



Autism is like one of those 1000-piece jigsaws showing a picture of an Amazonian rainforest (from the air) with thousands of trees with only the slightest change in leaf shape and colour. Trying to put that jigsaw together is something that requires commitment, dedication, time and the ability to overcome frustration. This folks ... is how I see autism!

As a parent I cope with autism by reaching forward, something like a quicksand victim reaching for an overhanging branch. That branch is a life line – my hope for the future. A breakthrough for us and our children depends on new information, new research and new developments. I have always said that we have learnt much through diagnostic testing. Testing does reveal abnormalities and abnormalities can be treated. I am still an advocate of a dysfunctional immune system and *inflammation*. It is the key to this disorder but we need to identify more pieces of our autism jigsaw. Looking at these Amazonian jigsaw pieces, like autism, is baffling and nonsensical sometimes. However, once the miniscule details are revealed it gives sufficient evidence to place that jigsaw piece accurately in this picture of gargantuan

As the father of an **autistic** child...

proportions. We have to find those details, identify them and fix them if this jigsaw is to be completed.

Every problem has a solution and the only thing that is slowing the treatment of autism is identifying the 'total' picture. This gives me the energy and that total, intrinsic drive to continue. This feeling of wanting, desire and success has never left me and I hope it never will.

The light gets brighter as I grow stronger. This however is not a sole mission – it is a mission that is possessed by us all and uneducated doctors should not be our guiding light. We must use those powers within us to guide us into a brighter future, we deserve it as do our children.

I have been watching programmes where parents have been faced with major problems with their unborn babies and during pregnancy. I feel dreadfully sorry and upset for those parents who, through no fault of their own, lose their child. This is something I can partially relate to as I initially felt I had lost my son soon after Billy was given his initial diagnosis of autism. I on the other hand have a child. A child who is autistic but a child who gives so much, a child that is physically brilliant, a child that is 'angelic' in his appearance, a child with the stubbornness of a mule, a child with the heart of a lion, a child with love, laughter and affection but none

the less a child with autism. Autism – a name that in my opinion is dated was discovered in 1943 by Leo Kanner who identified a number of autistics possessing the same characteristics. Today we have, in addition, a 'new breed' of 'acquired autistics' who may still possess the same triad of impairments but do not have the same physical, behavioural, emotional and mental replications of the earlier type. My son is this new breed, he is not self injurious, he is affectionate, he doesn't self stim, he is gaining speech, he is not constantly repetitive, he doesn't rock, he has imaginative play and is not put off by new surroundings or people ... my son acquired autism and my son can recover. He may have 'changed' through our interventions and endeavours but he does not fit the 1943 Kanner definition.

What gives me great pleasure is hearing Billy laugh, he has such a great laugh and it reassures me he is happy when I hear it. When times are tough and I am literally pulling my hair out wanting Billy to achieve something, I combat my frustration by making him laugh through any means I can – tickling, jumping on the bed, riding a scooter around the kitchen table, pretending I am Buzz Light-year falling down the stairs or even jumping down off the table. These are some of the things that will bring those fits of hysterical laughter and

beaming smiles from Billy. I need to hear that. (I can't imagine what sort of picture I have painted of the Tommey household.)

I can recall the times when I would walk into the house from work to find Billy on the hall floor playing with his toys. I would say 'hi' and get no reaction, I would shout 'Hi' and get no reaction, I would jump up and down and get *no reaction*. He didn't look at me, he didn't even glance at me, it was as if I were invisible. These are memories I shall never forget and thankfully we have come a long way forward from those very 'black' days. With time comes experience, with experience comes knowledge and with knowledge comes understanding, adjustment and forward planning.

Let us look at our autistic children and try and understand how they may see the world. Our children are hypersensitive to their environments. They are light sensitive and see colours very vividly – bright and even offensive. They hear noises much louder than they are, they cannot focus in on singular objects but have a vast peripheral vision that unnerves and confuses them. They are sensitive to touch, smell and taste. Their heat senses may be disturbed, they rarely get dizzy and therefore their balance mechanisms may be out. They find it difficult to concentrate if there are too many stimuli around and are most likely to be found in places which do not 'stress' them. Their perception of the environment is not as we see our world and we need to adjust the environment to suit them. How would we react if we were to see our world as they do. It is no wonder they have tantrums in supermarkets – the noise, the chaos, the colours the mania. They have a tantrum because they want out. Billy, as I mentioned in an earlier issue of *The Autism File*, went to the local fair with us. He was fine on the perimeter

but when we went further into the centre it became all too much for him and he lay in a tight ball on the floor holding his ears – I suppose very similar to a hedgehog faced with danger. Auditory integration therapy along with other therapies have pretty much stopped his acute sensitivities and I feel he has now adjusted to his environment as we see it today.

