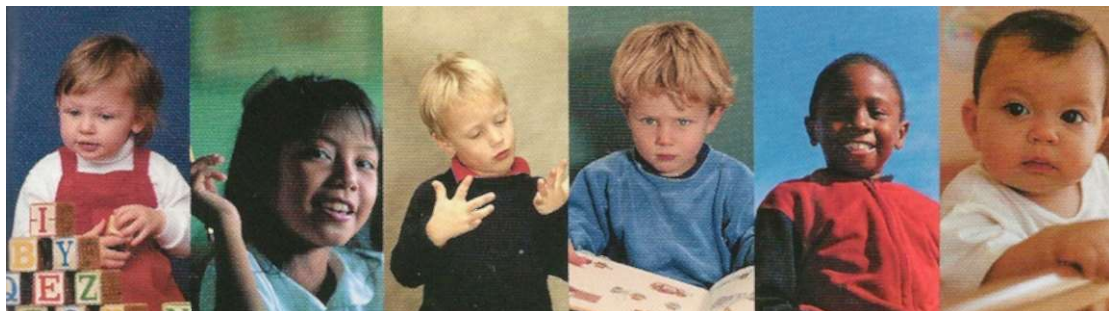


# **Essential Fatty Acids Minerals & Vitamins** and their importance in the management of ADHD / Hyperactivity

**A collection of documents & case histories**



**The Hyperactive Children's Support Group**  
[www.hacsg.org.uk](http://www.hacsg.org.uk)

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# WHAT ARE ESSENTIAL FATTY ACIDS? (EFAs)

*The following is a summary by the late Brenda Sampson of Wellington, of a 32- page transcription of a lecture given in 1987 by Udo Erasmus, the Canadian scientist, and author of "Fats That Heal & Fats That Kill".*

## INTRODUCTION

"The entire human body is made of food. So the quality of our health largely depends on the quality of our food".

There are 45 known essential nutrients; we have to have them to live and be healthy. The body cannot make them, so we must get them in their natural state from the food we eat. Of the 45, 20 are minerals, 15 vitamins. Eight are essential amino acids (building blocks of protein), two are essential fatty acids (building blocks of fats and oils).

Major nutritional research shows that over 60% of the North American population is deficient in one or more essential nutrients.

Over 75% of the North American population die of degenerative diseases; 50% of heart disease, 23% of cancer, 5% of diabetes, 1% of multiple sclerosis; this has not always been so; in 1900, 14% died of heart disease and only 3% of cancer.

## FATTY ACIDS

In chemistry, acid does not mean sour tasting; it means something which will combine with a mineral to form a new compound.

Fatty acids are the major component of all fats and oils. There are hundreds of them in nature; some saturated (solid fats), some unsaturated (liquid oils).

Some are non-essential, but two are essential to health; these two are called Essential Fatty Acids or EFAs. What does essential mean in this context? Answer: You absolutely have to have them to be healthy; you die if you don't get any. The body cannot make them from other things, so you have to get it in its natural state from the foods we eat.

These two EFAs are actually two families; the Omega 3 family and the Omega 6 family.

## THE OMEGA 3 FAMILY

The Parent of the Omega 3 family is called Alpha Linolenic Acid (LNA). It is found in linseed (called flax seed in USA because it is the seed of the linen flax plant) and also in many nuts & vegetables. Alpha is just Greek for the letter A.

From LNA the healthy body makes several derivatives:

1. Stearidonic Acid (SDA)

2 From SDA, the body makes, in a couple of steps, EicosaPentaenoic Acid (EPA).

EPA is found in fish oils, which are now recommended for heart health, clean arteries and arthritis relief.

3. From EPA, through a couple more steps, the body makes DHA (DecosaHexaenoic Acid).

DHA is also found in fish oils and is needed for brain development in the foetus, and adult brain function. (I was told 60 years ago that fish was good for the brain).

So you have alpha Linolenic Acid (LNA) from linseed oil, becoming SDA, which becomes EPA (found in fish oils) which becomes DHA.

## THE OMEGA 6 FAMILY

The parent of the Omega 6 Essential Fatty Acid family is linoleic acid (LA). LA is found in seeds and seed oils, e.g. safflower, sunflower etc. From LA healthy bodies make gamma linolenic acid (GLA). GLA is found in evening primrose oil and in mother's milk. From GLA the body makes another derivative. Dihomo-gamma-linolenic acid (DGLA) which is the parent of the hormone-like Prostaglandin 1. (PG1) series.

From DGLA the body can also make arachidonic acid (AA) which is the parent of the Prostaglandin 2 (PG2) series. Arachidonic acid is also found in animal fats from meat and eggs.

### **WHAT DO EFAS DO IN THE BODY?**

Omega 3 and Omega 6 fatty acids are essential, we can't do without them. If we lack them, we degenerate slowly; if they are completely missing we degenerate quickly. When stores are completely used up, we die. Why are they so important? What do they do?

1. They are needed for the transport and metabolism of cholesterol and triglycerides. (Metabolism is the process of turning food into energy for all our activities) EFAs lower blood levels of cholesterol & triglycerides.
2. EFAs are needed for brain development and function. In animals, deficiency of Omega 3 and Omega 6 in pregnancy produces learning-disabled offspring. Omega 3s are also needed in the retina for vision; in the synapses (junctions) of the nervous system; in the adrenal system for coping with stress, and for sperm formation.
3. They are needed in the cells, and in the structures surrounding the cells. Deficiencies cause leaky membranes; leaky membranes are one of the causes of allergy. When undigested food goes through a leaky gut into the blood the immune system sees it as an invader and attacks it. This is a cause of allergic reactions.
4. EFAs stimulate metabolism, increase metabolic rate, increase oxygen uptake, and increase energy production.
5. From EFAs, the body makes derivatives that are the parents of three kinds of Prostaglandins. Prostaglandins are very important. They occur in every tissue of the body. They have five known functions; (possibly other unknown ones).

### **FUNCTIONS OF PROSTAGLANDINS**

1. They regulate the stickiness of the little platelets in the blood that causes the blood to thicken and clot.
2. Prostaglandins regulate the muscle tone (or tension) of the arteries. When the arteries relax, blood pressure falls. When they constrict, it rises.
3. PG's regulate inflammatory response. The word ending 'itis' means inflammation. Starting at the top with meningitis, you can have an 'itis' or inflammation of any part of the body.
4. Prostaglandins regulate sodium excretion through the kidneys. When sodium is excreted, water goes with it. When sodium is retained, water is also retained leading to swelling. E.g. swollen ankles, swelling of the uterus or breasts.

## ESSENTIAL FATTY ACIDS INTERACTIONS WITH OTHER NUTRIENTS (CO-FACTORS)

A whole series of co-factors, including magnesium, biotin, pyridoxine, nicotinic acid, iron, zinc and ascorbic acid are required for the normal metabolism of **linoleic acid**. All these nutrients must be present in adequate amounts if EFAs are going to have their expected effects. In the context of EFAs and immune responses, it is possible that zinc, vitamin C and pyridoxine are of particular importance. It is well known that zinc deficiency leads to severe immunological abnormalities and also to a clinical syndrome which is remarkably similar to that of EFA deficiency. A lack of zinc seems to have two separate effects on EFA metabolism: it interferes with the Enzyme-Delta 6-desaturation of linoleic acid to GLA and also with the conversion of DGLA to PGE. Vitamin C deficiency leads to major suppression of normal immune function. Vitamin C specifically stimulates the formation of PGE, as opposed to PGs derived from AA, and this effect could explain many of the features of clinical ascorbic acid deficiency. This too could be important in view of the frequency of borderline or frankly subnormal vitamin C intake in the elderly and in people of all ages on poor diets.

