

NEW WAYS OF UNDERSTANDING AND ADDRESSING ANXIETY, OBSESSIONS, AND COMPULSIVE BEHAVIORS

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2014

How do children manifest anxiety?

- Avoidance of feared situations or objects (such as school refusal or avoidance)
- Temper tantrums and inflexibility
- Crying
- Freezing or standing motionless and expressionless
- Hyperactivity
- Avoiding eye contact
- Separation anxiety and clinging behaviors
- Difficulty sleeping

Disclaimer

- The vitamins, minerals, and herbs presented in this talk have not been approved by the FDA for the treatment of autism spectrum disorders or any anxiety disorder.
- The only FDA approved medications for autism spectrum disorders are risperidone and aripiprazole.

Physical signs of anxiety

- Rapid heartbeat
- Dizziness
- Shortness of breath or difficulty breathing
- Muscle tension
- GI upset
- Diarrhea
- Headache

Introduction

- Anxiety, obsessions, and compulsive behaviors are common in ASD.
- Anxiety, obsessions, and compulsive behaviors are symptoms of underlying diseases and dysfunctions.
- The current explanatory model for anxiety states is lacking.
- There is a need for a more individualized, complex and holistic model.

DSM IV-TR Anxiety Disorders

- Generalized anxiety disorder
 - Panic disorder
 - Specific phobia
 - Obsessive-compulsive disorder
 - Posttraumatic stress and acute stress disorder
- In Childhood:
- Separation anxiety disorder

Obsessive Compulsive Behaviors and Autism

DSM IV Criteria for Autism:

- (C) restricted repetitive and stereotyped patterns of behavior, interests and activities, as manifested by at least two of the following:
1. encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
 2. apparently inflexible adherence to specific, nonfunctional routines or rituals
 3. stereotyped and repetitive motor mannerisms (e.g. hand or finger flapping or twisting, or complex whole-body movements)
 4. persistent preoccupation with parts of objects

Anxiety and PDD

- In a study of children with PDD, 43% of the children met the criteria for at least one anxiety disorder.
- Higher levels of anxiety were correlated with
 - Higher IQ
 - Functional language use
 - Higher stereotyped behaviors

Sukhodolsky DG et al. Parent-rated anxiety symptoms in children with pervasive developmental disorders: frequency and association with core autism symptoms and cognitive functioning. *J Abnorm Child Psychol.* 2008 Jan;36(1):117-28. Epub 2007 Aug 3.

Post Traumatic Stress Disorder

- Criterion A: stressor
- Criterion B: intrusive recollection
- Criterion C: avoidant behaviors/numbing
- Criterion D: hyper-arousal
 - Difficulty falling or staying asleep
 - Irritability or outbursts of anger
 - Difficulty concentrating
 - Hyper-vigilance
 - Exaggerated startle response

Anxiety Disorders in Children and Adolescents with Autistic Spectrum Disorders: A Meta-Analysis.

A systematic review of the literature identified 31 studies involving 2,121 young people with ASD.

Across studies, 39.6% of young people with ASD had at least one comorbid DSM-IV anxiety disorder, the most frequent being specific phobia (29.8%) followed by OCD (17.4%) and social anxiety disorder (16.6%).

Van Stennel FJ et al. *Clin Child Fam Psychol Rev.* 2011 Jul 7. [Epub ahead of print].

Causes of Physiological Stress

- | | |
|-------------------------------|-------------------|
| □ Emotional abuse and neglect | □ Excess cold |
| □ Chemical toxins | □ Loud noises |
| □ Heavy metals | □ Physical trauma |
| □ Nutritional deficiencies | |
| □ Infections | |
| □ Pain response | |
| □ High electromagnetic fields | |
| □ Excess heat | |

The Broad Autism Phenotype Findings from an Epidemiological Survey

Autism March 2004 vol. 8 no. 1 21-37

- Depression and anxiety were significantly more prevalent in mothers of children with PDD.
- Significantly more PDD children had at least one first degree relative with anxiety and one second degree relative with OCD.

New Ways of Understanding Anxiety and Hyperactivity

Anxiety, obsessions, and compulsions are symptoms. These conditions often involve a biomedical component.

Anxiety, obsessions, and compulsion behaviors involve not only imbalances in monoamine neurotransmitters but other substances in the brain, including glutamate, inflammatory markers, and brain derived neurotrophic factor.

These conditions involve not only the central nervous system but also the autonomic nervous system, HPA axis, mitochondria, gastrointestinal system, and immune system.

THE LANCET

Selective serotonin reuptake inhibitors in childhood depression: systematic review of published versus unpublished data.

Published data suggest a favorable risk-benefit profile for some SSRIs; however, addition of unpublished data indicates that risks could outweigh benefits of these drugs (except fluoxetine) to treat depression in children and young people.

Greater openness and transparency with respect to all intervention studies is needed.

