

AutismOne
May 27, 2011


Jerry J Kartzinel MD FAAP

Kartzinel Wellness Center
www.MendingAutism.com
16263 Laguna Canyon Road
Suite 150, Irvine, CA
(949) 398-7654



The Best Kept Secret!

We Don't Treat Autism....




We Treat:
Underlying Medical Problems
(and Autistic issues improve!)

DIAGNOSE AND MANAGE

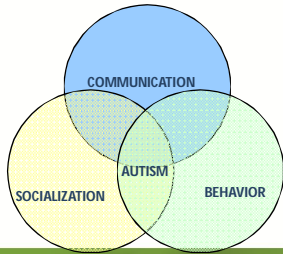

- GI ISSUES
- SLEEP ISSUES
- ALLERGIC ISSUES
- IMMUNE ISSUES
- NEUROLOGIC and PSYCHIATRIC ISSUES
- ENDOCRINE ISSUES
- INFLAMMATORY AND OXIDATIVE ISSUES
- TOXIC ISSUES



SOUND BITES:
QUICK OVERVIEW AND TUTORIAL





Old Definition of Autism Looks Like This:

Physical Signs Long Forgotten:

- **Case 1:** "Eating has always been a problem for him. He has never shown a normal appetite."
- **Case 2:** "...large and ragged tonsils."
- **Case 3:** diarrhea and fever following smallpox vaccination ... healthy except for large tonsils and adenoids.
- **Case 4:** vomited a great deal during his first year... feeding formulas were changed frequently ... tonsils were removed."
- **Case 5:** nursed very poorly ... quit taking any kind of nourishment at three months ... tube-fed five times daily up to one year of age... At camp she slid into avitaminosis and malnutrition but offered almost no verbal complaints."
- **Case 7:** vomited all food from birth through the third month...
- **Case 8:** feeding formula caused ... concern ... colds, bronchitis, streptococcus infection, impetigo...
- **Case 9:** none of the usual children's diseases."
- **Case 10:** frequent hospitalizations because the feeding problem ... repeated colics and otitis media
- **Case 11:** was given anterior pituitary and thyroid preparations for 18 months

Leo Kanner 1943




TOXINS

+


OXIDATIVE STRESS

+

INFLAMMATION






+




=

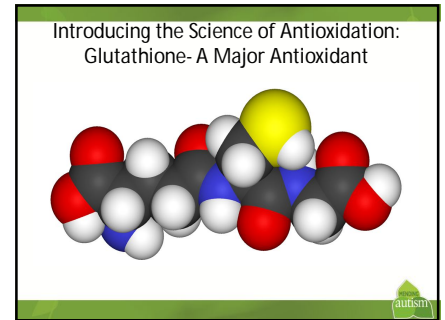
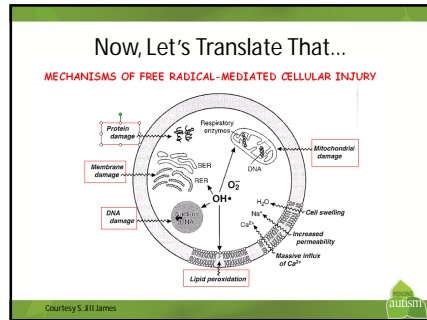
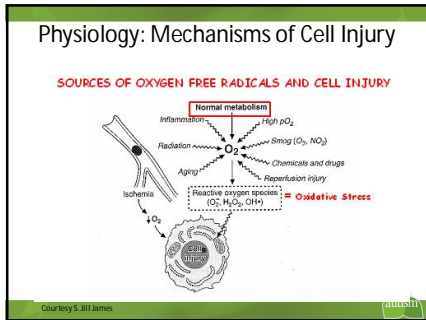
**D
I
S
E
A
S
E**



**Good Science and Physiology Will Provide
Many Answers**

Physiology: is the study of the mechanical, physical, and biochemical functions of living organisms.

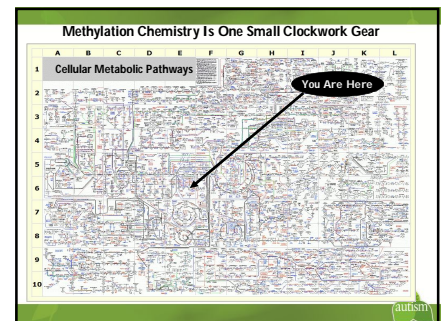
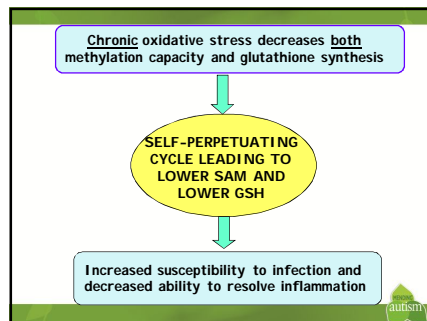




Comparison of methionine cycle and transsulfuration metabolites between autistic children and control children¹

	Control children (n = 33)	Autistic children (n = 20)
Methionine (µmol/L)	31.5 ± 5.7 (23-48)	19.3 ± 9.7 (15-25) ²
SAM (nmol/L)	96.9 ± 12 (77-127)	75.8 ± 16.2 (68-100) ²
SAH (nmol/L)	19.4 ± 3.4 (16-27)	28.9 ± 7.2 (14-41) ²
SAM:SAH	5.2 ± 1.3 (4-8)	2.9 ± 0.8 (2-4) ²
Adenosine (µmol/L)	0.27 ± 0.1 (0.1-0.4)	0.39 ± 0.2 (0.17-0.83) ²
Homocysteine (µmol/L)	6.4 ± 1.3 (4.3-9.0)	5.8 ± 1.0 (4.0-5.8) ²
Cystathionine (µmol/L)	0.17 ± 0.05 (0.1-0.27)	0.14 ± 0.08 (0.04-0.2) ²
Cysteine (µmol/L)	202 ± 17 (172-252)	163 ± 15 (133-189) ²