**GLA** = gamma Linoleic Acid    **DGLA** = Dihomo-gamma-linolenic acid  
**PGE** = Prostaglandin E    **AA** = Arachidonic acid

### CO-FACTORS

**PYRIDOXINE (B6)** seems to be required particularly for EFA elongation but also for desaturation, perhaps explaining why pyridoxine deficiency is also common in Western society, especially among the elderly, and why its supplementation is associated with improved immune responses. Vitamin B6 tends to raise serotonin levels. Deficiency can cause tension, irritability, insomnia and nervousness.

**ZINC** is a very important trace element needed for enzyme activity. (Enzymes are used for chemical changes in the body). Zinc is needed for growth, wound healing, eyes, pancreas and many other nutritional functions. Symptoms associated with zinc deficiency include reduced taste sensation, lack of appetite and white spots or bands on fingernails.

**VITAMIN C** deficiency leads to major suppression of normal immune function. Vitamin C specifically stimulates the formulation of PGE1. It is very important in all areas of the body.

**ALL THE B GROUP VITAMINS** are necessary for the functioning of the nervous system.

**MAGNESIUM** is a mineral that helps to utilize the vitamin B complex along with vitamins C and E. It helps to regulate the acid-alkaline balance in the body and has a quieting effect on the central nervous system.

An **integrated approach** to good nutrition, with particular emphasis on Zinc, ascorbic acid (Vitamin C) and pyridoxine (B6) is likely to lead to optimal results from EFA supplementation.

## ESSENTIAL FATTY ACIDS SIGNS OF DEFICIENCY

Symptoms	Deficiencies are common and an EFA deficiency will occur if:
ADHD, Hyperactivity, Mood Changes, Poor Attention Visual Problems Digestive Problems, Excessive thirst <sup>1</sup> or insatiable appetite, Dry flaking skin, 'Chicken Skin' -bumps on back of arms, thighs or cheeks, Brittle, soft or splitting fingernails. Eczema, Dry unmanageable hair. Dandruff, Asthma, Multiple allergies. Excessive or hard ear-wax.	Not enough EFA-rich foods are consumed.  Insufficient co-factors are given (Refer to page 12)  There is a high consumption of hydrogenated vegetable oils (ie. margarine and snack foods)  Consumption of too much white flour and processed food.  Consumption of too much sugar or subject suffers from Candida / Yeast infection

Both Omega 3 & Omega 6 EFAs are vital for health. Because there may be problems in converting Linoleic acid and alpha- Linolenic acid to their products, some people may not get relief from deficiency unless they take products such as GLA of the Omega-6 series and the EPA of the Omega-3 series

<sup>1</sup>NOTE: The HACSG SURVEY (see Page 24) showed that 80% of hyperactive children surveyed were always thirsty. Thirst is a cardinal sign of lack of EFAs.

## BENEFITS OF THE OMEGA 3 PROGRAMME

BIOCHEMICAL EFFECT	CLINICAL RESULT
Normalizes the body's fatty acids	Smoother skin; shiny hair; soft hands; Increased stamina; vitality; agility and zest for life.
Normalizes and rebalances Prostaglandins	Smoother muscle action; Improvement of many other functions
Reduces appetite	Eliminates 'bingeing' and addictive need for food
Stabilizes insulin and blood sugar levels	Keeps stamina high for longer periods
Strengthens immune system	Avoids or overcomes food allergies; fights off some diseases more effectively.
Increases fibre & aerobic bacteria	Promotes proper functioning of the digestive tract to avoid gas, constipation and other disorders.
Normalizes blood fats and lowers Cholesterol	Stronger cardiovascular system; Clear thinking
Corrects the body's thermogenic system (ability to burn off calories)	Burns off fat; increases cold weather resistance; increases comfort
Brings enjoyment of good health	Improved quality of life.

## NOTES ON EFA SUPPLEMENTATION OMEGA 3 & 6

- [1] Doses might vary. One child will suit recommended dose. Another will need more or less.
- [2] Start with half the dose recommended for age. Increase gradually in case the EFA supplement does not suit the child.  
This is especially important for young children.
- [3] Do not expect improvements for some weeks. We look for adverse reactions in first days/weeks.
- [4] Obtain small packs of EFA supplements for initial trial in case the product you have chosen does not suit the child.
- [5] Give all oils with meals. They can make you feel nauseous on an empty stomach. If children are too young or cannot take capsules, put in a small container enough butter or other vegetable spread, for one day, add that day's supply of oil from the capsule and mix thoroughly. Use throughout the day. It may not be noticed. Rub oil on soles of feet. It seems a good area for absorption.
- [6] Children require a plentiful supply of EFAs on a regular basis through diet and supplementation.
- [7] Before giving EFA supplements to children under two, [please contact the HACSG](#).
- [8] [Should your child suffer from EPILEPSY, you must seek advice before giving EFA supplements.](#)

### IMPORTANCE OF THE B GROUP VITAMINS

The B complex vitamins (there are 16 different B vitamins) function in the body as a 'group' and hence it is advisable to take a supplement as a 'complex' i.e. incorporating all the B vitamins in one tablet/capsule. They are essential for the release of energy from food and for the metabolism of fats and proteins. These vitamins help maintain healthy skin, hair, eyes, mouth, liver and the production of haemoglobin (blood). The brain and nervous system must have an adequate supply of B vitamins.

*NOTE: Children who are deficient in B group vitamins, need to be given a supplement of the complete B Complex, to prevent any imbalances. Most good quality children's vitamin and mineral supplements should contain all the essential B vitamins.*

The B vitamins which are thought to be of particular benefit in ADD or ADHD are:

#### **B1: THIAMINE**

Thiamine has been termed the morale-boosting vitamin due to its positive effect on the nervous system. Thiamine helps to overcome emotional stress, depression and anxiety, confusion and poor memory, stabilizes appetite and stomach acid secretions, maintains normal heart function and is important to growth, lactation and fertility.

The following is an extract from a Medical Journal explaining the symptoms observed in patients who were deliberately given too little thiamine in their diet. This type of experiment would be considered unethical today.

"There are unmistakable, easily-demonstrated changes of personality, which are reflected in attitude, behaviour and effectiveness in performing tasks which previously had been performed readily. All subjects became irritable, depressed, quarrelsome, uncooperative and without knowing why, fearful that some misfortune awaited them. All became ineffective in their work. In part this could be attributed to weakness, in part to inability to concentrate, confusion of thoughts and uncertainty of memory, which required repeated consultation of spoken or written instructions....all subjects lost manual dexterity."

*(Williams R.D. et al; Induced thiamine deficiency and the thiamine requirement of Man Archives of Internal Medicine, 1942, 69(5), 721-738)*

Thiamine plays an important part in converting carbohydrates to glucose, the only type of sugar our bodies can convert to energy. It also ensures proper levels of oxygen in the blood for optimum release of energy.

Thiamine is quickly absorbed from food but cannot be stored in the body in significant amounts. For that reason a daily supply is required. The absorption of thiamine is blocked by many of the substances common to modern life: white sugar, white flour, alcohol, caffeine, antibiotics and contraceptive pills.

#### **VITAMIN B3: NIACIN / NICOTINAMIDE**

Niacin assists in the breakdown of nutrients and is essential for the synthesis of sex hormones (estrogen, progesterone and testosterone) and other hormones such as cortisone and insulin. Small quantities of niacin are present in most foods. Vitamin B3 assists macronutrient metabolism, strengthens digestion, improves blood circulation. It is vital to a healthy nervous system and normal mental function.

