INTERNATIONAL HEALTH NEWS

William R. Ware, PhD - Editor

NUMBER 232 **NOVEMBER 2012** **21ST YEAR**

In this issue we first discuss some recent work indicating potential serious health problems associated with genetically modified corn and wheat. The problem of the safety of GM foods is a hot topic presently, with a referendum on the California ballot in November that, if passed, would require all food labels to indicate the presence of any GM foods. As discussed, there are very few human studies regarding potential risks, for the obvious reasons. This will no doubt change as interest grows, but the indications of risk will always be indirect since properly designed long-term studies are out of the question for practical, financial and political reasons. Meanwhile, for example, it appears that in North America it is no longer easy to purchase a breakfast cereal free of GM corn.

Other subjects discussed include modifying the risk of cardiovascular disease, new information concerning longevity from one study and from observations of individuals living in Hong Kong, the issue of the relative benefits of balloon angioplasty vs. non-invasive medical treatment, and fruit and vegetable consumption in regard to both stroke and risk of cognitive decline. Two studies related to type 2 diabetes are also discussed, as well as new evidence that eating bisphenol A is not a good idea.

This issue also contains a Research Review devoted to a detailed discussion of the so-called biomedical approach to childhood autism. This disorder has become essentially an epidemic and mainstream medicine has little to offer aside from psychological and educational help and their arsenal of potent psychiatric drugs which are, incidentally, not approved by the FDA for safety or efficacy in the treatment of pediatric cases of autism but are still widely used. At issue here is the matter of treating symptoms vs. treating causes, and in addition the vastly different view of autism among those who successfully treat it and those who adhere to the official, conventional view which offers little hope for those involved. While there has for some time been considerable information available on the internet to help parents who are not willing to accept the dismal prognosis provided by the conventional experts, there is now a comprehensive book available written by one of the leading proponents of the biomedical, whole-person approach, who is uniquely qualified to provide advice and direction.

And finally, if you need to restock your supplements, please remember that by ordering through the on-line vitamin store you will be helping to maintain the web site and the publication of IHN. You can find the store at http://www.yourhealthbase.com/vitamins.htm.

Wishing you and your family good health,

William R. Ware, PhD, Editor

Highlights

THE GREAT GMO DEBATE

This is a subject that has been intentionally avoided in IHN because of the high level of complexity, the uncertainty in interpreting the science, the strong industrial bias, and the obvious absence of human studies of sufficient length and design to be significant. Nevertheless, with an anti-GM food referendum on the California ballot in the November US election, some studies seem worth mentioning. For those unfamiliar with the California referendum system, generally when one is voted in it becomes law.

Genetically Modified Organisms (GMOs) are organism in which the genetic material, i.e. DNA has been altered such that is does not occur naturally. Fragments of DNA from on organism are inserted into another, usually different species. For example, an artificial combination of genes that includes a gene to produce a pesticide protein commonly known as Bt is inserted into corn. The resultant seeds eventually become plants which can be selected, grown and ultimately seeds marketed. The corn now contains an *in situ* pesticide. The corn is found to be nutritionally equivalent, the criterion on which safety is mostly based.

The implication of being a healthy human being is that thousands of biological pathways are working correctly, that thousands of genes that should be silent are silent, and those that should be turned on are indeed turned on, that thousands of receptors that should be active are active, etc. The healthy human is in a state of homeostasis, with an incredible number of complex biological systems functioning in concert and correctly. It is like a giant symphony orchestra playing a work of unimaginable complexity and getting every note and nuance right. Childhood development from conception to about age 20 is also unimaginably complex. After all, at the beginning there is only a fertilized egg. Then development begins with the whole process exquisitely orchestrated such that if all goes well everything is the right size and functions properly. Now add chemicals to which the body has never been exposed. These chemical can be from food, water, air or absorbed through the skin. They can be herbicides, pesticides, chemicals added in food processing, chemicals out-gassed from furnishings, electronic equipment, paint or construction materials, chemical leached from cookware and food containers, chemicals in personal care products, the list is almost endless. However, genetically modified food for animals or humans represents a unique potential source of toxins. However, we are told that these GM foods present no danger whatsoever to humans. Critics argue emphatically that this has never been demonstrated and never adequately tested.

Some foreign molecules are eliminated by our detoxification system, some are not. Our biochemistry is so complex that is the height of arrogance to claim that we understand human biochemistry or genetics to the point where we can predict what the residual chemicals might do or even understand every aspect of their metabolism. The arguments from industry attempting to establish the safety of GM foods are based on test-tube studies, very short term animal studies, and generalizations based on their way of looking at Genetics 101.

Obviously, human studies would be highly informative if they were done over a range of doses and carried out for the period required for diseases to become clinically manifest. The problem is that no one in their right mind would volunteer as a guinea pig if they appreciated the uncertainties associated with the experiment. Even though these uncertainties could be concealed and suppressed, the problems that can over the long term develop would easily be considered the natural result of aging and no connection with harmful chemical intake could be made. Problems that might develop over a shorter term would probably never be seen because the term of exposure would still be much too short. Observations on occupationally exposed individuals are difficult to interpret

because it can always be asserted that there is no connection. However, Jeffery Smith has collected a number of anecdotal reports where individuals report dramatic resolution of health problems by eliminating GM foods. He also comments that parallel experiences are being reported by veterinarians and farmers.[1]

Rarely have humans been studied for evidence that the claim is true that GM foods are just like their non-GM counterparts and completely harmless. There is supposedly no transfer of toxins that are not eliminated by the body nor is there any implantation of foreign genetic material, etc. A study just published in the journal *Reproductive Toxicology* merits consideration.[2] Scientists at Sherbrooke University Hospital in Quebec found the Bt-toxin from GM crops like corn in the blood of pregnant women and their babies and as well in non-pregnant women. The prevalence was high 67% to 93%. It was also in umbilical cord blood at a prevalence of 80%. Farmers have used Bt-toxin from soil bacteria as a natural pesticide for years, but they spray it on and it washes off and biodegrades in sunlight. It nevertheless was known by farmers to be toxic. The GM version is another matter since it is in the plant itself, and we eat it. The industry claim that Bt-toxin would be completely destroyed in the human digestive system appears to be inconsistent with the Canadian study.

Animal studies can be informative. A number are documented in a position paper from the American Academy of Environmental Medicine.[3] Also, consider the recent study of three GM corn varieties on mammalian health in rats.[4] The authors in one study concluded that their data strongly suggested that the GM varieties tested induced a state of liver and kidney toxicity. Or another study where rats were fed for a lifetime with GM corn.[5] They developed horrifying tumors, pictures of which made the newspapers (see *Mail*Online, September 19), and the females had shortened life expectancy. The time for these adverse effects to appear was longer than the industry standard, animal testing time of 90 days.

There are now a number of large companies and government agencies actively involved in developing new herbicide resistant varieties to replace the Roundup Ready varieties currently on the market. These include not only corn but soybeans and wheat. According to the Australian press (The West Australian, September 11, 2012), scientists in Australia claim that GM wheat developed by the government agency CSIRO can cause liver failure in children born of mothers who consumed this modified food and then could experience vastly shortened life expectancy. On the other battlefield, there are a number of weed varieties actively engaged in developing herbicide resistance. GM crops and foods represents a controversial area smart politicians should avoid altogether because the intertwining of politics, big business, science and public opinion are all mixed together with huge amounts of money involved to grease the wheels of influence. It is simply too dangerous.

