



YOUR
GUIDE TO A
**VEGAN
DIET**

Brought to you by **CYTOPLAN**

SINCE



1990

ABOUT CYTOPLAN

Cytoplan Ltd provides an innovative range of science-based nutritional supplements supplying the needs of healthcare professionals and consumers. The company was founded in 1990 by health practitioners, including doctors and nutritionists, with many years' experience in nutrition therapy.

Cytoplan is a leader in the highly specialised food-based supplementation sector with a product range continually developed based on the latest nutrition research for optimally 'bio-effective' products. Not all vitamins and minerals are the same and a bio-effective nutrient is one that will easily be taken up into human metabolic pathways and have a biological outcome that is beneficial to health.

Cytoplan is wholly owned by the AIM foundation, a charitable organisation that addresses the issue of community wellbeing plus health and nutrition projects in the UK and overseas. Cytoplan has supplied supplements to over 6,000 health professionals in the UK and overseas such as doctors, dentists and nutrition therapists. The company offers an incentivised, nurturing and supportive programme for health professionals and students.

THE INCREASE IN POPULARITY OF VEGAN DIETS

The number of people choosing a vegan lifestyle has increased significantly in recent years. Research published in 2016 showed over half a million people in Britain are vegans, an increase of 360% in the last decade.¹ In 2017, research commissioned by the Vegan Society found that over one fifth of respondents would consider becoming vegan.²

Having made the decision to follow a diet of healthy vegetables, fruits, nuts, seeds and wholegrains, vegans frequently eat foods wonderfully rich in a whole host of nutrients such as phytonutrients, fibre, folate, magnesium, potassium and vitamins C and E.

A high intake of fruit and vegetables has been linked in numerous studies with health benefits including a reduction in risk of a number of diseases such as cardiovascular disease and diabetes. Various mechanisms for this risk reduction have been proposed including the high levels of antioxidants and fibre found in plant foods.

On the other hand, vegan diets do need to be carefully planned to ensure adequate intake of protein, vitamins A, B12 and D3, iodine, iron, zinc, calcium and omega-3 fatty acids.³ However, it's not just people following a vegan diet who can be low in these nutrients, the National Nutrition and Diet Survey (2013/14)⁴ showed significant numbers of the population are low in omega-3 fatty acids, vitamin D, vitamin B12, riboflavin and iron (teenage girls and pre-menopausal women in particular are low in iron).



THE NUTRITION GAP

For many years now at Cytoplan we have presented the rationale that there is a nutrition gap in the diets of most people by virtue of several factors. The nutrition gap describes the difference between the level of nutrients the average person, eating a 'reasonable' Western diet, is obtaining from food and those nutrient levels identified by research as being needed for optimal health in the population.

Nutrient shortfalls are caused by a number of different factors, including dietary intake, and this means that most people are not getting the level of essential nutrients needed for health and protection on a daily basis. This deficit impacts adversely on both immediate and long-term health.



The nutritional status of our bodies is dependent on six factors:

- **Our food choices** – people often choose calorie-dense but nutrient-poor foods. There are plenty of unhealthy vegan foods (e.g. laden with sugar etc.)
- **Food growing, processing and preparation methods** – processing of food severely depletes nutrient content e.g. milling of flour reduces calcium, magnesium, zinc and folate
- **Modern farming methods** – soil depletion, transport, storage and deep ploughing all affect the nutrient content of food and studies have shown dramatic falls in levels of minerals in food over the past 80 years
- **Poor digestive health** – will affect the ability of our bodies to absorb the nutrients in the foods we are eating
- **Lifestyle factors** – such as smoking, stress, alcohol intake, medications etc. which all deplete nutrients and thus give rise to extra nutrient needs
- **Sedentary lifestyle** – our ancestors expended about 4000 calories as opposed to an average of 2000 today, therefore they consumed a greater amount of food to meet their energy requirements. We are now consuming fewer calories and fewer micronutrients (e.g. vitamins and minerals)

This leaflet outlines sources of nutrients that, in particular, may be low in vegan diets and suggests where supplementation may be a good idea.

