

# Hypo Health News

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<p>The Hypoglycemic Health Association of Australia PO Box 830, Kogarah NSW 1485 ABN 6584 6851 613 Phone: 02 9553 0084 Fax: 02 9588 5290 Registered Charity: CFN 16689 Website: <a href="http://www.hypoglycemia.asn.au">www.hypoglycemia.asn.au</a></p>	<p><b><i>In this Issue:</i></b></p> <ul style="list-style-type: none"><li>• President's Report</li><li>• Treasurer's Report</li><li>• Hypoglycemia: an article by Dr Sarah Myhill including sections on nutritional supplements and exercise</li><li>• Oral Allergy Syndrome by Dr Daniel More</li><li>• Sue Litchfield's update on her travels in the USA</li><li>• Member Survey Re: Change of Name</li></ul>
<p>The Newsletter of the Hypoglycemic Health Association of Australia is distributed to members of the association and to Health Professionals with an interest in Nutritional Medicine and Clinical Ecology. Past newsletters are also available on the website.</p>	<p><b>PATRONS</b></p> <ul style="list-style-type: none"><li>• Dr George Samra</li><li>• Steve McNaughton BE (NSW)</li></ul> <p><b>PRESIDENT</b></p> <ul style="list-style-type: none"><li>• Dr George Samra</li></ul> <p><b>SECRETARY</b></p> <ul style="list-style-type: none"><li>• John P Natoli</li></ul> <p><b>TREASURER</b></p> <ul style="list-style-type: none"><li>• Sue Litchfield</li></ul>
<p>Our next Public Meeting (and AGM) will be at <b>2pm</b> on <b>Saturday 7 August 2010</b></p> <p>at <b>YWCA</b> (Check Noticeboard in the lobby near the lift on arrival) <b>5 – 11 Wentworth Ave, Sydney</b></p> <p>Our guest speaker will be <b>Dr George Samra</b> speaking about <b>"Diabetes Prevention"</b></p> <p>Can you please RSVP to Sue Litchfield on 0418 217 364 or email <a href="mailto:litch.grip@bigpond.com">litch.grip@bigpond.com</a> to assist with the organisation of the catering.</p> <p><b><i>(Don't forget to put the next meeting of the year in your diary: 4 December 2010 – speaker and topic to be announced in the next newsletter)</i></b></p>	<p><b>CATERING</b></p> <ul style="list-style-type: none"><li>• Reg Grady</li><li>• Sue Litchfield</li></ul> <p><b>AUDITOR</b></p> <ul style="list-style-type: none"><li>• Michael Pendlebury (Chartered Acc't)</li></ul> <p><b>NEWSLETTER EDITOR</b></p> <ul style="list-style-type: none"><li>• Susan Ridge</li></ul> <p><b><u>Dr George Samra</u></b></p> <p>Dr Samra is a practicing medical practitioner at Kogarah, in Sydney, who has published several articles and books on hypoglycemia and food allergies.</p>

## **LETTER FROM THE PRESIDENT**

As Dr Samra has recently taken up the role as President, he will provide his report at the next meeting. He has asked me to convey his condolences to the family and friends of one of our previous presidents, Geoff Goninon, who died recently. Geoff joined the association after his wife, Margaret, was diagnosed with hypoglycemia, and he later became the president for around 18 months. He worked tirelessly to help the hypoglycemic cause whilst he was involved with the Association, and is sadly missed.

## **LETTER FROM THE TREASURER, SUE LITCHFIELD**

Because we did not have a quorum at the last meeting, we were unable to have our AGM. However as our President, Lyn Grady, had tendered her resignation, it was voted that Dr George Samra would take over the role of our new President.

The name change to “**Diabetes Prevention Association of Australia incorporating The Hypoglycemic Health Association of Australia**” has not been formally voted for, but hopefully at the next meeting we will get a quorum. A \$5 voluntary donation would be appreciated for those attending the next meeting. Afternoon tea will be provided.

I am sorry I have not been able to do any recipes for this newsletter as at the moment we are on a cruise. I have written more on my travel experiences in the newsletter. I would like to take this opportunity to thank Susan Ridge for all the work she has put into our newsletters and from the members response they have been very well received. I shall be home the 1st week of July and will be attending the August meeting.

**If anybody would like to receive a meeting reminder by email**, could you please email me at *litch.grip@bigpond.com* and I will ensure a reminder is sent to you prior to the meeting.

**Congratulations** - Our congratulations go to Amittee Goulton and her husband Richard on the birth of a 7 pound daughter Ashley Eleanor born 9th May. Both mother and daughter are very well. Amittee as you all know has, over the years, donated a lot of her spare time updating and creating our web page.

## **Hypoglycemia**

*(This article was copied and modified from the website of Dr Sarah Myhill of the UK – [www.drmyhill.co.uk](http://www.drmyhill.co.uk))*

### **Introduction**

It is critically important for the body to maintain blood sugar levels within a narrow range. If the blood sugar level falls too low, energy supply to all tissues, particularly the brain, is impaired. However, if blood sugar levels rise too, then this is very damaging to arteries, and the long term effect of arterial disease is heart disease and strokes – this is caused by sugar sticking to proteins and fats to make AGEs (Advanced Glycation Endproducts) which accelerate the ageing process.

Normally the liver controls blood sugar levels. It can create the sugar from glycogen stores inside the liver and releases sugar into the blood stream minute by minute in a carefully regulated way to cope with body demands, which may fluctuate from minute to minute. Excess sugar, flooding into the system after a meal, can be mopped up by muscles, but only as long as there is space there to act as a sponge. This occurs with exercise - the right sort (see article following). This system of control works perfectly well, until we upset it by eating the wrong thing, or not exercising. Eating excessive sugar at one meal, or excessive refined carbohydrate, which is rapidly digested into sugar, can suddenly overwhelm the muscle and liver's normal control of blood sugar levels.

