Autism is a MEDICAL disorder, not a MENTAL disorder.

Most Autistic patients have environmentally-induced toxicity.

Autism is therefore preventable, treatable and reversible.

Genetic Polymorphisms

Inflammation

Heavy Metal Exposure

Pre-disposition

Genetics

- Male Gender 4:1
- Family History of Autoimmunity (Hornig, 2004)
- Allergies, asthma, diabetes, arthritis, colitis, celiac, thyroiditis
- Single Nucleotide Polymorphisms (SNP)
- MTHFR - Methylene Tetrahydrofolate Reductase
- COMT - Catecholamine O-Methyltransferase
- MTR/MTRR - Methionine Synthase and Methionine Synthase Reductase (Delah, 2004)
- BHMT - Betaine Homocysteine Methyltransferase
- TCI - Transcobalamin
- GABRB3 - Gaba Receptor
- ADA - Adenosine Deaminase
- GST M1/71 double null

Experimental Biology 2005. April 2. Jill James PhD

The Gut-Brain-Immune System Connection

There is a Bi-Directional Pathway of communication between the brain, the gut, and the immune system.

American Academy of Pediatrics

“...there is emerging evidence relevant to ASDs in the areas of immune function, the relationship between signaling pathways of the gut and brain, and genome-GI microbiome interactions.

Increasingly, evidence supports a combination of changes in gut microflora, intestinal permeability, inappropriate immune response, activation of specific metabolic pathways, and behavioral changes in genetically predisposed individuals.”

Pediatrics 2012;130:S140
Body – 10 trillion cells

Microbiome – 100 Trillion Bacteria
Are We a Bus for our Bacteria?

Inciting Factors
Biologic and Immunologic Triggers
- Virus (Measles, Rubella, Polio, CMV…)
  (Virus Model for Developmental Disorders: Borna Virus, Hornig 1999)
- Measles (Wakefield, Singh)
- CMV
- Bacteria (Clostridia, Streptococcus, Gram Negative Rods…)
- Fungal (Yeast [candida], Mold)
- Other (Lymes)
- Some of these biologic agents produce neurotoxins.
- Our body may produce antibodies to these agents. These antibodies may cross react with our own tissue creating an autoimmune reaction. This is called molecular mimicry.

PANDAS
Predominating theory to explain the pathophysiology behind PANDAS:

Molecular mimicry whereby antibodies intended to target Group A strep target brain proteins instead.

Mechanisms by which autoantibodies cause clinical symptoms in central nervous system (CNS) diseases include:

- Direct stimulation or blockade of D2 receptors in the basal ganglia with marked increse in Dopamine & increase in TNFalpha results in more Brain Inflammation and Hyperactivity
- Immune complexes promoting inflammation of various brain regions

Fecal Transplant for CDiff.
- Review predominantly comprised of single center case series and case reports, a meta-analysis and one systematic review.
- In all, about 92% of patients were cured of their RCDI, with a range of 81–100%.
- FMT has been found to be quite acceptable to patients. In the recent multicenter study, 97% of patients with RCDiff reported willingness to undergo another FMT if they were to have a repeat CDI episode, and 53% stated that they would choose FMT as first-line therapy before antibiotics.

Curr Opin Gastroenterol. 2013;29(1):79-84
Patient with ulcerative colitis and idiopathic thrombocytopenic purpura (ITP). FMT not only resulted in remission of ulcerative colitis but also reversal of ITP with platelet counts that increased from a mean of 97K to 195K / microliter.

Normal defecation was achieved in three patients with multiple sclerosis, who underwent FMT for chronic constipation and who also noted improvement of motor symptoms and urinary function, resulting in a regained ability to walk and removal of indwelling catheters. [Ref]


Extensive antibiotic use is commonly associated with late-onset autism (18–24 mo. of age), & often follows antimicrobial therapy. Gastrointestinal abnormalities also often present at the onset of autism and frequently persist. Autistic symptoms have sometimes been reduced by oral Vancomycin treatment & relapse occurs following cessation of treatment - due to spores? [Ref]

Physiol Rev • VOL 90 • JULY 2010 • www.prv.org

Fecal Microbial Transplants (FMT) Autoimmune & Neurologic Disorders

Propionic Acid
- A by-product of bacterial fermentation with carbohydrates in intestine. A Short Chain Fatty Acid.
- Helps regulate the release of bad fatty acids from VAT and the liver.
- Helps regulate the production of cholesterol.
- Have broad effects on cellular systems
- Actively taken up into the brain.
- Some is good – More is NOT Better. Always a question of balance! To much fermentation creates “Leaky Gut”.