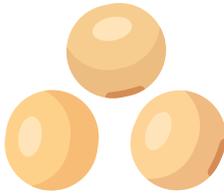


SOURCES OF NUTRIENTS



PROTEIN

Protein sources are plentiful in vegan diets – legumes, grains, nuts and seeds. However, plant sources of proteins are of lower quality than from animal sources due to one or more limiting amino acids. If a diet is inadequate in any essential amino acid, protein synthesis cannot proceed beyond the rate at which that amino acid is available. This is called a limiting amino acid. Thus, the efficiency with which plant proteins, compared to animal proteins, can be used to synthesise human proteins is lower. The exception to this is soya which has a protein quality score similar to that of animal proteins.

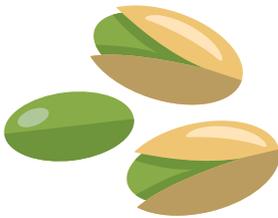


SOYBEANS

ONE AMINO ACID THAT VEGANS NEED TO PAY PARTICULAR ATTENTION TO IS LYSINE - THIS IS FOUND IN SOYA, LENTILS AND OTHER LEGUMES.



LENTILS



PISTACHIOS

QUINOA, AMARANTH, PISTACHIOS AND PUMPKIN SEEDS ALSO PROVIDE A REASONABLE AMOUNT OF LYSINE.



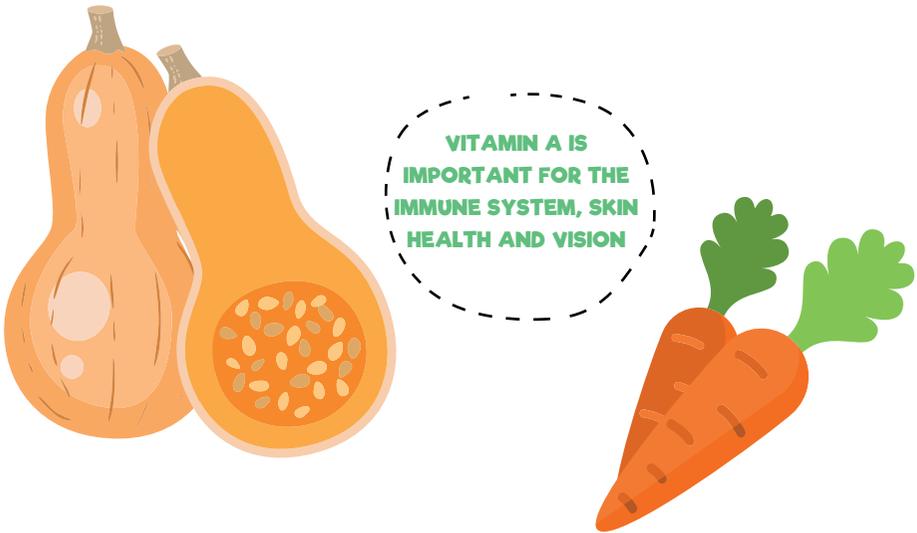
PUMPKIN SEEDS



VITAMIN A

The precursor to vitamin A is beta-carotene and this is found in yellow/orange vegetables such as carrots and squash. Beta-carotene needs to be converted in the body to vitamin A and some people do not carry out this conversion well.

Some vegans may benefit from supplementation with vitamin A and vegan vitamin A supplements are available. However current or ex-smokers and pregnant women need to be careful with vitamin A supplementation. In the case of smokers, long-term high dose supplementation should be avoided, however, smokers can nevertheless take vitamin A for short periods (e.g. a few weeks) to support immunity.



VITAMIN B12

Research has found both vegans and non-vegans are often low in B12. Vitamin B12 is primarily available from animal foods. In vegan diets some B12 is available from fortified foods and some seaweeds/fermented foods. However, most B12 in seaweeds are analogues of the vitamin and may compete with true B12 for absorption and assimilation.⁵

Vitamin B12 is important for nerve health and low levels can cause many symptoms including extreme tiredness, pins and needles, low mood and problems with memory.