¹ All values are $\bar{x} \pm$ SD; range in parentheses. SAM, S-adenosylmethionine; SAH, S-adenosylhomocysteine; GSH, total glutathione; GSSG, oxidized glutathione.
² Significantly different from control children: ² $P < 0.001$, ³ $P < 0.01$, ⁴ $P < 0.05$, ⁵ $P < 0.002$.



- ### Consequences of Abnormal Physiologic Functions:
- Immunologic- shift a balance between TH1 and TH2 heavily to TH2 (allergy and autoimmunity)
 - Gastrointestinal- stripping the gut of its ability to keep foreign things inside, dysbiosis, inflammation, maldigestion
 - Neurologic- inflammation, alterations in serotonin, dopamine, norepinephrin
 - Endocrine: abnormal feedback controls of the thyroid, adrenal, pituitary glands, and many other glandular functions

- ### Consequences of Abnormal Physiologic Functions: Th1 to Th2 Shift
- | | |
|---|---|
| Clinical Clues to Immune Dysregulation | Evidence of Immune Dysregulation |
| <ul style="list-style-type: none"> Allergic Shiners Eczema Fungal skin infections Oral thrush Molluscum contagiosum Warts | <ul style="list-style-type: none"> Autoimmunity markers Increased IgE Abnormal natural killer cell function IgA deficiency Lymphopenia T cell abnormalities |

- ### Consequences of Abnormal Physiologic Functions: GI
- Gastrointestinal- compromising the gut of its ability to keep foreign things inside the digestive tube (so it does not effect the body adversely, allowing dysbiosis, inflammation, maldigestion)

Laboratory Investigations Can Help Clinical Decision Making

Dyslipidemia and Triglyceric Acid

The screenshot shows a laboratory information system interface with a header for 'Dyslipidemia and Triglyceric Acid'. Below the header, there are several data fields and buttons. On the left, there are labels 'Bc', 'Be', 'Ad', and 'M'. The main area contains a table with columns for 'Test Name', 'Result', and 'Reference Range'. There are also buttons for 'Print', 'Refresh', and 'Close'. The interface is designed for medical professionals to view and manage patient test results.

What is Autism: Parent's Perspective

The image shows a caution sign on a road. The sign is orange with black text that reads 'CAUTION! ZOMBIES! AHEAD!!!'. The sign is placed on a road with orange traffic barrels. The background shows a road and some trees.

- Behaviors
- Illnesses
- Pain
- Multiple delays
- Growth and muscle tone issues
- Isolation

What is Autism: Parents Perspective

- Mismanagement of incoming stimuli:
 - External environment
 - Internal environment
 - The five senses which bring information to the brain
 - Response to the senses
 - Regulation of the response to the stimuli
 - Inappropriate response to internal cues
 - Responses are all biochemically mediated!

What is Autism: A Physician's Perspective

- Genetically influenced

The image is a microscopic view of a biological structure, possibly a cell or a small organism, showing a purple, textured surface with some internal structures.

What is Autism: A Physician's Perspective

- Genetically influenced
- Environmentally triggered

The image shows a baby lying on a yellow patterned blanket. A black dog is sitting next to the baby. The scene is set indoors, possibly in a home or a clinical setting.

What is Autism: A Physician's Perspective

- Genetically influenced
- Environmentally triggered
- Involves the BODY and the BRAIN- attached to the body, downstream, and all that is "wet"

The image is a cross-section of a brain, showing the internal structures, including the cerebral cortex, white matter, and brainstem.

What is Autism: A Physician's Perspective

- Genetically influenced
- Environmentally triggered
- Involves the BODY and the BRAIN- attached to the body, downstream, and all that is "wet"
- Metabolic, immunologic, gastro, neuro and endocrine abnormalities

The image shows a young child sitting at a table with a plate of food. The child is looking towards the camera. The setting appears to be a dining area.

What is Autism: A Physician's Perspective

- Genetically influenced
- Environmentally triggered
- Involves the BODY and the BRAIN- attached to the body, downstream, and all that is "wet"
- Metabolic, immunologic, gastroenterological abnormalities
- Is treatable and recoverable

The image shows a man and a young boy smiling together. The man is wearing a light-colored shirt and the boy is wearing a blue shirt. They appear to be in a clinical or office setting.


The Main Ingredients

- Case History
- Overall approach
- Team work, education
- Broad picture
- Patterns
- Details
- Biochemical aberrations

The image is a close-up of a grasshopper, showing its legs and body. The grasshopper is positioned on a reflective surface, creating a reflection.