**DEFICIENCY SYMPTOMS:** Severe deficiency can bring about pellagra. Subclinical deficiencies common in modern life manifest themselves as indigestion, fatigue, mouth disorders, arthritis and headaches. In susceptible people, deficiencies can cause depression, dementia and even schizophrenia.



## VITAMIN B6

Vitamin B6 is a collective term for pyridoxine, pyridoxal and pyridoxamine phosphate. All forms are water-soluble, and readily excreted from the body, normally within eight hours of ingestion.

### *Where does it come from?*

All three forms are found in foods.

Good sources are meat, poultry, fish, egg yolk, legumes, peanuts and walnuts, bananas, avocado, cabbage, cauliflower, potatoes, prunes, wholegrain bread and cereals. Significant amounts will be lost through cooking, freezing, canning, and improper storage of the food.

### *What does it do?*

The presence of B6 is essential for the production of antibodies, hydrochloric acid, and red blood cells. It is also necessary for the absorption of B12. It has an important role in the metabolism of amino acids and essential fatty acids, and is also heavily involved in many enzyme reactions throughout the body, being a known cofactor in over 100. Improves concentration and memory.

This means that B6 is a very important nutrient. Known deficiency symptoms include skin lesions, anaemia, alopecia, conjunctivitis, impaired wound healing, weakness, pins and needles, muscle cramps, poor co-ordination in walking, irritability, nervousness, insomnia, hair problems, mouth sores and cracks, water retention, hyperactivity, heart disease (arteriosclerosis), infantile convulsions, vomiting, diarrhoea, abdominal distention and irritability. There are no diseases medically associated with B6 deficiency; however, the following conditions may also respond to B6 therapy - kidney stones, depression, carpal tunnel syndrome, asthma, dermatitis, acne, glossitis, autism and monosodium glutamate intolerance.

B6 should be taken as pyridoxal-5-phosphate (the active form of B6) as some children are unable to convert B6 from the diet into the active form (P-5-P) which can then be used by the body. Hence dietary intake does not necessarily show how much B6 is 'available' to the body for use.

#### CALCIUM

Adequate intake is important from birth to death. Role : essential for bone growth and calcification of the infant cartilages and teeth, for heart muscle function, for contraction of all muscles, for the substance holding body-cells together and correct function of some cell membranes. Found in: milk and cheese, in apples, bananas, oranges, green vegetables, eggs, potatoes, carrots, bone broth or jelly, whole grain products, fatty fish - herrings, sardines, salmon.

Deficiency: can cause pain in the joints, brittle bones and poor teeth.

#### MAGNESIUM

Role: helps transmit nerve impulses to muscles. Is necessary for the growth and repair of body cells. It has been found to help children become calmer and more responsive to the spoken word. It is a vital component in numerous biochemical reactions. Found in: nuts, soya beans, green vegetables, whole grains. Vegetable water from cooking should be kept and consumed. Deficiencies: can inhibit brain development, increase vulnerability to infections and can cause muscle twitches, cramps, tremor and emotional irritability. (Has been found to be very low in many HA children).

#### IRON

Role: essential for the oxygen-carrying constituent of blood. Found in: brewer's yeast, wheat germ, whole grains, egg yolks, fish, red meat, liver, raisins and all dried fruit, green vegetables. Vitamin C is necessary for complete uptake of iron in food. For children who are not salicylate sensitive, apples are helpful (they contain malic acid which helps iron absorption) and/or raisins soaked for twelve hours in lemon juice. Iron cooking pans may contribute trace amounts.

#### COPPER

Role: necessary for the efficient absorption of iron from food and for brain development and function. Since the invention of copper water pipes, deficiency is less frequent. Needed in minute quantities and generally sufficient if absorbed from food or water. However, often found to be at very low levels in hair of autistic or retarded children. This may sometimes be due to prolonged use of medication to control epilepsy and is worthy of further investigation.

#### MANGANESE

Role: essential for growth and skeletal development. Carries oxygen to the nucleus of the cell and is essential for correct brain function. This includes thought, memory and concentration. Frequently found to be VERY LOW in the hair of hyperactive children and epileptics. Both conditions respond to supplementation. Choline, pantothenic acid, folic acid, biotin, vitamin B6, essential fatty acids and vitamin E are required for absorption/usage. Found in: nuts, whole grains, dried fruits, green vegetables, seeds, bran, brown rice, oats, buckwheat, onions, strawberries, bananas, apples, pineapples, green beans, liver, poultry and sea foods.

#### CHROMIUM

Role: needed for insulin to utilize glucose. Found in: brewer's yeast, whole wheat, liver, beef, beets, beet sugar, molasses and mushrooms. Deficiencies: found in 'reactive hypoglycaemia' and diabetes.

#### ZINC

Role: needed for cell multiplication, i.e. mental and physical development. Found to be especially important in pregnancy, puberty, teething, and when fighting infection. Essential too for healthy growth, skin, wound healing, hair growth. (Has been found to be very low in HA also dyslexic children.) Found in all raw vegetables, especially peas and carrots, green vegetables, nuts, a small quantity in all fruit, liver, lean meat, chicken, whole grains, wheat buds, bran, oatmeal, eggs, milk. North Sea herrings and oysters.

#### SELENIUM

Role: essential for the skin and pancreas. Important in the prevention of cancer. Found in : brewer's yeast, garlic, liver, eggs, brown rice, whole wheat bread. It is not included in the Juno supplements as raised levels can be found following the use of shampoos containing selenium.

*NB: When there is an intolerance to dairy products, a supplement containing Calcium, Magnesium and Vitamin D will be required..*

## MINERALS & ADHD

### MAGNESIUM

Magnesium, like all nutrients, is essential. It is a major mineral and frequently found to be deficient in hyperactive children. Calcium requires magnesium for absorption and use.

Soft water areas will be deficient in Magnesium.

Magnesium helps regulate nerve cell function. It must be available in adequate amounts or the cells become hyper-reactive. Noises will sound excessively loud, lights will seem too bright and emotional reactions will be extreme and insomnia will occur.

Magnesium helps bind Calcium to tooth enamel.

Magnesium is needed to activate the enzyme needed to convert EFAs to Gamma Linolenic Acid.

White flour and white sugar, diets low in fresh vegetables, wholewheat and wholegrains, will be deficient in magnesium.

Chronic constipation, irritability, insomnia, anxiety, PMS, loss of appetite, tics and hyperactivity could be associated with magnesium deficiency.

Children require 100-200 mg. daily. If supplementation causes loose motions, reduce doses by half. Increase magnesium-rich foods- ie nuts, green vegetables, whole grains. Vegetable water from cooking can be kept and consumed.

[Magnesium is one of the co-factors for essential fatty acid metabolism.](#)

Help and advice from a Nutritional Practitioner and testing for magnesium levels is desirable. A Health Store can advise on suitable supplements.

It is essential to obtain proper advice with regard to magnesium supplements for babies and young children.

