so gives an indication of kidney function. Creatinine tests may also be called kidney function tests.

CT coronary calcium scoring: Computer Tomography (CT) coronary artery calcium scoring is a highly advanced, non-invasive test that uses a high-speed CT scanner and computer software to detect and measure calcium build-up in the arteries. The calcium score, which is based on an objective assessment of the size and density of calcified plaque in arteries, provides a general indication of coronary artery constriction. A high score usually indicates greater calcification and an increased risk of heart attack.

Cushing's syndrome: refers to a syndrome consisting of a variety of symptoms caused by the production of too much cortisol (and other hormones); a cause of secondary hypertension

Cytokines: are small, hormone-like proteins released by leukocytes, endothelial cells, and other cells to promote an inflammatory immune response to an injury.

Deep vein thrombosis: Deep vein thrombosis, or DVT, occurs when a blood clot develops in the large veins of the legs or pelvic area. It may be painful or produce no pain at all. With prompt medical attention DVT is not life threatening. However, a blood clot that forms in the 'deep veins' can be life threatening, because it is more likely to break free and travel through the vein. It is then called an embolus (capable of causing an embolism). When an embolus travels from the legs or pelvic areas and lodges in an artery, the condition is known as an embolism, a potentially fatal condition if not immediately diagnosed and treated.

Diabetes, type I: a condition in which the body stops making insulin.

Diabetes, type II: a condition in which the body cannot use insulin properly, common in overweight people.

Diastolic blood pressure: the lower number of a blood pressure reading. Diastolic blood pressure is the minimum pressure that remains within the artery when the heart is at rest.

Dilate: enlarging the opening or the lumen of a hollow structure such as a blood vessel

Direct myocardial revascularisation (DMR): an approach that stimulates the heart to grow new blood vessels.
Distensibility: the ability of an artery to increase in diameter; refers to the basic wall properties of large vessels containing elastin.
Diuretics: drugs that 'wash' sodium from the body and blood vessel walls to allow vessels to dilate, which can help to lower blood pressure. Potassium may also be depleted leading to muscle cramps. Also known as water pills.
Duplex doppler ultrasound: a diagnostic imaging technique in which an image of an artery can be formed by bouncing sound waves off the blood flow and measuring the frequency changes of the echoes.
DVT: see deep vein thrombosis.
Dyslipidemia: abnormal blood levels of lipids (fats from animal or vegetable cells, including fatty acids and 'fat-soluble' vitamins).
Echocardiogram: a non-invasive test that uses sound waves to create a picture of the heart, which is more detailed than an x-ray image. This test can be used in the diagnosis of a number of heart conditions including valve disorders, cardiomyopathy and heart attack.
Ejection fraction: percentage of blood contained in the ventricle that is ejected during systole (ventricular contraction).
Elastic arteries: arteries that easily distend due to elastin contained in the arterial walls.
Elastic recoil: the vessel mechanically returning to a smaller size.
Electrocardiogram (ECG or EKG): a non-invasive graphic record of the electrical activity of a working heart. It shows abnormal rhythms and can be used in the diagnosis of a number of heart conditions including valve disorders, arrhythmias and heart muscle damage.
Electrolytes: minerals in the bloodstream and in the cells of the body, such as: sodium, potassium, calcium, etc. Electrolytes must remain in balance for the body to function normally.
Electron beam computed tomography (EBCT): a test that identifies and measures calcium build-up in and around the coronary arteries. It is important because it can indicate an increased risk of heart disease. See CT.
Electrophysiological study (EPS): a cardiac catheterisation to study electrical current in patients who have arrhythmias.
Embolism: a blockage caused by a blood clot that has broken away from main clot.

