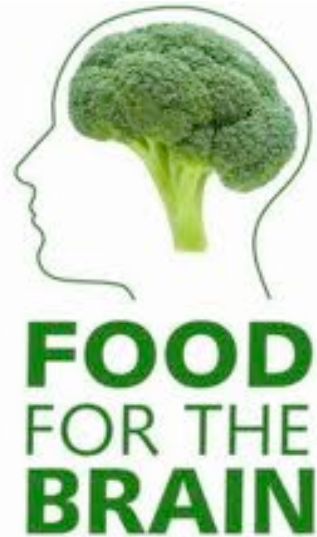




Congratulations

Through downloading this report, you can begin to understand how nutrition will impact on your child's learning ability.

Feeding your child's brain is of utmost importance to support optimal brain development, brain function, concentration and behaviour. We often forget that the brain needs the right nutrients to do its best work.

I have been privileged to support thousand's of children over my 15 years as a paediatric dietitian and have witness so may amazing transformations just by focusing on what your child eats. What has been obvious is that every child is different and their nutritional requirements need to be assessed on an individual basis.

However, there are some similarities. It has been my experience that children diagnosed with ASD and ADHD have some common nutritional deficiencies.

The below summary will give you food for thought and a place start. I have described some of the key nutrients to support brain function and behaviour. Please discuss any concerns you may have with your child's doctor.

Feel free to send me feedback about this report or share your stories with me through my email at paula.taz@optusnet.com.au

In wellness,

Paula

Let's begin!

IRON

Iron is a mineral needed for the formation of haemoglobin in red blood cells. Haemoglobin itself is a protein that carries oxygen to the body's tissues, given them energy. Iron is very important for maximizing energy levels. It plays a vital role in brain function and brain development, as well as in immune function and detoxification. Iron is vital to make the brain chemical dopamine, which supports concentration. Anaemia is strongly related to low birth weight babies and post-natal depression. Children can exhibit poor concentration, behaviour problems, headaches, dizziness, more sickness and they can be tired /irritable as a result of low iron levels.

Requirements

	Ages	RDI mg/day	UIL
infants	0-6months	0.2 mg	20 mg
	7-12 months	11 mg	20 mg
children	1-3years	9 mg	20 mg
	4-8 years	10 mg	40 mg
boys	9-13 years	8 mg	40 mg
	14-18 years	11 mg	45 mg
girls	9-13 years	8 mg	25 mg
	14-18 years	15 mg	45 mg
men	19 onwards	8 mg	45 mg
women	19 onwards	18 mg	45 mg
pregnancy		27 mg	45 mg
lactation		9 mg	45 mg

RDI= recommended dietary intake

UIL= upper intake limit

What are the signs of deficiency?

Pale inner eyelid, nail beds, gums, tongue, lips and skin. Tiredness, dark circles, headaches, breathlessness. Restless leg syndrome is also a sign of low iron levels. Pica, eating non- foods like dirt, clay, bark etc. is a major warning sign. Discuss with your Doctor if you are concerned regarding low iron levels, as excess iron is toxic. "Spatone" is a non-constipating iron supplement should supplementation be needed.

Not all iron is the same!

Iron from animal products (haem iron) is best absorbed by the body. Iron from plant sources (non-haem) iron can be boosted by including Vitamin C, meat, fish or chicken in the same meal. Excess dairy products can interfere with iron absorption. For adults coffee, tea and unprocessed bran can all interfere with iron absorption and so should be limited. Allow at least 1hr in between a cup of tea and an iron-rich meal. Zinc and calcium supplements also interfere with iron absorption.

Iron content in common foods

Food	Iron mg	Food	Iron mg
Oysters fresh 6	4.6	Pine nuts 50 g	2.0
Sardines 5 small	2.0	Bread wholemeal 1 slice	0.5
Beef fillet lean 100g	2.5-4	Muesli 1c	5.0
Lamb 100g	2.5	Porridge 1c	1.3
Pork 100g	1.1	Weetbix 2	3.0
Chicken 100g	0.9-1.2	Dried apricots ½ c	2.1
Tuna 100g	1.- 1.3	Saltanas	1.7
Salmon 100g	1.7	Egg 1 medium	0.9
Baked beans 2/3c	2.9	Spinach cooked 1/3c	1.5
Cashew nuts 50 g	2.6	Broccoli 1/3c	0.6
Almonds 50g	1.8	Milo 2 tsp	2.2

ZINC

Zinc is an essential mineral that plays a role in the function of many different enzyme systems in the body. It is needed for growth and repair, sexual development and reproduction, wound healing, immunity, appetite control, normal brain development and for optimal energy levels. Zinc plays a key role in behaviour and in making the “feel good” brain chemical serotonin.