## MAGNESIUM - A KEY TO CALCIUM ABSORPTION

*This article appeared in the Australasian Health and Healing, Journal of Alternative Medicine, Vol &. No 1, September/November 1986 and is reprinted from A IRA Newsletter. August 1987.*

We are told today to keep our intake of calcium high to prevent the loss of this mineral from bones, for the development of bones and to prevent muscle cramps including some menstrual symptoms. Perhaps we should be aware that our ancestors ate a low calcium but a high magnesium diet. As a result, nature arranged for the retention of calcium and the excretion of magnesium. Magnesium mainly comes to us in foods high in chlorophyll, in whole seeds, grains and legumes. Modern diet is the reverse, with a dairy intake (high calcium) and a low whole grain and seed intake (low magnesium). It is argued by some that this change is causing what we call arthritis and osteoporosis. The more calcium we eat without the complimentary magnesium, the worse our problem becomes. Why is it that Western nations with their high calcium intake, are so ridden with these two diseases?

Consider the fact that people in these societies eat refined grains, few legumes, much sugar, alcohol and caffeine as well as a chlorophyll-poor diet. Sugar is involved in the excretion of magnesium. Oriental and Indian diets are rich in magnesium and poor in Calcium, they have little arthritis or osteoporosis. This is because they eat mostly grains, legumes and vegetables as well as seafoods. Another misunderstanding is that calcium actually makes muscles contract while magnesium makes them relax. When calcium is taken for muscle cramps, it knocks the magnesium out of the cells where it is available for immediate use. However, this results in a depletion of magnesium. It would be wiser to ensure that the diet was high in magnesium. Women who have a craving for chocolate (a high magnesium food), will lose this craving if they take magnesium supplements, especially before menstruation.

*Source : "Magnesium : A Key to Absorption" by Nan K Fuchs, PhD 'Let's live' July 1985.*

Comment: chocolate craving can also be due to other factors, e.g. chemical exposure and sensitivity.

## MORE ON MAGNESIUM

According to Dr Stephen Davies, a British researcher in the field of nutrition, "Magnesium is an extremely important element and it is also very commonly deficient in clinical practice. Without an awareness of the wide range of symptoms that can be produced by magnesium deficiency, and an ability to differentiate between other possible causes, practitioners may instigate inappropriate treatment. "

In his discussion of the benefits of magnesium therapy, Dr Davies said "simple therapeutic measures can produce remarkable results"

[Here is a summary of Dr Davies comments and recommendations:](#)

Average daily intake of a healthy adult should be between 400 and 800 mg of magnesium. However, requirements can increase in certain circumstances such as a high protein, high calcium, high phosphorous diet. A diet high in refined and processed foods is often deficient in magnesium.

Symptoms of magnesium deficiency include nervousness, anxiety, insomnia, twitching, tremor, depression and palpitations, muscles cramps, heart irritability, lethargy, muscle weakness, premenstrual tension, menstrual cramps, low blood sugar and constipation.

Commenting on children. Dr Davies said. "Children when suffering impairment of concentration and hyperactive behaviour (with or without sleep disturbances) should be thought of as magnesium deficient until proven otherwise. Though zinc, thiamine, pyridoxine (Vitamin B6) and calcium deficiencies can also be factors (as can food and chemical allergies), magnesium is often extremely helpful in "cooling them off". Additionally, autistic children who have been treated with high doses of Vitamin B6 may become fractious and in these instances, magnesium supplementation can be beneficial.

One of the features of these children is that many of them drink a lot of milk. This may have something to do with the extremely low magnesium phosphorous ratio of milk, which results in impairment of magnesium absorption. Drinking large quantities of milk increases magnesium requirements which are often not met by other sources in the diet.

[Good food sources of magnesium](#)

include wheat, green leafy vegetables (except spinach), buckwheat, cashews, almonds, kelp, wheat germ, Brazil nuts, blackstrap molasses and Brewer's Yeast.

### VITAMINS: FUNCTION, DEFICIENCY SYMPTOMS, BEST FOOD SOURCES, DAILY REQUIREMENTS

VITAMIN	FUNCTION	DEFICIENCY SYMPTOMS	BEST FOOD SOURCES
(Minimum Daily Requirement)	(Minimum Daily requirement)	(Minimum Daily requirement)	(Minimum Daily requirement)
A (Retinol) Children 1200 iu; Adults 250iu	Health of eyes, skin and tissues	Lowered resistance to infection; night blindness; catarrhal & bronchial infections Skin complaints	Oily fish; fish liver oil; kidney; dairy foods; margarine; green vegetables. Yellow fruit & vegetables
B1 (Thiamine) Children 0.5mg; Adults 1mg	Conversion of carbohydrates into Energy; health of nerves, muscles	Nervous disorders; poor skin & hair; depression Poor digestion	Lean meat; whole grains; wheat germ; soya beans; yeast; vegetables
B2(Riboflavin) Children 0.5mg; Adults 1-7mg	Health of skin, mouth, eyes, nails, hair	Dry skin & hair; mouth sores; ragged cuticles Nervousness; lack of stamina	Yeast; wheat germ; meat; soya beans; eggs Vegetables.
B5 (Pantothenic Acid) Children 2.5mg; Adults 5-10mg	Health of skin & hair, needed for all tissue growth and production of anti-bodies	Dry skin and bad hair condition.	Wholemeal bread; liver; yeast; brown rice; eggs Cereals; beans
B6 (Pyridoxine) 1 mg.(Women taking oral contraceptives need more)	Health of skin, nerves, muscles and essential for metabolism of protein esp. during childhood and pregnancy	Irritability; depression; skin eruptions; muscle cramps	Yeast; wheat germ, meat; wholemeal products; Potatoes; cabbage; milk; liver; fish.
B12 (Cynocobalamin) Children 0.5mcg; Adults 0-5mcg	Production of red blood cells, health of nerves, skin metabolism of protein.	Anaemia; tiredness; skin disorders; memory & Sleep disturbances; visual disturbances	Meat; liver; milk; fish; eggs.
BIOTIN Children 0.25mcg; Adults 1mcg	Thought to be necessary for cell function And health of skin	Skin abnormalities; depression; lassitude Muscular pain.	Liver, kidney; vegetables; nuts; eggs; yolk; yeast
CHOLINE & INOSITOL Children 2.5mg; Adults 10mg	Both essential for functioning of liver to prevent build-up of fats	Liver disorders; decreased alcohol tolerance.	Eggs, liver, yeast, offal.
FOLIC ACID 0.5mg	Concerned with use of proteins and blood formation	Certain types of anaemia.	Offal; Green vegetables; yeast.
B3 NIACIN (Nicotinic Acid) Children 5-10mg; Adults 15-18mg	Carbohydrate metabolism; health of tissues, esp.skin, nervous & digestive systems.	Slow growth in children; rough red skin; sore tongue; diarrhoea & other digestive upsets; dementia and confusion.	Fruit; raw vegetables; meat; wholemeal products Yeast; liver.
VITAMIN C (Ascorbic Acid) 30mg minimum, but more is required in certain conditions.	Healing of wounds; protection against infection; essential for health of cells blood vessels, gums and teeth.	Sore bleeding gums; slow healing of wounds; Lowered resistance to infection	Citrus and other fruits; raw vegetables.
VITAMIN D (Calciferol) Children 400iu; Adults 100iu	Formation of healthy teeth & bones; needed for calcium & phosphorous use.	Retarded growth; rickets; tooth decay; brittle or abnormal bones; weak muscles	Fish liver oils; sun's action on skin; butter & margarine; eggs; milk; fish.
VITAMIN E (Tocopherol) Not certain but estimated at 10 mg.	Precise role in body uncertain, but known to be necessary for fertility in animals. Health of veins, arteries, heart & circulation. Antioxidant.	Deficiencies observed in animals not humans	Wheat germ oil; Other vegetable & nut oils; Wholemeal bread; egg yolks; green vegetables
VITAMIN K Minimum unknown	Essential for blood clotting	Prolonged bleeding from cuts or sores.	Green vegetables; soya; beans; liver; oils.