Endarterectomy: the surgical removal of plaque or blood clots in an artery.
Endocardial: within or on the inside surface of the heart.
Endocarditis: inflammation of the inner lining of the heart, can affect tissue and the valves. Sometimes caused by bacteria or viral infections.
Endocardium: the inner lining of the heart.
Endothelial cells: a smooth layer of cells that make up the innermost lining of the arteries and the heart.
Endothelin: the most powerful vasoconstrictor hormone produced by the endothelium (endothelial cells lining blood vessels); also has growth-promoting effects
Endothelium-derived substances: biologically active substances released by the endothelium in response to neural and chemical stimuli; these substances are involved in the regulation of vascular tone (i.e. peripheral resistance) and structure.
Eosinophils: white blood cells that fight allergic disorders and parasitic infestations amongst other functions.
Epicardium, Epicardial: the outside or on the outside surface of the heart (the inner layer of the pericardium that is in actual contact with the surface of the heart).
Epithelium: the cells or membrane covering the outside of organs. Simple squamous epithelium lines the lumen of the blood vessel. The cells lining the chambers of the heart, lumen of the blood vessels and lymphatics is refered to as the endothelium.
Erythroapheresis (EPH): an alternative method of iron depletion to reduce ferritin level.
Erythrocyte: a red blood cell.
Erythrocyte Sediment Rate (ESR): a non-specific blood test that signifies illness, if rate is high. It can mark inflammation within the body.
Essential hypertension: high blood pressure of unknown cause, although multiple theories exist, it accounts for 90-95% of individuals with hypertension.
Familial hypercholesterol(a)emia: heredity lipid disorder, leading to abnormally high serum cholesterol levels.
Fat: a nutrient that supplies energy to the body. The body needs regulated amounts of fat that coincides with the amount of physical activity. There are several different types of fat: saturated fat, polyunsaturated fat, and monounsaturated fat. Fats are not bad when taken in moderation, and are essential to mental and physical well-being.

Fat Soluble Vitamins: Vitamins that are stored by the liver and can accumulate within the body. Vitamins A, D, E and K are fat-soluble vitamins.
FDA: Food and Drug Administration (USA). Equivalent to MCA.
Ferritin: a protein in which iron is stored in the liver and spleen.
Fibrates: Cholesterol lowering drugs
Fibrinogen: a major blood-clotting protein. High levels are associated with an increased risk of heart attack.
Flutter: abnormally rapid pulsation of a heart chamber, especially of the atria or ventricles of the heart.
Free radicals: unstable oxygen molecules that steal electrons from other molecules causing damage to cells.
Functional intact fibrinogen (FIF): a diagnostic test for fibrinogen levels.
Generic drug: a medicine, usually costing less, that has the same active drug as a trademarked brand-named version.
Glycosylated haemoglobin: (HbA1C) a measurement that is the most widely used for long term glycaemic control in diabetes. Glucose sticks to the haemoglobin to make a 'glycosylated haemoglobin', called haemoglobin A1C or HbA1C. The more glucose in the blood, the more HbA1C.
Haemoglobin: a component of red blood cells.
Hematocrit: is a measure of the mass of the red blood cells.
HbA1C: see glycosylated haemoglobin.
Heartbeat: the normal pulsating rhythm of the heart.
Heart block: partial or complete interruption of electrical impulses between the atria and ventricles.
Heart disease: any disease affecting the heart.
Heart failure: inadequate pumping of the heart. See congestive heart failure.
Heart Recovery Rate: a test that assesses how quickly the heart rate returns to normal after exercising. It is useful in determining cardiovascular health. The requirements are that 85% of your maximum predicted heart rate (your maximum predicted heart rate is calculated as 220 minus your age) is reached. Once you are able to reach that heart rate, you stop the exercise and measure your heart rate 1 minute later. If the rate drops by 12 or less during the minute, the test is abnormal and there is significant risk of cardiovascular disease.
Heredity: the transmission of characteristics from parent to offspring.

High-density lipoprotein (HDL): also known as the good cholesterol; a compound consisting of a lipid and a protein that carries a small percentage of the total cholesterol in the blood and deposits it in the liver.
Homocysteine: an amino acid that is incorporated into the body's proteins. A high level of homocysteine is a significant risk factor for heart attack, stroke, neural tube defects etc.
Hormones: chemical substances, formed in one organ or part of the body and carried in the blood to another organ or part.
Hypercholesterol(a)emia: abnormally high serum levels of cholesterol.
Hypertension: the medical term for high blood pressure, that stays high over an extended period of time.
Hypotension: the medical term for persistently low blood pressure.
Infarct: an area of tissue that is dead or dying because of a loss of blood supply.
Inflammatory response: chemical reactions that occur in blood vessels and nearby tissues in response to an injury or abnormal stimulation caused by a physical, chemical, or biological agent.
Integrated medicine: the combination of orthodox, orthomolecular and herbal medicine to cure disease.
Ischemic: referring to decreased blood flow.
Isolated systolic hypertension (ISH): a condition where only the systolic blood pressure is high (systolic above 140 mmHg and diastolic under 90 mmHg). ISH is more common in older people.
Leucocyte: a white blood cell.
Lipids: fatty substances, including cholesterol and triglycerides, that are present in blood and body tissues.
Lipoprotein profile: a blood test that measures cholesterol, usually taken while on a 9-12 hour fast. The test gives information on total cholesterol level; LDL (bad) cholesterol; HDL (good) cholesterol; and Triglycerides.
Lipoprotein electrophoresis: this test is often done at the same time as a triglyceride test, it measures the amounts of the various kinds of lipoproteins in the blood.
Lipoproteins: protein-coated globules of fat and cholesterol, produced in the liver, which travel through the bloodstream.
Low-density lipoprotein (LDL): also known as the bad cholesterol; a compound consisting of a lipid and a protein, which oxidises and can deposit along the inside of arterial walls.
Lumen: the inner open space or cavity of a tubular organ such as an artery, vessel, heart or intestine.