The above very brief discussion just scratches the surface of the debate concerning GM foods. Even a ten-page research review would require dealing with only a narrow aspect of the subject. A good starting place for more information is the book by Jeffrey Smith titled *Genetic Roulette* as well as his website. The position presented is well documented with almost 1000 citations. The current debate hot spot is the State of California where a referendum, if passed, would legally require the disclosure on labels of any GM food content. While the results, which will be known late November 6 or early November 7, are being awaited with intense interest, and while companies are said to have already “invested” almost $20 million in an attempt to swing the vote against the proposition, polls indicate it may carry. But already, suggestions about how the industry might circumvent the new law, if it comes into effect, are being tossed around on the internet.

GM foods are becoming widely distributed in the food supplies in countries that do not have an outright ban on any GM human or animal food or crops. It appears almost impossible in North America to buy a breakfast cereal free of GM corn. Ten year from now will we have evidence that these cereals contained substances that harmed our children and that no there is nothing that can be done? Almost certainly not. It is obvious that really informative human studies would be unethical and it would be impossible to recruit subjects if informed consent was required. Long-term

adverse effects could be easily confused with a multitude of disorders with other causes. *This leaves us with one of the largest, uncontrolled experiments in toxicology in the history of the human race*.

ANOTHER CALL TO ARMS REGARDING CARDIOVASCULAR DISEASE

An international writing group with members from the World Heart Federation, the American Heart Association, American College of Cardiology Foundation, the European Heart Network, and the European Society of Cardiology have just published "*A Call to Save Preventable Death from Cardiovascular Disease*."[6] Readers will recall a similar theme discussed in the March IHN which was from the American Heart Association. Both position papers involve lifestyle and risk factor modification. While probably no one will argue with more exercise, not smoking and a eating a healthy diet, the focus on biomarker or other surrogate risk factors deserves comment. In 2010 Mark A. Hyman, M.D. wrote a particularly pertinent perspective in *Alternative Therapies in Health and Medicine,* in which he discusses the failure of aggressive risk factor treatment prompted by elevated blood glucose, lipids, or blood pressure.[7] These are the primary non-lifestyle factors that are currently on-stage worldwide, if one judges by the two position papers cited above. He cites two trials, NAVIGATOR AND ACCORD, which failed to show any reduction in morbidity or mortality and where there were significant side effects. He also points to the JUPITER trial, which showed that lowering LDL cholesterol without reducing inflammation as measured by C-reactive protein, showed no benefit in a primary prevention trial. Also cited was the ENHANCE trial where the combination of a statin and non-statin drug produced much more lipid lowering than either drug used alone, but led to more arterial plaque and no fewer cardiac events.

If one divides the recommended interventions into medication and lifestyle, the former has only an exceedingly weak evidence base whereas the latter appears much more compelling. Hyman cites the EPIC study which examined the adherence of 23,000 subjects to four simple behaviors, not smoking, exercising for 3.5 hours a week, eating a healthy diet which included fruits, vegetables, beans, whole grains, nuts, seeds and a limited amount of meat, and maintaining a healthy weight with a BMI < 30, which incidentally embraces both normal and overweight individuals. The mean follow-up was almost 8 years. Based on hazard ratios adjusted for confounding, those who adhered to these behaviors has a 93% decrease in the risk for developing diabetes, there was an 81% decrease in heart attacks, 50% decrease in strokes and 36% of all cancers were prevented. These results had strong statistical significance. The raw EPIC data is informative.[8] For total events—diagnosed cancer, diabetes, heart attack and stroke, out of 924 participants with zero healthy lifestyle factors, there were 209 events whereas for 2100 characterized by having all four of these factors, there were 96 events. This translates into the need for only about 5 individuals to adopt the best healthy lifestyle to avoid one chronic disease diagnosis over 8 years. This unadjusted NNT is not only very low but rarely seen when the intervention is medication. It underscores the clinical significance of this lifestyle intervention in the context of primary prevention. The contrast with treating risk factors such as lipids, blood sugar and blood pressure cannot help but be striking since these latter approaches do not appear to offer any significant benefit at all as suggested by large NNTs.

He also cites the famous INTERHEART study which followed 30,000 subjects and found that changing lifestyle prevented 90% of all heart disease. An unhealthy lifestyle coupled with unhealthy environmental factors are what is important, not a deficiency in medication. Hyman likens the current approach to continuously mopping up the floor around a leaking faucet rather than turning off the faucet. Root causes need to be addressed, including inflammation, insulin resistance, psychological stress and environmental toxins.

Finally, it is time for patients to start asking about numbers needed to treat to prevent one adverse incident, and numbers needed to treat to cause one harmful side effect. This means directing attention away from relative risks and benefits, and looking at absolute values. The reader's attention is directed to a website called NNT.com which provides an analysis using this viewpoint for a large number of treatments for a variety of disorders, each with a commentary from a physician. Preventive medical intervention that benefits only one person out of eighty or one hundred will not significantly impact the problems associated with chronic diseases and the seventy nine or ninety nine who derived no benefit deserve to be seriously considered.

THE "SECRETS" OF LONGEVITY

As the population ages, longevity with health becomes ever more fascinating. Remain healthy to a ripe old age and then go quickly. A study in the *British Medical Journal* examines the lifestyle and social factors associated with survival after age 75.[9] A group of 1810 subjects aged 75 or more were followed for 18 years. The object was to examine the association between certain lifestyle and social factors and the age at death. They then defined four risk profiles, high, moderately high, moderately low and low. Three lifestyle factors considered unhealthy were being over- or underweight plus current or former smokers, having a limited or poor social network and not engaging in leisure activities. Low risk subjects had none of the unhealthy factors whereas those classified as high risk had all three. In between were moderate-high with any two and moderate low with only one. Then, taking the high risk group as a reference, they determined the median life extension for the other three groups. They found 2.1, 3.6 and 5.4 years for the moderately high risk, moderately low risk and low risk groups, respectively. When the low risk group was compare to the reference, men lived about a year longer than women, and those 75-84 lived 6.1 years more and those ≥ 85 still lived 4 additional years. Having chronic conditions had only a modest influence on the results. Note that neither alcohol or diet were considered in this analysis, aside from the influence diet might have had on not being in the ideal weight range.

Smokers in the study had a one year shorted median survival time compared to those who had never smoked. Former smokers (most quit 15-30 years before reaching 75) exhibited the same results as never smokers. The researchers also addressed the question of the impact of illness at baseline and how this might confound the results that involved physical and leisure activity. After adjustment for baseline morbidity, the association between physical activity and survival was still significant. Of interest is the finding that even if one was 85 or more, the median age at death could still be four years higher if the individual was in the low risk group.

At about the same time this paper was published, the press carried a story concerning longevity in Hong Kong.[10] Despite the crowded living condition and smog, Hong Kong women appear to have the greatest longevity in the world, surpassing Japan for the first time. The average life expectancy for women is now 87 years whereas for men it is 81. These numbers are up from 79 and 72 for women and men 30 years ago, which is attributed to better medical services and greater health consciousness. This great longevity is explained by a number of factors including keeping busy, traditional Cantonese cuisine and social networking encouraged by the popularity of the centuries-old Chinese game of Mahjong. Also, many people in Hong Kong continue to work into their 70s and 80s, which may contribute to better psychological and mental health. They also avoid the stress and inactivity commonly associated with retirement which frequently is associated with having nothing to do. Also, Cantonese food is famous for steamed fish and vegetables and consuming green tea in large quantities is common.

