The Puzzle of Autism: Supplement Program

Dr. Amy A. Yasko
Announcements

- NRI Newsletter, June 2004
- Boston Autism Conference
- NRI Newsletter, April 2004
- NRI Newsletter, May 2004
- Introducing The Neurological Research Institute Newsletter
- New! Video Tapes
Use the search feature to inquire about a particular vitamin or supplement. You may enter a phrase, term or word which best describes your health concern. Your search will also list any links to Dr. Amy’s article database related to your request.

The following descriptions of nutritional supplements do not necessarily represent the “classic” uses that are ascribed to these supplements and herbs. Rather it is information based upon my experience and my personal opinions after using these materials. At the end of each supplement description there are links to some of the articles in our personal database that reference research on these items. Please note that any suggestions for use, as well as nutritional supplements themselves are not intended to diagnose, treat or cure disease. Any suggestions or comments are based on my experience and knowledge without the benefit of your history.
Supplement Details

Name
GABA

Description
is a calming neurotransmitter in the body that helps to balance glutamate. It should be useful to help decrease anxiety, with speech, eye contact, social interactions. GABA comes in several forms and it will be a bit of trial and error to determine which is best. GABA calm seems to work well for many individuals during the day, it melts in the mouth like a lozenge. For those who do not like the taste or prefer to swallow a pill, GABA is also available as a supplement to be swallowed. ZEN (GABA and theanine) is nice to take later in the evening as I find that it helps with sleep and anxiety.

Article References

2. Spike Transmission and Synchrony Detection in Networks of GABAergic Interneurons, Science, June 22, 2001 - Vol. 293
3. Other Neurological Disorders Related to Excitotoxins, Excitotoxins
4. How Your Patients May Benefit From 200mg of Zen, Dietary Supplement, Allergy Research Group / Emerson Ecologics
Step #1
Program for
Neurological Inflammation
Vitamins/ minerals/ antioxidants to lay the nutritional groundwork:

General Vitamin/ Antioxidant
Vitamin D
Vitamin C (Beyond C)
Cell Food
Primal Defense
Vitamin E + mixed tocopherols
Potassium chloride (depending on levels)
Liquid Selenium drops
Liquid Molybdenum drops
Iodine (depending on levels)
Nerve Calm RNA NutriSwitch Formula (2X/day or as needed)
Health Foundation RNA NutriSwitch Formula (2X/day or as needed)
Stress RNA NutriSwitch Formula (2X/day or as needed)
HyperImmune RNA NutriSwitch Formula (2X/day or as needed)
Behavior RNA NutriSwitch Formula (2X/day or as needed)
Bowel RNA NutriSwitch Formula (2X/day or as needed)
Stomach pH RNA NutriSwitch Formula (2X/day or as needed)
Molybdenum helps to oxidize purines, pyrimidines, pteridines and involved in nicotinic acid metabolism.

Molybdenum helps the body to oxidize purines and pyrimidines, and produce uric acid, an important waste product.
Uridine helps to negate mitochondrial toxicity.

Uridine has been reported to have dramatic effect on social, cognitive, language, and motor improvements in cases of autism.

Uridine is important for the maintenance of normal metabolism of nerve cells.

Uridine is a pyrimidine. Pyrimidines form RNA which is essential for every learning and memory process.

Uridine influences the function and regeneration of nerve cells.
Support liver health/increase glutathione/ increase sulfur:

- Milk thistle
- B complex + SAMe
- Alpha lipoic acid
- Taurine
- Broccoli
- Rosemary
- Garlic
- Sublingual glutathione
- Oral GSH glutathione
- Glutathione Shampoo
- Glutathione toothpaste
  (some parents prefer IV glutathione)
- Glucosamine/ MSM
- Chondroitin sulfate
- N-acetyl cysteine w/ quercetin
- Vitamin C (with Rose Hips) (500mg c for every 250 mg NAC)
- Dandelion root
- Carnitine
- Cod Liver Oil
- Ora-liv

Creams (transdermal):
- Glutathione cream
- Magnesium sulfate cream
- Alpha lipoic acid cream
- Glucosamine/ MSM cream
Melatonin
\[ N\text{-acetyl-5-methoxytryptamine} \]

Serotonin
\[ 5\text{-HT; 5-hydroxytryptamine} \]
**DAY**

- Tryptophan
- Tryptophan Hydroxylase
- S Hydroxytryptophan
- Methionine
- Serotonin
- SAMe
- ATP

**NIGHT**

- Neradrenaline
- Pineal β-Receptor
- Serotonin
- Serotonin-N-Acetyltransferase
- Hydroxyindole + N-Acetylserotonin (NAS)
- O-Methyl transferase
- Melatonin
Methionine + ATP → SAMe