We evolved over millions of years eating a diet that was very low in sugar and had no refined carbohydrate. Control of blood sugar therefore largely occurred as a result of eating this Stone Age diet and the fact that we were exercising vigorously, so any excessive sugar in the blood was quickly burned off. Nowadays the situation is different - we eat large amounts of sugar and refined carbohydrate and do not exercise enough in order to burn off this excessive sugar. The body therefore has to cope with this excessive sugar load by other mechanisms.

When food is digested, the sugars and other digestive products go straight from the gut in the portal veins to the liver, where they should all be mopped up by the liver and processed accordingly. If excessive sugar or refined carbohydrate overwhelms the liver, the sugar spills over into the systemic circulation. If it is not absorbed by muscle glycogen stores, high blood sugar results, which is extremely damaging to arteries. If one were exercising hard, this would be quickly burned off. However, if one is not, then other mechanisms of control are brought into play.

The key player here is insulin, a hormone excreted by the pancreas. This is very good at bringing blood sugar levels down and it does so by shunting the sugar into fat. Indeed this includes the "bad" cholesterol LDL. There is then a rebound effect and blood sugars may well go too low. Low blood sugar is also dangerous to the body because the energy supplied to all tissues is impaired. It is when the blood sugar is low that this is called hypoglycemia. Subconsciously people quickly work out that eating more sugar alleviates these symptoms, but of course they invariably overdo things, the blood sugar level then goes high and one ends up on a rollercoaster ride of blood sugar going up and down throughout the day. Ultimately this leads to metabolic syndrome or syndrome X - a major cause of disability and death in Western societies, since it is the forerunner of diabetes, obesity, cardiovascular disease, degenerative conditions and cancer.

### **Sugar and fast carbs are addictive**

The problem is that when the blood sugar is high, people feel boosted by this high level of blood sugar. This is because they have good energy supply to their muscles and brain, albeit short-term. The problem arises when blood sugar levels dive as a result of insulin being released and energy supply to the brain and the body is suddenly impaired. This results in a whole host of symptoms - the brain symptoms include difficulty thinking clearly, feeling spaced out and dizzy, poor word finding ability, foggy brain and sometimes even blurred vision or tinnitus.

The body symptoms include suddenly feeling very weak and lethargic, feeling faint and slightly shaky, rumbling tummy and a craving for sweet things. The sufferer may look as if they are about to faint (and indeed often do) and have to sit down and rest. The symptoms can be quickly alleviated by eating something sweet - if nothing is done then the sufferer gradually recovers. These symptoms of hypoglycemia can be brought upon by missing a meal (or one's usual sweet snack top up such as a sweet drink), by vigorous exercise, or by alcohol. Diabetics may become hypoglycemic if they use too much medication.

So the brain likes sugar. Running a high blood sugar allows the brain to function efficiently and also releases the happy neurotransmitters such as GABA and serotonin which have a calming effect. We all recognise this because the comfort-eating foods are carbohydrates. The second problem is that we have a "thermostat" for blood sugar (this is, if you like, a measure against which blood sugar levels are compared and controlled), which I suspect gets set upwards if blood sugars run consistently high. I believe this because I've seen several people with diabetes who run consistently high blood sugar levels but feel hypo if their blood sugars drop below 7 or 8. **So whatever interventions one makes to control high blood sugars must be done slowly so that this "thermostat" can be gradually reset.**

### **The fermenting gut**

This is a major cause of hypoglycemia because sugars (or carbohydrates that are digested to sugars) are fermented to produce various alcohols. These destabilise blood sugar levels. *(There is enough information on Dr Myhill's website to fill many pages and I will publish more on this in the next newsletter.)*

### **Energy supply to the brain**

The brain's preferred fuel supply is fat. Eating a low fat diet and relying on sugar to nourish the brain is a little like running your car on reserve petrol tank rather than a full tank. The brain goes into panic mode at the prospect of the fuel supply running short and produces adrenaline which results in all the symptoms of hypoglycemia. This ensures a petrol station is just round the corner as one rushes for a carbohydrate snack!

### **We have a sugar addiction gene**

This makes perfect evolutionary sense. We evolved eating a **Stone Age Diet**. But every so often there would be a carbohydrate bonanza - perhaps the banana tree would ripen. The only way primitive man could take advantage of this would be by eating the lot! Bananas do not store well and one is at risk of

someone else eating them. Once he started eating, the carbohydrate addiction gene would switch on and he would go on eating until there was none left. He would gain weight which would give him energy for other tasks such as building the house, fighting the neighbours, getting the wife pregnant or whatever! **The carbohydrate gene is switched on when just 3% of the diet contains sugar.** The trouble with Western diets is they are high in sugar and refined carbohydrate and so the sugar addiction gene is permanently switched on. When you can get your sugar intake low, the gene is switched off and you stop craving.

### **Disturbed sleep is a common symptom of hypoglycemia**

When blood glucose levels fall for any reason, glycogen stores in the liver may be mobilised to prop them up. Another rapid and very effective way in which the body repletes the low glucose is by conversion of short chain fatty acids to glucose. In a healthy person on a good balanced diet the only time this is of importance is during the night because of the long break between food intake. Short chain fatty acids are used to prop up circulating glucose and prevent a fall below whatever that person's usual fasting glucose level is. Short chain fatty acids are made in the gut by bacteria fermenting fibre (and such starch as escapes small intestinal digestion). Production is maximised from about 3 hours after food intake. That is to say, short chain fatty acids are highly protective against the dips we see in blood sugar.

