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Select Committee on Autism
by email autism.sen@aph.gov.au

This submission is made on behalf of the Food Intolerance Network, which consists of 16,216 current members (verify here https://www.facebook.com/groups/128458328536/members), mostly in Australia and New Zealand but with members in USA, UK, EU, Canada and several other countries and includes dietitians and other health professionals. The Network provides independent information about the effects of food on behaviour, health and learning in both children and adults through www.fedup.com.au which has had nearly 13 million visitors.

Responsibility for comments is taken by Howard Dengate BSc (Food Sci UNSW), PhD (Plant Sci LC), Cert Plant-based Nutrition (eCornell) and by Sue Dengate BA (Psych UNSW), DipEd (UNSW). The support of Network members is gratefully acknowledged.

This submission seeks to address an issue not otherwise so far considered by the Select Committee, yet clearly falling within the Terms of Reference under diagnosis ("current approaches and barriers to consistent, timely and best practice autism diagnosis...misdiagnosis..), strategy ("... development of a National Autism Strategy..."), and research ("..the adequacy of funding for research..).

The issue is the effects of food on autism diagnosis and symptom management. This is not a claim of cure but of managing symptoms to the extent that diagnosis or misdiagnosis can sometimes be reversed and is based on recent scientific research.

Major submissions to the Select Committee from bodies who might be presumed to know about any relationship between diet and autism, those from the Australian Medical Association, the Royal Australian College of General Practitioners, the Autism Cooperative Research Centre and the Royal Australasian College of Physicians, and their position statements on their various websites, do not anywhere mention the word 'diet'. This is a reflection of the nearly-complete absence of any training for medical practicioners in diet and nutrition.

In fact, there is a distinct bias in these submissions towards the use "suitably experienced or trained clinician such as a paediatricians, psychologists, psychiatrists or neurologists" with never any mention of dietitians. Yet here is a broad statement about the effects of food and a scientific approach to understanding them from dietitian Joy Anderson, who was made a Member of the Order of Australia for significant service to community:

"As a dietitian who uses the RPAH Allergy Unit Elimination Diet in my everyday practice, I can assure you that it does work brilliantly in the majority of cases, in infants (via mother's breastmilk), in children and in adults as well. However, it needs to be done properly .... the diet should be supervised by an Accredited Practising Dietitian with experience in food-chemical intolerances and conducted as a test diet, for a limited period of time - usually only 3-4 weeks in duration ... challenges are then performed in a timely manner and the diet refined to be liberalised as much as possible, while only avoiding the problem foods long term.

I have many, many satisfied clients who were fobbed off by other health professionals in the past, because they didn't 'believe' in food-chemical intolerance" - in the June 2013 issue of the Medical Journal of Australia InSight

It is widely believed publicly that the gluten-free /casein-free (GFCF) diet can improve the lives of autistics, yet a recent scientific review concluded that "little evidence that a GFCF diet is beneficial" for the symptoms of autism in children. The problem is that even these researchers lacked an understanding of food intolerance and so did not recognise that that the studies reviewed include foods or added substances that, if excluded, would lead to a different conclusion.

One specific example. A simple chemical called 'propionate' is used to induce autism in animal models of autism. If this chemical causes autism in rats, why would anyone give it to children? And the answer is that most children now eat this chemical every day because it is used as a preservative in common foods, especially breads and flour products such as wraps, tortillas, pizza, pasta, noodles. It is also permitted world-wide in a huge variety of processed food including products based on milk, meats, fruit and vegetables, desserts, confections, drinks, salads, condiments, soups, sauces, and it also occurs naturally in Swiss-style cheeses and sourdough breads.