I. Methylation

Transfers methyl groups to:
- DNA and RNA
- Proteins
- Phospholipids
- Catechol and indoleamine

Growth
- Hormones
- Heat Shock Proteins
- Phosphatidylcholine (cell membrane)
- Transcriptional activation (inhibition of cancer and viruses)
- Prevention of Point Mutations (DNA)
- Neurotransmitters
- ATP

II. Polyamines

Spermidine
- Putrescine
- Spermine

III. Transsulphuration

Cysteine
- Sulphates
- Glutathione
- Taurine

Antioxidants
- Mitochondria protection
- Membrane protection
- Liver protection
- Prevention of cholestasis

Cell growth and differentiation
- Gene expression
- Protein phosphorylation
- Ca homeostasis
- Neuron regeneration
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<tr>
<td>Nucleotides</td>
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<tr>
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<tr>
<td>Acetylserotonin</td>
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SAM: S-adenosylmethionine
Supplements to aid in the balance of glutamate and GABA:

- Branched amino acids (ONLY leu/ileu/val)
  (discontinue immediately if urines smells like “maple syrup”)
- Pycnogenol
- Grape seed extract
- GABA
- Sublingual GABA/Glycine
- ZEN
- Theanine
- Taurine
- Cats Claw
- Trehalose

Supplements to Support the Pancreas:

- Ora-Pancreas
- Vitamin K
- Super digestive enzymes-with meals
- Gymnema sylvestre

Valproic acid

- Sublingual methylcobalamin (B12)
- Sublingual cyanocobalamin
- Sublingual hydroxycobalamin
Valproic acid can be used to treat seizures.

Valproic acid helps to increase reelin

There is literature to suggest that valproic acid may exacerbate measles viral infection; subsequent research has found the combination of Valtrex in conjunction with Valproic acid to be beneficial in treating viral infections.

Brand names for valproic acid include Depakote, Depakene, Valproate
Supplements to aid in protection from excess calcium:

Magnesium
Vinpocetine
Zinc (25-40mg/day)
Three years of oral B12 were compared with four years of intramuscular B12 administration. Serum B12, hemoglobin, were compared. Oral B12 was as effective as intramuscular B12.


Study looked at “low dose” B12. The intramuscular form of B12 is generally the hydroxy form.
Decrease yeast/ repopulate GI tract/ decrease E.coli and Strep:

Stomach pH RNA NutriSwitch Formula (with meals)
Bowel RNA NutriSwitch Formula (2X/day or as needed)
Super digestive enzymes-with meals
UtraDairy enzymes-with meals
Kyodophilus-with meals
Candex
Lactoferrin
Suprema dophilus
Grapefruit seed extract
Inuflora
ARA6
Oregamax
Caprylic acid

Oregon grape
Myrrh
Neem
Goldenseal
Uva Ursi (limited use)
Cranberry – chewable
Support to Reducing Stims:

Behavior RNA NutriSwitch Formula (2X/day or as needed)
Stress RNA NutriSwitch Formula (2X/day or as needed)
Nettle
Inositol or IP6
The PI3K signalling pathway is involved in polyglutamine toxicity

Nature Medicine July 2003
Support Membrane Fluidity:

- Phosphatidyl serine or Pedia-active chewable
- Essential Fatty Acid Mixture
- Neuromins (DHA)
- Policosanol
Mutations in Lpin1 lead to peripheral neuropathy and to the dysregulation of genes that participate in lipid metabolism in nerves.

*Nature Reviews Microarrays March 2004*
Aid in helping inflammation around nerves:

Health Foundation RNA NutriSwitch (2X/day or as needed)
HyperImmune RNA NutriSwitch (2X/day or as needed)
Boswellia
Curcumin
Supplements to support energy/protect the brain:

- CoQ 10
- NADH
- Ginkgo
- Oxydrene
- Idebenone
- ATP
- Vinpocetine
- Carnitine
- Melatonin
Support proper sugar glycosylation/ balance Zinc/ Copper:

- Carnosine
- Vitamin K
- Rosemary
- EDTA (just 1X/day at this stage)
- Molybdenum
Supplements to support the gut:

- Curcumin
- Slippery Elm
- Colostrum
- Glucosamine/MSM
- Mastica gum
- Bowel RNA NutriSwitch Formula (2X/day or as needed)
- Slippery Elm
Supplements to aid in Constipation:

- Artichoke
- Yellow Dock
- Cascara sagrada
- Aloe vera
- Magnesium
- Cod liver oil
- Rhubarb
Step #2