Zinc deficiency in children results in growth failure and delayed sexual maturation. Children with ADHD have been found to be zinc deficient with lower levels of zinc associated with more severe symptoms. Low zinc levels are common in autism, depression and anxiety. Zinc may also have a role in keeping kids in shape.

Requirements

	Ages	RDI mg/day	UIL
infants	0-6months	2 mg	4 mg
	7-12 months	3 mg	5 mg
children	1-3years	3 mg	7 mg
	4-8 years	4 mg	12 mg
boys	9-13 years	6 mg	25 mg
	14-18 years	13 mg	35 mg
girls	9-13 years	6 mg	25 mg
	14-18 years	7 mg	35 mg
men	19 onwards	14 mg	40 mg
women	19 onwards	8 mg	40 mg
pregnancy		11 mg	40 mg
lactation		12 mg	40 mg

What are the signs of deficiency?

White spots/ridges on nails, stretch marks, poor wound healing, poor skin health (dermatitis, psoriasis, eczema), poor growth, hair loss, a low immune system, loss of appetite, impaired sense of taste and smell.

A blood test for zinc is not a reliable marker as only 1% of zinc is found in the blood. Ask a naturopath to administer a zinc drink test, as taste buds are rich in zinc.

Zinc content in common foods

Food	Zinc mg	Food	Zinc mg
Oysters fresh 100g	47.9	Rolled oats raw 100g	1.9
Oysters smoked 100g	14	Pasta wholemeal 100g	1.4
Beef fillet lean 100g	7.8	Cheese parmesan 100g	6.5
Beef mince premium 100g	6.2	Cheese mozzarella 100g	4.1
Pork butterfly grilled 100g	2.3	Yoghurt 100g	0.5
Chicken breast lean 100g	0.8	Milk full cream 1 cup	1.0
Tuna/salmon canned 100g	1.0	Tofu 100g	1.7
Cassava 100g cooked	2.7	Egg hard boiled 2	2.7
Cashews 30g handful	1.8	Green beans 100g	1.9
Brazil nuts 30 g	1.3	Peas 100g	1.0
Sunflower seeds	1.9	Spinach ½ cup	0.7

MAGNESIUM

Magnesium is a mineral essential for the effective functioning of the nerves and muscles. It also helps build and strengthen bones and maintains a regular steady blood flow. Up to 65% of the magnesium found in food is stored in the bones. Most of the remaining magnesium is stored in our muscles and is used as a muscle relaxant. Magnesium is found in high concentrations inside brain thus it helps with concentration.

Requirements

	Ages	RDI mg/day	Upper safe levels from supplements
infants	0-6months 7-12 months	30mg 75 mg	
children	1-3years 4-8 years	80 mg 130 mg	65 mg 110 mg
boys	9-13 years 14-18 years	240mg 410 mg	350 mg 350 mg
girls	9-13 years 14-18 years	240 mg 360 mg	350 mg 350 mg
men	19 onwards	420 mg	350 mg
women	19 onwards	320 mg	350 mg
pregnancy lactation		400mg 360 mg	350 mg 350 mg

What are signs of deficiency?

When magnesium levels are low, muscles are tight and stiff leading to cramps and muscle fatigue. Decreased magnesium levels were also associated with increased hyperactivity and impulsivity, poor sleep, poor school attention, constipation, anxiety/depression. A blood test for magnesium is not a reliable marker for magnesium levels as the body will do all it can to maintain blood magnesium normal.

Magnesium deficiency occurs more frequently in children with attention deficit hyperactivity disorder (ADHD) than healthy children. Studies have shown that **magnesium supplementation (200mg/day)** may be of great benefit in children with ADHD.