Parent's Concerns

- Foul smelling loose yellow green stools
- Bloated belly
- No language
- NOT SLEEPING: hard to get down, mom has to sleep with him
- Does not do well with running errands as he tantrums with each transition
- Covers ears
- Strange "eeeeee" sounds
- Tantrums severely, sometimes triggered, sometimes no clue
- Fevers can come and go
- Not potty trained, no interest





Commonly Seen During an Office Visit

- Poor eye contact
- Non-stop moving
- Climbing on everything
- Language deficit
- Repetitive play on office Brio train
- Restricted diet: loves bread, cheese, juice, milk, chips (grazing in office)
- Physical exam:
 - Dark circles below eyes
 - Dry, pale, translucent skin
 - Dull hair, straw-like
 - White tongue
 - Dilated pupils
 - Low muscle tone
 - Tender "mass" in LLQ
 - Enlarged lymph nodes




Blood Draws: Technique is Everything

Considerations:
 Wrap child in blanket (the baby burrito)
 Recline in chair with child in lap
 22 gauge intra cath needle
 Sedation if necessary

Listing What's Biologically Different

- Gut Problems**
 - Inflammatory Bowel Disease
 - Reflux Esophagitis
 - Gastritis
 - Dysbiosis
 - Leaky gut
 - Malabsorption
- Immunologic**
 - Persistent Viral Illness
 - Food allergy
 - Recurring illnesses
 - Auto immune/auto inflammatory processes- especially brain
- Neurologic**
 - Seizures/Sensory Issues
 - Low muscle tone- especially trunk
 - Perfusion Defects- SPECT
 - Opiate effect
- Metabolic/Detoxification Pathway Disruption**
 - Purine disorders
 - Elevated ammonia
 - Omega 3 deficits
 - Sulfation defect
 - Methylation disorders
 - Serotonin/Melatonin deficit
 - Dopamine defect
 - Heavy metal burden
- Chromosomal issues**



RESTORATION OF CHILDREN'S HEALTH

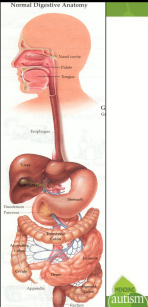

BREAK THE GRIDLOCK, INTERRUPT THE VICIOUS CYCLES, RESTORE NORMAL FUNCTION:

- Removing dietary/environmental stressors
- Bolstering nutrition
- Relieving inflammation
- Improving broken biochemistry
- Improving immune function
- Detoxification



Dr Pangborn



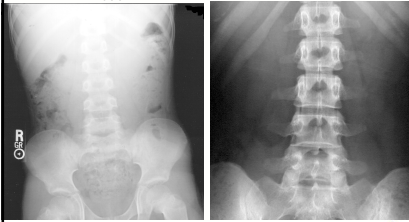

Time to Translate Physical Findings Into Meaningful Medical Interventions



From Constipation to Normalcy

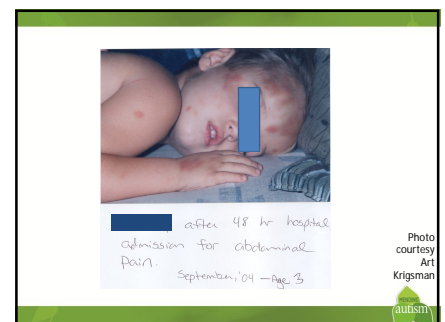
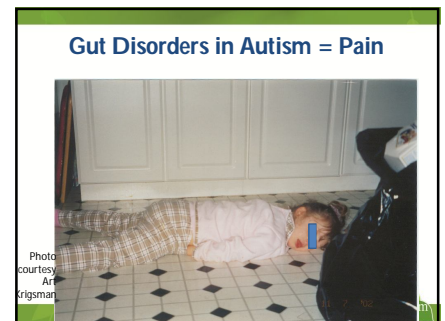
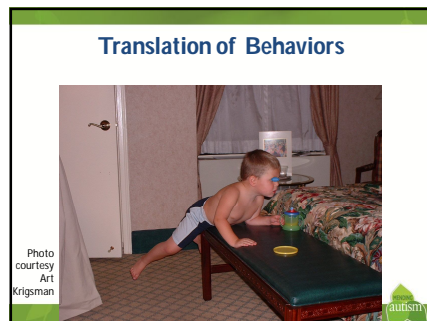
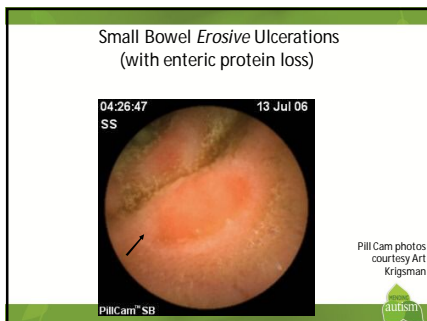
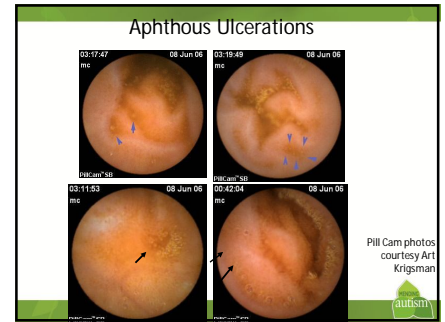
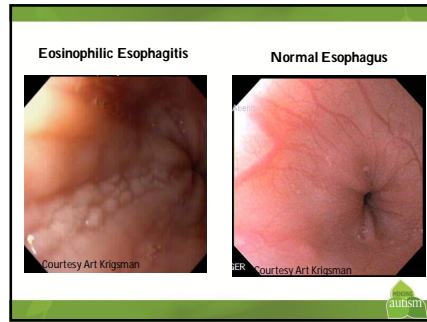
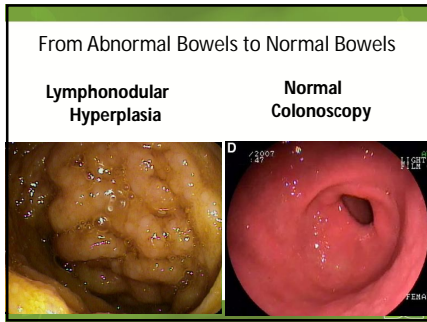