Therefore, a key symptom of a hypoglycemic tendency is disturbed sleep. This occurs typically at 2–3 am, when blood sugar levels fall and there are insufficient short chain fatty acids to maintain a blood sugar. Low blood sugar is potentially serious to the brain, which can only survive on sugar and, therefore, there is an adrenalin reaction to bring the blood sugar back, but this wakes the sleeper up at the same time. The commonest symptom of alcohol causing hypoglycemia is sleeplessness. Initially alcohol helps one to go to sleep, but then it wakes one up in the small hours with rebound hypoglycemia.

### **Insulin is a stress hormone**

There is a final twist to the hypoglycemic tale which complicates the situation further. When one becomes stressed for whatever reason, one releases stress hormones in order to allow one to cope with that stress. Insulin is such a stress hormone and has the effect of shunting sugar in the blood stream into cells. This produces a drop in blood sugar levels and also causes hypoglycemia. Therefore, hypoglycemia can be both a cause of stress and the result of stress, indeed, another one of those vicious cycles that are so often seen in disease states.

### **Symptoms of hypoglycemia**

Hypoglycemic symptoms and manifestations can be divided into those produced by the counter-regulatory hormones (epinephrine/adrenaline and glucagon) triggered by the falling glucose, and the neuroglycopenic effects produced by the reduced brain sugar.

- **Adrenergic manifestations**

Shakiness, anxiety, nervousness, palpitations, tachycardia, sweating, feeling of warmth, pallor, coldness, clamminess, dilated pupils (mydriasis), feeling of numbness, "pins and needles" (parasthesia)

- **Glucagon manifestations**

Hunger, borborygmus (intestinal rumbling/growling), nausea, vomiting, abdominal discomfort, headache

- **Neuroglycopenic manifestations**

Abnormal mentation (thinking/thoughts), impaired judgment, nonspecific dysphoria (unhappiness), anxiety, moodiness, depression, crying, negativism, irritability, belligerence, combativeness, rage personality change, emotional lability, fatigue, weakness, apathy, lethargy, daydreaming, sleep confusion, amnesia, dizziness, delirium, staring, "glassy" look, blurred vision, double vision, automatic behaviour (also known as automatism), difficulty speaking, slurred speech, ataxia, incoordination, sometimes mistaken for "drunkenness", focal or general motor deficit, paralysis, hemiparesis, paresthesia, headache, stupor, coma, abnormal breathing, generalized or focal seizures.

### **Treatment of hypoglycemia**

- **Low glycaemic index diet**

Treatment is to avoid all foods containing sugar and refined carbohydrate. One needs to switch to a diet which concentrates on eating proteins, fats and complex (and therefore slowly digested) carbohydrates. Initially I suggest doing a high protein, high fat diet, but include all vegetables (care with potato), nuts, seeds, etc. Fruit is permitted but rationed, since excessive amount of fruit

juices or dried fruits contain too much fruit sugar for the liver to be able to deal with. I suggest one piece of fruit at mealtimes.

- **Nutritional supplements** - what everybody should be taking all the time even if nothing is wrong.
- **Exercise - the right sort** (see the following article).
- **Brain Fuel** - The brain's preferred fuel are ketones which the liver synthesises from medium chain fatty acids. The best source of these is coconut oil. This fuel source is much more constant than glucose and highly protective against hypoglycemia. Coconut oil 10-20ml twice daily is often very helpful! The brain loves fat! If the brain runs short of fats and ketones, it can swap to short chain fatty acids (which come from the large bowel fermenting soluble fibre and can provide up to 500kcal a day) or worst, sugar. The trouble with sugar is it is a short term fuel, like running on reserve tank. The brain is constantly assessing the fullness of the tank and if the tank starts to run low, the brain stimulates the release of adrenaline - this will bring blood sugar up for the brain but one then suffers from the adrenaline effects.
- **Probiotics**. I consider taking high dose probiotics an essential part of controlling low blood sugar. This is because probiotics ferment carbohydrates to short chain fatty acids – these have no effect on blood sugar and are the preferred fuel of mitochondria. The best and cheapest way to do this is to brew your own – we should all be taking these all the time and double the dose following antibiotics and gastroenteritis. Probiotics also displace yeast, which worsen the hypoglycemia problem.
- **Fermentation in the gut and CFS** - a fermenting gut produces alcohol which further destabilises blood sugar levels (more on this in the next newsletter).
- **Additional supplements - niacinamide and chromium** are particularly helpful. I recommend taking a high dose for two months. Both these supplements have a profound effect on blood sugar levels to stabilise them but sometimes have to be given in high doses initially to kick start the necessary mechanisms. By this I mean niacinamide 500mgs, 3 daily at mealtimes and possibly double this dose. Rarely, niacinamide in these doses can upset liver enzymes but this is accompanied by nausea – so if you feel this symptom, reduce the dose to 500mgs daily. Niacinamide is a really interesting vitamin – it shares the same action as diazepam (Valium) to produce a calming effect which is not addictive. I suspect it works because so much anxiety is caused by low blood sugar and niacinamide helps prevent this.
- **Allergies to foods** - this can certainly cause hypoglycemia – the top three allergens are grains, dairy products and yeast. But one can be allergic to any food!
- **Hypothyroidism - Symptoms:** lethargy, sensitivity to cold, heat intolerance, mood swings and depression, poor memory and concentration, joint pains and morning stiffness, headaches, vertigo and deafness, pre-menstrual tension, voice changes, loss of libido and susceptibility to viral infections. **Signs:** weight gain, fluid retention, puffy face, puffy eyes, hair loss (classically the outer third of the eyebrows), cold extremities and dry skin, rashes, eczema and boils, enlargement of the tongue, hoarse voice, hypoglycemia, constipation, menstrual problems, skin problems and tendency to infections, slow pulse or bradycardia (slow heart rate), goitre, infertility, digestive problems, slowed Achilles tendon reflex, carpal tunnel syndrome. Further useful information is the basal body temperature. Use a mercury thermometer to take the temperature in the armpit over 10 minutes immediately on waking. Temperatures consistently below 97.8 degrees F (36.6 degrees C) indicates slow metabolic rate. Remember that low body temperature can also be caused by poor mitochondrial function.
- **Adrenal problems and cortisol** - the job of the adrenal gland is to produce the stress hormones to allow us to move up a gear when the stress comes on. Cortisol raises blood sugar levels. It is largely excreted during mornings and declines as the day progresses - this is why we should feel at our best early in the day, and blood sugar problems get worse as the day progresses. Often people compensate for this by eating more as the day goes on and explains why many hypoglycemics do not need or eat breakfast with supper being the largest meal of the day. Changing all of the above will help. But it may be appropriate to do an adrenal stress profile and