#### ZINC IS IMPORTANT FOR:

- Action in at least 200 enzymes
- Membrane integrity
- Taste acuity and appetite
- Growth of cells
- Maturity, physically/mentally
- Sexual growth
- Behavioural difficulties
- Wound Healing
- Help with night vision

#### SUMMARY : ZINC DEFICIENCY OR COPPER EXCESS MAY OCCUR:

1. During pregnancy when growth and development require zinc.
2. During the first year when newborn has excess of copper and needs ZINC to balance the copper.
3. During the rapid growth the child requires adequate zinc.
4. From the twelfth year zinc is required for normal pubertal development of the male.  
Deficiency may cause growth lag. The pubertal development of the female may require less zinc.
5. During the teenage years at a time when zinc is at its lowest and copper is high, premenstrual tension occurs.

HACSG studies show that 69% of mothers of hyperactive children (mostly boys), have PMT.

6. From fifteen to twenty years stress of any kind causes loss of zinc, and in some people, stress causes excretion in the urine of kryptopyrrole which takes with it both zinc and Vitamin B6. Zinc and B group vitamins are low in ADHD children.

7. In adult life chronic zinc and B6 deficiency may predispose the cells to cancerous change.  
Wounds and burns require zinc to heal.  
Hypertensives are high in copper and low in zinc.

The HACSG has tested large numbers of ADHD children (mostly males), and with few exceptions, all have been deficient in zinc, some markedly so. MAGNESIUM is another essential mineral, which is often found to be low in hyperactive children. ADHD children are always under severe stress.

#### IMPROVEMENT IN LEARNING ABILITY

Zinc and iron are two of the most important minerals for all aspects of brain function. Children with learning difficulties seldom laugh or smile, dislike close contact and are difficult to settle. Zinc supplementation can completely transform these children. Restoration of smiling can be the earliest sign of improvement. Research has shown that university students with high body stores of iron have better learning ability, enhanced left-brain function (better analytical ability) and greater verbal fluency. If anaemic children fail to get an iron supplement early enough they can suffer from an irreversibly low IQ and poor learning ability right through their schooling years.

*Bob Buist in ADDSUP Newsletter, No. 25*

#### ROBBERS OF ZINC

1. Refining of flour. 78% is removed (present in wheat germ). Trace Elements and Nutrition. H.A. Schroeder. MD. Faber 1976.
2. Refining, of sugar. 98% is removed (present in molasses sold as cattle feed). (Ibid).
3. Refining of fats into lard. 98% removed (Ibid).
4. Hydrogenation of oils. 75% removed. (Ibid).

5. Leaching by excessive rainfall. Mental and Elemental Nutrients, Carl C. Pfeiffer, Ph.D., MD. Keats, 1975.
6. Glaciation of area - sandy soils, over cultivated soils as in Egypt, Iran and Iraq. (Ibid).
7. E.D.T.A. used in canning to enhance green colour of vegetables (Ibid).
8. Wholemeal flour without leavening (as in pastry, cakes, crumbles, sauces, scones, etc.), because [phytate](#) content prevents absorption of the Zinc (Ibid).
9. Throwing away water in which vegetables have been cooled (Ibid).
10. Presence of copper in (1) pig and chicken feeds which reappears in pig and chicken flesh.(2) Copper cooking utensils. (3) Water pipes in areas of soft water (Ibid).
11. Cadmium in the air from electro plating, etc. displaces Zinc. Trace Elements and Nutrition, H.A. Schroeder. MD, Faber (1976) Same in water and from galvanised milk cans and traffic.
12. Superphosphate fertilizers which are high in cadmium Fertilizer Application, Andre Voisin. (1965)

*Courtesy of H.C.Hills, 1982*

## **ZINC FOR GROWTH, GENERAL HEALING AND PREVENTION**

Children's behaviour, physical growth, mental development, immunity from environmental toxins and disease may all be affected by proper nutrition. Feeding kids wholesome meals plus giving a daily vitamin/mineral supplement will provide the nutrients needed for optimum health. Severe malnutrition stunts growth. Recent evidence suggests that marginal deficiencies may also keep some children from reaching optimum height.

In Ontario, at the University of Guelph, researcher Rosalind Gibson studied 60 healthy but shorter-than-average Canadian boys. Sixteen were found to be marginally zinc deficient. Although nearly all boys had zinc intakes exceeding dietary recommendations, some needed more zinc in their diets than their peers or the zinc wasn't being absorbed. One of the first symptoms of zinc deficiency is an impaired appetite. When Gibson gave eight zinc-deficient boys 10 mg .of extra zinc a day for a year, they grew faster than boys without supplements. Since zinc is essential for cell and bone growth, children and teens-especially boys-need more during growth spurts.

According to Michael Hambidge, M.D., of the University of Colorado, and other researchers, many children lack sufficient zinc. Moreover, Hambidge's studies show that zinc deficient children tend to have impaired taste, poor appetites, slow growth and impaired resistance to infection.

**Signs of zinc deficiency include:** skin stretch marks; impaired hair and nail growth; brittle nails which may have white spots or will be generally opaquely white, hair will be brittle, lacking pigment and may change to a deeper colour with zinc therapy; facial skin acanthosis, a severe form of acne (the skin lesions frequently clear with zinc and vitamin B6 therapy); painful knee and hip joints; cold extremities with poor peripheral circulation; and delayed wound healing.

Stress of any kind depletes the body of zinc. Burn patients end up with body tissue zinc at such low levels that normal healing is retarded. Most burn centres now use dietary zinc supplements in all their patients.

In 1978 a study conducted at the Brain Bio Center in Princeton, New Jersey, showed clearly that [vitamin C and zinc together protect against lead poisoning](#).

For twenty-two workers in a battery plant where the air was so filled with lead that many workers showed signs of lead poisoning, the researchers saw a 26% drop in blood levels of lead after 24 weeks of supplementation of both vitamin C and zinc. Other measurements also showed a decrease in lead levels. These changes were striking in view of the fact that they were achieved while the workers were on the job, constantly exposed to high levels of lead.

Researchers theorize that vitamin C and zinc may prevent the absorption of lead from the digestive



tract. Biochemist Rhoda Papaioannou said "Vitamin C and zinc might also prevent the symptoms of low-level lead poisoning. By increasing zinc and Vitamin C, everyone could be better protected against the inevitable lead exposure that is part of modern life. It would be better to clean up the environment, but in the meantime we can at least protect our bodies."

The nauseated pregnant woman is usually deficient in both vitamin B6 and zinc. Both are needed for growing tissues of any kind, and the foetus in the uterus makes extraordinary demands on the mother's supplies. Many pregnant patients who have had difficulty with previous pregnancies go through a pregnancy on a zinc and B6 nutrient programme with no difficulties.

Several researchers have shown that zinc deficiency in pregnant rats often results in stillborn pups, and those born alive often have one of a number of birth defects. Dr. Caldwell and his colleagues in Detroit have shown that rats born of zinc-deficient mothers are mentally retarded and do not learn as well as rats born in zinc-supplemented mothers. It has also been found that areas of the world where zinc has been depleted in the soil have a high incidence of learning disabilities among the children, as high as 30 per cent.

Studies of zinc deficiency with regard to brain function revealed depletion of zinc in the hippocampus after generation of the mossy fibres. This is compatible with the concept of the neurotransmitter role of zinc. Any deficiency in mossy fibre cells, or of zinc or histamine in the cells, might result in schizophrenic behaviour.

