This year’s MINDD International Forum focussed on gastrointestinal and environmental issues in Autism Spectrum Disorders (ASD). The quality of the international and local speakers was excellent as usual. The conference was held over three days with two concurrent streams. One was for the general public and the other was for professionals and included training to be a recognised Medical Academy of Pediatric Special Needs (MAPS) practitioner. Although this review focuses only on the practitioner presentations, there was considerable overlap between the presentations in both streams. It is not intended to give a comprehensive review of each day’s sessions, rather a brief (selected) summary with some key pearls of information to take away.

Day 1—Gastroenterology in ASD

Presenters: Dr Nancy O’Hara, Dr Jerry Kartzinel, and Jessica Tran N.D.

Gastrointestinal abnormalities in ASD children are common. Studies over the years have shown that between 54 to 80% of ASD children have gastrointestinal issues.

**Clues from a child’s history that a child has gastrointestinal dysfunction:**

- Difficulty breastfeeding
- Persistent colic
- Gastro-oesophageal reflux
- Food sensitivities
- Failure to thrive
- Frequent antibiotics
- Abnormal posturing
- Hands in pants/ probing
- Self injurious behaviour/ aggression
- Poor sleep
- Abnormal growth
- Abnormal stools
- Abnormal cytokine (immune inflammatory marker) profile
- Stool culture identifying pathogenic bacteria, parasites and yeast
- Duodenitis, lymphonodualar hyperplasia
- Esophagitis
- Gastritis
- Colonitis, ileitis

**Physical/ laboratory clues of a gastrointestinal disorder:**

- Abnormal growth
- Abnormal stools
- Abnormal cytokine (immune inflammatory marker) profile
- Stool culture identifying pathogenic bacteria, parasites and yeast
- Duodenitis, lymphonodualar hyperplasia
- Esophagitis
- Gastritis
- Colonitis, ileitis
**Disruptive Behaviour and Diet**

An interesting study from 1978, which would not pass ethics committee approval these days, shows how individually sensitive ASD children can be.

“The effect of particular foods on levels of hyperactivity, uncontrolled laughter, and disruptive behaviour was studied in an 8-year old autistic boy. Frequency data were recorded on screaming, biting, scratching and object throwing. During an initial 4-day period the child was fed a normal American diet. A 6-day fasting period followed, during which time only spring water was allowed. The third phase lasted 18 days and involved the presentation of individual foods. During the final phase the child was given only foods that had not provoked a reaction in the third phase. Results showed that foods such as wheat, corn, tomatoes, sugar, mushrooms and dairy products were instrumental in producing behavioural disorders with this child.”

**How Dietary Changes Can Help**

Much of the 3 days included discussion around how to heal the underlying gastrointestinal issues in ASD children. Although a complex topic, addressing dietary issues in ASD children helps with:

**Digestive problems** - removal of foods that inflame the gut, add in foods that reduce inflammation and heal the gut, supply beneficial bacteria (fermented foods and probiotics) and remove sugars and refined flour products.

**Biochemical and cellular issues** - if necessary remove phenolic or oxalate foods, improve methylation, sulphation and nutritional deficiencies.

**Toxins and chemicals that deplete** - avoid food additives and toxins in the food supply

**Poor diet** - increase the quality/ nutritional value of food and increase digestibility through traditional cooking/ preparation methods.

**Helminths (Worm) Therapy for a Healthy Immune System**

May be somewhat controversial, however in the last 100 years or so we have completely changed our evolutionary—history lifestyles. Traditionally we have lived in harmony with helminths. Helminths and their eggs are the most potent stimulators of beneficial mucosal immunity. They evoke an immune response which we need and it is a normal part of our immune conditioning. Helminths have been shown to decrease the levels of inflammatory markers found to be high in ASD children (like TNF-α and other inflammatory cytokines, and raise the level of regulatory markers (IL-10). This therapy is not available in Australia and requires a permit to be imported into the country.

**Day 2 - Environmental Issues in ASD**

Presenters: Dr Nancy O’Hara, Dr Jerry Kartzinel, and Jessica Tran N.D., Stephanie Seneff, PhD

The research is implicating an association between ASD and immune dysfunction/ inflammation, oxidative stress, mitochondrial dysfunction and toxicant exposure. Most studies have been published only in the last 5 years. Therefore ASD is increasingly being viewed as a metabolic disorder.