X-Ray of Constipation in Autism vs Normal Tummy X-Ray

From Diarrhea to Normal Stools



Abnormal Bowels



- Soiling
- Constipation
- Diarrhea
- Anorexia
- Nocturnal awakenings
- Reflux
- Foul Smelling Stools
- Foul Smelling Breath
- Protuberant Belly

Laboratory Evaluation

- Urine Organic Acids
- Urine Opiates/Peptides
- Comprehensive Stool Cultures and Parasitology
- Food Sensitivity Profile
- Inflammatory Markers, ie IBD profile, CRP, ESR, Calprotectin
- Yeast
- Dysbiotic Bacteria
- Parasites
- Overall digestion
- X ray/KUB
- Endoscopy

What is Stool?

- 10 parts water
- 1 part bacteria
- 1 part fiber
- 1 part mucous, fat, dead cells, protein

Lab Stool Studies Visualization



Undigested Food in Stool

- **Gastrointestinal Abnormalities in Children with Autistic Disorder**
- **RESULTS:** Histologic examination in these 36 children revealed grade I or II reflux esophagitis in 25 (69.4%), chronic gastritis in 15, and chronic duodenitis in 24. The number of Paneth's cells in the duodenal crypts was significantly elevated in autistic children compared with non-autistic control subjects. Low intestinal carbohydrate digestive enzyme activity was reported in 21 children (58.3%)
- Horvath K, Papadimitriou JC, Rabszyn A, Drachenberg C, Tildon JT, J. *Pediatr* 1999 Nov;135(5):559-63. Department of Pediatrics, University of Maryland School of Medicine, Baltimore, USA. PMID: 10547242 [PubMed - indexed for MEDLINE]

Very Large Stools

- **Constipation With Acquired Megarectum in Children With Autism**
- *Conclusions: Constipation is a frequent finding in children with gastrointestinal symptoms and autism, particularly in the rectosigmoid colon, often with acquired megarectum.*
- **PEDIATRICS Vol. 112 No. 4 October 2003**
- Nadeem Atzal, MRCPCH*; Simon Murch, PhD*; Kumran Thirupathy, MBBS*; Leslie Berger, FRCP; Andrew Fagbemi, MRCPCH*; and Robert Heuschkel, FRCPCH

Large Amount of Flatulence

- Fermenting organisms
- Incomplete breakdown of polysaccharides
- Air swallowing
- Old stool

Soft Serve

- Poor absorption and digestion
- Fructose
- Lactose
- Gluten/sprue



Snake Stools

- Baring down against a partially closed sphincter
- Straining

Pebble Stool

- Small pebbles often result due to the lack of fiber.
- Decreased fluid intake



Rainbow Stools

- Yellow: fat in stool
- Red: blood, beets
- Green: GI infection
- Black: blood, Bismuth, iron
- White/grey: lack of bile flow
- Reddish-black: intussusception (currant jelly)



Gut Disorders in Autism

Historical Clues:

Difficulty breastfeeding
Persistent Colic
Gastro-esophageal reflux
Infantile eczema
Food sensitivities
Failure to thrive
Frequent antibiotics (abnormal flora)
Abnormal posturing
Self injurious behavior
Poor sleep

Physical/Lab Clues:

Abnormal stools
Abnormal cytokine profile
Lymphonodular
Hyperplasia of ileum
Esophagitis
Gastritis



When bowels improve.....

- Stools improve, still soft-serve like
- Eye contact improves
- Word approximations may start
- Tantrums are remarkably improve
- Appetite improves; trying new things
- Just seems "happier in the skin he/she is in"
- Health improves



Diarrhea

- 1-6 (or more) liquid movements per day
- Some can be explosive
- Can be very foul
- Can have varied colors



Management of Diarrhea

- Diet: remove gluten, dairy, consider removing fruits and fruit juices
- Digestive Enzymes
- Antibiotics
- Antifungals
- Antiparasitics
- Zinc: adding 20-60mg per day
- Fiber: soluble 1 to 4 tsp per day

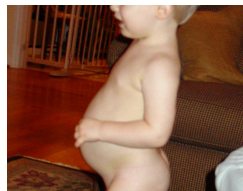


Management of Diarrhea

- Monolaurin
- Ionic silver
- Transfer factor, such as colostrum
- Oral immunoglobulins (off label)
- Consider immunodeficiency work-up (ie, IgA deficiency)
- Secretin IV (off label)



Constipation



Constipation

- Can be daily to once weekly
- Can be small balls, pellets, to soft ball sized
- Very foul smelling
- Don't forget about Hirschsprung's Disease



Treatments for Constipation

- Enemas daily for up to a week if necessary
- Glycerin suppository
- Polyethylene glycol
- Aloe
- Fiber (may require larger amounts)
- Vitamin C 2000-10,000mg daily as tolerated (buffered)
- Magnesium 200-600mg as tolerated
- Magnesium citrate
- Water soluble contrast enema (in radiology suite)
- Admit, NG tube, etc

Fiber

- **Soluble Fiber** helps prevent [constipation](#), which in turn, diminishes the potential for dysbiosis.