Lancet. 2004 Apr 24;363(9418):1341-5

Prevalence and Pattern of Psychoactive Medicine Use in Children with ASD

Autism Society of Ohio

45.6% psychotropic agents
21.6% antidepressants
14.9% antipsychotics
12.5% antihypertensives
11.3% stimulants

11.5% antiepileptic drugs
10.3% OTC autism supplements

Autism society of North Carolina

45.7% psychotropic agents
21.7% antidepressants
16.8% antipsychotics
13.9% stimulants

12.4% antiepileptic drugs
5.7% supplements

Aman et al. Prevalence and patterns of use of psychoactive medicines among individuals with autism in the Autism Society of Ohio. *J Autism Dev Disord*. 2003 Oct;33(5):527-34.

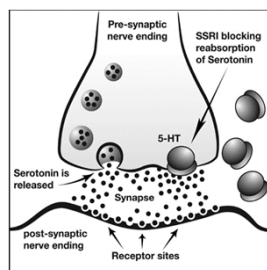
Longworthy-Lam KD et al. Prevalence and patterns of use of psychoactive medicines in individuals with autism in the Autism Society of North Carolina. *J Child Adolesc Psychopharmacol*. 2002 Winter;12(4):311-21.

Lack of Efficacy of Citalopram in Children With Autism Spectrum Disorders and High Levels of Repetitive Behavior: Citalopram Ineffective in Children With Autism

Arch Gen Psychiatry. 2009;66(6):583-590.

- **Results** There was no significant difference in the rate of positive response on the Clinical Global Impressions Improvement subscale between the citalopram-treated group and the placebo group.
- Citalopram use was significantly more likely to be associated with adverse events.
- **Conclusion** Results of this trial do not support the use of citalopram for the treatment of repetitive behavior in children and adolescents with autism spectrum disorders.

Mechanism of SSRI Action



Selective Serotonin Reuptake Inhibitor (SSRI) Use during Pregnancy and Effects on the Fetus and Newborn: A Meta-Analysis
Karl A. Luttmer, Steven M. Dore, Nilsa Kirsch, Alex R. Kemper, Charles R. Neal Jr, and Dalia M. Yassierli

Antidepressants Increase Risk of Behavioural Symptoms in Children and Adolescents With Depression or Anxiety

David A Brent, Boris Birmaher
DisclosuresEvid Based Ment Health. 2014;17(1)

This study examined the risk of 'activation' and 'mania-hypomania' in antidepressant trials of depressed or anxious youth. 'Activation' included insomnia, arousal, irritability and anger. Within drug-placebo pairs, the rates of 'activation' for drug versus placebo in depression and anxiety were 3.95% vs 1.08% and 11.7% vs 5.22%, respectively, with a mean onset time of 5 weeks. For mania-hypomania, the drug-placebo differences for depression and anxiety were 10.4% vs 0.45% and 1.98% vs 0%, respectively

Published online April 23, 2012

Trends Pharmacol Sci. 2010 Feb;31(2):60-5. Epub 2009 Dec 4.

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FLUOXETINE ORAL SOLUTION, USP
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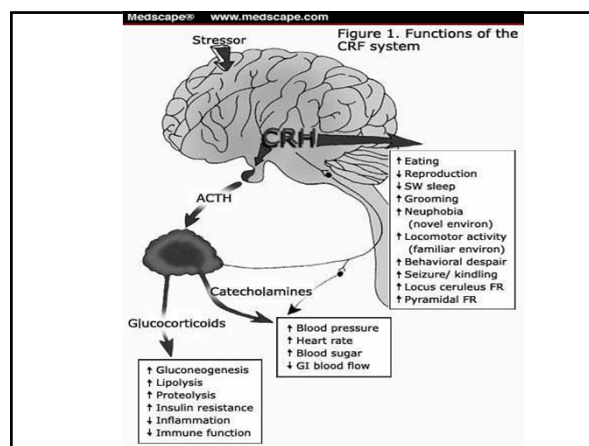
WARNING

Suicidality and Antidepressant Drugs—Antidepressants increased the risk compared to placebo of suicidal thinking and behavior (suicidality) in children, adolescents, and young adults in short-term studies of major depressive disorder (MDD) and other psychiatric disorders. Although antidepressants may be helpful for the treatment of MDD and other psychiatric disorders, there remains a concern about activation or exacerbation of suicidality in some patients, especially in children, adolescents, and young adults. Most patients who are started on antidepressant therapy should be monitored appropriately and observed closely for clinical worsening, suicidality, or unusual changes in behavior. Patients whose condition worsens or experience the emergence of suicidal thoughts, feelings, or impulses toward harm should be advised to stop taking the drug, be alerted to seek immediate medical attention, and be placed under close supervision until a new strategy for management has been implemented. Close monitoring is particularly important in children, adolescents, and young adults in whom the risk of suicidality appears to be higher. There is no evidence from randomized controlled trials that antidepressants increase the risk of suicide in older adults. However, because suicidality may occur at any time during treatment with antidepressants, careful monitoring is recommended. The following information is based primarily on results from clinical trials conducted in children, adolescents, and young adults. In addition, the PRECATIONS section contains information regarding suicidality associated with the use of antidepressants in older adults. Because the clinical effects of antidepressants may differ between individuals, it is important to monitor patients carefully and adjust the dose if needed. A patient's response to treatment should be considered along with the risk of adverse effects. Zoloft is approved for use in pediatric patients with MDD and obsessive compulsive disorder (OCD). See WARNINGS, Clinical Worsening and Suicide Risk, PRECAUTIONS, Information for Patients, and PRECAUTIONS, Pediatric Use.