actually measure output of the stress hormones cortisol and DHEA since a small supplement may be very helpful.

- **Sex hormones, The Pill and HRT.** These hormones all have the effect of raising blood sugar levels. Indeed this is the mechanism which is responsible for gestational (pregnancy) diabetes. The problem is that stopping these hormones then causes hypoglycemia and one gets withdrawal symptoms. I suspect it is part of the mechanism that makes these hormones so addictive.
- **Toxins and pollutants.** There was a fascinating paper in the Lancet that showed that the biggest risk factor for diabetes (and this is the end product of years of hypoglycemia as insulin resistance results) is the level of pollutants in the body (pesticides, volatile organic compounds and heavy metals). The paper showed that chemical pollutants were a greater risk factor than being overweight! It was suggested that the overweight problem reflected a larger chemical burden as the body tried to “dump” chemicals where they would be out of the way. When people who have the highest levels of POPs in the blood were compared to the people with the lowest levels of POPs in the blood, they were found to be 38 times more likely to be diabetic. The chemicals literally get in the way of many biochemical processes and prevent the body functioning normally. So for some people doing detox regimes is very helpful – ie far infrared sweating/saunas and improving liver detox with vitamins and minerals. We can easily test for pollutants in fat by doing a fat biopsy – this is a simple test, easier than a blood test!
- **Nickel toxicity.** Nickel toxicity is a very common problem and nickel is a substance often found stuck onto DNA. Nickel biochemically looks very much like zinc and so enzymes which normally incorporate zinc into them, in the presence of zinc deficiency, will take up nickel instead. This prevents the enzyme or the hormone from functioning normally. Clinically nickel toxicity often presents with hypoglycemia.
- **Fructose intolerance.** Fructose is fruit sugar generally perceived to be a healthy alternative to glucose. No problem if one is tolerant of fructose or if it is taken in small amounts, but intolerance of fructose, or excessive intake, can result in hypoglycemia. This is because the control mechanisms that apply to glucose are bypassed if the system is awash with fructose. In fructose intolerance (aldolase type B deficiency), fructose-1-phosphate builds up because it inhibits glycogen phosphorylase which is essential for the provision of glucose from glycogen and it also inhibits fructose-1,6-bisphosphatase which is essential for provision of glucose from protein and fat. This combination can result in severe hypoglycemia because it means effectively the body cannot mobilise glucose from stores in the liver for when blood sugar levels fall. This combination can lead to severe hypoglycemia. Even if the enzyme works perfectly well, excessive fructose intake will stress the same pathways. Sugar stores in the liver cannot be mobilised. Because liver uses up short chain fatty acids for the production of glucose to try to avoid this hypoglycemia, this tendency can be measured by looking at short chain fatty acids in the blood and also measuring levels of fructose-6-phosphate which gets induced in this situation. These three metabolic problems i.e. levels of short chain fatty acids, levels of fructose-6-phosphate and LDH isoenzyme (indicative of liver damage), can help diagnose this problem. I recommend people avoid tropical fruit (high fructose), and go for berries which are low fructose but rich in goodies!

Failure to tackle hypoglycemia is likely to result in **diabetes**. Indeed diabetes is an inevitable consequence of Western diets and lifestyles. On current figures, 50% of the UK population will be diabetic by the year 2030.

**Initial complications.** The problem for the established hypoglycemic is that it may take many weeks or indeed months for the liver to regain full control of blood sugar and therefore the symptoms of hypoglycemia may persist for some time whilst the sufferer continues to avoid sugar and refined carbohydrate. This means that when you change your diet you will get withdrawal symptoms and it may take many weeks of a correct diet before these symptoms resolve. This type of addiction is very much like that which the smoker or the heavy drinker suffers from.

With time, the regime can be relaxed, but a return to excessive sugar and refined carbohydrate means the problem starts again. Finally, many sufferers of hypoglycemia may need something sweet to eat immediately before and during exercise, until the body learns to fully adapt.

## Dr Myhill's advice on nutritional supplements

(Please note that Dr Myhill has created her own supplements in the UK and the editor has substantially altered the information contained on her website.)