Lymphocytes: white blood cells that fight bacterial infections, such as streptococcus, and viral infections, such as measles and chickenpox, amongst other functions.
Macrophage: a type of white blood cell that helps fight infections and disease by attacking certain microbes and cancer cells. Macrophages also enter the artery wall where they ingest oxidised cholesterol, enlarge, and become the foam cells of atherosclerosis.
Magnetic resonance angiography (MRA): an imaging technique involving injection of a contrast dye into a blood vessel and using magnetic resonance techniques to create an image of the flowing blood through the vessel.
Magnetic resonance imaging (MRI): a type of imaging involving the use of magnetic fields to create computer enhanced pictures within the body and head to detect subtle changes in tissue. MRI can identify damage after a heart attack, or diagnose certain congenital heart defects, and evaluate blood vessel problems, or stroke damage.
Mapping: Determining the origin of an arrhythmia by stimulating the heart electrically and analysing the electrocardiogram (ECG).
Maximum predicted heart rate: is calculated as 220 minus age.
MCA: Medicines Control Agency, UK equivalent to FDA.
Mean arterial pressure: static component of blood pressure equal to the cardiac output multiplied by the peripheral resistance.
Mechanism of action: used to describe the ways pharmacologic agents achieve their effects.
Media: The middle layer of the arterial wall, where the cholesterol-laden deposits of atherosclerosis develop.
Merci retriever: a tiny medical corkscrew-type implement that can clear blockages in arteries following a stroke.
Mitochondria: energy-producing 'factories', threadlike to spherical in shape, present in the cytoplasm of cells in the body. Converts food components into by-products (including free radicals) and energy.
Mitral annular calcification: a disease of the mitral valve of the heart.
Mitral valve prolapse (MVP): the mitral valve is the only valve with just two flaps. It separates the left atrium and the left ventricle. It occurs when one or both flaps becomes enlarged and cannot close properly, which allows some blood to leak backwards.
Mitral valve stenosis: a disease of the mitral heart valve involving the build up of a plaque-like material on and around the valve of the heart.

MmHg or millimetres of mercury: a term used in the measurement of blood pressure. It refers to the amount of mercury pushed upwards by the force of the blood rushing through the arteries.
Monocytes: white blood cells (part of immune system). They are able to ingest oxidised LDL cholesterol. In the process, they enlarge and are transformed into macrophages and eventually fat-laden foam cells.
Monounsaturated fat: contain one double bond between adjacent carbon atoms because hydrogen atoms are missing. They are less likely to oxidise when subjected to heat. Olive oil contains a high proportion of monounsaturated fat.
Murmur: heart murmurs are sounds made as the blood moves through the heart.
Myocardial infarction: a term used when the heart does not get enough blood flow, usually caused by a large blood clot, and the heart muscle dies. Also known as a heart attack.
Myocardiopathy: a non-inflammatory disease of the myocardium.
Myocarditis: an inflammatory disease of the myocardium.
Myocardium: Also known as the heart muscle. It is the middle layer of tissue, in between the pericardium and the endocardium, which forms the structure of the heart.
Necrosis: death of tissue.
Neutrophils: white blood cells that combat infections, amongst other functions.
Nitric oxide: a small molecule produced by the endothelial cells that line the inner layer of arteries. Nitric oxide helps maintain vascular health by preventing blood clots, relaxing smooth muscle cells and widening the artery wall.
Nuclear heart scan: a scan using radioactive tracers to outline heart chambers and major blood vessels leading to and from the heart. This enables damaged heart muscle, valve disorders or heart failure, to be diagnosed.
Oedema: the accumulation of an excessive amount of watery fluid in cells, tissues, or serous cavities.
Omega-3 fatty acids: polyunsaturated fats in which the last double bond between carbon atoms is located three carbons from the end of the chain. Oily fish contains Omega-3. Hemp seed oil, walnut oil and flaxseed oil contain constituents (ALA) that turn into Omega-3 within the body.
Orthomolecular medicine: curing disease via nutritional therapy.