Program to support

Viral Detoxification
Vitamins/ minerals/ antioxidants to lay the nutritional groundwork:

Cell Food +/- SAMe
Primal Defense
Selenium
Molybdenum
General Vitamin
Vitamin D
Nerve Calm RNA NutriSwitch Formula
Health Foundation RNA NutriSwitch Formula
Stress RNA NutriSwitch Formula
HyperImmune RNA NutriSwitch Formula
Behavior RNA NutriSwitch Formula
Bowel RNA NutriSwitch Formula
Stomach pH RNA NutriSwitch Formula
Supplements to Support the Immune System/Increase White Cells:

- Transfer Factor
- IP6
- MGN3
- Mycoceutics (mushrooms/beta glucan)
- Pau d Arco
- Guggul
- Myrrh
- Fenugreek
- SerenAid (start with 1/4 per day, increase to ½ or 1/day)
- Lactoferrin (every other day)
- Theanine
Supplements to Help Support the Liver/Pancreas/Thymus/Spleen:

- Ora-triplex
- Immuno-forte
- Ora-liv
- Ora-Pancreas
- Cod Liver Oil
- SAMe
- B complex
- Oral Kidney
- Kidney Support NutriSwitch Formula
Supplements to Support Viral Detoxification:

- Elderberry
- Garlic (start with 1X per day, may increase to up to 6X/day)
- Policosanol
- Glutathione (1X per day, then increase to 4 or more per day)
- Lysine
- Melissa
- Moducare (start 1X in AM and 1X in PM, increase to 4X/day)
- EDTA (start with 1X per day, may increase to 4-6X/day)
- Beyond Clean EDTA bath- nightly
- Colostrum (start with 1X per day, then increase to 2-3X/day)
- Alpha lipoic acid
- Vitamin C (Beyond C)
- Synthetic B1
- Transfer Factor
- Cats Claw
- Aloe
- Quercetin
- Proline
- Licorice
- 5 methyl folate
- Intrinsic B12
- Folinic
- Nucleotides
- Uridine Support NutriSwitch Formula
- Metal I RNA NutriSwitch Formula (progress to Metals II, III, IV +/- valtrex)
Support Oxygenation/Alkalinity to Limit Viral Growth:

- Oxydrene
- Penta water
- ATP
- Cell Food
- Ionic Breeze (Sharper Image)
- pH Kit and balancing for alkaline pH

Optional:
- Vitamin A (100,000 IU every other day for 2 weeks)
- Valtrex
Active center of tetrahydrofolate (THF). Note that the N5 position is the site of attachment of methyl and formimino groups, the N10 the site for attachment of formyl group and that both N5 and N10 bridge the methylene and methenyl groups.
Supplements to Support Moods:

Mood-S NutriSwitch Formula
Mood-D NutriSwitch Formula
Mood Focus NutriSwitch Formula
Dopa 400
Step #3

Program to support

Nerve Growth & Myelination
General Vitamin/Organ Support:

General Vitamin/ Antioxidant
Liquid Trace Minerals
OraLiv
Oral Pancreas
Oral Triplex
Immunoforte
Cod liver oil
Zinc
Potassium chloride (depending on levels)
Nerve Calm RNA NutriSwitch Formula
Health Foundation RNA NutriSwitch Formula
Stress RNA NutriSwitch Formula
Nerve Coat RNA NutriSwitch Formula
Behavior RNA NutriSwitch Formula
Bowel RNA NutriSwitch Formula
Stomach pH RNA NutriSwitch Formula
Support Nutrient Transport to Brain (taken with supplements):

Vitamin C (Right C)
Support Methylation (increases myelin):

- Curcumin
- SAMe
- B12 (balance of methyl/cyano/hydroxy cobalamine)
- Intrinsic B12
- 5 Methyl Folate
- Folinic
- Nucleotides
- Uridine Support NutriSwitch Formula
- DMG
- B complex
- Selenium (up to 100-200mg/day including General Vitamins)
- Amino Care amino acids
- MSM

Depending on over/under methylator

Mood Focus
Mood D
Support Myelination/Cell Membranes Fluidity:

- DHA (100-600mg/day)
- Phosphatidyl serine
- Nerve Coat RNA NutriSwitch (½ dropper 2X/day or as needed)
- EFA
- Policosanol
- Chondroitin sulfate(high MW)
- Glucosamine HCL
Help limit ROS, which trigger macrophage digestion of myelin:

- CoQ10
- Alpha lipoic acid
- Idebenone
- Vitamin E + mixed tocopherols

Limit macrophage digestion of myelin (MAY be an issue for phenol sensitive):