Magnesium (Mg) content in common foods

Food per 100g	Mg mg	Food per 100g	Mg mg
Almonds	260	Pine nuts	230
Cashews	260	Bread wholemeal (3slices)	60
Brazil nuts	350	Muesli	135
Wheat germ	276	Rolled oats	131
Wheat bran	497	All bran	378
Oat bran	235	Soy lecithin	200
Rice bran	690	Dark chocolate 70% cocoa	120
Soy flour	229	Peanut Butter	180
Soy powder	140	Vegemite	160
Spinach boiled	83	Sunflower seeds	370
Sundried tomato	150	Tahini	320
Popcorn	105	Sesame seeds	340

IODINE

Iodine is a trace mineral vital for healthy thyroid function as it is an integral component of thyroid hormones. Iodine also enhances mental performance.

The National Iodine Nutrition Study is the largest study of its kind ever carried out in Australia, involving over 1700 students from 88 schools across five states. They found that NSW children were mildly iodine deficient and that 50% of NSW women were iodine deficient. Australian soils have low levels of iodine.

Iodine deficiency causes a wide spectrum of mental and physical disorders. While a goitre is the most visible consequence of iodine deficiency, the most significant are on the developing brain leading to impaired intellectual development

Insufficient iodine in pregnant women could adversely affect the development of their unborn foetus, the IQ of their children (10 to 15 points less) as well as play a role on the incidence of attention deficit hyperactivity disorder (ADHD). Iodine deficiency has been linked to decreased fertility, miscarriages and stillbirths.

NH&MRC is advising all women who are pregnant, breastfeeding or considering pregnancy to take a daily supplement of 150 µg/day of iodine unless they have thyroid condition in which case it needs to be discussed with doctor.

In October 2009, iodine fortification in bread from **iodised salt** became mandatory. On average 3 slices (100grams) of wheat based bread will provide 46µg of iodine. Organic breads are not required to fortify. Non-wheat flours (eg. rye flour) are not required to be fortified by law. It follows that gluten free breads will not be fortified with iodised salt.

Requirements

	Ages	RDI micrograms/day	UIL
infants	0-6months	90 µg	
	7-12 months	110 µg	
children	1-3years	90 µg	200 µg
	4-8 years	90 µg	300 µg
boys & girls	9-13 years	120 µg	600 µg
	14-18 years	150 µg	900 µg
men	19 onwards	150 µg	1100 µg
women	19 onwards	150 µg	1100 µg
pregnancy		220 µg	1100 µg
lactation		270 µg	1100 µg

RDI= recommended dietary intake

UIL= upper intake limit

What are the signs of deficiency?

Goitre- enlarged thyroid gland.

Hypothyroidism- tired, low mood, cold hands & feet, weight gain, hair loss, bulging eyes, forgetfulness.

Cretinism- irreversible mental delays, lack of muscular control, dwarfism. Not seen in Australia but common in developing countries.

Iodine is tested via urine test.

A recent study found that **supplementing with 150 µg of iodine** per day over 24 weeks improved brain function in 180 children with mild iodine deficiency.

Iodine content in common foods

Food	Iodine µg	Food	Iodine µg
Fruit 1 serve	< 2	Iodized salt 1 g	30
Vegetables 1 serve	< 5	Nori seaweed 1 sheet	16
Ice cream 1 scoop	9.6	Red algae 5 g	174
Cheese- gauda 40g	13.6	Pink salmon 85g	51
Cheese- swiss 40 g	23.6	Egg 55g	20
Milk 200mls	31.8	Fish 100g	35
Yoghurt 200g	33.4	Milo B smart 20 g	32

OMEGA 3 FATS

Omega 3 fats belong to group of healthy fats known as polyunsaturated fatty acids. Every cell in the body needs omega 3 fats for its structure and function. Omega 3's are essential fats meaning the body cannot adequately make them so they must be supplied by our food or from a high quality supplements. Omega 3's are vital at all stages of life- from conception to death.

Omega 3's can be obtained from plant and marine sources:

Plant omega 3 = ALA (alpha linoleic acid)

Marine omega 3 = DHA (docosahexaenoic acid) vital **for brain structure**
= EPA (eicosapentaenoic acid) vital **for brain function**

Plant omega 3 needs to be converted to marine omega 3 to be active in the body. This process is very complex thus conversion is very poor especially in children and males.

ALA → EPA → DHA

How much omega 3 fats do we need?