If metabolic abnormalities cause or contribute to autistic symptoms, then this implies that some of the symptoms of autism may be **treatable** or **reversible**.

**Metabolic abnormalities in ASD:**
- Cerebral folate deficiency
- Mitochondrial dysfunction
- Oxidative stress
- Impaired methylation/sulphation
- Inflammation
- Seizures
- Hypothyroidism: ASD and ADHD
- Deficiencies: iron (ASD and ADHD)

**Some symptoms of metabolic disease include:**
- Growth delay
- Delayed or precocious puberty
- Developmental delays
- Immunodeficiency
- Diarrhoea
- Cyclic vomiting
- Muscle weakness
- Adrenal insufficiency
Mitochondrial Dysfunction and Autism

A considerable amount of time was spent on mitochondrial dysfunction in ASD. Mitochondria are the "power houses" within our cells and are responsible for the production of energy. Energy metabolism require oxygen, the heart and brain being the two most dependent organs.

Between 70 to 80% of ASD children have some form of mitochondrial dysfunction.

Mitochondrial dysfunction may be primary or secondary.

- Primary mitochondrial disease - due to a gene mutation
- Secondary mitochondrial dysfunction - due to medication toxicity, environmental toxins, inflammation, etc.

Some causes of mitochondrial dysfunction:

- Heavy metals - mercury, arsenic, lead, cadmium, aluminium
- Pesticides, diesel fumes, polychlorinated biphenyls
- Propionic acid from clostridia
- Oxidative stress/ low glutathione
- Hypoxia
- Poor nutrition, infection
- Abnormal proteins (high levels of Alzheimer beta-amyloid precursor protein in ASD)
- Statins

Mitochondrial findings in ASD:

- Speech regression
- Poor articulation
- Low muscle tone
- Constipation
- Regression with illness, vaccination or exercise
- Low activity level, fatigability
- Low glutathione as a marker for mitochondrial disorders (symptoms improve as glutathione is restored)

Environmental Toxins and ASD

We are all exposed to toxic substances in our environment. Children may be more susceptible to exposure to environmental toxins than adults. A review of the literature concluded that 74% of published studies suggested a positive association between toxic metals and incidence of autism.

An interesting study that looked at the first baby hair of ASD children found that the more severe the ASD symptoms, the less mercury was excreted in the hair. Suggesting that ASD individuals have a problem with the ability to excrete mercury. Reduced Levels of mercury in first baby haircuts of autistic children. Amy Holmes, et al.. International Journal of Toxicology, 22:277-285, 2003.

Toxic metals such as mercury, lead, arsenic, pesticides, polychlorinated biphenyls (PCB's), xenobiotics and phthalates, have been shown to:

- Inhibit thyroid function
- Cause mitochondrial dysfunction
- Lead to toxic stress
- Increase glutamate/ excitotoxicity
- Cause inflammation
- Decrease glutathione production

Clean up the child's environment:

- Use natural biodegradable and perfume free detergents and cleaning agents, do not dry clean clothes
- Wear 100% cotton clothes, avoid flame retardant materials (antimony)
- Use stainless steel, ceramic, glass or cast iron cookware, avoid aluminium and non-stick cookware
- Use an air purifier, especially in the bedroom (due to the dust being full of toxins)
- No plastic furniture (polyvinyl chloride)
- Use aluminium free baking powder, deodorant. Do not cook in aluminium foil or drink from aluminium cans
- Avoid use of herbicides or pesticides
- Use natural shampoos, soaps, lotions, etc.
Detoxification Treatment

Foundation of treatment is:

- Healthy diet
- Healthy bowel movements
- Exercise (sweating)
- Sauna (toxic compounds released in sweat)

Support healthy liver detoxification

Chelation only if testing indicates harmful levels of heavy metals.

Glyphosate, the Microbiome and Mental Health

Stephanie Sneff gave a video presentation on glyphosate (Roundup), genetically engineered crops, and glyphosate’s effect on the human microbiome, mental health and ASD. The weed killer, glyphosate, sold under the trade name Roundup is the most widely used herbicide on the planet. Genetically engineered plants such as corn, soy, canola, cotton, alfalfa, and sugar beets have made it relatively easy to control weeds without killing the crop plant, but this means that glyphosate will be present as a residue in the derived foods. Glyphosate is also used prior to harvesting wheat, therefore it is a contaminant in the flour used for consumption.