Oxygen free radicals: Unstable molecules produced by the body's metabolism in which oxygen atoms are abnormally charged. Oxygen free radicals contribute to atherosclerosis, principally by damaging (oxidising) LDL cholesterol.
Pacemaker: a pacemaker is a small electronic device that is used to help the heart beat regularly.
Pacing threshold: the minimum electrical current required to trigger a heartbeat.
Partially hydrogenated fats: unsaturated fats that have had hydrogen atoms attached to their carbon chains during processing, also known as trans-fatty acids. Margarines or polyunsaturated vegetable oils used to deep fry foods can have a large quantity of these dangerous fats.
Percutaneous transluminal coronary angioplasty (PTCA):a minimally invasive procedure used to open clogged arteries. A catheter with a tiny balloon at its tip is positioned in the narrowed artery, the balloon is inflated and deflated to compress blockage, to improve blood flow.
Pericardium: the outer layer of tissue that forms the heart's structure.
Peripheral pulse: a pulse that is felt away from the centre of the body, such as in the legs or feet.
Peripheral vascular disease: encompasses a broad spectrum of arterial and venous narrowing, occlusions, aneurysms or malformations outside coronary and cerebral circulatory systems.
Pericytes: also known as Rouget cells or mural cells, are associated with all vascular capillaries and venules, they are thought to play a role in blood flow.
Phagocyte: an immune system cell that attacks and engulfs invading organisms, removing the dead cells. See macrophage.
Platelets: structures, found in blood, that are known primarily for their role in blood coagulation.
Platelet aggregation: platelets that stick together to form clots.
Platelet aggregation test: (also known as a coagulation test) a blood test that shows the length of time it takes blood to clot.
Plaque: a deposit of cholesterol, calcium, inflammatory cells, etc. in the wall of an artery.
Polyunsaturated fats: fats that contain two or more double bonds between adjacent carbon atoms because hydrogen atoms are missing.

Potassium: a mineral found in the cells, needed for maintaining fluid balance. Good sources of potassium are bananas and orange juice. Salt substitutes usually contain potassium chloride.
Potassium-sparing diuretics: agents used to treat patients with mild-to-moderate hypertension; their mechanism of action involves the excretion of sodium and retention of potassium.
Premature contraction: a beat that comes too soon and momentarily interrupts the heart rhythm.
Primary hypertension: Hypertension with no known cause, another name for essential hypertension.
Prostacyclin: a type of prostaglandin that causes blood vessels to widen and helps prevent blood clots from forming.
Prostaglandins: substances released by a number of tissues in the body; their actions include regulating smooth muscle contraction within blood vessels.
Pulmonary circulation: the passage of blood from the heart to the lungs and back again.
Pulmonary hypertension: is characterised by high blood pressure in the blood vessels that supply oxygen-depleted blood to the lungs.
Radionuclide imaging or radionuclide ventriculography: a type of nuclear heart scan.
Regurgitation of a Valve: this happens when a valve does not close properly and the blood is allowed to flow backward. This makes the heart work harder and can cause complications.
Renin: an enzyme that converts angiotensinogen to angiotensin I.
Renin-angiotensin system (RAS): a system of hormones and enzymes that plays an important role in regulating blood pressure and the body's balance of fluids and electrolytes, including angiotensin II; also known as renin-angiotensin aldosterone system (RAAS) when it includes aldosterone.
Resistance: the opposition to the flow of a fluid through one or more passageways, such as opposition to the passage of blood through a blood vessel.
Restenosis: the narrowing of arteries following balloon angioplasty.
Resting Heart Rate: An elevated resting heart rate is an indicator of cardiovascular disease in men (however studies have not shown the correlation in women). Healthy = Below 64 beats/min, Mild risk = 64 to 69 beats/min, Moderate risk = 70 to 75 beats/min, High risk = 76 to 80 beats/min, Above 80 beats/min the risk is 3 x normal.