If this chemical and others similarly implicated are excluded from the diet of autistics, remarkable improvements may be seen:

This one is from a teacher of autistics, talking about a 5 year old: *"when on [diet] he was back to **all normal development.** If he ate something off the diet then he would be in the corner banging his head on the wall with no speech at all"*

From a mother: "*My aspie son went from sitting under his desk (we were told he'd never hold a pencil) to **an A grade student** thanks to the ..[elimination] diet gluten-free and dairy-free. Best thing we ever did for him"*

And from the mother of a 12 year old: "*We went full elimination for my high-functioning autistic 12 year old son a year ago and had amazing results. **Teachers couldn't believe the difference**. I only wish we had known about [diet] when he was younger"*

From the mother of a 17 year old who was diagnosed at the age of 5 with autism, mild intellectual disorder and severe language disorder. At the age of 12, when he had been following [diet] for 5 years, the mother took him back to be reassessed. She wrote: ***"the change was so dramatic that the psych no longer considered him autistic."*** At the age of 17 he still had to stay on the diet, but on a day-to-day basis she wrote: ***"he is really happy, beautifully behaved and in great health.*** *I wish I had understood [diet] earlier"*

This 20-minute video presentation focussed entirely on this issue for autistics was recently prepared for a coming global autism summit and summarises the evidence. **It is essential viewing for the Select Committee**: https://www.youtube.com/watch?v=Cv-eRER3MxQ

Here is a recent 9-minute video of Jemma, a 19 year- old university student with autism and depression, speaking about "massive improvements" using diet https://youtu.be/n2Hb2S-ffpw

There also needs to be research focussed on the impact on the microbiome because there is a lot of good evidence of distinctive gut microbiota in autistics, with higher levels of particular metabolites like propionates. It has also been shown that changing gut microbiota, for instance by faecal transplant, alters behaviour and many of the physical symptoms of autism, at least for a time. We don't know yet whether the altered gut microbiota are the cause of ASD, or simply a consequence of the same underlying causes of autism. But changes in the gut due to diet do provide a plausible mechanism for many of the effects that parents observe. After all, if you swallow a chemical preservative designed to kill bacteria in food, one might expect it to also kill bacteria in your gut, with consequences. This factor is never taken into account in the approval process for food additives, and rarely by researchers looking at autism.

In your final recommendations, therefore, we would seek recognition of the food and autism connection:

That where autism spectrum is suspected and an autism diagnosis is being sought, a 3 week trial of the RPAH elimination and challenge protocol with an experienced and supportive dietitian be routinely offered

There are hundreds of dietitians trained in use of the RPAH protocol in Australia and New Zealand.

Increase priority of funding of research to explore the impacts of food on autism and the use of diet to manage symptoms

Some recent references towards such a review of research priorities are attached.

Yours sincerely

Dr Howard Dengate

Ms Sue Dengate

PO Box 718, Woolgoolga NSW 2456 AUSTRALIA +61 2 6654 7500 confoodnet@ozemail.com.au www.fedup.com.au The Food Intolerance Network provides independent information about the effects of food on behaviour, health and learning in both children and adults, and support for families using a low-chemical elimination diet free of additives, low in salicylates, amines and flavour enhancers (FAILSAFE) for health, behaviour and learning problems. ABN 72 705 112 854

Some useful references about food and autism

Abdelli A et al, Propionic Acid Induces Gliosis and Neuro-inflammation through Modulation of PTEN/AKT Pathway in Autism Spectrum Disorder, Sci Rep. 2019 Jun 19;9(1):8824. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6584527/

Autism/Aspergers diet success story collection of over 80 reports https://www.fedup.com.au/images/stories/SCautismAspergers.pdf

Brusque, A M et al, Effect of chemically induced propionic acidemia on neurobehavioral development of rats, Pharmacol Biochem Behav, 1999;64(3):529-34. https://pubmed.ncbi.nlm.nih.gov/10548267/