Low B12 can lead to raised levels in the body of an amino acid called homocysteine, a risk factor for cardiovascular disease and cognitive decline. One study found raised homocysteine levels in 53% of vegans compared to 28% of vegetarians and 5% of omnivores.⁶ In another study, homocysteine was elevated in 66% of vegans and 45-50% of the omnivores and vegetarians.⁷ We recommend supplementation of vitamin B12.

**VITAMIN B12 IS
IMPORTANT FOR
NERVE HEALTH**



VITAMIN D

Some types of mushrooms and fortified foods provide low levels of vitamin D in vegan diets. However, these foods contain vitamin D2, rather than the superior vitamin D3 form which is better utilised in the body. The government's recommendation for vitamin D intake is 10µg per day (which is difficult for anyone to achieve from diet alone) and many nutritional therapy practitioners are recommending higher intakes than this. Most people are low in vitamin D, not just vegans.

Vitamin D can be synthesised by exposure to sunlight. However, at latitudes above 42 degrees, such as the UK, there is no vitamin D synthesis in winter; although excess produced in the summer can be stored in fat tissue. To maximise vitamin D synthesis during the summer, legs and arms should be exposed (without sunscreen) on sunny days, between 10am and 2pm, for 5 – 20 minutes per day as often as possible. The skin should not be allowed to go pink or red. Cloud cover will reduce vitamin D synthesis.

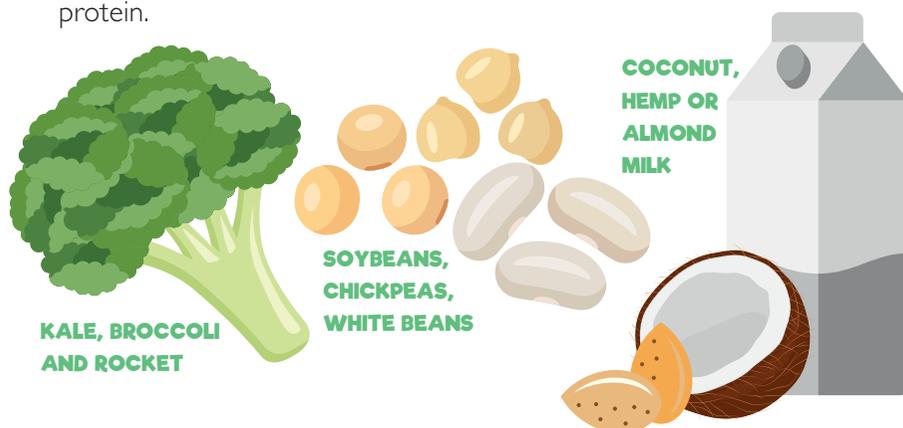
Vitamin D is well known for its role in bone health. However, it has many other important functions as well - deficiency can leave us vulnerable to infections (vitamin D is important for the immune system) and low levels are associated with many chronic diseases.

A photograph of a person sitting in a meditative pose on a grassy lawn. The person is wearing a light-colored, short-sleeved top and blue shorts. The background is a blurred green lawn. A dashed white oval contains the text 'MAXIMISE VITAMIN D SYNTHESIS DURING THE SUMMER'.

**MAXIMISE VITAMIN D
SYNTHESIS DURING
THE SUMMER**

CALCIUM

Good vegan sources of calcium include kale, broccoli, rocket and some beans. Calcium intake may be lower in vegans, however, adequate calcium intake can be achieved by including fortified non-dairy milks. Coconut, hemp or almond milk are the preferred choices; and plain soya yoghurt or tofu which will provide calcium along with some protein.



IODINE

As iodine cannot be stored in the body for a long period it must be obtained regularly via the diet. A 2003 study found that 80% of vegans were deficient in iodine.⁸ Low iodine levels can lead to problems with the thyroid gland and sometimes this can be severe. Iodine needs increase during pregnancy and breastfeeding.