The word 'individualism' comes to the foreground. Billy, as we are, is unique, an individual with his own feelings, reactions, likes and dislikes and why should I expect him to behave exactly as I want him to. Have you ever been faced with a situation in a supermarket, a playground, a party or even on

recent NAS advertisements show. This advert annoyed me as I am sure it has many other parents. It does not show the true nature of autism as I see it. Public awareness needs to focus on the actual expressions of autism and not what the books may say it is. A child banging his head against a wall does not explain or mean 'autism', it educates no one and shows no understanding of autism. We don't want people to feel sorry for us, we need people to be made aware of the real issues of autism. It is the *wrong* image. So come on guys, do the homework a little better and shadow a few more autistic children in their different environments before directing the next ad for the media

With **time** comes experience ...

with **experience** comes knowledge ...

with **knowledge** comes understanding, adjustment and forward planning.



Billy

the pavement outside your own home when your child is screaming, hitting, kicking and biting for no apparent reason? Have you then looked up to see a crowd of people frowning and gossiping to others, together pointing the finger at you as being an uncaring, undisciplining parent completely oblivious to the needs of your child. They simply do not understand why our children are behaving as they sometimes can and do. They need to know that our children are autistic, they need to be made aware, they need to understand. This 'behaviour', as I see it, is the characteristic of a child suffering from autism and not a child repetitively banging their head against a wall as the

networks. Government bodies, The Department of Health, Social Services, The NHS and The Medical Research Council, as well as looking at the lack of services, support and poor understanding of autism must concentrate on the biology of autism. This is where research needs to focus. Our children are autistic, our children are individuals. They deserve the opportunity to be helped by means outside of education and psychology. Our children possess so many biological, neurological, digestive, nutritional and immunological deficiencies that these must be addressed and understood if they are to have any chance at all.



Jonathan
Tommey

When the wheels come off the **transport system** for moving **heavy metals** around the body

I have always asked myself the question. Why do those suffering from autism exhibit great

problems with the ability to transport metals in and out of cells? It is widely known that autistic children have increased levels of cadmium, mercury, aluminium, arsenic and lead to name but a few toxic metals and primarily deficiencies in zinc and iron but also increased levels of copper.

We all know that toxic metals are found within the vaccines that are used on our children, within foods they eat and in the environment. However one must ask the question, why do children who have received the same 'insults' as our children remain non-autistic? Why do they not exhibit the same high toxic metal levels and low levels of beneficial metals such as zinc.

Billy, my autistic son, has had numerous diagnostic tests and as a consequence has received a number of alternative therapies including supplementation to help overcome any deficiencies or abnormalities found. We recently had a follow-up hair analysis completed which showed, to my dismay, deficiencies in zinc, magnesium and manganese along with elevated levels of cadmium. Why was this so? Billy has been receiving supplements orally to help alleviate those deficiencies that were found six months earlier. His levels had not changed and zinc was even more depressed than it was six months previously. I called a doctor who informed me that the receptors for zinc, as an example, will shut off in the gut if supplementation is continued on a daily basis. It will literally bombard the receptors and they will not respond. Dr Emar Vogellar, of the Autism Research and Treatment Centre (ARTC) in The Netherlands, also informed me that some children on the ASD spectrum did not respond as he would have imagined to zinc supplementation therapy. These patients still showed at best only a 30% improvement in their zinc levels some for months after therapy. I decided to look back at Billy's initial hair analysis – sensitivity to aluminium and poor use of cysteine flared up. It suddenly clicked, the transportation of heavy metals, eg mercury and metals such as zinc, in and out of cells within the body needs a

protein carrier. These carriers are called *metallothioneins* (MT) – proteins manufactured by the body to act as metal transporters – taking needed metals to cells and transporting unwanted metals away. The haemoglobin, for example that carries oxygen in the bloodstream, is an iron-containing metallothionein. The metal ions in metallothioneins are critical to the protein's function, structure and stability. These 61 amino acid protein chains rely heavily upon the amino acid cysteine which makes up 30% of its structure. Billy has a problem with cysteine which is the main amino acid in the body for producing sulphate which is found to be deficient in the majority of autistics. If metallothioneins were lacking in autism what would be the possible consequences? (I shall list these consequences later.)

Metallothioneins (MTs) constitute a family of proteins characterised by a high metal abundance namely zinc and copper and also by cysteine. There are four types MT-1, MT-2, MT-3 and MT-4. MT 1 and 2 are expressed in most tissues including the brain, MT-3 also called Growth Inhibitory Factor (GIF) and MT-4 are expressed predominantly in the central nervous system.