ANGIOPLASTY VS. OPTIMAL MEDICAL THERAPY FOR STABLE CORONARY ARTERY DISEASE

Angioplasty is also called percutaneous coronary intervention (PCI) or simply coronary revascularization. This is a non-surgical procedure used to treat narrowed coronary arteries associated with heart disease. PCI involves feeding a deflated balloon or other device on a catheter up into the heart to the site of the blockage using X-ray imaging for guidance. The balloon is then inflated to open the obstruction and frequently a stent is placed at the site to attempt a durable intervention. Early revascularization in the management of heart attacks has been shown to result in a reduction of cardiovascular events. In addition, it has also been shown to improve cardiovascular outcomes in unstable angina. A study has just reported which investigated the benefits of PCI for the management of stable angina as compared to optimal medical therapy (OMT) which is really risk factor modification (smoking cessation, exercise, blood sugar management, lipid lowering, anti-angina drugs and antihypertensive medications).[11] The study was based on a systematic review of 12 randomized clinical trials. It was found that in patients with stable coronary artery disease, PCI as compared to OMT did not reduce the risk of mortality, cardiovascular mortality or nonfatal heart attack. All that PCI appeared to do better was provide greater angina relief. However, as the nature of stents changes as well a medical management of stable angina, these results may eventually not apply. As discussed above, OMT in fact merely treats risk factors and does nothing to address the root causes of this chronic disease. For example, statin treatment for established coronary heart disease has a number needed to treat to prevent one acute event of about 50 compared to 100 for primary prevention.

These results are important because obviously PCI is an invasive procedure which exposes the patient to risks of perforation, infection, procedural induced heart attack, and subsequent stent failure, acute events that are absent when all one does is treat risk factors. But this study will not make hospital administrators happy since the so-called cath lab is a great revenue generator.

RED WINE, ALCOHOL AND CARDIAC BENEFIT

A paper just published in *Circulation Research*[12] compared the effect on blood pressure of red wine, gin and non-alcoholic red wine. *Medpage Today* had the headline, “Cardiac benefits of red wine not from alcohol.” This study found the in a 4 week three-way cross-over design, the only significant change in blood pressure was from non-alcoholic red wine. The decreases were 5.8 mm Hg and 2.3 mm Hg for diastolic and systolic pressure. The authors then use the results of a huge meta-analysis to claim that these changes are associated with a 14% decrease in risk of coronary heart disease and a 20% decrease in risk of stroke. This conclusion is inconsistent with the ACCORD study discussed above where aggressive blood pressure lowering did not result in a reduction of mortality or morbidity associated with cardiovascular disease. This illustrates the problem with using data where a risk factor change is translated into a predicted event rate change, especially without taking into account studies that looked at events. Also, according to Dr. Walter Willett from Harvard’s School of Public Health, the heart disease protection of moderate consumption of alcoholic beverages is similar across red wine, white wine, beer, cordials, gin or scotch whiskey.[13]

DIABETES DIAGNOSIS FOLLOWED BY WEIGHT GAIN INCREASES RISK OF CARDIOVASCULAR DEATH

At a presentation at the European Association for the Study of Diabetes held recently in Berlin, a study was reported that looked at the risk of cardiovascular mortality (CV) and weight gain or loss after the diagnosis of diabetes. While subjects who maintained or lost weight has no change in risk, those who gained weight had a statistically significant 63% increase in CV mortality and a 34% increase in all-cause mortality. Survival analysis was adjusted for age, gender, baseline BMI, previous angina, education level, marital status and glucose lowering drugs. The explanation for the increased event rate is not clear, but the researchers suggest it might be due to the sulfonylureas used frequently in the weight gain group. These drugs put patients at increased risk of hypoglycemia and that in turn can increase the risk of a heart attack and CV related death. The study involved 8486 patients with a follow-up of almost five years. Data was collected from 84 primary care centers in Sweden.

BELLY FAT + INSULIN RESISTANCE AND RISK OF TYPE 2 DIABETES

A recent study has provided additional evidence that individuals who have both visceral fat (abdominal or belly fat, also known as central obesity) and insulin resistance have a considerably increased risk of prediabetes or type 2 diabetes.[14] According to the researchers, the study was motivated by a lack of adequate information concerning diabetes risk and the distribution of adipose tissue coupled with inflammation and insulin biomarkers. Over 700 obese individuals without diabetes or cardiovascular disease at baseline where followed for seven years. It was found that excess visceral fat and insulin resistance, but not general adiposity were independently associated with incident prediabetes and type 2 diabetes. For higher baseline visceral fat, an increase of 1.4 kg increased the risk of diabetes by a factor of 2.4, but no association was found with total body fat or abdominal subcutaneous fat (fat layer under the skin). The take-home message is that a so-called beer belly is bad news.

One of the insights provided by this study concerns the metabolically healthy obese. This so-called phenotype is associated with decreased fat deposition in the abdominal viscera, increased lower body subcutaneous fat storage, insulin sensitivity rather than resistance, and a favourable blood lipid profile involving larger HDL and LDL particles. This suggests an interesting area of research would examine factors that determine whether an individual obese person will favour visceral vs. subcutaneous fat storage.

PLANT POLYPHENOLS FROM FRUITS AND VEGETABLES AND AGE-RELATED COGNITIVE DISORDERS

Tens of millions of elderly individuals worldwide now suffer from cognitive decline and dementia. It has been recognized for a long time that there is probably a systemic vascular component associated with the pathogenesis of dementia. Chronic inflammation may damage the vasculature of the brain or even be directly neurotoxic. Dietary factors such as the constituents of the Mediterranean diet as well as fruit juices and extracts are under study as treatments for cognitive impairment. Studies suggest that blueberry, strawberry, blackberry, grape and plum juices or extracts favourably impact cognitively impaired rodents, and resveratrol, a grape polyphenol is now being studied in humans.[15]

Kang *et al* from the Channing Laboratory, Harvard Medical School, reported in 2005 on a

study that examined fruit and vegetable intake and cognitive decline in aging women who had their cognitive status checked every 4 years from 1995 to 2001.[16] It was found that total vegetable intake and, in particular, intake of cruciferous vegetables were significantly associated with less decline. Women consuming the most green, leafy vegetables also experienced slower decline than women consuming the least amount. Overall, a high vegetable intake delayed cognitive decline by 1 to 2 years.

Researchers from this same laboratory now report on a more extensive study based on a somewhat expanded cohort (the Nurses' Health Study participants).[17] The study was initiated in 1980 and starting in the period 1995 to 2001, follow-up assessments were carried out twice. Cognitive assessment was focused on short-term memory. Long term diet was averaged over a number of years. In contrast with the earlier study, greater intakes of blueberries and strawberries were associated with slower rates of cognitive decline when extreme categories of intake were compared. Cognitive aging appeared to be delayed by up to 2.5 years. Also, grater intakes of anthocyanidins (bioflavonoids found in red grapes, berries, red cabbage, red onions and eggplant) and total flavonoids were associated with slower cognitive decline. One surprising results was that cognitive improvement was noted with rather small intakes of berries (1 to 1.2 cups per week). Correcting for potential confounding due to the fact that women who ate more berries tended to exercise more and have higher incomes did not change the general conclusions.

Dose dependence and diversity of the source of these plant-based chemicals becomes an interesting issue. Fruit extracts, concentrated bioflavonoids, and mixed polyphenols are all available at health food stores or online. Based on this study augmenting modest fruit intake with a few extract pills might prove beneficial in the context of this discussion, although this has not been studied carefully.