Seaweed is an excellent source of iodine and hence ideal for vegans. It is easy to buy seaweed in the shops, it is also available in supplement form as 'kelp'. An important note of caution here is that the iodine content of different types of seaweed varies considerably. For example, nori seaweed is very low in iodine. Also, be aware that excessive iodine intake may cause thyroid problems.

IRON

There are plentiful sources of iron in vegan food sources such as pulses and tofu, although the iron in plant sources is not as well absorbed as from red meat (which is the most bioavailable form of the mineral iron). The average iron content of female vegan and omnivorous diets were reported in one study as 14.1mg per day and 12.6mg per day respectively.⁹ However, iron status, as measured with blood tests, is reduced in those eating a vegan diet.¹⁰ This is due to lower bioavailability of non-haem iron and constituents in vegan diets that inhibit absorption such as tannins/polyphenols, phytic acid and oxalic acid. As the phytic acid content of the diet increases, intestinal absorption of iron decreases.

Irrespective of dietary preferences, women during their menstrual years, and young girls particularly, should consider supplementing their diet with iron as their need for iron is greater (a good multivitamin/mineral will provide an adequate amount for most people).

ZINC

Similar to iron, zinc is plentiful in vegan diets but the bioavailability is reduced. Good sources of zinc include hemp and pumpkin seeds, and other grains, nuts and beans. Soaking, fermenting and sprouting foods can increase nutrient bioavailability. An all-round multivitamin/mineral will provide some additional zinc.



OMEGA 3

Eating oily fish provides the long-chain omega-3 fatty acids DHA/EPA which are needed for human health. Flaxseeds are a good plant source of the parent omega-3 called alpha linolenic acid (ALA). This can then be converted in the body to the long-chain omega-3 fatty acids EPA and DHA. However, this conversion is inefficient - less than 5-10% for EPA and 2-5% for DHA¹¹; conversion efficiency is affected by multiple factors.