Flavinoids:
- Lutein/Bilberry
- Quercetin
- Pycnogenol
- Grape seed extract
- Elderberry
- Cranberry
- Green tea or Theanine
Support New Nerve growth/support nerves:

- Ashwaganda
- SAMe
- B12
- Milk thistle
- B complex
- Colostrum
- IGF
- FGF
- HGH
- Erythropoietin (EPO)
- Taurine
- OraPlacenta
- Ginkgo
- Carnosine
- Rosemary
- DHEA (monitor with hormone test)
- Synthetic B1 (benfotiamine)
- Shark liver oil (nervonic acid)
- Vitamin K (or vit d/k/ca/mg depending on calcium levels)
- Vitamin D (or vit d/k/ca/mg depending on calcium levels)
- Magnesium (or vit d/k/ca/mg depending on calcium levels)
- Calcium- DEPENDING ON CALCIUM LEVELS
- Tyrosine
- Glutathione
- Choline, or lecithin, or huperzine (depending on the child)
- Huperzine (depending on the child, as it regulates NMDA and acetylcholine)
• EPO is made by cells in the brain and spinal cord.

• EPO helps protect nerve cells against a lack of oxygen (of all the tissues in the body, active brain tissue uses the most oxygen).

• EPO seems to prevent healthy nerve cells from dying in response to signals sent by damaged nerve cells.

• EPO can reverse and prevent diabetic neuropathy

Science News Week of Nov. 9, 2002; Vol. 162, No. 19 , p. 296
New England Journal Medicine June 10, 2004
• IGF and BDNF are increased in an enriched environment
• Increased IGF helps to prevent muscle atrophy
• Pregnenolone increases IGF
Supplements to support progesterone for nerve growth:

- GABA
- Sublingual GABA/ Glycine
- Zen
- (Pregnenolone)
Support Oxygenation/Energy for New Nerve Growth:

- Oxydrene
- ATP
- Carnitine/acetyl-carnitine
- Vinpocetine
- NADH
- Cell Food
- Magnetico Magnetic Mattress (north only, 20 gauss)
- Body Fields OMT Magnopro
- Ionic Breeze (Sharper Image)
- Penta water
- Hyperbaric oxygen
- Nariwa water
Support language:

DMG
Fenugreek (start with 1X/day increase to 3X/day)
Gotu kola
Bacopa
Piracetam
B12-cyano/methyl/hydroxy cobalamin
Black cohosh
Dong quai
Indole 3 carbinol (discontinue if a fish odor from the body)
Uridine Support RNA NutriSwitch
Spinal Nerve Support RNA NutriSwitch
Mood Focus and/or Mood D NutriSwitch Formula in MODERATION

Supplements to support left/right communication:

Gotu kola
Bacopa
Nootropics:
Piracetam
Aniracetam
Fenugreek
Creatine
Supplements to keep virus in check IF still an issue:

- Transfer Factor
- Moducare (may increase gamma interferon)
- Glutathione
- Metals I, II, III, IV RNA NutriSwitch Formulas
Glutamate synapses in the neonatal hippocampus can rapidly lose their AMPA, but not their NMDA signalling.

NR2B and NR2A type NMDA receptors

“Glutamate synapses in the neonatal hippocampus can rapidly lose their AMPA, but not their NMDA signalling”

Nature Neuroscience March 2004
Supplements that may help increase muscarinic receptors and fusion:

- Ashwaganda
- Ginkgo
- MSM
- Acetyl carnitine
- Alanine
- Nystatin + Moducare
- Shilajit
RNA Monitoring Metals
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**Creatinine**

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**Creatinine**

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**Creatinine**

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# Urine Toxic Metals

## Potentially Toxic Metals

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## Creatinine

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</tr>
</tbody>
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## Specimen Data

- **Date Collected:** 7/23/2004
- **Method:** ICP-MS
- **Collection Period:** Random
- **Date Received:** 7/26/2004
- **<dl:** less than detection limit
- **Volume:**
- **Provoking Agent:**
- **Provocation:** PRE PROVOCATIVE

Toxic metals are reported as µg/g creatinine to account for urine dilution variations. **Reference ranges are representative of a healthy population under non-challenge or non-provoked conditions.** No safe reference levels for toxic metals have been established.