Dysbiosis

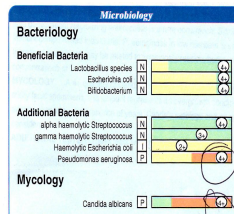
- Stools studies can give information of many aerobic overgrowths as well as current probiotic bacterial counts
- Urine organic acid studies can give information on anaerobic bacterial growth
- Fungal cultures with sensitivities will point to antifungal medication preferences
- Parasitology studies, when positive, can help with therapeutic interventions

Yeast



Yeast

- Giddy
- Up at night laughing
- Bloating belly
- Flatulence
- "bakery smell"
- Climbing
- Hanging upside down



Yeast Treatments

- Fluconazole 5mg/kg/day x 14-30 day
- Ketoconazole 5mg/kg/day x 14-30 days
- Itraconazole 5mg/kg/day x 14-30 days
- Nystatin compounded 1-2 million unit 2-3 times daily
- Amphotericin B 250mg – 500mg four times daily
- Check Liver Function Tests every 8 weeks if on "azoles" for longer periods
- Bicarbonate/alkalinized water may play a role
- Assure daily stooling

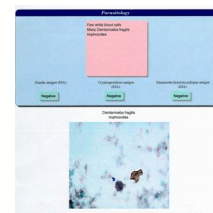
Yeast Treatments

- Monolaurin ¼ to ½ tsp twice daily
- Oregano 0.2 ml twice daily
- Olive leaf extract varies with preparation
- Caprylic acid 500-1000mg with meals
- Berberine (very bitter)
- Garlic 1-2 pills per day
- Nano particle silver ½ tsp twice daily

Treatment for Bacteria: Gram Positive Bacteria

- Azithromycin 5mg/kg/day once daily 5-30 days
- Cephalexin 25-50mg/kg/day divided twice daily
- Vancomycin 5-10mg/kg/day divide three times daily ORALLY (not absorbed)
- Clindamycin 5-10mg/kg/day divided three times daily orally

Dysbiosis



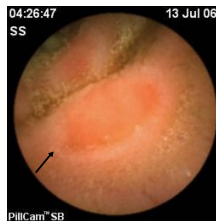
Treatment for Bacteria:

Gram Negative Bacteria and Some Parasites

- Metronidazole and Metronidazole Benzoate (suspension form of metronidazole) 30mg/kg/d divided three times daily for 7-10 days
- Nitaoxanide suspension: use published tables for 3 days...or longer



Small Bowel *Erosive* Ulcerations (with enteric protein loss)



Pill Cam photos
courtesy Art
Krigsman



Inflammatory Bowel Disease

- Mesalamine: individual dosing, starting with 250mg twice daily.
- Budesonide 3mg twice daily for up to 8 weeks
- Oral steroids
- Dietary changes
- Regular bowel movements
- Zinc 40-60 mg per day
- Purified distilled Aloe
- Fiber
- Probiotics



Inflammatory Bowel Disease

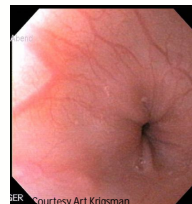
- Antiviral therapies
- Trichuris Suis Ova therapy
- IV Immunoglobulin therapy
- Curcumin
- Omega 3's
- Pain/discomfort management such as compounded ibuprofen



Eosinophilic Esophagitis



Normal Esophagus



Reflux

- This is a common allergic/noxious stimuli response
- Associated with otitis media, sinusitis, asthma
- Dietary changes help
- Antacids: promote healing
- Gastric motility/constipation



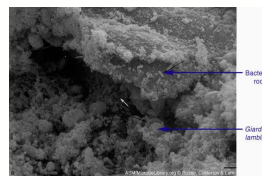
Reflux Treatments

- Remove exogenous allergens
- Famotidine 20 to 40 mg once daily
- Ranitidine 5-10mg/kg/day divided twice daily
- Omeprazole 5-10kg give 5mg per day, 10-20kg give 10mg per day, over 20 kg, give 20mg per day
- Cimetadine 20-25mg/kg divided in 4 doses
- Esomeprazole: 1-10yrs 10mg once daily, 11yrs and older, 20-40mg once daily



Biofilms

- Relatively new theory put forth to explain the need for frequent use of antibiotics and/or antifungals



Current Therapeutic Practices

- Phase 1: Digestive enzymes that break down mucin/biofilm include Nattokinase, Pectinase, Amylase. Included are proteolytic blend composed of enzymes derived from the edible fungi, *Aspergillus oryzae* and *Aspergillus melleus*. There are several manufacturers that have combination products.



Current Therapeutic Practices

- Phase 2: NaEDTA (ethylenediaminetetraacetic acid) which is purported to breakdown the ionic matrix that holds the biofilm together.
- Phase 3: the antibiotics, antiparasitics, antifungals.
- Timing: may take several months



When bowels improve.....

- Stools improve, still soft-serve like
- Eye contact improves
- Word approximations may start
- Tantrums are remarkably improve
- Appetite improves; trying new things
- Just seems "happier in the skin he/she is in"
- Health improves
- Sleep improves



Sleep

- Melatonin: 1-3mg before bedtime (Start with lower dose, also useful in chronic pain)
- 5-HTP: 100mg 5-hydroxytryptophan before bedtime. Especially useful when taken with vitamin B6 and magnesium
- Calcium/magnesium: can really be helpful
- Vitamin D3 1000 IU and up
- GABA 125mg or Gabapentin
- Cortisol replacement
- Vitamin B6/niacinamide: 50mg B6 and 500 mg niacinamide before bedtime
- Pantothenic acid (Vitamin B5): 50 mg daily. (good for relieving stress)
- Inositol: 100mg daily (Enhances REM sleep)
- Herbs: milk thistle, valerian, chamomile tea