Factors affecting conversion of ALA to EPA/DHA

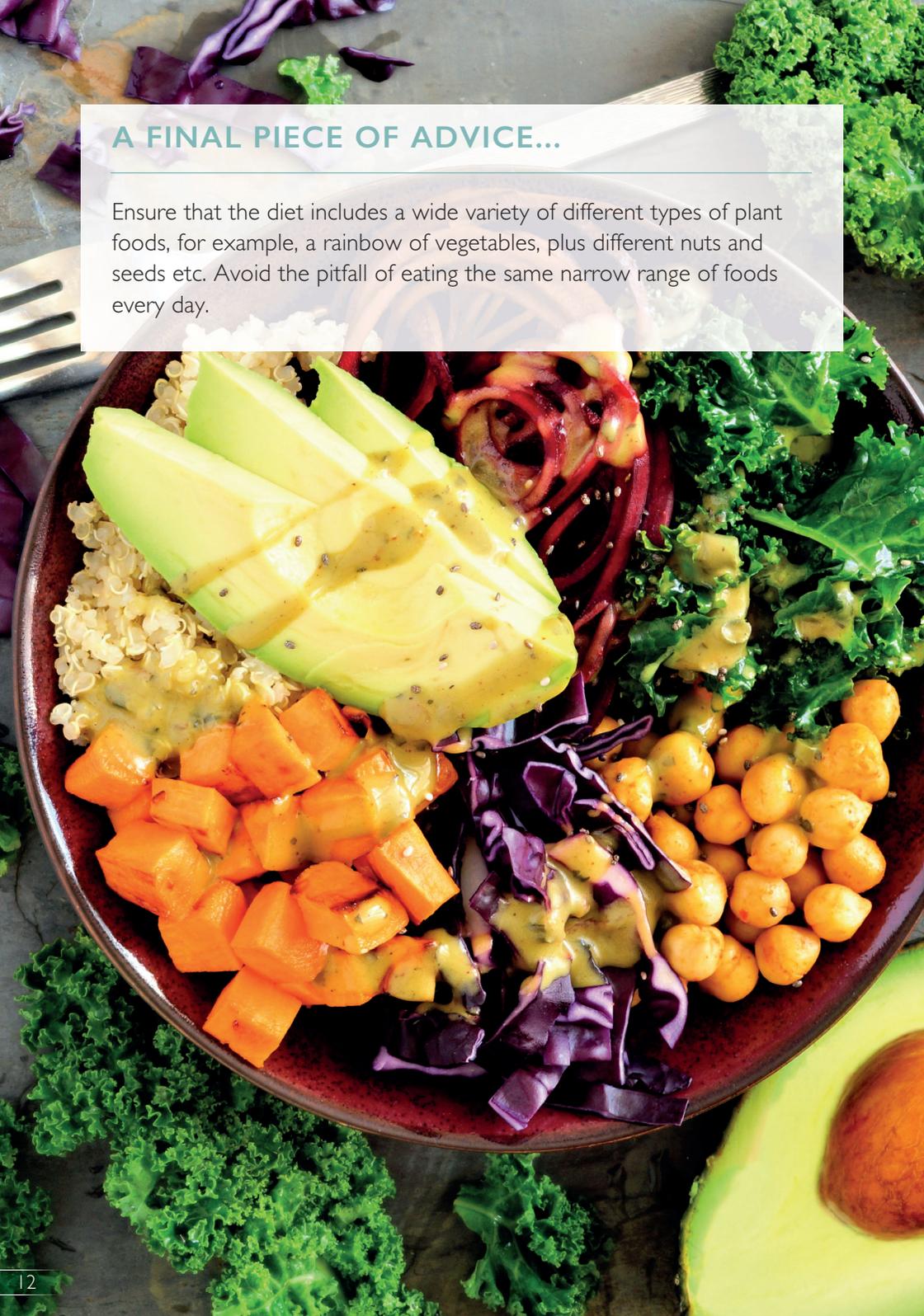
- **The balance of linoleic acid (LA) and ALA in the diet.**
LA is an omega-6 fatty acid found in nuts, seeds and their oils. Diets high in processed foods, margarines and sunflower oil may be high in LA and result in an unfavourable ratio of LA : ALA (i.e. a diet high in omega-6 relative to omega-3). These two fatty acids compete for the same enzymes and conversion of LA to AA is more efficient than ALA to EPA and DHA¹²
- **Compromised metabolism** (e.g. diabetes, metabolic disorders or genetics leading to limited ability to produce conversion enzymes)¹³
- **Suboptimal dietary intake** of B3, B6, vitamin C, magnesium or zinc which are cofactors for conversion enzymes¹⁴

Several studies have demonstrated that vegetarians and vegans have much lower plasma concentrations of omega-3 fatty acids (DHA and EPA).¹⁵ Some algae are high in DHA and in the last few years algae supplements have become available, harvested from microalgae.



A FINAL PIECE OF ADVICE...

Ensure that the diet includes a wide variety of different types of plant foods, for example, a rainbow of vegetables, plus different nuts and seeds etc. Avoid the pitfall of eating the same narrow range of foods every day.



IN SUMMARY

- Vegan diets are plentiful in sources of protein. However, plant proteins are less efficient at being used to make human proteins (compared to animal sources). Therefore, eating a range of protein containing foods daily is important – beans, pulses, grains, nuts and seeds.
- We recommend a good all-round multivitamin and mineral to ensure adequate intake of some micronutrients. So, it should contain good levels of vitamin B12, vitamin D3 (vegan sources are now available), iron and iodine.
- Vitamin A may also be recommended for some vegans. Beta-carotene in orange/yellow vegetables can be converted to vitamin A in the body; some people may not be able to do this well. Current or ex-smokers and pregnant women need to be careful with vitamin A supplementation.
- There are plenty of vegan sources of calcium – leafy greens and fortified foods. Non-dairy fortified milks such as coconut provide a useful source.
- Flaxseed provides a good source of the omega-3 fatty acid – alpha linolenic acid. This can then be converted in the body to the long chain fatty acids – EPA and DHA. However, some people do not carry out this conversion well. Omega-3 supplements derived from algae are now available – look for one that contains both DHA and EPA.
- As with any diet, food choices and variety are important. There are plenty of unhealthy vegan foods (e.g. foods high in sugar etc.) and some people eat a restricted diet with limited food types. Eat a rainbow of foods every day and over the week aim to eat a wide variety of different foods.