- **In the mornings, take one multivitamin/mineral** daily (contains B vitamins which can cause insomnia, so don't take in the evening). The multi should contain vit A 2,000 i.u, B1 25mg, B2 25mgs, B3 50mgs, B5 100mgs, B6 as its active form pyridoxal-5-phosphate 25mgs, B12 30mcg, inositol 12mgs, PABA 10mgs, folic acid 400mcg, magnesium ascorbate 300mgs (vit C), Vit D 250i.u, Vit E 75i.u. (50mg). Also zinc 7.8mgs, manganese 300mcg, chromium 50mcg, iodine 50mcg, selenium 50mcg.
- **Morning and Evenings take Vitamin C** 1,000mgs - the best value source is ascorbic acid and mixed in water with a multi-mineral supplement (MMMs). When mixed in water with the MMMs, the minerals convert to the ascorbate, which enhances absorption of the minerals. OR take ascorbic acid with meals - this helps to digest protein and sterilise the upper gut. If ascorbic acid is not tolerated then use the neutral magnesium or calcium ascorbate .
- **Essential Fatty Acids** such as fish oils (also linseed, borage seed and evening primrose oils for vegans) - 4 capsules morning and evening daily for one month, then a maintenance dose of 2 capsules mornings only.

Dr Myhill is also trying MMMs as a cream rubbed onto the skin. This is very easy to do - simply take your daily dose of powdered minerals, mix it with a cream of your choice (such as aqueous cream) and apply after your daily wash. This appears to be very helpful where there are gut problems such as a fermenting gut, or when you just find the taste too awful!

**Sunshine and Vitamin D3** – Sunshine is necessary to make vitamin D. Vitamin D deficiency is extremely common and partly responsible for our epidemics of immune disorders (allergy and autoimmunity), osteoporosis, cancer and heart disease! So the maximum daily dose of vitamin D3 is 5,000iu. Sunshine is the best way to increase vitamin D levels. Thirty minutes of good sunshine on skin exposed by swimming costumes will give us about 5,000iu of D3.

**Salt** - If you are not eating processed foods, then you will need some salt. Use sea salt, which also contains very rare trace elements and which are also likely to be essential for normal metabolism. I suggest 1/4 tsp daily on food.

## Dr Myhill's advice on Exercise - the right sort

Exercise must be the right sort to give benefit. Humans, along with all other mammals, evolved living physically active. Most activity was long hours of sustainable activity, but there would be occasions when maximal activity was needed to, for example, fight an enemy or bring down a prey. Indeed one could argue that most internal metabolism is geared towards physical activity and indeed without this we cannot be fully well.

Exercise is just like food and water - one needs just the right amount. Too much risks injury and muscle damage, too little and we degenerate. We need the above mixture of steady state exercise combined with outburst of extreme energy to maintain optimal fitness. Just like with food, the type of exercise and the amount is critical. Thanks to research and practical application by Dr Doug McGuff and John Little in their book *"Body by Science – a research based programme for strength training, body building and complete fitness in 12 minutes a week"* we now know how to exercise most efficiently. We do not want to exercise so much that we wear out our body (this is what happens with so many athletes – most runners are carrying injuries!) but when we do exercise it must be effective to improve cardiovascular fitness. What is so interesting about McGuff's approach is how well this correlates with what we already know about mitochondria, blood sugar control and fats.

## The underlying principles

We are taught that there are two types of fitness viz, muscle power and cardiovascular fitness. Not so. What drives cardiovascular fitness is muscle strength. When muscle strength is used to its full capacity, it creates a powerful stimulus to the energy supply mechanism. This includes mitochondrial function and heart function. The heart pumps blood to send fuel and oxygen round the body where it is picked up by

mitochondria who convert that to ATP, the currency of energy in the body. This means that if muscle strength is correctly developed, this automatically translates into cardiovascular fitness and increased numbers of mitochondria. More mitochondria means better cardiovascular fitness. Most importantly, McGuff has an excellent research base to show **only 12 minutes a week** is needed to achieve this.

What this means is that cardiovascular fitness **IS THE SAME THING** as mitochondrial fitness. Getting fit is actually about supplying the right stimulus to mitochondria to get them geared up to speed and to increase their numbers. If the mitochondria can supply the energy, then the muscle can work at a high level and maintain that.

### **How does exercise impact on mitochondria?**

McGuff discusses in great details the mechanisms by which exercise stimulates mitochondria. We start with the muscle itself:

#### **Muscle fibres**

The body has to gear its energy use very carefully to work load in order that energy is used most efficiently. To achieve this there are four types of muscle fibre. On the one hand we have slow twitch, on the other fast twitch, with intermediate fibres between the two.

**Slow twitch fibres** – these are used when power demands are low. This makes them very efficient, they use small amounts of energy, give good endurance so we can use them for a long time, they are rather weak fibres but are slow to fatigue and quick to recover. These are the fibres we use for pottering about when we do not need much power.

If we work a bit harder we start to recruit **intermediate twitch fibres**.

**Fast twitch fibres** – these are employed when power demands are high. They occupy much more space and give us big muscles, they require a lot of energy to cope with high power demands, they fatigue very quickly and take a long time to recover once fatigued.

#### **What happens when you start to use the muscles – Recruitment**

The brain controls whether slow twitch or fast twitch fibres are used. It wants energy to be used in the most efficient way with quick recovery. So initially, it employs the slow twitch fibres. If the power demands are low, these fibres stay in use. Energy supplied from the blood stream is sufficient. This is what we do when we potter. The trained athlete can run very efficiently just using slow twitch fibres. These people are thin with smallish muscles. They make the best long distance runners.

If the power demand increases, the brain also starts to recruit the fast twitch fibres. This requires much more energy to cope with the power demand and energy stores within the muscle, i.e. glycogen stores are quickly used up. These athletes are the sprinters and weight lifters – they have large powerful muscles. Actually these people are much healthier than the long distance runners!