> Abstract: High levels of propionic acid (PPA) comparable to those of human propionic acidemia were achieved in blood (1-5 mmol/l) and brain (1 micromol/g) of rats by administering saline-buffered propionate (pH 7.4) subcutaneously twice a day from the 6th to the 28th day of life. PPA doses ranged from 1.44 to 1.92 micromol/g body weight as a function of animal age. Control rats were treated with saline in the same volumes. Growth and development of physical landmarks were assessed by monitoring the following parameters daily: body weight, upper incisor eruption, eye opening, and hair coat. Development of some reflexes was also monitored, and a specific subset of motor skills was evaluated at days 14 and 21 of life by the free-fall righting test and the spontaneous alternation test. Chronic PPA administration had no effect on body weight, cerebral cortex weight, or cerebellum weight, but caused slight but significant delays in the day of appearance of hair coat and eye opening, indicating an effect of PPA on the development of physical parameters. Free-fall righting was impaired in PPA-treated animals. On the other hand, PPA administration had no effect on the performance of the animals in the spontaneous alternation tests. Long-term effects of early PPA administration were investigated by assessing animal performance in an aversive task (two-way shuttle avoidance task) and in a nonaversive (open-field task) behavioral task at 60 days of age. PPA-treated rats did not habituate to the open field, and presented a lack of retention of the shuttle-avoidance task. Our results suggest that early postnatal PPA administration to rats alters normal development and induces long-term behavioral deficits in aversive and nonaversive tasks.

Dengate, S and Ruben, A. Controlled trial of cumulative behavioural effects of a common bread preservative, J Paediatr Child Health, 2002,Aug;38(4):373-6. https://www.ncbi.nlm.nih.gov/pubmed/12173999

> Irritability, restlessness, inattention and sleep disturbance in some children may be caused by a preservative in healthy foods consumed daily. Minimizing the concentrations added to processed foods would reduce adverse reactions. Testing for behavioural toxicity should be included in food additive safety evaluation. Download this paper (6Mb pdf)

Dengate, Sue https://www.fedup.com.au/news/blog/harm-from-bread-preservative-confirmed This blog summarises the most recent research from brain researchers on the propionate bread preservative 280-283.

Elizabeth L et al, Ultra-Processed Foods and Health Outcomes: A Narrative Review , Nutrients, 2020 Jun 30;12(7):1955. https://theconversation.com/the-rise-of-ultra-processed-foods-and-why-theyre-really-bad-for-our-health-140537

Feingold BF, Hyperkinesis and learning disabilities linked to the ingestion of artificial food colours and flavours, J Learn Disabil,1976;9(9):19-27. https://psycnet.apa.org/record/1977-06105-001

Jacka FN et al, Association of Western and traditional diets with depression and anxiety in women. Am J Psychiatry. 2010;167(3):305-11. “These results demonstrate an association between habitual diet quality and the high-prevalence mental disorders ...”
https://www.ncbi.nlm.nih.gov/pubmed/20048020

Jacka FN et al, A randomised controlled trial of dietary improvement for adults with major depression (the 'SMILES' trial). BMC Med. 2017;15(1):23
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5282719/

> A group of 33 adults with major depressive disorders over 12 weeks of diet therapy showed significantly greater improvement in depression scores than a similar control group on social support therapy. The diet was a modified Mediterranean recommending consumption of the following 12 key food groups): whole grains (5–8 servings per day); vegetables (6 per day); fruit (3 per day), legumes (3–4 per week); low-fat and unsweetened dairy foods (2–3 per day); raw and unsalted nuts (1 per day); fish (at least 2 per week); lean red meats (3–4 per week), chicken (2–3 per week); eggs (up to 6 per week); and olive oil (3 tablespoons per day), whilst reducing intake of ‘extras’ foods, such as sweets, refined cereals, fried food, fast-food, processed meats and sugary drinks (no more than 3 per week). Red or white wine consumption beyond 2 standard drinks per day and all other alcohol (e.g. spirits, beer) were included within the ‘extras’ food group. Individuals were advised to select red wine preferably and only drink with meals.