Propionic Acid & Gut Bacteria
- Gut Bacteria Clostridia and Desulfovibrio produce PPA from fermentation of dietary carbohydrates. Urine biomarker - Hydroxyphenyl/Hydroxypropionic Acid (HPHPA)
- High levels of these bacteria are often found in children with ASD or Schizophrenia.
- Avoid Beta lactam antibiotics (penicillin, cephalosporins, monobactams and carbapenems), may promote Clostridial growth
- Common antibiotics kill these bacteria. (Flagyl/Vancocin) also add probiotics and S. Boulardii may suppress or kill strains of Clostridia.
- Remove refined carbohydrates from diet.

Autism - Damaged Microbiome And/Or Antibiotic Induced Gut Dysbiosis With Immune Defects?

1) Extensive antibiotic use is commonly associated with late-onset autism (18–24 mo. of age). & often follows antimicrobial therapy.
2) Gastrointestinal abnormalities also often present at the onset of autism and frequently persist.
3) Autistic symptoms have sometimes been reduced by oral Vancomycin treatment & relapse occurs following cessation of treatment - due to spores?

4. Trimethoprim/sulfamethoxazole (TMS) antibiotics - much more likely to precede diagnosis of late-onset autism than exposure to any other antibiotic regimen.
5. TMS Tx Gm+, and are not effective against Clostridium spp., suggesting that early exposure to these drugs may promote an overgrowth of Clostridium spp. that could contribute to the etiology of autism.
6. Oral vancomycin targets Gm+ organisms. (Clostridium spp.) Clostridia spores that remain viable after vancomycin Tx may be responsible for relapses that occur in autistic patients /sibs after discontinuation of vancomycin.

Autism - Damaged Microbiome And/Or Antibiotic Induced Gut Dysbiosis With Immune Defects?
Inciting Factors

**Environmental Toxicity**

**Mom**
- Amalgams – Portuguese Study (JAMA)
- Fish consumption (tuna, swordfish, king mackerel)
- Vaccines (Yazbak, 2004)
- Environmental and Occupational Exposures
  - Heavy Metals
  - Persistent Organic Pollutants (POPs)
  - Pharmaceuticals (oral contraceptives, antibiotics)
  - Viral, Bacterial, or Fungal Infections
  - Diet and Stress

**Patient**
- Thimerosal Exposure From Vaccines
- Mercury Exposure Other
- Amalgams, Food, Coal burning plants, Breast Milk...
- Other Heavy Metals
- Lead, Antimony, Arsenic, Aluminum, Cadmium
- Environmental Toxins
- Persistent Organic Pollutants (POPs)
- Dietary Sources
- Pharmaceuticals
- Live Virus Vaccines (MMR)
- Multiple Vaccines at one time (up to 7)

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**Mercury in Breast Milk**

- Results indicated that there was an efficient transfer of inorganic mercury from blood to milk and that, in this population, mercury from amalgam fillings was the main source of mercury in milk.
- Exposure of the infant to mercury from breast milk was calculated to range up to 0.3 microg/kg/d of which approximately one-half was inorganic mercury.
- This exposure, however, corresponds to approximately one-half the tolerable daily intake for adults recommended by the World Health Organization.
- Should we measure Hg++ & filter Breast Milk as needed?

**Arch Environ Health. 1996 May-Jun;51(3):234-42**

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**Environment-induced Disease: Everyone is exposed to these chemicals**

- Aplastic anemia, pure red cell aplasia, leukemias, lymphoma and other hematologic disorders have followed exposure to products containing the pesticide.

**Neurotoxicology. 2002 Sep;23(3):229-39**

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**Antidepressant use during pregnancy and childhood autism spectrum disorders**

- Found a 2-fold increased risk of ASD associated with treatment with selective serotonin reuptake inhibitors by the mother during the year before delivery with the strongest effect associated with treatment during the first trimester


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**FMT & AUTISM**

- Single case series, the intestinal microbiota of 13 children with autism were compared with 9 children without the disease. The autistic children were found to have greater numbers and different types of clostridial species when compared with controls.
- Published observations of improvement in autistic symptoms in two children after FMT and in five children who received daily cultured Bacteroidetes and Clostridia for several weeks (T. Borody, personal correspondence).