#### **Having lots of strong fast twitch muscle fibres has huge metabolic benefits**

- During power exercise, glycogen in the muscle is used up. This is excellent news! Sugar is the petrol of the engine - highly necessary, but highly dangerous. When blood sugar levels rise after a meal the best sponge for mopping it up is muscle glycogen. Normally this is depleted by exercise - but without exercise, glycogen remains saturated, blood sugar levels spike and the hypoglycemia roller coaster is triggered.
- This means when blood sugar levels peak after food, the sugar is shunted into muscles and liver and converted to glycogen. Insulin sensitivity is restored (in diabetes there is insulin resistance).
- If glycogen stores are never depleted, then sugar gets shunted into fat instead. This means carbohydrate consumed results in fat (obesity) and the formation of the bad cholesterol LDL. This suggests that high levels of LDL are symptomatic of the wrong sort of exercise, and so poor mitochondrial function, and poor cardiovascular fitness.
- Depleting glycogen activates hormone sensitive lipase so that fats are mobilised from body stores and made available for energy supply. This is very helpful for the dieters who get stuck!
- If sugar in the blood stream following a meal cannot be taken up because glycogen stores are full, then this excess sugar sticks on to other things creating Advanced Glycation End-products or AGEs – they literally accelerate the normal ageing process. One such example is glycosylated haemoglobin which is measured to assess blood sugar control in diabetics.

## **Having fast twitch fibres that work well means good mitochondrial function means good cardiovascular fitness**

The right sort of exercise (see below) creates a demand for energy. Initially this comes from Krebs citric acid (KCA) cycle which is anaerobic (without oxygen) and provides pyruvate for oxidative phosphorylation. In this scheme, KCA provides 2 molecules of ATP (a type of energy) and happens very fast. Oxidative phosphorylation is slower to get going but provides 36 molecules of ATP! If energy demands increase (see below) too much pyruvate is supplied and spills over into lactic acid. This gives us our lactic acid burn, makes exercise uncomfortable and makes us want to stop! This, of course, is part of how the body conserves energy – without this burn we would spend energy mindlessly, rapidly lose weight and not survive.

But the important point about lactic acid is that it provides a powerful stimulus to our energy supply system – that means mitochondria and heart function ie cardiovascular fitness. More mitochondria mean bigger muscles (each heart cell has 2,000-3,000 mitochondria occupying most of the cell!). Big muscles mean lots of mitochondria means good cardiovascular fitness. It really is a case of "no pain no gain", but the good news is with correct exercise the pain is only short lived.

### **So what sort of exercise?**

To increase muscle bulk and improve cardiovascular fitness one needs to do the right sort of exercise:

- The exercise has to be very slow but powerful – this prevents damage to muscles and joints.
- It must be sufficiently powerful so that initially the slow twitch fibres are used, but towards the end of the exercise all the fast twitch fibres are being used. If the exercise is not demanding enough then only the slow twitch fibres will be used – so no gain!
- The window of time to exercise a group of muscles needs to be 45-90 seconds.
- At the end of this window, the muscles being worked must be burning with lactic acid and weak – that is to say the exercise cannot be sustained any longer. This means your fast twitch fibres have all been fully employed and exhausted. This provides the maximum stimulus for improved energy supply (and therefore cardiovascular fitness) and enlarging muscles. Since over half of muscle weight is mitochondria, big muscles mean more mitochondria. What makes muscles fatigue is not lack of muscle filaments, but inability to supply energy to them. When body builders show off their muscles, actually they are showing off their mitochondria!

The slow twitch fibres will recover quickly, so after a few minutes you will be able to function normally, but you could not repeat the power exercise you have just done. If you could, then you have not done enough! If you did repeat the exercise, you would just cause excessive muscle damage:

- This mild muscle damage is a powerful stimulus to create more mitochondria.
- After exercising a group of muscles, they must be rested for a week (ie stay within slow twitch capabilities). This allows time for healing and repair to upgrade mitochondria, make more mitochondria and better functioning fast twitch muscle fibres.
- There is no gain to be had by repeating these exercises more often than once a week – the heart and mitochondria only need one good kick to upgrade their performance. Indeed, repeat exercises are likely to be counter-productive by causing too much tissue damage.

Remember wild animals are all super fit - but most of the time they are pottering about gently or hiding. It is only occasionally that either the predator has to put in a powerful burst of activity to catch his prey, and this is matched by a similar burst in the prey. This is how Nature keeps them fit!

### **What are the actual exercises?**

McGuff recommends five exercises to use for five different muscle groups. Do each exercise very slowly – it is not the number of times that is important but the power used. You should experience gentle increasing muscle pain until you are forced to give up at 45-90 seconds. At this point the muscle will be so weak you cannot continue (this prevents tendon and muscle damage). You will also puff and pant and your heart will go faster – that is OK too! McGuff does use a machine – you will have to get the book (or look on You Tube [\*Body by Science presentation by Dr McGuff\*](#)) to see exactly the exercises, but they are:

1. **Seated row**
2. **Chest press**
3. **Pull downs**

#### 4. Overhead press

#### 5. Leg press

- Each exercise is done for 45-90 seconds, which is how he arrives at 12 minutes a week!
- Each exercise is done very slowly – you may only do 4 or 6 repeats of each movement.
- You will puff and pant by the end of the exercise. This reflects oxygen consumption.
- Each exercise must be done to the absolute limit of your ability, until the muscle weakens under the strain. It is very painful - but it does not last long! This means no injury to joints and ligaments! You have to work out through experience how much is right for you, but this will increase with time as you become more powerful. This can be done on the machine by increasing the weights. With age we expect to lose muscle mass and cardiovascular fitness – this therefore slows the ageing process.