To gain the benefits, like those seen in the published studies, children were given 720mg of EPA and DHA with 552mg of EPA omega 3 to support brain function. Evidently, the guidelines below have been set too low to gain optimum results for all children but especially for children with learning difficulties.

Published studies using supplementation with a unique omega3/6 formulation called “Eye q” have been shown to significantly support learning, concentration, reading, writing, problem solving and behaviour. Scientific studies have also shown significant gains in language development. The children in these studies were given 6 capsules or 3 teaspoons per day of the eye q formula. Parents reported children were also calmer.

Further information can be found at www.novasel.com.au or call **1800 222 655**

For a healthy heart, the National Heart Foundation recommends 500mg of EPA and DHA per day for children and adults. It is known from research from Wollongong University that children between 4-8 yrs consume only 55 mg EPA/DHA per day. This is a far cry from what is needed to gain heart benefits let alone brain benefits.

Keep in mind that EPA omega 3 has the anti-inflammatory properties, which are of value in asthma and eczema management. EPA is also the antidepressant omega 3. Scientific studies have shown 1 gram of EPA omega 3 supports depression.

In pregnancy, aim for at least 200mg of DHA per day. This is key for the brain development of the unborn baby as Omega 3 DHA is one of the building blocks of the brain. It is crucial from week 25 of pregnancy. Pregnancy formulas may not provide enough Omega 3 DHA to support brain growth. Check the ingredients listings to ensure there is enough Omega 3 DHA in the formula you are taking.

Omega 3 EPA is a great support for mood. Aim for at least 500 mg of EPA to support mum's mood post-delivery.

	Age (years)	Adequate Intake of EPA & DHA in milligrams per day	
		AI	UIL
Children	1-3	40	3,000
	4-8	55	3,000
Boys	9-13	70	3,000
	14-18	125	3,000
Girls	9-13	70	3,000
	14-18	85	3,000
Men	19 onwards	160	3,000
Women	19 onwards	160	3,000
Pregnancy	14-18	110	3,000
	19 onwards	115	3,000
Lactation	14-18	140	3,000
	19 onwards	145	3,000

AI= adequate intake

UIL= upper intake limit

What are the signs of Omega 3 deficiency?

Blood test to investigate the levels of omega 3 fats are very expensive and not usually done in Australia. Look for signs that the body needs more omega 3 fats.

Physical signs- excessive thirst; frequent urination; rough, dry, bumpy skin; dry, dull hair/dandruff; soft, brittle nails

Allergic tendencies-eczema, asthma, hay fever

Visual symptoms- poor night vision, sensitivity to light, visual disturbances

Attention problems- distractibility, poor concentration, difficulties with memory

Emotional sensitivity- depression, excessive mood swings, undue anxiety

Sleep problems- difficulties falling asleep or waking up

Food Sources

Aim to eat fish, ideally fish oily, 2-3 times a week. A serve of fish is 75g for children under 6 years and 150g for other kids and adults. Focus on small fish to keep mercury levels low. Watch out for larger fish-shark/flake, swordfish, marlin, deep-sea perch and catfish that may have higher levels of mercury. Tinned fish is safe to eat. Aim to introduce fish to children early so they develop a taste for it and gain health benefits early in life.

Marine omega 3 – salmon, sardines, trout, mackerel, tuna, herring, anchovies

Plant omega 3- flaxseed/linseeds, dark green leafy vegetables, walnuts, soy & canola

Seafood/100grams	EPA/DHA omega 3 content
Swordfish (high in mercury)	1059mg
Salmon, Atlantic	689mg
Gemfish	441mg
Mackerel, spanish	411mg
Trout, rainbow	309mg
Sardines	295mg
Snapper	223mg
Dory, john	188mg
prawns	130mg
Tuna, yellow fin	117mg

What about Mercury?

Focus on small fish to keep mercury levels low. Watch out for larger fish-shark/flake, swordfish, marlin, deep-sea perch and catfish that may have higher levels of mercury. Tinned fish is very safe to eat. Omega 3 supplements have been tested for mercury and other heavy metals. It is well established that the benefits of eating fish far outweigh the mercury concerns.