SUPPLEMENTS TO SUPPORT A VEGAN DIET

MULTI-FORMULAE

Foundation Formula 1 – all-encompassing Food State multivitamin and mineral formula with good levels of B vitamins, vitamin D3, iron, zinc, iodine and other trace minerals.

Women’s Wholefood Multi – this is a Wholefood multivitamin and mineral formula with good levels of vitamins and minerals. It provides a higher level of iron - 10mg per two capsule dose.

Pregna-Plan – specially formulated to support all stages of pregnancy and breastfeeding and ideal for preconception planning as well. A comprehensive wholefood multimineral and vitamin formulation comprising all of the most appropriate vitamins and minerals necessary for women and babies during preconception, pregnancy and breastfeeding.

Other products:

Foundation
Formula 2,
CoQ10 Multi,
Little People,
Nutri Bears
(children’s
chewable),
Organic Women’s
Multi



ESSENTIAL FATTY ACIDS

Omega 3 Vegan – a plant source of the omega-3 fatty acids, DHA and EPA. From marine algae.

Organic Flaxseed Oil – contains the omega-3 fatty acid alpha-linolenic acid (ALA).

Omega Balance – a plant source of the omega-3 fatty acids DHA and EPA along with the omega-6 fatty acid GLA.



VITAMINS

Vitamin A – Retinol palmitate, a vegan source.

Vitamin B12 – hydroxocobalamin is an inactive form of B12 which can be converted to the active methylcobalamin and adenosylcobalamin in the body.

Vitamin B12 – methylcobalamin and adenosylcobalamin which are the active forms of vitamin B12.

Vitamin D3 / K2 – providing 100µg (4000iu) of vitamin D3 from lichen and 100µg of vitamin K2 as MK-7, the most bioeffective form of vitamin K. Designed for short to medium term use (e.g. over the winter) to increase vitamin D levels. Can be used in conjunction with one of our multi-formulae. If long-term intake of vitamin D is indicated then we recommend checking levels regularly. People taking blood thinning medication should not take more than 100µg of vitamin K daily. In this case, we suggest taking one of our multi-formulae (which contain 60µg of vitamin K) alongside our High Potency Vitamin D3 (62.5µg per tablet).

Other products: Vitamin D3 drops (5µg), Vitamin D3 (62.5µg)



MINERALS

Wholefood Calcium – from calcified seaweed.

Organic Kelp – three species of seaweed rich in iodine. Sourced from a sustainable and clean supply of kelp and guaranteed free of all impurities and pollutants with Soil Association Organic standard certification.

Food State Iron – a gentle, non-constipating and bio-available (well absorbed and used) source of this important mineral. Food State vitamin C is included to aid absorption and molybdenum because it is a vital part of the enzyme responsible for iron utilisation.

Other products: Wholefood Iron

Food State Zinc – providing 15mg zinc and 1 mg copper. Zinc is provided with copper to prevent the possible risk of copper deficiency during long-term usage. Zinc and copper compete for the same absorption sites and long-term high dose zinc intake can ultimately cause a copper deficiency.

Zinc Citrate (30mg) – a non-food form of zinc, as a citrate it is readily absorbed into the bloodstream. High dose zinc supplement for short-term use. If taking longer term then consideration should be given to copper intake as zinc and copper compete for uptake and high dose zinc supplementation can deplete copper levels.

Other products: Wholefood Zinc



LIVE BACTERIA

Cytobiotic Active – contains 8 strains of live bacteria in a powdered form. Providing 3 billion bacteria per teaspoon.



For our full range of vegan products, please visit our website – www.cytoplan.co.uk or call 01684 310099.

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Science Based Supplements