#### Exercises with free weights - less fancy equipment!

The exercises are:

- **Bent over barbell** – raising barbell from floor to hips using arms (slight bend at knee)
- **Standing overhead press** – raising barbell from shoulders to above head with arms
- **Dead lift** – raising barbell from floor to hips using legs
- **Bench press** – lying on the floor and pushing barbell up off you body
- **Squat** – barbell across shoulders and neck, squat and stand alternately.

Again the weight of the barbell can be adjusted so that you work to the limit of your ability. This will increase with time. If you do not work to your limit there is no gain. The actual exercises you can see on You Tube: “*The big 5 workout Part 1, Part 2, Part 3*” or search for “*Body by Science*” to watch related videos.

#### Most people are not exercising the most efficiently

Increasing fitness of the body takes place early on when you start exercising – i.e. in the first 45 to 90 seconds. If you continue to exercise beyond this, without increasing the work load, then all you are doing is risking injury and wearing out the body. It's fine to continue if you are enjoying yourself, but a waste of time if you are going through the motions in a misguided attempt to get fitter!

What people call “aerobic exercise” is not achieving much! It is the initial getting up to speed which stimulates increasing fitness. Once you have got your “second wind” (and I believe this is a symptom of mitochondria having geared up to speed so they are running smoothly), exercise becomes fairly effortless, but is not achieving additional fitness –it is just wearing out the system. Fine when you are young but no good for older people! Competition helps a lot! This gives an adrenaline buzz which allows you to perform at a much higher level and increase fitness further.

#### To conclude

- Do the “Body by Science” exercises once a week to increase your numbers of mitochondria and improve cardiovascular fitness.
- Do very gentle daily mobilisation exercise to put every joint and muscle through its full range of movement to stay supple.
- Anything else should be done, whenever you like, for pure fun in such a way that you do not risk injury nor exhaust the system!

If you “pay for it” the next day then you have overdone things - this is intentional in the “Body by Science” exercises but there must be a week for recovery before these exercises are repeated. Don't let the exercises for fun do this, or they won't be fun any more!

## Oral Allergy Syndrome

(this article by Daniel More, MD was downloaded from the following website:  
<http://allergies.about.com/od/foodallergies/a/oas.htm>)

**What is the Oral Allergy Syndrome?** The oral allergy syndrome (OAS) is caused by cross-reactivity between proteins in fresh fruits and vegetables and pollens. This syndrome occurs in a large number (up to 70 percent) of people with **pollen allergy**. The proteins in the fruits and vegetables causing OAS are easily broken down with cooking or processing. Therefore, the OAS typically does not occur with cooked or baked fruits and vegetables, or processed fruits such as in applesauce.

### What Symptoms Occur with OAS?

Most people with OAS have symptoms such as itching, burning, tingling and occasion swelling of the lips, mouth, tongue and throat where the fresh fruit or vegetable touched. Symptoms usually only last a matter of seconds to a few minutes, and rarely progress to anything more serious. However, some studies have shown that up to 9 percent of people with OAS may experience more severe symptoms of food allergy, and up to 2 percent may experience **anaphylaxis**. It is for this reason that some authorities suggest changing the name to pollen-food syndrome. Symptoms are more likely to occur and be more severe during the **season in which the responsible pollen is found**.

### What are the Associations Between Foods and Pollens?

The following fruit-pollen associations have been shown in people with OAS. People with allergy to these pollens often experience symptoms of OAS if the fresh fruit or vegetable is eaten:

- **Ragweed (weed):** melons (watermelon, cantaloupe, honeydew), bananas, cucumbers and zucchini.
- **Birch (tree):** potatoes, carrots, cherries, celery, apples, pears, plums, peaches, parsnip, kiwi, hazelnuts and apricots.
- **Mugwort (weed):** celery, carrots, various spices.
- **Grasses:** tomatoes, potatoes, peaches.

### How is OAS Diagnosed and Treated?

OAS is diagnosed when there is a history of the above symptoms in people with seasonal allergic rhinitis with pollens as a trigger. Positive **skin testing** to the suspect food can confirm the diagnosis of OAS, although food skin testing extracts obtained commercially will commonly be negative since the proteins resulting in OAS are broken down during processing. Therefore, it may be necessary to use the fresh fruit or vegetable to skin test, called a "prick-prick" procedure. The skin-testing needle is inserted into the fresh food, then used to prick the person's skin.

Because of the small chance for a more severe reaction, avoidance of the fresh fruits or vegetables is advised. Many people already avoid the suspect foods since the symptoms are uncomfortable. Usually, the fruits and vegetables are tolerated in cooked, baked and processed forms. A few studies have shown that allergy shots to the cross-reacting pollens can reduce or eliminate the OAS symptoms.

## Sue Litchfield's Update from the USA

By the time I got to New York I was starting to get desperate. All was not lost, I found Whole Foods. What a store it is - a supermarket chain that is all over the States. All the stores I have been in so far are as big as any of our supermarkets, plus everything they sell is organic. On entering, the fruit and vegetable section blew me away. Then onto the meat section - well they had every cut of meat imaginable. Then onto the cheese section - well they had the lot, and the selection is on a par with David Jones food hall. As if that was not enough, onto the frozen section - there was frozen (sit down all!) waffles, pancakes, English muffins, bagels plus a selection of breads, ALL gluten and sugar free. Not to mention the Ice-cream selection - there was ice-cream made out of rice ( Rice Dream), soy and even almond milk, some sweetened with fruit juice, others with Agave, plus there was a large choice of flavours. In the breakfast cereal section, there was a large variety of sugar free and wheat/gluten free - quite a few of them were sweetened with agave. There was also a large choice of sugar free jams, many different nut spreads, and also biscuits and snack foods. I must add they even sold organic dog food! So after the disastrous start to the trip, it all ended up with one very happy vegemite. However, eating out was still a challenge, but I was able to overcome that with grilled chicken and fish. I wish we had something that compared with the Whole Foods chain of supermarkets. Also I might add the prices were fantastic and not over the top like they are in Australia.