For some individuals a zinc deficiency may explain the severity and long duration of many illnesses, especially those caused by viruses or other infectious invaders.

Deficiencies of zinc are commonly recognized in crops and stock foods over most of the United States. Even when zinc is not actually lacking from the soils, deficiencies are caused by chemical fertilization saturating the soil solution to such a degree that zinc cannot dissolve in it or be absorbed by the plants. Because of this situation zinc is customarily added to feed for stock, though it is rarely included in supplements for humans. The only reliable food source seems to be shell fish. When foods are grown on good soils, nuts and green leafy vegetables are especially rich sources of zinc. Zinc is essential for the synthesis of body protein and the action of many enzymes. This nutrient is easily lost if cooking water is discarded. Food processing is designed to remove anything from food that will discolour, turn rancid or attract bugs

Bugs cannot grow without zinc, so 80% of the zinc is removed from wheat flour in the milling process. Corn starch has much less zinc than corn meal. Frozen peas have less zinc than backyard peas because the surface layer of trace metals is removed with EDTA in order to produce a brighter green when the peas are cooked. The same goes for broccoli and spinach, too. This bright green may be more appealing to the eye, but is certainly less nutritious.

All trace minerals can be toxic if taken in excess. Consult your physician if you suspect a zinc deficiency and go with his recommendations. Zinc deficiency can be detected by an informed clinical observer.

(Sources for the preceding information on calcium and zinc *The Healthy Celli News* Vol. 4, No. 6, February 1994; *Nutrients for Healthy Kids* published by Nutrition Now Inc., a wholesale supplement company, 2519 North Hayden Island Drive, Portland, OR 97217; *The Washington Post Health*. June 14, 1994; *Let's Eat Right to Keep Fit* by Adel Davis and *The Complete Book of Minerals for Health* by Sharon Faelton and the Editors of *Prevention Magazine*.)

## **ZINC & UNMANAGEABLE CHILDREN**

Children that are unsettled, frequently demanding attention, upset much of the time, and whose sleep is regularly broken during the night can be very wearying on parents.

Dr Joseph T. Hart, a paediatrician of Portland, Oregon, has found that by supplementing zinc you may be able to eliminate the problem of sleeplessness. He has supplied zinc drops to hundreds of children and in the majority of cases the chronic sleeplessness has disappeared.

- Dr K. M. Hambridge of Denver, Colorado, observed that zinc fed babies were much less irritable.



- [Dr Carl C. Pfeiffer of Princetown, New Jersey](#), demonstrated that supplementing zinc to pregnant women who had high copper levels would result in healthier babies.

Dr Hart observed that in babies who habitually wake up many times at night, with zinc supplementation in 2 to 3 nights the children are responding and sleeping through till morning, and continuing to do so.

Hart reports that zinc supplementation also produces improvement in appetite, daytime irritability, diarrhoea, skin rashes, and pallor. Older children whose wakefulness was followed by climbing out of bed, getting in bed with parents, lost those annoying habits.

Zinc also helps to get rid of the terrible two's. Within a week we often see a definite settling down and reduction of tantrums and the terrorising of poor mother. Zinc is being successfully used for learning-disabled children, for kids with seizures, skin lesions, and histories of infections.

Zinc is essential for new tissue formation. It is essential for white blood cell and antibody formation, and helps to neutralize toxic minerals in the body such as lead, cadmium and copper. It also seems to make other nutrients work better.

*From "Nutritional Summary" by Earl Conroy  
With thanks to Wellington Allergy & Hyperactivity Association, New Zealand.*

## SOURCES OF MINERALS

Magnesium	Wheatgerm, nuts, legumes, wholegrains, all dark green vegetables, dolomite, milk
Potassium	All fresh fruits and vegetables, all legumes, oatmeal. Potato, nuts, sweet potato, avocado, bananas, apricots, mushrooms, molasses, fish, milk
Calcium	Milk and its products, yoghurt, cheese, dolomite, seeds, bonemeal, dark leafy greens, legumes
Sodium	Celery, kelp, salt, cheese, seafoods
Sulphur	Garlic, onion, mushrooms, cabbage family, celery
Selenium	Liver, brewer's yeast, wheatgerm, egg, onion, garlic, kelp, goat's milk
Zinc	Liver, oatmeal, legumes, fish, oysters, seeds, grains, leafy vegetables
Iron	Liver, brewer's yeast, legumes, egg yolk, green leafy vegetables, wholegrains
Copper	Liver, brewer's yeast, eggs, heart, prunes, almonds, legumes

## OTHER ESSENTIAL NUTRIENTS

Folic Acid	Green leafy vegetables, liver, kidney, eggs, legumes, brewer's yeast
P.A.B. A.	Brewer's yeast, wholegrains, yoghurt, liver, kidney
Bioflavonoids	Pigment and pith of fruits and vegetables, buckwheat, citrus
Choline.	Lecithin, brewer's yeast, liver, legumes, wholegrains, milk, eggs, brains
Inositol	Lecithin, brewer's yeast, citrus, nuts, wholegrains

## CASE HISTORIES & SCIENTIFIC STUDIES



**Steven R.** six years old, with a history of hyperactivity, severely disturbed sleep and disruptive behaviour at home and at school.

Threatened with expulsion from school because of his impossible behaviour, his parents were given two weeks to improve matters. They contacted the HACSG and evening primrose oil was suggested. A dose of 1.5g was rubbed into his skin morning and evening. The school was unaware of this, but after five days the teacher telephoned the mother and said that never in 30 years teaching had she seen such a dramatic change in a child's behaviour. After three weeks, the evening primrose oil was stopped, and one week later the school again complained. The oil was reintroduced.

**Donald J.** is also a six year old, who from childhood has had disturbed sleep.

His concentration and speech were poor, he was abnormally thirsty and restless and often had stomach upsets. He was found to be sensitive to wheat products and on removing wheat from his diet, he became a changed child with normal sleep, behaviour and speech. On trial re-introduction of wheat products, he deteriorated, his pulse rate rose rapidly and his speech became almost incomprehensible. He was given three capsules of evening primrose oil and three Efavite tablets morning and evening by mouth. After two weeks on this regime, wheat was tried and no behavioural reaction or change in pulse rate occurred. Over the next four weeks he was gradually introduced to a normal wheat-containing diet with no evidence of the previous abnormal reactions.

**Charles B.** 11 years old, had eczema, disordered sleep and severely disrupted behaviour, which led to his expulsion from school.

He responded moderately well to a Feingold diet with a low dose of dexamphetamine. However, he still had bouts of disruptive behaviour. He was given three capsules of evening primrose oil by mouth each morning and evening. His eczema improved and over a period of eight weeks, he had no episodes of hyperactivity, even after eating forbidden foods.

**David K.** is 20 years old with a history of disturbed sleep and behaviour from birth.

He developed eczema and asthma during childhood and he was given dexedrine and phenergan from ages 8 to 14. He had very serious problems in school between 14 and 16. At 16 he began to follow a modified Feingold Diet and progressively improved. He was given three capsules of evening primrose oil and three tablets of Efavite morning and evening. His parents noted a rapid positive change with a more relaxed attitude to people and situations and more self-confidence.

**Keith F.** is a ten year old who has been partially deaf from birth, possibly due to rubella. He had poor concentration, rocked himself to sleep, and was impulsive, aggressive and uncooperative. He was attending a special school for the deaf and improved on the Feingold Diet, but he was still hyperactive and rapidly deteriorated following even minor indiscretions. He was given three capsules of evening primrose oil morning and evening, plus one multivitamin and one mineral tablet each evening. His mother reported that his behaviour and attitude have shown tremendous improvement and he has been promoted to the top academic group in the school. This seems to be due to his vastly improved behaviour, his better attitude to his work and his newly acquired ability to concentrate to a far greater extent than previously.