$\text{\n}$
Mercury Excretion in Urine

Mercury (ug/g Creatinine)

Metals III & IV
+ valtrex
According to the World Health Organization (WHO), "There is no 'safe' level of mercury"

TD-DMPS tm (a unique, proprietary, transdermally applied, combination of 2-3-dimercaptopropane-1-sulfonate, glutathione and other amino acids, in a base of Evito tm)

“…specifically formulated transdermally applied combination of DMPS conjugated with a number of peptides, called TD-DMPS tm. This proprietary formulation of DMPS used in the study consisted of DMPS conjugated with glutamic acid, glycine and cystein (glutathione) and methionine in a base of Evito.”
EVITO™ (a blend of all natural ingredients combined into a proprietary formula) consisting of Oleic acid, Linoleic acid, Gamma Linolenic acid, Stearic acid, Hexadecenoic acid, Palmitic acid, Icosenoic acid, Docosenoic acid, Tetracosenoic acid, Eicosapentaenoic acid, Docosahexaenoic acid, Mryistic acid, Lauric acid, Caprylic acid, Capric acid, a,b, g & d Tocopherols, Tocotrieols, and naturally occurring antioxidants and bioflavinoids in an organic marine lipid concentrate.
Inhibition of telomerase by linear-chain fatty acids: a structural analysis

Masako ODA,* Takamasa UENO,* Nobuyuki KASAI†, Hirono TAOKASHI*, Hiromi YOSHIDA,‡§, Fumio SUGAWARA,‡, Kengo SAKAGUCHI†, Hideya HAYASHI* and Yoshiyuki MIZUSHINA,‡§

EVITO™ (a blend of all natural ingredients combined into a proprietary formula) consisting of Oleic acid, Linoleic acid, Gamma Linolenic acid, Stearic acid, Hexadecenoic acid, Palmitic acid, Icosenoic acid, Docosenoic acid, Tetracosenoic acid, Eicosapentaenoic acid, Docosahexaenoic acid, Mryistic acid, Lauric acid, Caprylic acid, Capric acid, a,b, g & d Tocopherols, Tocotrieneols, and naturally occurring antioxidants and bioflavinoids in an organic marine lipid concentrate.
Telomerase and oligodendrocyte differentiation
Caporaso GL, Chao MV.

Myelin in the mammalian central nervous system (CNS) is produced by oligodendrocytes, most of which arise from oligodendrocyte precursor cells (OPCs) during late embryonic and early postnatal development. Both external and internal cues have been implicated in regulating OPC exit from the cell cycle and differentiation into oligodendrocytes. In this study, we demonstrate that differentiation of cultured OPCs into mature oligodendrocytes is associated with lower levels of activity of telomerase, the ribonucleoprotein that synthesizes telomeric DNA at the ends of chromosomes. Differentiation is also associated with lower levels of mRNA encoding the catalytic subunit of telomerase (TERT), whereas no difference is seen in the expression of its telomeric template RNA component (TR). These data suggest a possible role for telomerase during normal growth and differentiation of oligodendrocytes that may be relevant to the mechanism of myelination in the CNS.

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The benefit of telomerase inhibition, as compared with existing therapies, would be that the cancer cells would live out their normal cellular life span and then die, and the anti-telomerase inhibitor would likely have no effect on normal cells where the telomerase gene is inactive. Unfortunately, male reproductive cells and immune cells that have telomerase activity also will likely be affected by anti-telomerase. As most cancers occur in later years when patients have had children, any potential side effects on male reproductive cells might be an acceptable trade-off for cancer eradication. Or, patients could store sperm for future use.

The potential negative effect on immune cells will be more problematic, requiring constant monitoring to avoid complications from bacterial or viral infections. Current experience with patients with compromised immune systems will help to make management of this potential side effect easier. In reality, though, the side effects of telomerase will not be known until such time as the animal and human clinical studies have been initiated.
Also consistent with this delayed consequence of telomerase inhibition is the phenotype exhibited in mice rendered deficient in telomerase by genomic deletion of TER. Telomerase-deficient mice are initially phenotypically normal. However, successive generations of breeding result in progressive telomere shortening, eventually resulting in male and female sterility, reflecting germ cell senescence, as well as a variety of manifestations of somatic cell dysfunction (8). This model of telomerase-deficient mice also has allowed studies of the role of telomerase in tumorigenesis in vivo. Perhaps the most straightforward prediction in these mice was an expectation that tumor susceptibility and/or tumor growth would be limited as a result of telomere shortening uncompensated by telomerase. However, the effect of telomerase deficiency in this knockout model has been complex and is highly instructive of the considerations that require attention in targeting telomerase inhibition as a strategy for cancer treatment. It was observed that late-generation, telomerase-deficient mice have an increased, not decreased, incidence of spontaneous tumors (9). In interpreting this surprising finding, it was suggested that telomere shortening might predispose to chromosomal abnormalities that in turn may increase the risk of altered gene expression, leading to malignant transformation.

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