Decreased Melatonin Activity

- Subgroup of children with very poor sleep cycles in autism
- Biol Psychiatry 1990 Nov 1;28(9):773-93. **A novel biochemical model linking dysfunctions in brain melatonin, proopiomelanocortin peptides, and serotonin in autism.** Chamberlain RS, Herman BH



Sleep

- Benadryl dye free/compounded 1-2mg/kg
- Ibuprofen 10mg/kg
- Clonidine 0.1mg: ¼ -2 tabs at bedtime
- Trazadone: 0.75mg-1mg/kg at bedtime
- Risperidone: 0.25mg-1mg at bedtime
- Buspirone: 2.5mg-5 mg divided twice daily
- Synthesized Tetrahydrocannabinol 2.5mg 1-3 times per day
- Clonazepam: 0.01-0.03 mg/kg/d divided three times daily
- HBOT
- Neurontin



Dietary Recommendations

- Removal of dairy: that's anything that comes from a cow's udder! No casein, whey, etc
- Removal of Gluten is next
tacanov.org
gfcfdiet.com
- Selective removal of specific foods your child may be sensitive to
- True addictions may make these transitions difficult!

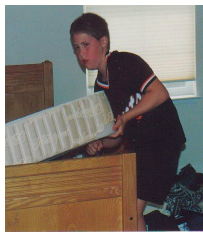


Diets

- There are many, many different diets
- The **best** diet: the one that works for your child
- Laboratory investigations can point direction
- Trial and error may be the only way to find out what really works for your child
- As organic as possible, cook from "scratch"
- Medically prescribed diets are a tax deduction!!



Add Lithium or Remove Sugar?



Eicosanoids as Inflammatory Mediators – the Sugar Link to Mood and Bad Behaviors.

- Generally underemphasized influence, over the inflammatory response in your child, is the eicosanoid pathway.
- the consumption of certain fats and/or sugar (starch/carbohydrates) influences the production of these inflammatory mediators (Diet Link)
- Vascular effects of eicosanoids, are likely part of the observed perfusion (blood flow) abnormalities in autism



Starting with Nutritional Supplements

- Vitamins and Minerals: need replenishment due to usual self limited diet
- Digestive Enzymes: well known and well described deficiency
- Omega 3's: crucial to start these
- Soluble Fiber: very important for bowel health

Vitamins

- **Vitamins:** Vitamins are micronutrients that are critical for normal cellular metabolism and function. They must be consumed regularly as our bodies are not able to synthesize these vital nutrients in sufficient amounts. Vitamins are required for proper cell signaling, mediators of cell growth, as antioxidants, and even as hormones

Minerals

- **Minerals:** The main electrolytes are Sodium, Potassium, Calcium, Magnesium and Chloride. Proper levels of these minerals in the body allow the body to have energy, better muscle and nerve function (including faster stress recovery) and improved function in many other areas. The so called trace minerals (such as selenium, iodine, chromium, magnesium, molybdenum, just to name a few) need to be replenished daily, ideally through the diet.

We have to address the Vitamins and Minerals

ELEMENTS	UNIT	REFERENCE RANGE		INDIVIDUAL	
		MIN	MAX	MIN	MAX
Calcium	mg	900	1200	100	100
Magnesium	mg	350	400	100	100
Potassium	mg	2000	3500	100	100
Phosphorus	mg	400	1200	100	100
Copper	mg	0.9	1.3	100	100
Zinc	mg	8	15	100	100
Iron	mg	8	18	100	100
Manganese	mg	2.3	5.0	100	100
Chromium	mcg	25	125	100	100
Selenium	mcg	55	90	100	100
Biotin	mcg	30	35	100	100
Vanadium	mcg	100	250	100	100
Molybdenum	mcg	45	90	100	100

Digestive Enzymes

- **Digestive Enzymes** break down the foods that we eat into smaller compounds that can be readily absorbed and put into the bloodstream. The enzyme class of proteases breaks down proteins to amino acids. The enzyme class of lipase is responsible of breaking down fats to fatty acids, and the carbohydrases break down carbohydrates into simple sugars.

Omega 3's

- **Omega 3 :** the fatty acids, maintain the fluidity and stability of cell membranes and protect the body from harmful substances such as bacteria and viruses. They must be obtained through diet or supplementation with EFA-rich food oils.
- They have an amazing affect on behaviors, mood, focus and concentration.

Fatty Acid Profile: deficient Omega 3's Adding Oils

- Orange flavored Cod Liver oil, start with 1/2 tsp daily and work up to 2 tsp daily IF TOLERATED

Primary Goals of Supplementation

- Optimization of Normal Physiology
- Improve Function of the Immune System
- Enhance Cognitive Abilities
- Improve Red Cell Membrane Function
- Reduction of Autistic Behaviors
- Improve Gastrointestinal Function
- Minimize our NEGATIVE genetic influences

Ca/Mg deficiency:

- Typically recommend supplementing 500-1000 mg of Calcium in Citrate, glycinate/malate complexes with at least 200-400mg of Magnesium (fully reactive chelate or ionic) daily. Calcium and magnesium blood levels should be checked regularly.

Zinc

- Consider supplementing with 20 mg (or more) of zinc daily. Some children require much higher doses.
- Some sources of Zinc may be better absorbed than others
- Zinc Picolinate and Zinc Monomethionine are very good sources



Selenium

- Many children with ASD require additional selenium. We will start with 25-100 mcg daily. Packed red blood cell element evaluations may reveal higher levels of supplementation are necessary.