The link below highlights how to keep mercury levels low and what fish to be careful of- www.health.nsw.gov.au/news/2008/20080106_00.html

Vitamin D

Vitamin D is a fat-soluble vitamin necessary to help calcium absorb into the bones. Vitamin D is made in the skin when it is exposed to sunlight (UVB rays). About 90% of requirements are obtained via sun exposure.

Deficiencies in children are increasingly common- rickets (bowed legs & knocked knees), delayed tooth formation, low muscle tone (floppy baby) bone pain, bone fractures and osteoporosis in later life. Vitamin D deficiency has also been linked to depression, increased risk of cancers especially of the bowel/breast/prostate, diabetes, MS, infertility, poor balance, muscle weakness, poor immunity & poor dental health.

Vitamin D levels below 46 nmol/L in pregnant mum's have been associated with a two-fold increase in language development difficulties in their children. Children born to mothers with Vitamin D levels above 70 nmol/L have no increased risk of language delay problems. Thus it is vital that Vitamin D levels are checked before pregnancy as deficiency can take months to repair. For Vitamin D to pass through the breast milk mum's need to ensure their levels are optimum. If supplementing, 4000-6000 I.U of Vitamin D needs to be given on a daily basis.

Ensure optimum levels at pregnancy and breastfeeding!

Vitamin D is vital for brain development. It increases the production of *glutathione* which helps protect the brain from toxins, has powerful antioxidant activity and acts as an anti-inflammatory for the brain. Glutathione is also found in large amounts in the gut to protect it from toxins and inflammation.

Sunscreen inhibits the production of Vitamin D. Pollution and clouds reduce the strength of the UV rays. All ages need 5µg/day (200 I.U) with requirements increasing after 50 years of age to 15µg/day (600I.U). Again, it is thought that these guidelines have been set too low to gain optimum benefits from Vitamin D.

If supplementing, Vitamin D3 is the active form of Vitamin D. To strengthen the immune system you need to supplement with 2000-4000 I.U/day. Vitamin D supplementation is safe even at high levels (10,000 I.U per day) Vitamin D drops are available for children.

In Sydney, to get enough Vitamin D you need to expose 15% of the body to direct sunlight between 10am and 3pm. If you have fair skin, you need 6-8 mins in summer and 26-28 mins in winter. The darker the skin the more sun exposure is required. If maternal Vitamin D status is good infants should have adequate stores for first few months of life. Babies need 2 hrs of sun/week if only the face is exposed and 1/2hr/week if baby is only wearing a nappy.

It is very important not to get sunburned but some sunlight is vital!

Vitamin D is found in only a few foods-oily fish, egg yolk, full cream dairy products, and fortified margarines. Look for dairy with Vitamin D added.

It is hard to believe but Vitamin D deficiency is becoming very common in Australia. You can have a blood test to determine your Vitamin D levels. Aim for levels are well above 75 nmol/L all year around. Some evidence is indicating that levels around 100-120 nmol/L will give optimum protection from diseases like cancer, especially bowel, breast and prostate cancers.

For children with Autism Spectrum Disorder aim for Vitamin D levels 125-150 nmol/L. Vitamin D toxicity is rare but aim to keep levels below 250 nmol/L.

Useful sites are www.vitamindcouncil.org

A note on supplements:

Vitamins and minerals given at high levels can become toxic. Be aware of what is the upper safe limit of intake for a specific nutrient (UIL) and how the supplement can be best absorbed to minimise side effects. Always consult with your healthcare professional before starting supplementation.



About the author:

Paula Tazzyman is an Accredited Practice Dietitian (ADP), who is passionate about supporting children who have had an ASD/ ADHD diagnosis. She strives to raise awareness about the critical link between nutrition and childhood learning as an active educator and public speaker.

Paula is a member of the Dietetics Association of Australia and has had a 15 year work history in the area of childhood developmental disorders. Paula offers nutritional support to families all over Australia and overseas. If you would like any more information about Paula's clinical practice, please visit her website www.paulatazzyman.com.au

If you wish to contact Paula for nutritional support or dietary advice for your child or for yourself call for a FREE, 10 minute, no obligation, telephone consultation at 0418162202. Paula can also be reached via her emailed - paulataz@optusnet.com.au

For lots of helpful nutritional tips specific to ASD and ADHD follow me on Facebook-<http://www.facebook.com/pages/Paula-Tazzyman-Dietitian/180866515360313>

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