*Acknowledgements to Here's Health, November 1982*

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**My 11 year old son has attention deficit hyperactivity disorder and is taking Ritalin. Are there any nutritional ways of helping control ADHD symptoms instead of taking the drug?**

Attention deficit hyperactivity disorder (ADHD) is characterised by a lack of focused attention, hyperactivity and impulsive behaviour. It is thought to affect up to 10 per cent of children and is more

common in boys than girls. The exact cause of this disorder is not known but many researchers believe that an improved diet often helps ease the symptoms. Dr Basant Puri, a consultant in psychiatry at Hammersmith Hospital who researches ADHD and nutrition, says that there is now some evidence that a diet lacking in nutrients which are important for brain health such as essential fatty acids, magnesium, zinc and the B vitamins, can contribute to, if not cause, ADHD. "Other factors such as eating foods high in trans-fatty acids, such as chips and burgers, can prevent essential fatty acids from being metabolised, so cutting down on fried foods is also important".

**In a recent trial where 41 ADHD sufferers were given either fatty acid supplements or dummy pills, the 20 who were given the fatty acids showed a marked improvement while the others did not.**

Dr Puri recommends that your son eats a mixture of fatty acids from sources such as fish, nuts and seeds with plenty of fresh fruit and vegetables. In addition, a supplement which includes evening primrose oil and fish oils may help.

Sally Bunday, founder of the Hyperactive Children's Support Group, has also found that many children with ADHD respond very well to improved nutrition but recommends that you see your son's GP before stopping the prescribed medication. "It can take three months for the supplements and improved nutrition to work.

#### **Remarks from HACSG parents' reports on children's response to supplements of Essential Fatty Acids & co-factors...**

**Boy aged 5** • "Hyperactivity lessened, allergies improved. Initially took 3-4 days to show response and overall improvement was marked."

**Boy aged 4** • "Response almost immediate (3days) improvements sustained. When zinc taken out, symptoms reappeared... when zinc reintroduced, symptoms reduced again."

**Boy aged 4** • "Improvements seen after 1 week with evening primrose oil. After 2 weeks in general (including diet) improved speech, concentration, cooperation and understanding. Thirst back to normal."

**Boy aged 3** • "After 1-2 months was able to eat a less restricted diet without having any noticeable effects. Eczema and asthma somewhat better. My husband and I are thrilled with what the diet has achieved and that the world is at last able to see the lovable good child which we knew was always hiding in him. Results of infractions of the diet are not now so noticeable."

**Boy aged 7** • (Tourette's Syndrome) "His tics have virtually disappeared since being on these supplements. This was noticeable in the first week. Concentration definitely improved."

**Boy aged 6** • "Much calmer, less aggressive able to concentrate more at school... this started after stopping his blackcurrant drinks... but continued improving after 3 weeks on the supplements."

**Boy aged 12** • "Calmer, concentration better, mixing better, less aggressive (verbally), happier. Before hearing about HACSG my husband and I were heading for a breakdown. We feel that a weight has been lifted."

**Boys aged 7** • "A great deal calmer and better able to complete school work. Teacher impressed. Overactive bowel stopped within first week."

**Boy aged 7** • "General behaviour better. Less tearful and irritable. Patch of eczema he has had for approx 1 year has almost gone completely."

**Boy aged 2** • "Goes to bed easily at night on the first attempt and does not wake often in the night. We now have many uninterrupted nights. No nappy rash... and seems much happier in himself."

**Boy aged 5** • "Hyperactivity lessened, eczema and asthma improved. There has been a huge improvement in school, especially with aggressiveness."

**Boy aged 10** • Improvement in both eczema and asthma (now off Intal) school reports increase in concentration. Less frustrated."

**Boy aged 8** • "Eight-year-old catarrh problem has disappeared; constant thirst is normal now; easier to handle; less tantrums; better appetite. Diarrhoea and vomiting stopped; more colour in cheeks. School work improved on higher dose. Teacher said that there had been a big improvement in school work and behaviour getting good marks now. The school does not know he is on EFA's and Efavite!

## EFFECTS OF DIET & SUPPLEMENTATION

### Boy aged 10 at first contact.

Impossible behaviour at home and school. Poor handwriting, memory and mathematical skills. Dramatic response to EFAs: more sensible, more relaxed, "vastly improved handwriting and astonishing improvement in mathematics": within one term moved from the bottom of the class to the top: recently qualified as a lawyer 13 years' later.

### Boy aged 4 at first contact.

Dry skin, always thirsty, aggressive to other children and to mother, impossible to get to sleep at night, would not eat ordinary meals.

Within 2 weeks of starting EFAs stopped being thirsty, sleep and eating patterns became normal, 'mother no longer used as a punch bag'.

### Boy aged 2 at first contact.

A good baby while breast fed but on weaning became violent and at 20 months expelled from a toddler s group: extremely thirsty, cried incessantly and deliberately broke anything within reach: no fear of anything, constantly running into the road, rejected all mothering and cuddling. "On a day when one would have gladly have given away my little son, I wrote to HACSG and poured out my heart. It changed my life".

Within 3-weeks E was a different child. Now 6 he is a happy, well-adjusted child, doing well at school, with a demonstrative affectionate nature.

"I feel that his childhood was saved by HACSG and I cannot begin adequately to express my gratitude".

### Girl aged 2 at first contact.

Constantly unhappy, day and night. Specialised in emptying cupboards into the toilet. Always thirsty. Within 3 weeks of starting EFAs, less thirsty, contented to play properly with toys, calm sleep throughout the night, much happier and less disruptive, no need for sedatives. Now 4 years later a normal, healthy child whose mother says "I cannot thank HACSG enough".

### Boy aged 10 at first contact.

Very hyperactive even during pregnancy.

Always thirsty, impulsive and clumsy. Disruptive at school and referred to psychologist. Very poor school performance; Excellent response to EFAs: happier all round, school work better, handwriting greatly improved. Mother writes "although you did not promise a miracle I think you have given us one."

*NOTE: The supplement Efavite mentioned in some of the case histories is no longer available. Alternatives are available however. Please refer to page 26 of this booklet for a list of supplement suppliers.*

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### FISH OIL PILLS MAY AID PUPILS WITH LEARNING DIFFICULTIES

**FOOD SUPPLEMENTS** might produce radical improvements in the educational ability of children with learning difficulties, research shows.

Children whose lives are blighted by such neuro- developmental disorders as dyslexia, dyspraxia, hyperactivity or autism could gain by taking a daily supplement of fish and plant extracts, the researchers suggest.

Preliminary results from their six-month investigation into the benefits of supplements found that taking a combination of fish oil, evening primrose oil and vitamin A could have a startling effect on children's concentration and learning.

Analysis at the halfway stage of the study shows remarkable advances among children taking the supplements, while those on a placebo have not shown any improvement.

One child's reading skills improved by the equivalent of four years after only 12 weeks of taking the supplements, the study found. Other children appeared brighter, more out-going and found concentration easier.

Andrew Westerman, head-teacher at the 480-pupil Timothy Hackworth Primary School in Shildon, Co Durham, which is taking part in the study, said: "Some children have become more outgoing and lively as new connections are being made in their brain. It is like lights being switched on." He said he hoped the supplements would help his pupils "achieve their very best".