In May 2001 the American Psychiatric Association said, 'Autism ... could be related to a defect in the body's ability to process common metals such as zinc, copper, and aluminium'. It also reported, 'A deficiency in a protein known as metallothionein, which helps regulate minerals and metals in the human body, is highly prevalent in children with autism ... It is important for the development of the brain, intestines, and the immune system. If you have a defect in that protein – whether it's genetic or caused by an environmental insult (or stress) – those areas will be affected. ... Some of the features of autism – problems with speech, socialisation, eye contact, immune system and the stomach – are similar to those in people who have a metallothionein defect.'

The Association studied 503 children with autism and found that 99% had evidence of the metallothionein defect. Dr Usman of the Pfeiffer Institute in Naperville says, 'If there is a problem with metallothionein in the first two years of life, the brain will not develop

fully ... speech would not develop properly, and that could be due to high levels of copper. Any exposure to toxic elements that put a burden on the defective metallothionein system could exacerbate problems related to autism ... Such exposures could include vaccines that contain high levels of copper and mercury such as the Hepatitis B vaccine.' They do also conclude by saying that, 'it seems highly unlikely that any single mechanism would be present in 99% of individuals with this disorder'. It was also identified that in autistic patients the levels of unbound copper was four times higher than that in the control group.

98
Mt
 dysfunction
 45

What are the causes of MT dysfunction?

- Genetic MT defect
- Genetic disorder which disables MT
- Environmental insult which disables MT eg, build up of toxic metals, copper overload and zinc depletion, weakened immune function, incomplete maturation of brain and GI tract.

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 autism
 2002



Billy Tommey

56
Fe
 iron
 27

64
Cu
 copper
 29

27
Al
 aluminium
 13

201
Hg
 mercury
 80

65
Zn
 zinc
 30

207
Pb
 lead
 82

112
Cd
 cadmium
 48

75
As
 arsenic
 33

41
Fu
 functions
 28

The functions of metallothionein are as follows:

- Development of brain neurons.
- Homeostatic control of zinc and copper.
- Detoxification of heavy metals. Mercury and cadmium bind very quickly to MTs and therefore if they are present in hair samples then surely it must be MT dysfunction that causes it. Heavy metals such as mercury, cadmium, lead and arsenic inhibit antioxidant enzymes and deplete intracellular glutathione. These metals also have the potential to disrupt the metabolism and biological activities of many proteins due to their high affinity for free sulfhydryl groups. Metals also disrupt cysteine status in the body. Refer to: www.thorne.com/altmedrev/fulltext/tox3-4.html or www.thorne.com/altmedrev/fulltext/tox3-4.html
- Maturation of the gastro-intestinal (GI) tract.
- Powerful antioxidant.
- Immune function.
- Delivery of zinc to cells. Zinc may act as a neurotransmitter and low levels are also associated with behavioural disorders. Studies have found zinc deficiencies in assaultive young males and elevated copper levels compared to normal controls.

59
Co
 consequences
 62

The consequences of MT dysfunction seen in autism:

- Hypersensitivity to mercury, lead, cadmium and other toxic metals.
- Immune function – (its depletion compromises in utero development of thymic and lymphoid tissue, reduces T-cells, Interlukin-2, natural killer cells, weakens immune system in mice models).
- Zinc depletion and copper overload.
- Hypersensitivity to vaccines.
- Incomplete breakdown of gluten and casein (due to zinc dependant peptidases). Zinc is a component of more than 80 enzymes.
- Intestinal inflammation, diarrhoea and yeast overgrowth, reduced stomach acid and secretin release. (MT-4 reduces production of stomach acid, impairs secretin signalling, reduces gastrin production.)
- Increases skin sensitivity.
- Tendency for seizures, anxiety and emotional instability. (MT knockout mice exhibit higher seizure incidence, Zinc released by hippocampal MT-1 decreases seizure activity).
- MT kills candida (therefore if MT is dysfunctional candidiasis may occur).



Jonathan Tommey

As you can see there are a lot of consequences associated with MT dysfunction or deficiency that are very applicable to autistics. I must say zinc deficiency and amalgam fillings do also seem to be quite high in parental questionnaires and it is probably worth looking into this as another highly plausible route that is a 'PART' of this multifactorial jigsaw.