Monsanto the company producing the genetically engineered crops argues that it is harmless to humans as our cells do not have the biochemical pathway that glyphosate inhibits. However our gut bacteria do have this pathway. Therefore the human microbiome will be adversely affected. Also other ingredients in Roundup greatly increase its toxic effects.

Some biological effects of glyphosate:

- Depletes aromatic amino acids and methionine
- Disrupts gut bacteria (Studies with chickens, cows and pigs show overgrowth of pathogens in gut)
- Disrupts cytochrome P450 (CYP) enzymes which are involved in many biological functions
- Depletes important minerals (Calcium, manganese, zinc, cobalt, iron, ....)
- Likely impairs sulfate synthesis and sulfate transport

An interesting graph that was presented (left) which plotted the incidence of ASD against the rise in glyphosate use in corn and soy. The correlation between the two plots is extremely close.

*Glyphosate and Autism*  
Testing for glyphosate in American mother’s breast milk, urine and water, found:

- Breast milk levels ranging from 76ug/L to 166ug/L, which are 760 to 1600 times higher than the European Drinking Water Directive allows
- Urine testing shows glyphosate levels over 10 times higher than in Europe.
- Soy based formula used in feeding tubes for neonates also contain glyphosate

**Day 3 - GAPS Fundamentals and various speakers and topics**

Presenters included: Dr Natasha Campbell-McBride, Rachel Arthur ND, Dr Leila Masson

**Fundamentals of Gut and Psychology Syndrome (GAPS)**

Dr Natasha Campbell-McBride presented an outstanding lecture on the GAPS diet.

There are many sources of information on GAPS including YouTube presentations, so it is not my intention to go over the full GAPS diet. However, there are some comments that Natasha made that brings home what we need to do to do to help individuals recover.

"Children are trapped in a toxic fog. The longer they are in this toxic fog, the longer it takes them to recover."

Regarding diagnosis - "Valuable time is being wasted, especially for those that have been put into a label (box), delaying treatment. As a parent you know that something is wrong."

GAPS aims to restore the body’s detoxification system - "the body has ways of removing toxins that we still do not understand. It is a nutritionally hungry system."

**Thyroid Assessment in Children and Teenagers**

Presented by Rachel Arthur

What do we know about kid’s thyroids? The answer is surprisingly little. There is an elevation of thyroid stimulating hormone (TSH) between 9-11 years in both boys and girls, which corresponds with a growth spurt of the thyroid. What is interesting in the research is that there is an increase in thyroid antibodies, especially in girls at puberty. This is believed to be due to the immune activating effects of oestrogen. However if we look at the children with high anti-thyroid peroxidise levels, 80% of these children have signs of thyroid abnormalities on scans. Is this an early warning sign?

How may a child with thyroid problems present?

- Female
- Tired
- Weight gain
- Mood and memory issues
- Hair loss
- Constipation
- Arthralgias
- Family history - first degree relatives with a thyroid disorder
- Iodine imbalance or selenium, iron, zinc, vitamin A or vitamin D deficiency
- Heavy metal toxicity

A higher percentage of autoimmune thyroid disease patients have gluten antibodies, but do not have coeliac disease.

**Symptoms of thyroid disease are often interpreted by doctors as problems associated with adolescence and teenager lifestyle.**
Dr Leila Masson. Integrative Paediatrician

Dr Masson outlined her approach to treating children with ADHD and ASD. The presentation put many of the issues discussed over the three days together in treating children.

There are a few points that are worth noting.

Stimulant medication: Ritalin, Concerta, Rubifen are not approved to be prescribed for children under 6 years old. Prescribing under 6 year old children is "off label".

Optimal levels of lead in children is zero. In Australia we still have an acceptable range which is twice that of other countries.

Screen time:

- Screen time before three years of age increases the risk of ADHD
- Recommendation is for no screen time for < 3 year olds
- Less than 30 minutes per day for <5 year olds
- Less than one hour for older children
- Set a good example as parents
- Find other fun activities - take them outside

Next years MINDD International Forum focus will be on immunity and neurology. Save the date in May 2016.