FRUITS, VEGETABLES AND RISK OF STROKE IN MEN. THE IMPORTANCE OF LYCOPENE

There are a number of observational studies suggesting that a high dietary intake of fruits and vegetables is associated with a decreased risk of ischemic stroke. However, the identification of the most active ingredients in this context has proved challenging. A study just published in the journal *Neurology* examined the association between blood levels of dietary lycopene, alpha-carotene, beta-carotene and alpha-tocopherol in over 1000 stroke-free Finnish men aged 46-65 and the incidence of stroke when followed over about 12 years.[18]

A total of 67 strokes occurred during follow-up of which 50 were ischemic (blood-clot related). After adjustment for age, entry year, BMI, blood pressure, smoking, LDL, diabetes and history of stroke, men in the highest quartile of blood lycopene had a 59% reduction in the risk of an ischemic stroke and a 55% lower risk of any stroke. The event rates given allow the calculation of an absolute effect which for ischemic stroke was that 21 men needed to have lycopene levels in the highest quartile compared to the lowest to prevent one stroke over 12 years whereas for any stroke it was 18 men. These are not large numbers by the standards of modern medicine where millions take pills for life when the number needed to treat for one benefit can be 100 or greater.

The authors comment that among the four antioxidants studied, lycopene is the most effective quencher of reactive oxygen (singlet oxygen) and is more effective than beta-carotene in cell protection against hydrogen peroxide and nitrogen dioxide related oxidants. Oxidative stress has been associated with cell injury that can lead to strokes. For the other micronutrients studied, there was no significant effect on the rate of strokes when low and high blood levels were compared. This study has two significant weaknesses – the event rate was rather low, and the levels of lycopene and the other antioxidants were determined only at baseline.

Lycopene gives tomatoes and other fruits and vegetables their deep red color although other

compounds also do this. In terms of weight per wet weight of various foods, tomato products such as juice, sauce and ketchup are all very high in lycopene. Other good sources are watermelon and papaya. A source of huge amounts is the South East Asian fruit gac. Lycopene is of course available as a supplement. The FDA allows the claim to be made that one-half to one cup of tomatoes and/or tomato sauce a week may reduce the risk of prostate cancer. Cell culture studies also suggest anticancer activity for other common cancers, and lycopene is widely thought to benefit eye health.

ASSOCIATION BETWEEN BISPHENOL A AND OBESITY IN CHILDREN AND ADOLESCENTS

The national Health and Nutrition Examination Survey ((NHANES) has proved to be a gold mine of information concerning the association between health and a huge variety of markers and individual characteristics. A study just published in the *Journal of the American Medical Association* makes use of this database to examine the question of bisphenol A (BPA) and obesity in children and adolescents, aged 6 through 19.[19] Data on urinary levels of BPA and obesity (as measured by the Body Mass Index—BMI) were obtained and analysed taking into consideration confounding by race/ethnicity, age, caregiver education, poverty to income ratio, sex, caloric intake, TV watching and kidney function. Prevalence of obesity, corrected for confounding, was found to increase dramatically from the lowest to the highest quartile of urinary BPA (10.3%, 20.1%, 19.0%, 22.3%).

NHANES data indicate that the main sources of dietary BPH were soda, school lunches and meals prepared outside the home. The BPA exposure may be decreased since the NHANES study due to the ban on certain types of cups and plastic baby bottles.

The authors address the issue of reverse causation, i.e. obese children simply eat more food including food containing BPA. However, the results were adjusted for caloric intake but this does not rule out this effect. Also, obese children could have higher BPA levels because sedentary children may consume more foods high in this chemical and the high levels may reflect to some extent BPA released from fat storage. These qualifications simply indicate the complexity of studies that attempt to identify risk factors from a snapshot data which is what is retrieved from these so-called cross sectional study designs. Nevertheless, BPA is an endocrine-disrupting chemical and thus there is biological plausibility.

REFERENCES

(1) Smith JM. Dramatic Health Recoveries Reported. *http://vitalitymagazine com/article/dramatic-health-recoveries-reported/* 2012 January 5.
(2) Aris A, Leblanc S. Maternal and fetal exposure to pesticides associated to genetically modified foods in Eastern Townships of Quebec, Canada. *Reprod Toxicol* 2011 May;31(4):528-33.
(3) American Academy of Environmental Medicine. Genetically Modified Foods. *http://aaemonline org/gmopost html* 2011.
(4) de Vendomois JS, Roullier F, Cellier D, Seralini GE. A comparison of the effects of three GM corn varieties on mammalian health. *Int J Biol Sci* 2009;5(7):706-26.
(5) Seralini GE, Clair E, Mesnage R et al. Long term toxicity of a Roundup herbicide and a Roundup-tolerant genetically modified maize. *Food Chem Toxicol* 2012 September 11.
(6) Smith SC, Jr., Collins A, Ferrari R et al. Our Time: A Call to Save Preventable Death From Cardiovascular Disease (Heart Disease and Stroke). *J Am Coll Cardiol* 2012 September 11.
(7) Hyman MA. The failure of risk factor treatment for primary prevention of chronic disease. *Altern Ther Health Med* 2010 May;16(3):60-3.
(8) Ford ES, Bergmann MM, Kroger J, Schienkiewitz A, Weikert C, Boeing H. Healthy Living Is the Best Revenge: Findings From the European Prospective Investigation Into Cancer and Nutrition-Potsdam Study. *Arch Intern Med* 2009 August 10;169(15):1355-62.

(9) Rizzuto D, Orsini N, Qiu C, Wang HX, Fratiglioni L. Lifestyle, social factors, and survival after age 75: population based study. *BMJ* 2012;345:e5568.
(10) Sims T. Daily exercise is a recipe for long life in Hong Kong. *http://www nytimes com/2012/08/25/sports/global/25iht-athlete25 html?_r=0* 12 A.D. August 24.
(11) Pursnani S, Korley F, Gopaul R et al. Percutaneous coronary intervention versus optimal medical therapy in stable coronary artery disease: a systematic review and meta-analysis of randomized clinical trials. *Circ Cardiovasc Interv* 2012 August 1;5(4):476-90.
(12) Chiva-Blanch G, Urpi-Sarda M, Ros E et al. Effects of red wine polyphenols and alcohol on glucose metabolism and the lipid profile: A randomized clinical trial. *Clin Nutr* 2012 September 3.
(13) Willett WC. Ask the doctor. For the health of my heart and arteries, how does regular consumption of red wine compare with grape juice or the equivalent in grapes? *Harv Heart Lett* 2007 March;17(7):7.
(14) Neeland IJ TAACea. Dysfunctional adiposity and the risk of prediabetes and type 2 diabetes in obese adults. *JAMA* 2012 September 19;308(11):1150-9.
(15) Cherniack EP. A berry thought-provoking idea: the potential role of plant polyphenols in the treatment of age-related cognitive disorders. *Br J Nutr* 2012 September;108(5):794-800.
(16) Kang JH, Ascherio A, Grodstein F. Fruit and vegetable consumption and cognitive decline in aging women. *Ann Neurol* 2005 May;57(5):713-20.
(17) Devore EE, Kang JH, Breteler MM, Grodstein F. Dietary intakes of berries and flavonoids in relation to cognitive decline. *Ann Neurol* 2012 July;72(1):135-43.
(18) Karppi J, Laukkanen JA, Sivenius J, Ronkainen K, Kurl S. Serum lycopene decreases the risk of stroke in men: A population-based follow-up study. *Neurology* 2012 October 9;79(15):1540-7.
(19) Trasande L. Association between urinary bisphenol A concentration and obesity prevalence in children and adolescents. *JAMA* 2012 September 19;308(11):1113-21.

RESEARCH REVIEW

AN ALTERNATIVE APPROACH TO TREATMENT OF AUTISM

William R. Ware, Ph.D.