A total of 120 pupils aged between six and 11 at 13 primary schools in the county have joined the six-month trial, run by a research team led by Dr Madelaine Portwood. She is a senior educational psychologist at Durham County Council's education authority. The project has also shown substantial improvements in the social skills of some children. Half of the pupils are being given daily supplements, the other half receiving a placebo. No child knows which substance he or she is taking.

Dr Portwood is interested in the theory that [the recent rise in learning difficulties is caused by changes in children's diet](#).

She said: "Why are there so many more children with developmental problems? [The most significant change in the last 20 years has been the diet of children, and that is why we are exploring the use of food supplements. This really is a major landmark study which could make a real difference.](#)"

Dr Portwood added: "The children's social skills seem to be improving because they are more confident. They are becoming more socially inter-active and perhaps this increases the motivation to learn." The researchers believe their study could lead to new treatments for dyslexia and other learning disorders.

The project is based on the theory that learning difficulties may be caused by children's metabolisms, which leave them short of essential fatty acids. The study may be widened to children without learning difficulties and to adults if the study's success continues.

Two years ago, a research project in Oxford showed that children displayed impressive improvements in concentration and behaviour after being given supplements containing evening primrose oil and fish oils.

Dr. Portwood and her 10-year-old son are taking the food supplements. She said she had noticed a marked improvement in him since he started taking the capsules.

"I wouldn't give them to him if I did not feel they were beneficial" she added.

[Reproduced from The Independent, 14th May, 2002.](#)

## ESSENTIAL FATTY ACID METABOLISM IN BOYS WITH ADHD/HYPERACTIVITY DISORDER

*Another study supporting the biochemical basis of behaviour.*

Laura J. Stevens, and other researchers at Purdue University demonstrated that boys diagnosed with ADHD are likely to have difficulty metabolizing essential fatty acids (found in oils derived from certain plants and seafood).

The Journal of the Hyperactive Children's Support Group (HACSG) notes:

"The study showed that these children had more temper tantrums, problems getting to sleep/waking up, head/stomach aches, more colds, asthma, hayfever, chronic stuffy noses and eczema, more than 10 ear infections since birth, more had had surgical tubes in ears."

Excessive thirst, as well as dry skin and hair are clinical signs that can indicate poor EFA metabolism.

The HACSG has long recommended parents consider supplementing the diets of hyperactive children with oils rich in essential fatty acids, and with a group of vitamins and minerals believed to enable the EFAs to be metabolized.

In 1981 an HACSG paper documenting many of the characteristics of EFA deficiency among hundreds of children was published in Medical Hypothesis.

Other Feingold groups abroad have experimented with supplementing their childrens' diets with oils high in EFAs to see if it alleviated symptoms, but the results were not conclusive.

Stevens et al, write that supplementation may be more successful if it were based on "individual fatty acid profiles." The Purdue study follows earlier work in this area which suggests that poor EFA metabolism can be a factor in behavioural or neurological dysfunction.

*Sources:*

*American Journal Clinical Nutrition 1995;62:7618,1995*

*Journal of the HACSG, No. 53.*

## RESULTS OF THE HACSG SURVEY

Here are some of the important findings from our 1979 survey of hyperactive children belonging to the HACSG.

In May 1991 our research paper A Lack of Essential Fatty Acids as a possible cause of Hyperactivity in Children' was published, based on these findings.

- 1 • At least half our children have shown a good response to the diet and more have shown a partial response. Like others we have found that foods containing synthetic colouring material such as tartrazine, preservatives such as butylated hydroxy toluene and butylated hydroxy anisole (BHT & BHA) and foods containing natural salicylates are the main offenders.
- 2 • Also like others we have found that many more boys than girls are affected. Of 214 children, 161 were boys. Males are known to have a higher requirement of Essential Fatty Acids than females.
- 3 • A range of minor and sometimes major health problems repeatedly recurred in about four fifths of our children. They included infantile colic, eczema, asthma, rhinitis, and repeated chest and ear infections.
- 4 • We took hair samples from 31 boys and 15 girls and had them analysed by Dr E. J. Barlow of the Department of Environmental Health, University of Aston, Birmingham. 24 of 31 boys and 7 of 15 girls had zinc values below the normal range. Zinc is an important factor in the metabolism of Essential Fatty Acids.



5 • About four fifths of our children were consistently thirsty. This was particularly striking in families which contained normal children as well as a hyperactive one. Thirst is a cardinal sign of the lack of Essential Fatty Acids.

6 • Some of our children who had not responded or had responded only partially to the Feingold Diet did respond to a regime which eliminated all milk and wheat products• There was a striking preponderance of fair and ginger haired children in the Survey Group.

7 • SALICYLATES are known to block the formation of substances called PROSTAGLANDINS (PGs) and it was suggested that we should show our findings to a research scientist in Canada who has done work on PGs. He pointed out that many of our observations were consistent with the idea that hyperactive children might be deficient in PGs notably PGE1 which is formed from the essential fatty acid dihomo-gamma-linolenic acid (DGLA).

PGE1 is known to be very important in the control of the IMMUNE SYSTEM, BEHAVIOUR, KIDNEYS, THIRST and ASTHMA. Essential fatty acids (EFAs) are like vitamins in that they cannot be made by the body but must be taken in via foods. The polyunsaturate of overwhelming importance in the human diet is LINOLEIC ACID. This is the major active constituent of such vegetable oils as corn oil, sunflower and safflower oils. (If possible these should be bought as 'cold pressed oils').

But Linoleic Acid as such has little biological activity and in order to be of use to the body as an EFA it must be converted to gamma-linoleic acid (GLA). Our research suggests that some hyperactive children may be unable to form PGE1 because of either an inadequate supply of essential fatty acids or of the co-factors: zinc, vitamins B3, B6 and C, necessary for the conversion of Essential Fatty Acids to Prostaglandin E1.

Simple dietary supplements of EFAs and co-factors can be given to overcome these problems and full details are given in our research paper/parents notes.

*Please contact HACSG before giving Evening Primrose Oil to children under 2 years and to children/adults with epilepsy.*

## SUPPLEMENT SUPPLIERS

### BIO-CARE Ltd.

1 Hedera Road, Ravensbank Business Park, Redditch, Worc, B98 9EY  
Tel: 0121 433 3727 [www.biocare.co.uk](http://www.biocare.co.uk)

### BIO HEALTH Ltd.

The Herb Place, Medway City Estate, Rochester, Kent, ME2 4HU  
Tel: 01634 290115 [www.bio-health.co.uk](http://www.bio-health.co.uk)

### EQUAZEN:

Suppliers of Omega 3 & Omega 6 suppliments. [www.equazen.co.uk](http://www.equazen.co.uk)

### THE GREEN PEOPLE COMPANY Ltd.

Nutritional supplements and other organic health products. [www.greenpeople.co.uk](http://www.greenpeople.co.uk)

### HIGHER NATURE

10 Discovery Way, Horam, TN21 0GE  
Tel: 0800 458 4747 [www.highnature.com](http://www.highnature.com)

### LAMBERTS Healthcare Ltd

1 Lamberts Road, Tunbridge Wells, Kent TN2 3EH.  
Tel: 01892 554312. [www.lambertshealthcare.co.uk](http://www.lambertshealthcare.co.uk)

### VITABIOTICS

"OsteoCare" Calcium, Magnesium, Vit.D, Zinc and supporting nutrients.  
Available from Health Stores, supermarkets and Boots.

HACSG would like to thank Biolab Medical Unit for their generous support towards the Hyperactive Children's Support Group

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