**Curr Opin Gastroenterol. 2013;29(1):79-84**
Cerebral Folate Deficiency

- Folate is extremely important to the brain and the rest of the CNS.
- A deficiency within the brain will produce neurological disorders beginning around age 4-6 months.
- Symptoms include delayed development, speech difficulties, spasticity, ataxia, epilepsy, unusual movements or writhing and other ASD symptoms.

Cerebral Folate Deficiency

- Folate transport into the brain is blocked resulting in low levels of active folate in cerebrospinal fluid, but normal levels in RBCs & serum.
- Exposure to folate receptors found in cow and goat milk cause the body to produce antibodies that will bind to folate receptors in the brain and block transport of methyl folate into brain and cerebrospinal fluid.
- In addition, synthetic folic acid (added to bread and grains) competes with natural methyl folate for brain receptor and proves toxic once inside.

Suggestions

- Remove milk and dairy from the diet as early in age as possible.
- Remove grains from the diet as early in age as possible.
- Supplement with 5-Methyl Folate not folic acid.
- Test for MTHFR genetic mutations.

Note: If your child has responded favorably to a dairy-free, grain-free diet it is a possible CFD is a factor.

“...downregulates folate receptor autoimmunity in cerebral folate deficiency syndrome”


NUTRITION - Setting the Stage

Half the US population is deficient in at least one of the following:

Vitamins - B12, B6, C, D, E, or Folic Acid
Minerals - Iron, Zinc, and Selenium


Essential Nutrient Insufficiencies Linked with Top Causes of Death in U.S.

- Heart Disease: Ca, Mg, Zn, Se, K, Cr, Cu, Vit D
- Malignant Neoplasms: Ca, Mg, Zn, Se, Cu, Vit D
- Chronic Respiratory Diseases: Mg, Se
- Diabetes: Ca, Mg, Zn, Se, Cr, Vitamin D
- Alzheimer’s: Mg, Se, Cu
- Nephritis, Nephrotic Syndrome: Zn, Se
- Liver Disease: Zn, Se
- Hypertension: Ca, Mg, Zn, Se, K, Cr, Cu, Vit D

Percent of U.S. Population NOT Meeting the Dietary Reference Intake (DRI) for Specific Nutrients

http://www.barnesandnoble.com/w/nutrition-setting-the-stage-ames-b/1120382778?ean=9781594518693
Green Veggies Vaccinate the Immune System

- AhR/Ligand is vital for the correct functioning of immune cells in the gut & skin known as intra-epithelial lymphocytes (IELs).
- Dec. AhR = Dec. IEL = Dec in anti-microbial peptides

Cell. 2011, October 13.

Autism Treatments % of effectiveness 23,000
DAN Parent Surveys

- Detox (Chelation): 76%
- Gluten-/Casein-Free Diet: 65%
- Vitamin B12: 63%
- Food Allergy Treatment: 61%
- Melatonin: 61%
- Digestive Enzymes: 54%
- Fatty Acids: 53%
- Cod Liver Oil: 50%
- Removed Chocolate: 49%
- Removed Milk Products/Dairy: 49%
- Removed Sugar: 48%
- Removed Wheat: 48%
- Rotation Diet: 48%
- Zinc: 47%
- Vitamin B6 with Magnesium: 47%
- Folic Acid: 42%

Elemental Red Blood Cell Analysis
Chronic Disease Nutritional Problems

- Low Vitamin D  30-80% Population
- Low Calcium  30-80% Population

(46 different studies worldwide)

LOW VITAMIN D

Decreased neurotrophic factor levels, increased mitosis, decreased apoptosis, enhanced proliferation, and changes in brain morphology and altered behaviour patterns

Post-mortem human studies show that areas of the brain, e.g., the hippocampus, limbic system, pituitary, substantia nigra, diencephalon, cerebral cortex & white matter generally have high concentrations of vitamin D receptor (VDR)


Prevalence of Vitamin D Deficiency Among Healthy Infants and Toddlers

Catherine M. Gordon, MD, et. Al.