INTRODUCTION

Today autism is called *Autism Spectrum Disorder* (ASD) and comprises a range of developmental disabilities involving dysfunctional ability regarding social interactions, severe communication problems, restricted, repetitive behavior and patterns of behaviour, and restricted interests, activities and imagination. The disorder is characterized by an early onset, generally before age 3 to 5. It can be present at birth or develop later. But ASD is really a collection of developmental disorders which include full-fledged autism as described above and as well attention deficit disorder, attention deficit hyperactivity disorder, and a catch-all diagnosis of pervasive developmental disorder (PDD) for children that do not meet developmental milestones and exhibit autistic symptoms, and yet still retain at least some ability to speak and communicate. The ASD is described in detail in the *Diagnostic and Statistical Manual of Mental Disorders,* the famous DSM now in its revised fourth edition (DSM-IV) with the fifth edition currently being prepared. DSM-IV describes over 200 mental disorders thought to plague humans, along with suggested treatments. The editor-in-chief of DSM-IV was an academic psychiatrist from Duke University where he was chair of the department of psychiatry. In an opinion piece in the *Los Angeles Times* on March 01, 2010, Frances made a remarkable confession:

Our panel tried hard to be conservative and careful but inadvertently contributed to three false "epidemics"—attention deficit disorder, autism and childhood bipolar disorder. Clearly, our net was cast too wide and captured many "patients" who might have been far better off never entering the mental health system.

The latest statistics from the Centers for Disease Control and Prevention (CDC) gives a prevalence for ASD of 1 in 88, based on surveillance in 2008 of children born in or after 2000. In 2000 the number was 1 in 150. According to the CDC, data from Asia and Europe also find similar prevalence.[1] Some, when they think about a prevalence such as 1 in 88, find such a disaster beyond comprehension and wonder what could have possibly gone wrong.

It is not clear the extent to which the DSM-IV, published in 1994 and revised in 2000 has influenced these numbers. Today there is considerable controversy in psychiatry concerning overdiagnosis and overtreatment of pediatric mental disorders. Nevertheless, there are many children with genuine autism identified by unmistakable behavior patterns and developmental problems. The impact on their lives, the lives of their parents and siblings, and ultimately on the healthcare system is clearly immense.

WHAT CAUSES AUTISM?

In her book *Children with Starving Brains. A Medical Treatment Guide for Autism Spectrum Disorder*, 4th Edition, Dr. Jaquelyn McCandless,M.D., board certified in both neurology and psychiatry with 16 years of experience in the field of autism, provides an answer to this question.[2] The short form is that autism involves a combination of genetic and environmental factors. The long answer involves eight distinct theories or models.

- It is simply genetics. While it is clear that there are genetic components associated with autism, the details and therapeutic guidance are still in the early stages of elucidation. At this point, identifying environmental triggers amenable to intervention should proceed independent of questions of genetic predisposition.

- The toxic chemical model. Pre- and post-natal exposure to toxic chemicals is considered an important causative factor for components of ASD. The number of potentially dangerous toxins in the air, food, water and in use as household pesticides is large. The associations with pre- and post-natal mental disorders in children not a particularly popular field of research. However, thought provoking reports are available and point to detoxification as an important therapeutic approach.[3,4]

- The heavy metal contamination model. It is generally agreed that both lead and mercury are neurotoxins of significance and therapies exist to specifically detoxify for these two elements.

- The vaccination theory. A highly controversial theory which includes reference to mercury. However, the use of mercury in vaccines has decreased in the past few years although still present in some vaccines. But the issues go way beyond mercury and are discussed from quite different points of view in the medical and popular literature. It is not in keeping with the purpose of this review to enter into this debate.

- The auto-immunity/allergy model. Immune system deregulation, either overactive or suboptimal, is evident in many autistic children. These children also exhibit signs and symptoms of allergy. Some of these are familial. Evidence of autoimmune reactions against the central nervous system protein myelin basic protein have also been observed. Triggers have not been conclusively identified.[5-7]

- The viral model. In her book Dr. McCandless relates her experience and that of other physicians treating autistic children when an anti-viral medication is prescribed.[2] She cites a typical favourable response rate of 30% associated with this intervention. Implicated are such viral infections as those caused by herpes simplex, varicella, Epstein-Barr and herpesvirus 6. Blood tests for subclinical viral infections can guide therapy.

- The gluten/casein, enzyme deficiency and yeast overgrowth model. It is widely recognized that most autistic children have an inability to digest gluten and/or casein. Gluten proteins are found in wheat rye, oats, barley and in numerous other products. Casein is a milk protein. One theory holds that the required digestive enzyme is missing which allows the build-up of opioid or morphine-like substances with concomitant adverse mental effects. It is common for autistic children to have one or more food hypersensitivities, which can be demonstrated by food-allergy tests and by elimination diets. The end result is an impaired immune systems and inflamed intestines and the gastrointestinal dysfunction frequently observed in autistic children.[8] This also renders the child vulnerable to yeast or other fungal overgrowth. There is considerable research suggesting that many of the behavioral and health problems of autistic children derive from this overgrowth phenomenon.[9] This model obviously provides considerable therapeutic guidance.

- The Metallothionein theory. This theory has been put forward by William Walsh, Ph.D. a biochemist associated with the Pfeiffer Treatment Center. As outlined by McCandless[2] he theorizes that a peptide called metallothionein can be dysfunctional due to an environmental insult during early development. This results in impairment of the following: regulation of serum copper and zinc; detoxification of toxic metals; development of the immune system and brain neurons; and production of enzymes that break down casein and gluten. This protein is involved in the response to intestinal inflammation. This theory is consistent with the frequently observed abnormal copper and zinc levels in the blood of autistic children and suggests aggressive removal of excess zinc and copper as part of a therapeutic approach.

Physicians involved in the non-conventional treatment of autism[2,10] emphasize the multiplicity of causes listed above and that several generally coexist in the autistic child. *Only when all the causative issues present are addressed will therapeutic success be achieved.*

WHAT MAINSTREAM MEDICINE HAS TO OFFER

An overview is available from the National Institutes of Health, National Institutes of Child Health and Human Development on their website.

- There is no cure for autism.
- Behavioral therapy, speech-language therapy and physical therapy may help.
- Individualized education in school is necessary.
- Medication options. There are no medications that can cure ASD or all of the symptoms. There are no FDA approved medications specifically for autism. Unapproved medications are however used which include antidepressants, anti-psychotics, stimulants and anti-anxiety drugs. Secretin which helps digestion is not recommended.

Thus the message parents presumably receive when their child has been diagnosed with autism is not very optimistic if it is based on the views of mainstream medicine. What is most important and significant is that the above list does not address the currently suspected causes and regards manifestations of autism to originate and have their cause in the brain rather than elsewhere in the body. In addition, the use of psychiatric drugs involves pure symptom manipulation and the drugs have never been cleared by the FDA as being either effective or safe for these indications. Psychiatric drugs obviously do not get at the root of the problem but only attempt to control behavior and other symptoms. There is a considerable literature on the adverse effects of psychiatric drugs when given to children and the suggestion has been made that the observed benefits are a fantasy and that the drugs actually appear to improve the symptomatic picture by altering and damaging the brain.[11-14] The bottom line seems to be that parents are being told that there is little hope and that they must prepare for a very difficult life, not only theirs but their child's.

The views of mainstream medicine can be likened to thinking in the box. Autism is viewed partly as a genetically determined fixed brain-based disorder and is defined by three characteristics. The child has difficulty with expressive and receptive communication, making eye contact or expressions of socialization, and exhibits repetitive or other odd behaviours. If the parents mention the child's rashes or digestive problems or intestinal problems that they note seemed to appear along with the above mentioned three characteristics defining autism, this will probably be ignored. The physician is documenting the diagnosis of autism and is not interested in bowel problems. The immune system and the gut are not relevant to the official view of autism. Moreover, they then become irrelevant in the context of therapy.