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https://www.fedup.com.au/images/stories/LoblaySwain1986.pdf

Lobzhanidze G et al, Behavioural and brain ultrastructural changes following the systemic administration of propionic acid in adolescent male rats, Further development of a rodent model of autism, Int J Dev Neurosci, 2020 Apr;80(2):139-156. https://pubmed.ncbi.nlm.nih.gov/31997401/

Lopresti AL. A review of nutrient treatments for paediatric depression. J Affect Disord. 2015;181:24-32. https://www.ncbi.nlm.nih.gov/pubmed/25913919

MacFabe DF et al. Neurobiological effects of intraventricular propionic acid in rats: possible role of short chain fatty acids on the pathogenesis and characteristics of autism spectrum disorders. Behav Brain Res. 2007 Jan 10;176(1):149-69. https://pubmed.ncbi.nlm.nih.gov/16950524/

McCann D et al, Food additives and hyperactive behaviour in 3-year-old and 8/9-year-old children in the community: a randomised, double-blinded, placebo-controlled trial. Lancet. 2007;370(9598):1560-7 https://pubmed.ncbi.nlm.nih.gov/17825405/

Omnia El-Rashidy et al, Ketogenic diet versus gluten free casein free diet in autistic children: a case-control study, Metab Brain Dis. 2017 Dec;32(6):1935-1941.
https://pubmed.ncbi.nlm.nih.gov/28808808/

"…modified Atkins diet and gluten free casein free diet regimens may safely improve autistic manifestations and could be recommended for children with ASD"

Parker G, Watkins T, Treatment-resistant depression: when antidepressant drug intolerance may indicate food intolerance, Aust N Z J Psychiatry, 2002:36(2):263-5.
http://www.ncbi.nlm.nih.gov/pubmed/11982551

Describes the case of a 25 year old patient from a stable and caring family. A university graduate, the patient had a history of attention deficit disorder without hyperactivity, motor tics, generalised anxiety, social phobia, panic attacks, obsessive-compulsive disorder manifested mainly in checking compulsions and five years of severe depressive episodes which were non-responsive to a range of psychotropic drugs. After four weeks on the RPAH elimination diet, his mood and other symptoms had improved considerably. Double blind placebo controlled testing revealed that the patient was severely affected by salicylates and later tests showed effects of food additives. While staying on the diet, the patient was able to remain symptom free. When reviewed after a year, he had been able to return to full time work.

Peretti S et al, Diet: the keystone of autism spectrum disorder? Nutr Neurosci. 2019;22(12):825-839. https://pubmed.ncbi.nlm.nih.gov/29669486/ *"…the role of maternal diet during gestation and diet of ASD children as modifiable risk factors at the base of development or worsening of symptoms of autism"*

Piwowarczyk A et al, Gluten- and casein-free diet and autism spectrum disorders in children: a systematic review, Eur J Nutr. 2018 Mar;57(2):433-440.
https://pubmed.ncbi.nlm.nih.gov/28612113/ *"Overall, there is little evidence that a GFCF diet is beneficial for the symptoms of ASD in children"*

Sathe N et al, Nutritional and Dietary Interventions for Autism Spectrum Disorder: A Systematic Review, Pediatrics. 2017 Jun;139(6):e20170346. https://pubmed.ncbi.nlm.nih.gov/28562286/
"There is little evidence to support the use of nutritional supplements or dietary therapies for children with ASD"

Slimak K, Reduction of autistic traits following dietary intervention and elimination of exposure to environmental substances, In Proceedings of 2003 international symposium on indoor air quality and health hazards, National Institute of Environmental Health Science USA and Architectural Institute of Japan, January 8-11, 2003, Tokyo, Japan, vol 2, pp206-216.
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An open trial of a diet free of additives, low in salicylates, amines and glutamates with 140 children, nearly two thirds improved significantly. DBPC challenges showed reactions to salicylates, preservatives, artificial colours, synthetic antioxidants, amines and MSG.

Swain et al, Salicylates, oligoantigenic diets, and behaviour, Lancet, 1985;2(8445):41-2.
https://www.fedup.com.au/images/stories/Swain1985.pdf Includes children's behavioural reactions to propionic acid.

The Autism Enigma documentary video, 2011, https://www.youtube.com/watch?v=DKXx5gBeWUA

Tirosh A et al, The short-chain fatty acid propionate increases glucagon and FABP4 production, impairing insulin action in mice and humans, Sci Transl Med. 2019 Apr 24;11(489):eaav0120. https://pubmed.ncbi.nlm.nih.gov/31019023/ "chronic consumption of propionate leading to an increase in insulin levels might in turn lead to an increase in food intake, weight gain, and insulin resistance"