Chromium

- If this is revealed to be low on blood level tests, we recommend about 50 to 100 mcg daily.



Iron Deficiency

- This can be easily evaluated by simple blood tests: a CBC, RETICULOCYTE COUNT, SERUM FERRITIN, AND A TOTAL IRON BINDING CAPACITY



Iodine

- There is a move away from iodized salt in fast food and natural products.
- Natural products often use sea salt (relatively low in iodine).
- Necessary for Thyroid function
- Lugol's 5% solution has 6.26mg per drop
- There is a lot of controversy about the optimal amount of iodine to recommend



Omega 3 Fatty Acids



Essential Fatty Acid Deficiency

- Omega 3 Fatty Acids in Particular
 - (EPA) Eicosapentaenoic Acid and (DHA) Docosahexanoic Acid
 - Prostaglandins/Leukot Essential Fatty Acids 2001 Jul; 65(1):1-7. **Plasma fatty acid levels in autistic children.** Vancassel S, et al
 - Prostaglandins/Leukot Essential Fatty Acids 2000 Jul-Aug; 63(1-2):21-5. **Red blood cell fatty acid compositions in a patient with autistic spectrum disorder: a characteristic abnormality in neurodevelopmental disorders?** Bell JG,



EFA deficiency:

- Just about all the children will require omega 3 fatty acids
- Start with Cod Liver Oil
- Children ages 2-5: ½ tsp of cod liver oil per day
- Older children: 1 tsp daily
- A blood test, called an Essential Fatty Acid Profile will reveal other possible fatty acid deficits that can be supplemented.



Failure to Thrive



- Same weight for a long growth period
- Age of bone well behind chronological age
- Thin, pale, irritable
- Height is well below 5th percentile or is falling off graph



Causes of Failure to Thrive

- Stress
- Poor caloric intake
- Poor digestion
- Poor absorption
- Gut motility issues
- Chronic inflammation
- Many other issues ...



Stress and Growth Hormone

- Excessive Corticotropin-Releasing Hormone (CRH) from chronic stress.
- Possible excess cortisol.
- Also reduces the body's secretion of Growth Hormone



Protein deficiency:

- RICE PROTEIN POWDER:
 - 1 tablespoon is equal to 14 gms of protein.
 - If under 3 years, supplement with 1 gm per 2 pounds of body weight.
 - Ages 4-6 years, 1 tablespoon daily.
 - 7-10 years of age supplement with 1 ¼ tablespoons daily.
 - Older boys and girls: 2 tablespoon daily.
 - Pea Protein is another great option



Consequences of Abnormal Physiologic Functions:

- Endocrine: abnormal feedback controls of the thyroid, adrenal, pituitary glands, and many other glandular functions



Thyroid Symptoms

- Lethargy
- Abnormal weight gain
- Constipation
- Mental slowness
- Dry skin
- Thin hair
- Poor growth parameters



Thyroid

- Labs: T3 Free, T4 Free, TSH, reverse T3
- Many aberrations found with feedback control
- Ideally, TSH is considered normal if falls within 1.0 and 2.0
- Insure daily amount of Iodine:
Children Tolerable Upper Intake Levels (UL):
200mcg/day for ages 1-3 years; 300mcg/day for 4-8 years; 600mcg/day for 9-13 years; 900mcg/day for 14-18 years
- Use compounded porcine thyroid for replacement/augmentation as indicated
- Remove sources of fluoride, chlorine



Allergies: Behavior Changes This is a form of inflammation!

- Eczema
- Dark circles under the eyes
- "Thick" creases under the eyes (Dennie's lines)
- Seasonal behavior issues
- "Immediate" behavioral issues
- Congestion
- Coughing
- Reflux
- Ear/sinus infections
- Food allergies/sensitivities
- Environmental allergies/sensitivities



Manage the Allergies

- Ensure diet is cleaned up
- Ensure environment is cleaned up
- HVAC system cleaned
- Pull carpet in bedroom, lay down hard-wood floors
- Remove all dust collectors, stuffed animals
- Wrap box springs and mattress in 100% cotton barrier
- Hypo-allergenic barrier
- Start Singulair and/or Zyrtec
 - Singulair chewables had aspartame, granules did not




Review of Cysteine and Glutathione, Methylation and Other Overwhelming (initially) Biochemistry




Methylation plays a role in:

- Alcoholism
- Bipolar disease
- Schizophrenia
- Depression
- Attention deficit disorder
- Autism
- And even constipation!

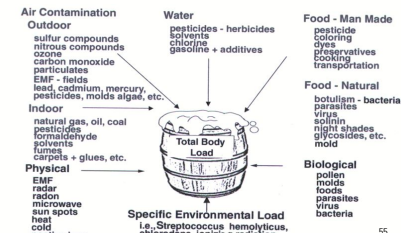


Methylation

- Methyl B 12 appears to work best when given sub-cutaneously, by the parents (this is a prescription). We tend to add folic acid and N- acetyl cysteine to the injection.
- TMG or DMG
- Folic/folinic acid
- Glutathione transdermally twice daily is prescribed as well



ENVIRONMENTAL LOAD



Air Contamination

- Outdoor:** sulfur compounds, nitrous compounds, ozone, carbon monoxide, particulates, EMF - fields, lead, cadmium, mercury, pesticides, molds, algae, etc.
- Indoor:** natural gas, oil, coal, pesticides, formaldehyde, solvents, fumes, carpets + glues, etc.
- Physical:** EMF, radar, microwave, sun spots, heat, cold, positive ions