**The Cruise** - As you all know we were on a cruise that left Santiago and went down the coast of Mexico, one of my favourite countries, calling into Puerto Vallarta, which is a holiday destination on the west coast of Mexico. From there we called into Huánuco (Santa Cruz) this where the Mexicans are hoping to eventually become another Acapulco, but it is still very much undeveloped. Then onto Puerto Chiapas where there was some very interesting Mayan ruins It was at this ruin the Mayan Calendar was started and the interesting thing is that it is due to expire on the 21st December 2012 where they predict

a major change in the world. It will be interesting to see what happens! Then onto Puerto Quetzal, the trading port of Guatemala. We went ashore to the town of Antigua - this was our favourite, not highly developed and very old with much of the town destroyed in an earthquake in 1970. Today there is still at least one inactive volcano. Then onto one of the most amazing days I have had. We sailed through the Panama Canal which is considered to be one of the seven modern day construction feats in the world. The construction of the canal was started by the French, but they eventually stopped the construction during which time they lost 20,000 lives due to Malaria and yellow fever. The Americans then took over after the French pulled out of the project. The Panama Canal is a lock type canal approximately 80 kilometers long that unites the Atlantic and Pacific oceans at one of the narrowest points of both the Isthmus of Panama and the American continent.

The canal opened to international trade in 1914 and since then it is estimated more than a million ships will have passed through before the end of 2010. The amazing thing about the whole project was that much was done by hand. Whole hills were dug through, using steam shovels and even a lake was constructed in the centre, with three locks at each end of Gatun Lake, each of which has two lanes. Each lane operates as water lifts to elevate ships 26 meters above sea level to the level of Gatun Lake in their transit through the Continental Divide, and then lowers them back to sea level on the opposite side of the Isthmus. During these lockage's, which use water obtained from Gatun Lake, the Miter gates seal the lock chambers and gravity drains the water to the lower levels. Approximately 197 million litres of fresh water are used for each lockage and ultimately flushed into the sea. The whole trip took seven hours from the entry point to exit. However due to the size of all the modern ships, the Canal is being widened and new bigger locks are being built. This project should be finished at the end of 2012 - we will see as there is a lot of work yet to be done! The whole trip was awesome and I would recommend the experience to everyone!

The next part of the trip was the Caribbean. This was amazing, as not only was it a lot more mountainous than expected, but the water was amazing, and a diver's and snorkler's paradise. Whilst in Barbados we had the opportunity to go to a 20/20 cricket match - what an experience! The atmosphere with the noise, the music, dancing girls and clowns etc was electrifying. Unfortunately, we were a day too late to see the Australians play. Down to the serious things - food. Well, the first morning out, all in a section that would have been about 2 meters long, all one could see was a whole lot of sticky buns muffins, doughnuts and chocolate brownies! You name it, they had it, all full of sugar! After a couple of days, I finally was able to get the message across that I needed gluten free bread. So breakfast every day was poached egg on toast. Lunch was sushi, with Caesar salad, no dressing - if I see another Caesar salad I will scream!

On about the 2nd day, sugar-free ice cream was on the menu so why not try it. Well, it was sweetened with Splenda, and so sweet, I became quite ill. Dinner at night did not present a problem as there was always plenty of meat and vegetables on the menu, except that I had to wait until everyone had eaten their starters - so it meant waiting for up to an hour for the main course to be served. Great! To some it all up, eating in the States so far has been a nightmare as everything is loaded with either sugar or salt, so it is no wonder that the statistics show that one in four Americans are suffering from diabetes. I saw plenty of evidence of that on board the ship. The amount of food people were consuming on a daily basis, especially in the sweet department, was really off putting to say the least. So, my advice anyone thinking of coming to the States, beware, as everything is laden with either sugar or salt and more often than not both!

**Fun recipe** - The cruise director, Mat, was responsible for the following omelette:

First put a little oil in a pan. Crack over enough eggs to cover the pan. Stir till sort of mixed. Add a pile of grated cheese, about 2 very large handfuls. Then add a good slurp of rice syrup (he used honey), and add a large slurp of Tabasco sauce and some chopped cooked chicken. Add a few good turns of the pepper grinder. In the meantime, have a swig of dry white wine to see if it tastes OK, then pour some into the mixture and stir over heat until cooked. When cooked, eat if you are game!!!

## Member Survey

It was decided at a previous committee meeting to change the name of the Association to:

**“Diabetes Prevention Association of Australia incorporating  
The Hypoglycemic Health Association of Australia”**

This motion will be put to the meeting for a general vote. This is a big decision to make, as it not only involves notifying all the necessary authorities, but will also require a change in the constitution.

Please give it some thought. It would be great if you could attend the meeting to air your opinion on this matter. However if you cannot attend, PLEASE cast a proxy vote for, or against, the proposed name change. Also, please list any motions/ideas that you would like to bring up for discussion at the AGM or at future meetings.

Also, at the AGM, all the Committee positions will need to be filled and it would be appreciated if you could cast your vote, or put yourself forward as a candidate.

**(Please return the completed form before the next meeting (7 August 2010) to: The Hypoglycemic Health Association of Australia, PO Box 830, Kogarah NSW 1485)**

Member Name:	
Signature:	Date:
I <b>agree</b> / <b>disagree</b> with the name change (please circle one option)	
I would like to make these comments:	
I would like to nominate _____ for the position of _____	
I would like these issues discussed at future meetings or included in future newsletters:	