Thus there is a reluctance to accept alternative views and consider the implications of the multiple causes of autism that have been proposed. They do not fit with the accepted view of the disease. There may even be satisfaction when some study, perhaps flawed, demonstrates that an alternative theory or therapeutic approach is misguided, and thinking in the box discourages the research that might someday fully justify alternative approaches, now only justified by the unacceptable statement that "its works with many children." In fact, modern medicine has a fixation on finding a label for a disorder that meets with professional approval, and then using the one drug—one target approach, and then adding more drugs if this fails. So-called novel and emerging treatments (read alternative) generally prompt studies that examine just one intervention such as chelation, a vitamin or mineral, or rarely a combination of two such as vitamin B6 and magnesium. Generally the conclusion is that the single item intervention has little merit.[15] In addition, the only therapies that stand a chance of regulatory approval must provide pharmaceutical companies with the hope of large enough profits to justify clinical studies. While there will no doubt be government-sponsored trials, the necessity of thinking inside the box to get funding is a severe impediment to progress.

The remainder of this review will explore an alternative view, one that offers hope, comprehensive treatment directed at suspected causes, and anecdotal evidence of great success in many cases. We will take as a guide the work and extensive experience of Dr. Jacquelyn McCandless,[2] Dr. Natasha Campbell-McBride,[10] and the doctors that follow the principles of "Defeat Autism Now." Some

members of Defeat Autism Now! (DAN!) are in fact parents of autistic children who are also physicians. Given what mainstream medicine has to offer, one might simply ask, what is there to loose in trying an alternative approach, especially if the risk are minor or absent and the anecdotal evidence suggests great merit. Alternative approaches, incidentally, have been promoted on the internet and are already rather widely used, and probably misused as well. The greatest success appears to involve what some call *The Whole System Approach* which is fundamental to the way the DAN! protocol works.

WHOLE SYSTEM, BIOMEDICAL APPROACH TO TREATMENT OF AUTISM

The protocol to be discussed is also called the biomedical approach which views the patient as a whole system with the potential for multiple areas of dysfunction causing the disorder being treated. In an editorial in the November/December 2008 issue of *Alternative Therapies in Health and Medicine*, Dr. Mark Hyman nicely sums up the case for the whole system, approach to the treatment of autism. His view of autism is similar to that outlined above if one views the suggested causes as targets for therapy.

The broken brain of autism is caused by a broken body. Fix the body and the brain can recover……the roots of the biochemical disasters and metabolic dysfunction are the same [for chronic diseases] *–genetic predispositions (rather than determinants), a toxic environment, and a nutrient deficient diet. In the case of autism, the effects of these insults are magnified by over use of medications such as antibiotics and vaccination, which increase susceptibility to infections and promote allergy and autoimmunity. What has emerged is the extraordinary insight that autism is a complex, multisystem disorder rooted in a series of toxic, infectious and allergic insults.*[16]

The whole system approach to treating autism generally starts with a search for evidence of specific dysfunctions. This is followed by correcting problems identified in an order found to be most productive of benefit. Once the problems are treated and eliminated, the normal result is a dramatic decline in symptoms, in some cases to the point where the diagnosis of autism is no longer appropriate. Those who apply this protocol almost always find evidence that autism is a disease with multiple triggers. Eliminating one problem can produce a dramatic improvement in one child but have little impact in another. Furthermore, the tests for dysfunction are not perfect, and some physicians will use a mixture of treating test-based indications and also using a set of interventions that almost always produce results, and then modifying the protocol on the basis of results. Dr. McCandless summarizes her experience in her book. She and many other physicians she knows who treat autism find that almost all children improve when several goals are all achieved: (1) healing of their inflamed digestive systems takes place; (2) strengthening their immune systems is accomplished; and (3) toxins and heavy metals and toxins are removed from their bodies.

THE HISTORY

Dr. McCandless emphasizes the importance of obtaining a complete history including information about the mother, the possibility of encountering toxins during pregnancy, dental work during pregnancy, or for the child after birth, breast feeding, formula feeding, vaccinations, family history, digestive function, diet, , etc. The object is to obtain as complete a history as possible as it relates to potential causes of autism, both pre- and post-natal.

THE BIOMEDICAL PROFILE

Laboratory testing to obtain a biomedical profile is important for the assessment of the patient. Dr. Mark Hyman lists the following:[16]

Genetic Predisposition

- Impaired biotransformation of toxins.
- Impaired methylation (giving low homocysteine).

Allergy and Autoimmunity

- Antibody blood serum test (IgG) for 90 food sensitivities and disrupted intestinal permeability.
- Of special interest, anti-gliadin antibodies indicating an autoimmune response to gluten.

Digestive function

- Stool analysis for yeast overgrowth and deficiency in beneficial gut flora.
- Stool analysis for intestinal inflammation.
- Urinary organic acid test to look for overgrowth of bacteria in the small intestine resulting in fermentation of carbohydrates.
- Urinary peptide analysis to look for neuroactive peptides.

Nutritional Deficiencies

- Amino acids levels to look for maldigestion and malabsorption.
- Mineral and vitamin levels.
- Urinary methylmalonic acid to look for B12 deficiency.
- Fatty acid levels.

Mitochondrial Dysfunction and Oxidative Stress

- Organic acid test to look for impaired fatty acid, carbohydrate and citric acid metabolism.
- Test to judge fatty acid transport into mitochondria.
- Lactic acid to look for cellular acidosis.
- Oxidative stress tests.

Toxicity and Impaired Detoxification

- Red blood cell aluminum and lead levels.
- Hair analysis for antimony, arsenic and mercury (low if detoxification impaired).
- Urinary test after a chelation challenge for mercury.
- Urinary tests for sulphate and glutathione status.
- Urinary porphyrins for disrupted enzyme action caused by heavy metals.

The above is provided to illustrate the detail needed when optimizing the search for system dysfunction. These test look for dysfunction of the body's ability to detoxify or to properly carry out various metabolic processes, levels of critical nutrients, and indicators of oxidative stress. *The dysfunctions and deficiencies of interest in these tests are frequently found in autistic children*. In Dr. McCandless' book there is a similar protocol.[2] McCandless emphasizes the importance of using appropriate laboratories and of course the results need expert evaluation. Physicians aligned with Defeat Autism Now! use similar protocols.

GASTROINTESTINAL HEALING, THE FIRST THERAPEUTIC STEP

The majority of autistic children suffer from impaired gastrointestinal function.[2,10] For some, the symptoms are clearly evident—persistent, diarrhea, constipation, or an oscillation between the two, abdominal pain, bloating and abnormal stools. It is apparently common for parents to comment on this aspect of their child's spectrum of symptoms but a common thread running through parent's descriptions of the office encounter is that these symptoms are ignored by conventionally trained physicians, either pediatricians or those specializing in autism. In some cases, gastrointestinal dysfunction is only evident from the biomedical testing. The brain-gut association, so well described in books by McCandless and Campbell-McBride, appears off the radar. This is especially unfortunate since the dysfunction is amenable to diagnosis and treatment and successful therapy generally results in marked improvement.

Impaired gut function can be due to the unavailability of breast feeding, persistent colic in infancy, frequent use of antibiotics, certain immunizations, and the inability to detoxify environmental toxins. Dysfunctions resulting from fungal, bacterial and parasite overgrowth, the leaky gut syndrome, maldigestion, inflammation, and impaired liver detoxification are also frequently seen in autistic children. Since 60-70% of the immune system is in the intestinal tract and digestive organs, gut dysfunction can also result in impaired immunity.