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Td

to do

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Things you can do

- Look at the zinc and copper levels. (Wilson's disease is caused by copper overload which disables MT function and can be treated using zinc supplementation to remove copper.)
- Look at heavy metals namely lead, mercury, cadmium and aluminium.
- Look at neuro-transmitter levels and then treat accordingly.
- Use zinc citrate or zinc picolinate (for inflamed GI tracts), glutathione, selenium, N-acetyl cysteine, B-Vitamins. Vitamins A, C and E, Genistein and Biochanin A, Glucocorticoids.
- You must have in place GI tract therapy, GF/CF diet, probiotics, secretin, digestive enzymes, dysbiosis treatment etc, biochemistry balancing; Methylation, trace metals, pyrroles, essential fatty acids etc.
- Cut out tap water due to copper piping.

The Pfeiffer Treatment Centre is looking at the best protocol for this at present.

Reproduced in part from William Walsh -Pfeiffer/metallothionein (www.bbbautism.com/dan).

This is undoubtedly a new approach to autism and understanding the effects of toxic metals upon the metabolic, biochemical and nutritional processes that occur in the body is essential. We all have been exposed to the possibility of autism being linked to mercury toxicity and vaccines being the culprits but we must consider all new avenues and be aware of the latest research findings. Metal toxicity and its associated links with zinc deficiency and cysteine and glutathione depletion to name three areas are important for future investigations. Yet again it only reiterates the importance for diagnostic testing. Understanding the biological, metabolic, immunological, neurological and biochemical dysfunctioning in autism will bring us all closer to treating this disorder. If our children possess a problem with metallothionein function it is no surprise that environmental insults could be so deleterious to their future. The one thing you *must understand* is that it is treatable!

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Rs

research

106

Research papers have found the following:

In mice models MT-3 seems to be able to prevent glutamate and nitric oxide induced neurotoxicity – *Brain Res. Bull. 55: 133–145, 2001*

Changes in the brain response to injury also showed significant increases in nitric oxide and a reduction in MT-3 and zinc – *J.Neurochem. 75: 266–273, 2000.*

Another very interesting article from the *Exp. Neurol. 163: 46–54, 2000* showed significant expressions of MT-3 in the neurodegeneration and demyelination of the cerebellum region of mice brains where there was a high degree of the pro-inflammatory cytokine TNF- α . It is thought that it is the effect of the MT-3 rather than the TNF- α that brought about the associated damage to the brain.

An article in *J. Comp. Neurol. 412: 303–318, 1999* suggests that MT-1 and 2 and vesicular zinc are implicated in zinc metabolism in the developing forebrain.

Neurochem. Int. 36: 555–562, 2000 looked at the role of zinc for the normal functioning of the central nervous system and concluded that zinc deficiency impairs the response of the brain metallothioneins during stress and inflammation. Cytokines can also have an effect on the induction of MTs following an immunological insult.

essential fatty acids and inflammatory cytokines

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he nutritional status of an individual can have a profound effect on their immune response and their ability to deal with a pathogenic challenge.

Conversely, the metabolic disturbance associated with various infectious diseases can adversely affect the nutritional and biochemical status of the host. Cytokines play an important role in this relationship. The production and bioactivity of cytokines are modulated by various factors including eicosanoids derived from essential fatty acids (EFA). Dietary input and, thereby, cellular EFA composition can have important effects on cytokine production and efficacy.

Cells of the immune system are the main source of cytokines and they can act both as defence agents and be involved in pathogenic processes of a disease. In the former role they can act as regulators of the non-specific immune processes, cell-mediated and humoral responses, haematopoiesis and the inflammatory response while in the latter they can induce pain, fever, inflammation and metabolic dysfunction. Arachidonic acid, and eicosanoids derived from it, plays an important role in cytokine production and function such that alteration in diet could modify cytokine production and attenuate some of the inflammatory reactions that occur in many disease processes.

Supplements of EFA, particularly GLA, EPA and DHA, have been shown to reduce serum cytokines (interleukin (IL) 1b, 2, 4 and 6), tumour necrosis factor- α (TNF- α) and interferon- γ .

There was no significant reduction in serum cytokines for the first two months of supplementation but values declined steadily thereafter, reaching minimum values after six months. The % reductions of the individual cytokines after six months were as follows: IL-1b (61%), IL-2 (63%), IL-4 (69%), IL-6 (83%) TNF- α (73%) and IF- γ (67%).

Three months after stopping EFA supplements the cytokine values returned to their pre-supplementation levels. This demonstrates that long-term n-3 and n-6 EFA supplementation results in a significant reduction in circulating cytokines although the precise mechanism remains unclear

Purasiri, Murray, Richardson, Heys, Horrobin and Eremin 1994. *Clinical Science* 87: 711–717.