- About 40% had a 25OHvitD level < 20ng/ml
- Patients found to have 25OHvitD <20 ng/ml (50 nmol/liter) participated in a randomized clinical trial:
  - 2,000 IU daily vitamin D2
  - 50,000 IU vitaminD2 weekly
  - 2,000 IU daily vitamin D3

Yield equivalent outcomes in the short-term treatment (6 weeks) of low vitamin D.
J Clin Endocrinol Metab, July 2008, 93(7):2716–2721

Effect of a vitamin/mineral supplement on children and adults with autism

Oral vitamin/mineral supplementation is beneficial in improving the nutritional and metabolic status of children with autism, including improvements in methylation, glutathione, oxidative stress, sulfation, ATP, NADH, and NADPH.

Natural Immune Modulators

- Vitamins C, D, A, E, selenium, zinc, & magnesium really good hydration
- Mushrooms Shiitake, Maitake, Reshi, Omega 3 with O6/O3 ratio < 4.0
- Plant based diet, GF,CF, low sugar diet
- Oral Chelation DMSA or DMPS
- Exercise, Yoga, Meditation, CBT

Omega-3 Fatty Acids Supplementation in Children with Autism: A Double-blind Randomized, Placebo-controlled Pilot Study

- A 6-week pilot trial investigating the effects of 840 mg/d eicosapentaenoic acid, 700 mg/d docosahexaenoic acid in 13 children (aged 5 to 17 years) with autistic disorders accompanied by severe tantrums, aggression, or self-injurious behavior.
- Results of this study provide preliminary evidence that omega-3 fatty acids may be an effective treatment for children with hyperactivity.

BIOLOGICAL PSYCHIATRY 2007;61:551–553
MSCs - found principally in the bone marrow and fat of adults, giving rise to skeletal muscle cells, blood, fat, vascular, urogenital systems, & connective tissues throughout the body. MSCs have two other extraordinary properties: 
- migrate to sites of tissue injury, where they inhibit release of proinflammatory cytokines
- Strong immunosuppressive activity and successful autologous, as well as allogeneic, transplantations without requiring pharmacological immunosuppression

Journal of Biomedicine and Biotechnology
Volume 2012, Article ID 480289, 6 pages

CD34 and Mesenchymal Stem Cells Are Found in the Bone Marrow

Mesenchymal Stem Cells Are Found in Adipose Tissue

Mesenchymal Stem Cells Are Found in the Cord Blood
What is the rationale behind using stem cells to treat autism?

Mesenchymal stem cells (MSCs) can regulate the immune system. It is thought that they may help to reverse inflammatory conditions and is currently in the final stages of clinical trials in the US for Crohn’s disease, a condition resembling the gut inflammation in autistic children.

Which types of stem cells are used to treat autism and how are they obtained?

The adult stem cells used to treat autism at the Stem Cell Institute come from human umbilical cord tissue (Wharton’s Jelly, high in allogeneic Mesenchymal Stem Cells).

These stem cells are recovered from donated umbilical cords. Before they are approved for treatment all umbilical cord-derived stem cells are screened for viruses and bacteria to International Blood Bank Standards.

What are the advantages of treating with allogeneic umbilical cord tissue-derived stem cells?

- Because HLA matching is not necessary, anyone can be treated.
- Allogeneic stem cells can be administered multiple times over the course of days in uniform dosages that contain high cell counts.
- Umbilical cord tissue provides an abundant supply of mesenchymal stem cells.
- No need to collect stem cells from the patient’s hip bone or fat under anesthesia, which especially for small children and their parents, can be an unpleasant ordeal.
- There is a growing body of evidence showing that umbilical cord-derived mesenchymal stem cells are more robust than mesenchymal stem cells from other sources.

How are the stem cells administered for autism treatment?

The umbilical cord-derived stem cells are administered intravenously by a licensed physician. Depending upon the age and physical size of the patient, the stem cells might also be administered intrathecally (into the spinal fluid) by an experienced anesthesiologist. Intrathecal injection allows the stem cells to bypass the blood-brain barrier and migrate throughout the central nervous system.

The autism treatment protocol typically takes 5 days. For More Information www.cellmedicine.com

WHAT TO DO BEFORE & AFTER RECEIVING STEM CELLS

- Eat 80% organic plant based alkaline diet
- Sleep at least 7-8 hours/day
- Moderate aerobic/resistance exercise 3-4 times/week, include stretching 2-3X/week
- Take Multivitamin, Vitamin D3, Fish Oil, Vi't. C and Probiotics most every day
- Consider toxic metal challenge and a Detoxification Program
- Modify Lifestyle and lower stress

The End

Thank You Attending and Listening

Any Questions?