The view that there is a direct connection between the gut and autism rather than the reverse where a brain disease is causing the gut problems is a subject of debate. If this were a one-way causality, then it would be surprising if therapeutic interventions directed at gut problems would eliminate the primary causative factor postulated to be a diseased brain. However, there seems little point is waiting while this is resolved when the success of gastrointestinal healing appears beyond doubt.

Three primary dietary culprits have been identified, gluten, casein and soy – independent of the state of understanding of the mechanisms. To quote McCandless:

Regardless of theories, clinical experience of many DAN! physicians has identified the GF/CF/SF [gluten, casein and soy free] *diet as the single most effective action you can take on your own to begin to help your child.*[2]

This statement is based on physician and parental observations and the common result is improved mental focus and capacity to learn, better eye contact and more normal inter-personal interactions. Only recently has soy been a general target, but McCandless reports improved results when all three culprits are simultaneously eliminated. Furthermore, progress can be in spurts. Casein is eliminated rapidly from the body when consumption is stopped, which may account for the rapid improvement sometimes seen, but for gluten the process is slower. In addition, to achieve satisfactory results, other foods where hypersensitivity is indicated by the IgG food sensitivity test may need to be eliminated. Incidentally, casein is not considered a dairy product, and thus foods marked “non-dairy” may still contain casein. On the CF diet, also avoid any food where the label lists sodium caseinate.

It is important to realize that the laboratory testing is not perfect and that independent of the test results, the GF/CF/SF diet should, according to McCandless, be the first step, followed by eliminating foods indicated by the IgG hypersensitivity test. Furthermore, McCandless, on the basis of years of treating autistic children, finds that gut healing has to come first and that this cannot take place if foods not being properly absorbed and digested are maintaining an inflamed gut. The clinical experience of those involved in the whole system alternative approach underscores the observation that multiple factors are involved and all need to addresses. If there is uncertainty as to the importance of some factor, say soy, it is best to assume it is important rather than finding this out late in the therapeutic process.

Instituting a GF/CF/SF diet can be challenging. Children with autism are in fact characterized by narrow food choices (mostly bad). Another barrier to be surmounted is finding substitutes that will be accepted. The website *Autism Network for Dietary Intervention* is devoted to helping families start and maintain GF/CF/SF diets.

Adjuncts to the restricted diet program are also important. These include broad spectrum digestive enzymes, a probiotics preparation containing a variety of “good” bacteria, and a multivitamin and mineral product without copper. McCandless suggests the multivitamin include B6, 50 mg/day, vitamin C, 100-1000 mg/day in divided doses, and calcium, 500-1000 mg/day.

The above initial treatment for autism can be carried out by some parents without help from a physician. Of course laboratory tests require physician intervention, and it seems highly desirable that the child enter a program supervised by a physician experienced in the biomedical intervention. This becomes essential when it is necessary to employ gastrointestinal healing procedures that can only be done by a physician. A huge problem exists since many physicians discourage anything but the

conventional, mainstream approach described above. The ideal solution is to find a physician qualified and experienced in biomedical protocols for autism.

Treatments requiring physician participation include dealing with fungal colonization and severe colonization of the gut due to the bacterium *Clostridium*. A prescription anti-fungal may be indicated, although there are effective natural anti-fungals such as grape seed extract, oregano and garlic extracts. There are other special issues associated with gastrointestinal healing which also strongly benefit from help provided by a physician.

SPECIFIC CARBOHYDRATE DIET FOR GASTROINTESTINAL HEALING

Some children do not respond to the GF/CF/SF diet. An additional option is called the Specific Carbohydrate Diet (SCD) first proposed in the 1950s to treat celiac disease.[17] The connection with the autism-gut-carbohydrate metabolism dysfunction was made once it was realized that the over-stimulation of intestinal flora and the attendant intestinal damage could be viewed as similar to the problems induced by gluten, casein or soy.[18] The SCD was originally intended for the treatment of Crohn's disease, ulcerative colitis, celiac disease and Irritable Bowel Syndrome (IBS). The solution was a diet where the carbohydrate content was carefully selected to be strictly grain-free, lactose-free, and sucrose free. This severe limitation of the availability of carbohydrates to intestinal bacteria impacts the formation of acids and toxins which can injure the small intestine. The dietary details are fully explained in the book *Breaking the Vicious Cycle* by Elaine Gottschall.[19] The transition from the GF/CF/SF diet to the SCD has been reported to produce generally good and some exceptional results in autistic children.[2,19] A website is available with up-to-date information concerning SCD, research links, news and the allowed foods.[20]

As might be expected, there is a striking lack of enthusiasm evident in the peer-reviewed literature because the standards of evidence based medicine are not met by either this intervention for autism or the gastrointestinal healing protocol used by McCandless and other DAN! physicians.[21,22] In fact, the dietary approach to gastrointestinal healing in children with autism does not easily fit into the clinical trial protocols, given that highly individualized and to some extent trial-and-error treatment is required and other issues than diet frequently must also be addressed. However, many parents acting only on anecdotal evidence have observed remarkable results, but these will rarely if ever never make it into the peer-reviewed literature due to the low level of respect for this type of evidence.

SUPPLEMENTS

In studies on children with ADS it is generally found they have multiple micronutrient deficiencies. This is consistent with the fact that many autistic children have diets that are, by choice, both limited and offer very poor nutrition. A study reported at a DAN! meeting in 2001 identified the following common deficiencies:

- Vitamin B6 and poor B6 binding
- Magnesium
- Vitamins A and D
- Biotin, B1, B3 and B5
- Vitamin C
- Low red blood cell membrane levels of the omega-3 fatty acid EPA
- Taurine vital to nerve cells
- Selenium
- Folate and vitamin B12

Correcting these deficiencies is important since these nutrients are required as part of the diet needed to reduce gastrointestinal inflammation. However, there are multiple problems. Young children have trouble taking capsules and pills. The dose depends on body weight. Tests will reveal which of these micronutrients are low, but some parents resist testing which leaves little alternative but to administer a mixture. Some children also take time to adjust to an adequate dose. Finally, mainstream medicine is quick to point out that this intervention is not evidence-based but that is

easily explained by the type of randomized controlled studies favoured which look at only one component.[15]

There are companies which provide vitamin and mineral supplements specifically designed for ASD children which resolve some of the problems of dose and administration. These include Klaire Labs, Ecological formulas, VRP (Vitamin Research Products), and Thorne Research, all of which have websites.

Response to micronutrient supplementation can be quite rapid and dramatic. Supplementation is emerging as an increasingly important means of treating autism and should be considered as an integral component of the biomedical approach, according to the experience of physicians who add this to their protocol.

REMOVING HEAVY METALS

Experts in the biomedical approach to treating autism regard removing heavy metals as an essential aspect of the autism healing process. Many, and probably most, ASD children have impaired detoxification ability. The ability to sequester and/or eliminate toxic substances appears impaired for reasons which include genetic susceptibility to toxic substances, early immune injury, and intestinal pathologies which impact nutritional status and immune function. Once the accumulation of heavy metals has been eliminated, other underlying pathologies may be revealed and can be addressed.[2] Among the DAN! physicians there is a consensus that this intervention should follow addressing gastrointestinal problems and nutrient/mineral deficiencies. Otherwise the results can be disappointing.