Saturated fat: a type of fat found in meat, dairy products and some vegetables, in which all the carbon atoms are surrounded by their full number of hydrogen atoms, there are no double bonds between carbons. Saturated fats are less likely to oxidise when heated or used for cooking. The vegetables that contain saturated fat are: avocado, coconut, cocoa butter, palm kernel oil, and palm oil. Saturated fat from vegetable sources has been found to be healthier, and should be consumed within the confines of a normal balanced diet.
Secondary hypertension: high blood pressure caused by a diagnosable condition.
Simvastatin (Zocor): a popular statin since 1988, used in the MRC/BHF British Heart Protection Study (Lancet *2002; 360*: 23-33).
Sinus node: a group of specialized cells in the right atrium where the heart's electrical impulse normally begins.
Sinus rhythm: a term used to describe a normal heartbeat.
Sodium: a mineral, one of the body's electrolytes that, in excess, can contribute to high blood pressure. It is found in processed foods, baking soda, some antacids, and MSG (monosodium glutamate) etc.
Sphygmomanometer: (sfig-mo-mah-nom-eter) an instrument used to measure blood pressure. A cuff is wrapped around the arm and a measurement is taken. A stethoscope is used to listen to the sound of blood travelling through an artery.
Statins: cholesterol-lowering drugs, also known as HMG-CoA reductase inhibitors, that regulate the amount of cholesterol the liver produces and opens up receptors, to help eliminate it from the blood stream. They can cause depression and affect liver enzymes and muscle function. They deplete vital supplies of CoQ_{10} from the body. Now available from chemists without prescription.
Stenosis: narrowing of a heart valve, when the valve cannot open properly, usually due to plaque formation. This makes the heart work harder and more prone to damage.
Stent: is an expandable mesh tube that can be permanently inserted into an artery to help keep it open. Stents can be used along with angioplasty or following a heart attack.
Stress test: non-invasive procedure used to measure the heart's response to exercise (also known as an exercise tolerance test); the person rides a stationary bicycle or walks on a treadmill while a machine records heart activity.

Stroke: sudden loss of function of part of the brain because of lack of blood flow. A stroke can be caused by a blood clot (thrombosis) or the rupturing of a blood vessel in the brain. Around 70,000 people a year die in the UK after suffering a stroke. It is the third most common cause of death after heart attacks and cancer.
Stroke volume (SV): amount of blood pumped out of the ventricle during one contraction (heartbeat).
Supraventricular: that which originates above the ventricles, in the atria or AV node.
Sympathetic nerves: nerves that, when stimulated, cause a narrowing of blood vessels, and a subsequent rise in blood pressure.
Systemic circulation: the circulation of blood through the arteries, capillaries and veins of the general circulatory system.
Systolic blood pressure: the higher or top number in a blood pressure reading. The maximum pressure produced as the heart contracts. As systolic pressure rises, especially reaching or passing 140, so does the risk of heart disease.
Tachyarrhythmia: irregularity of heartbeat with a rapid rate.
Tachycardia: rapid heartbeat.
Target organ damage: refers to damage to organs associated with uncontrolled high blood pressure.
Thiazide diuretics: most common class of diuretics used to treat mild hypertension.
Tamponnade: pressure on the outside of the heart due to bleeding.
Thrombosis: the formation of red blood cells and platelets, in one of the arteries that stays attached to the artery wall until it grows large enough to block the blood supply. It can also break off and block smaller blood vessels.
Thrombus: a fibrinous clot that forms in, and obstructs, a blood vessel or a chamber of the heart.
Total serum cholesterol: a combined measurement of a person's high-density lipoprotein (HDL), low-density lipoprotein (LDL) cholesterols and usually includes triglycerides.
TPA: a drug that, if given up to three hours after a stroke, can dissolve the blood clot.
Trans-fatty acids: unsaturated fats that have been processed by adding hydrogen atoms back, producing a straightened or "trans" shape to the molecule (see partially hydrogenated fats). A high intake of trans-fatty

acids increases LDL and lowers HDL cholesterol, raising the risk of heart attack.

Triglycerides: fats carried through the bloodstream to tissues. Most of the body's fat tissue is in the form of triglycerides, which the body naturally stores for use as energy.

Vascular: referring to the blood vessels.

Vasoconstriction: a reduction in the diameter of a blood vessel.

Vasoconstrictor: substance that causes narrowing of a blood vessel.

Vasodilation: increase in the diameter of a blood vessel.

Vasodilator: substance that causes widening of a blood vessel.

Veins: blood vessels that carry the de-oxygenated blood from the body to the heart.

Ventricles: the two bottom chambers of the heart. See atria.

Ventricle fibrillation: the primary mechanism and arrhythmia seen in sudden cardiac arrest. The heart's structured electrical activity and automatic pumping stops. If not started, brain damage occurs, due to lack of blood flow to the brain.

Vulnerable plaque: soft plaque, subject to inflammation and infection, liable to rupture, and form a blood clot, which can cause a stroke or a heart attack. This type of plaque cannot, yet, be detected by a normal angiography.

Water pills: a common name for diuretics.

Water-soluble vitamins: vitamins that dissolve in water and can be eliminated naturally from the body via the kidneys. Vitamin B complex & vitamin C are water-soluble vitamins. Beta-carotene is a water-soluble precursor of vitamin A.

White blood cell count: a test to see how the immune system is working.

White-coat hypertension: a temporary increase in blood pressure experienced by some patients in a clinical setting (such as in a doctor's surgery) attributed to stress associated with having blood pressure measured by a doctor or nurse.

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