Water: pesticides - herbicides, solvents, chlorine, gasolines + additives

Food - Man Made: pesticide, coloring, dyes, preservatives, cooking, transportation

Food - Natural: botulism - bacteria, virus, spirochete, night shades, glycosides, etc., mold

Biological: pollen, molds, foods, parasites, virus, bacteria

Total Body Load

Specific Environmental Load
i.e. *Streptococcus hemolyticus*, chloriodane, ionizing radiation

Courtesy of William Bar, MD


Considerations for OCD

Therapeutic plasma exchange and intravenous immunoglobulin for obsessive-compulsive disorder and tic disorders in childhood

Source: (Pheasant, Susan F, Laitman, Magaly, & Gump, Susan-Heninger, Eyal-Pedersen, Hershko, Liora, Scott & Speck)

Summary: In children, concentrations of IgG and oligoclonal antibodies are elevated in the cerebrospinal fluid (CSF) of patients with obsessive-compulsive disorder (OCD) and tic disorders. The elevated levels of IgG and oligoclonal antibodies in the CSF are associated with elevated levels of autoantibodies to neurotransmitters, particularly serotonin and dopamine. Treatment with intravenous immunoglobulin (IVIg) and plasma exchange (PE) may be beneficial in these patients. The mechanism of action of IVIg and PE is not clear, but it may be related to the removal of autoantibodies from the CSF.

Introduction: Obsessive-compulsive disorder (OCD) is a chronic and disabling condition, affecting 1-2% of children aged 10-18 years and adolescents. The etiology of OCD is generally thought to be multifactorial, involving genetic, neurobiological, and environmental factors. The neurobiological model of OCD involves dysfunction of the cortico-striatal-thalamic circuitry, particularly the orbitofrontal cortex and basal ganglia. The role of autoantibodies in the pathogenesis of OCD is still unclear, but recent studies have shown that elevated levels of autoantibodies to neurotransmitters are associated with OCD. Treatment with IVIg and PE may be beneficial in these patients, as it may remove autoantibodies from the CSF.




Back to the LAB: Pediatric Auto-immune Neuropsychiatric Disorder Associated with Streptococcus




- PANDAS profile:
 - Anti-streptolysin O titers (ASO)
 - Anti-DNAse antibodies

Keep in mind that **PANDAS is a Clinical Diagnosis**




Lab Results

- Elevated ASO titers and Anti DNAse antibodies
- Antibiotics for PANDAS:
 - Augmentin
 - Zithromax
 - Keflex
 - Omnicef




Inflammation

<p>Disease States</p> <ul style="list-style-type: none"> • Allergies <ul style="list-style-type: none"> - environmental sources - food sources • Reflux disease • Small bowel disease • Large bowel disease • Chronic viral activation • Low grade bacterial infections 	<p>Laboratory Findings</p> <ul style="list-style-type: none"> • Inflammatory markers: elevated platelets, elevated erythrocyte sedimentation rate, elevated C-reactive protein • Endoscopy/pathology findings • Viral titers: HHV 1,2,6, and CMV, EBV • Stool cultures, anaerobic markers
---	--




Inflammation

<p>Allergies</p> <ul style="list-style-type: none"> • Claritin Redi-Tabs • Zyrtec • Singulair • Nasonex • Gastrocrom • Quercetin • Provocation-Neutralization-Desensitization • LDA 	<p>Inflammatory Bowel</p> <ul style="list-style-type: none"> • Antacids <ul style="list-style-type: none"> - Nexium - Prilosec - Pepcid • Anti-inflammatories <ul style="list-style-type: none"> - Colazal - Pentasa - Rowasa - Steroids - 6 mercapto purine
--	---



Inflammation

<p>Infections</p> <ul style="list-style-type: none"> • Antibiotics • Antifungals • Antiparasitics • Antivirals 	<p>Anti-inflammatory</p> <ul style="list-style-type: none"> • Motrin/Advil • Celebrex • Naprosyn • Actos/Avandia • Steroids • LongVida/Neuroprotek • Natural agents <ul style="list-style-type: none"> - Curcumin - Omega oils - Pycnogenol
---	---



Language

- L Carnosine
- L Carnotine
- Namenda
- GABA or Gabapentin
- Steroids
- Ginkgo Biloba
- Anti-Seizure Medication
- HBOT
- IV Glutathione



Cognitive Function

- L-Carnosine 400 mg
- Coenzyme Q-10 up to 600 mg
- Ginkgo biloba leaf extract: 50 – 200mg
- American ginseng root extract (*Panax quinquefolium*): 200 mg q day
- DMAE (as dimethylaminoethanol bitartrate) 200 - 500 mg
- L-Theanine 25 - 200 mg
- Acetyl-L-Carnitine (from acetyl L-carnitine HCl) 300 – 1200 mg



The Recurrently Ill Child

- Frequent ear infections
- Frequent sinus infections
- Frequent upper and lower respiratory infections
- Frequent fevers



The Recurrently Ill Child Laboratory Approach

- CBC with Diff
- Comprehensive Metabolic Profile
- Erythrocyte Sedimentation Rate
- C-Reactive Protein
- Quantitative Immunoglobulins: IgG, IgM, IgE, IgA
- Lymphocyte Enumeration with Natural Killer Cell activity



The Recurrently Ill Child The Treatments

- IVIG
- Isoprinosine (not available in US) which is a TH1 stimulator
- Oral Immunoglobulins
- Syndromes such as Kartagener's/immotile cilia syndrome
- Bone Scan
- Anti-Virals