Removal of heavy metals in autistic children is accomplished by what is called chelation, which involves using a chemical that tightly binds the metal and the metal is then excreted in urine or via stool. Chelation has a long and controversial history well documented in a number of books.[23,24] Ethylene diamine tetraacetic acid (EDTA) is the classical chelator but is FDA approved only to treat lead poisoning. The success of this type of intervention can be followed by simply examining what is excreted. Since chelation also removes desirable minerals, it is routine to replace these with supplementation and to monitor for induced deficiencies. Chelating agents are capable of removing metals from deep tissue reservoirs but in general do not cross the blood-brain barrier. Thus removal of heavy metals from the brain must involve redistribution to where they can be captured.

An Autism Research Institute (DAN!) consensus protocol regarding heavy metal detoxification is followed by many physicians using alternative treatments for autism.[25] The chelator of choice is DSMA, which can be used orally or via a suppository. Transdermal DMSA is not recommended. Phase One involves determining dosage and timing followed by laboratory monitoring to track the metal removal and to check for adverse reactions and mineral status. Phase Two involves adding alpha-lipoic acid (ALA) when little or no more mercury is being excreted. Laboratory monitoring is used to track the additional metal removal caused by the addition of ALA. The process is completed when the child has plateaued and is no longer showing obvious changes in behavior and language. For some ASD children, the improvement at this stage is such that the child can return to the normal school environment and many no longer have the autism diagnosis. McCandless discusses variations on this protocol, reasons for lack of response, and what options then exist.[2]

It is clear that it is necessary to carry out this detoxification phase under the direction and supervision of someone experience and qualified in using the protocol.

ADDRESSING AUTOIMMUNITY, IMMUNITY AND VIRUSES

These are also areas that may need to be addressed. It has been found that individuals with autism have various types of abnormal immune functions which may partly be at the root of their syndrome. McCandless addresses this subject at length in chapter 8 of her book. Of interest are the many natural approaches to increasing immunity and the success with some children of using a standard antiviral medication to address a chronic viral infection. The necessity of doing this in some cases of autism illustrates the complexity of this disorder and the potentially lengthy path to a cure.

CONCLUSION

The contrast between the multiple interventions being used by the DAN! physicians and the dismal future for the autistic child based on the mainstream view and approach is extreme. Devotees to evidence-based medicine believe that many of these interventions, being untested by controlled clinical trials for safety and efficacy, should not be used until the proper scientific basis has been established. This is inconsistent with the widespread use off-label of unapproved psychiatric drugs to treat autistic children. Realistic parents and physicians open to alternative treatments would probably simply point out that they are unwilling to wait, do not regard the trials as necessary, believe that some trials being demanded cannot be done because the problem is one of the whole system and testing one particular therapeutic intervention at a time makes no sense. Also, the earlier the issues concerning the autistic child are addressed, the better the chances are of success in reversing or curing the syndrome.

Consider a randomized trial where half of the autistic children are provided with the alternative protocol outlined above and the other half receive psychiatric and special educational help and have their symptoms treated with powerful, unapproved psychiatric drugs which will have no impact on any of the aspects of the disease being treated by the alternative approach. Informed consent would involve providing the all the parents with information regarding the alternative approach. Once parents are aware that an approach to treating autism exists which has had, by any measure, phenomenal success, why would they agree to allow their child to be randomized with the risk of being in the conventional treatment group which clearly has by comparison a vastly smaller impact?

REFERENCES

(1) Centers for Disease Control and Prevention. Prevalence of autism spectrum disorders--Autism and Developmental Disabilities Monitoring Network, 14 sites, Unites States, 2008. *Surveillance Summaries* 2012;61(SS03):1-19.

(2) McCandless J. *Children with Starving Brains. A medical treatment guide for autism spectrum disorder. Fourth Edition*. Bramble Books; 2009.

(3) In Harm's Way:Toxic threats to childhood development. *http://www psr org/chapters/boston/resources/in-harms-way-report-download html* 2001.

(4) Landrigan PJ, Lambertini L, Birnbaum LS. A research strategy to discover the environmental causes of autism and neurodevelopmental disabilities. *Environ Health Perspect* 2012 July;120(7):a258-a260.

(5) Goines P, Van de WJ. The immune system's role in the biology of autism. *Curr Opin Neurol* 2010 April;23(2):111-7.

(6) Singh VK. Phenotypic expression of autoimmune autistic disorder (AAD): a major subset of autism. *Ann Clin Psychiatry* 2009 July;21(3):148-61.

(7) Enstrom AM, Van de Water JA, Ashwood P. Autoimmunity in autism. *Curr Opin Investig Drugs* 2009 May;10(5):463-73.

(8) Adams JB, Johansen LJ, Powell LD, Quig D, Rubin RA. Gastrointestinal flora and gastrointestinal status in children with autism--comparisons to typical children and correlation with autism severity. *BMC Gastroenterol* 2011;11:22.

(9) Shaw W. *Biological Treatments for Autism and PDD*. 2nd Revised Edition ed. Great Plains Laboratory; 2002.

(10) Campbell-McBride N. *Gut and psychology syndrome*. 2nd ed. Cambridge, UK: Medinform Publishing; 2004.

(11) Breggin P. *Brain-Disabling Treatments in Psychiatry*. Second ed. New York: Springer Publishing Co.; 2008.

(12) Breggin P. *Medication Madness. the role of psychiatric drugs in cases of violence, suicide and crime.* New York: St. Martin's Press--Griffin; 2008.

(13) Whitaker R. *Anatomy of an Epidemic*. New York: Crown Publishers; 2010.

(14) Wedge M. *Suffer the Children. The case against labeling and medicating and an effective alternative.* New York: Norton and Co; 2011.

(15) Rossignol DA. Novel and emerging treatments for autism spectrum disorders: a systematic review. *Ann Clin Psychiatry* 2009 October;21(4):213-36.

(16) Hyman MA. Autism: is it all in the head? *Altern Ther Health Med* 2008 November;14(6):12-5.
(17) HAAS SV, HAAS MP. The treatment of celiac disease with the specific carbohydrate diet; report on 191 additional cases. *Am J Gastroenterol* 1955 April;23(4):344-60.
(18) Gottschall E, http:, www.pecanbread.com/gottschall_veritas.pdf. Digestion-gut-autism connection: the Specific Carbohydrate Diet. *Medical Veritas* 2004;1(2):261-71.
(19) Gottschall E. *Breaking the Vicious Cycle. Intestinal health through diet*. Baltimore, Ontario: Kirkton Press; 2010.
(20) Breaking The Vicious Cycle. *http://breakingtheviciouscycle info* 2012.
(21) Buie T, Campbell DB, Fuchs GJ et al. Evaluation, Diagnosis, and Treatment of Gastrointestinal Disorders in Individuals With ASDs: A Consensus Report. *Pediatrics* 2010 January;125(Supplement 1):S1-S18.
(22) Jyonouchi H. Food allergy and autism spectrum disorders: Is there a link? *Current Allergy and Asthma Reports* 2009 May 1;9(3):194-201.
(23) Cranton E. *A textbook of EDTA chelation therapy*. Second Edition ed. Charlottesville, VA: Hampton Roads Publishing Company. Inc.; 2001.
(24) Walker M, Shah H. *Everything you should know about chelation therapy*. New Canaan, CN: Keats Publishing; 1997.
(25) Autism Research Institute. Treatment options for mercury/metal toxicity in autism and related developmental disabilities: consensus position paper. *http://www autism com/pdf/providers/heavymetals pdf* 2005.

Editor: William R. Ware, PhD

INTERNATIONAL HEALTH NEWS is published 10 times a year by
Hans R. Larsen MSc ChE, 1320 Point Street, Victoria, BC, Canada, V8S 1A5
E-mail: editor@yourhealthbase.com World Wide Web: http://www.yourhealthbase.com

ISSN 1203-1933