PEDIATRICS[®] Published online April 4, 2011 (doi:10.1542/peds.2011-0427)

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Heart Rate Variability

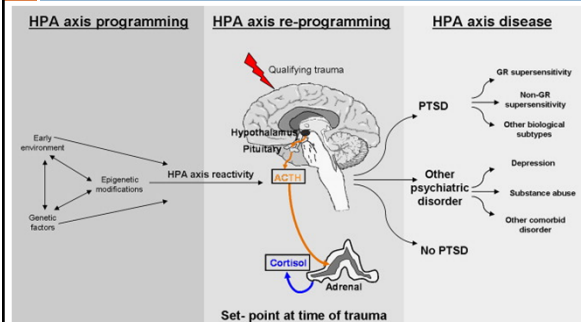


Stress, Language, and Autism

- Study of 14 high functioning participants with autism and 14 matched controls.
- Participants with autism had significantly impaired category and letter fluency.
- Propranolol significantly improved category but not word fluency.
- Propranolol inhibits the sympathetic nervous system by blocking beta receptors on the nerves of the sympathetic system.
- Propranolol has been used to treat performance anxiety

Effect of Propranolol on Word Fluency in Autism Cognitive & Behavioral Neurology. 24(1):11-17, March 2011. doi: 10.1097/WMN.0b013e318204d20e

Early disruptions and trauma can lead to HPA axis dysregulation



Rosmarinus officinalis polyphenols activate cholinergic activities in PC12 cells through phosphorylation of ERK1/2.

Canonic acid (CA) and rosmarinic acid (RA) significantly induced cell differentiation, increased acetylcholine level, and enhanced acetylcholinesterase activity.

J Ethnopharmacol. 2010 Sep 15;131(2):451-8

Activity of essential oils and individual components against acetyl- and butyrylcholinesterase.

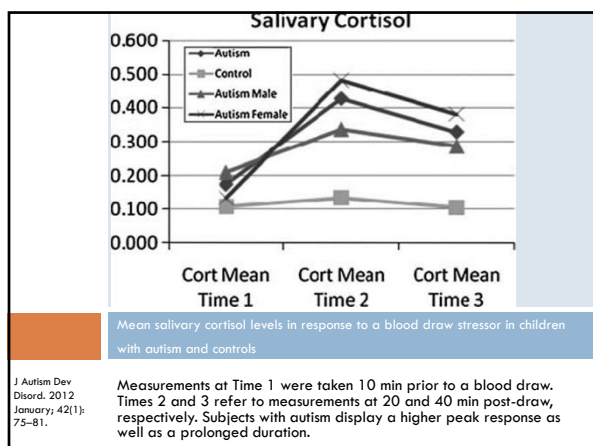
Almost all of the essential oils showed a very high inhibitory activity (over 80%) against both enzymes, whereas the single components were not as active as the essential oils.

Z Naturforsch C. 2008 Jul-Aug;63(7-8):547-53.

Testing

- Only the most devastating effects will be detected by serum cortisol levels as a result of the homeopathic mechanisms of the HPA axis
- Salivary cortisol measures active free cortisol and follows diurnal pattern
 - Biomarker of stress in research settings
 - Screening test for Cushing's syndrome
 - May be useful for more subtle forms of adrenal insufficiency, i.e. glucocorticoid replacement

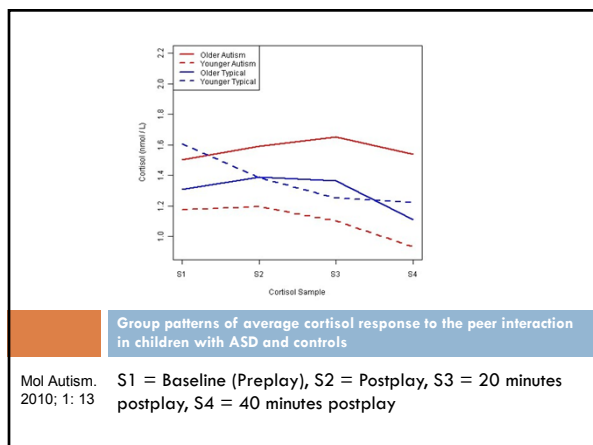
Inder WJ, Clin Endocrinol. 2012 Jul 20.



Effects of endocrine-disrupting chemicals on adrenal function

Dr. David S. BSc, PhD, DSc (Reader in Molecular and Cellular Endocrinology)

The chemical nature of adrenal disruptors is highly varied, and there are features of the adrenal structure and function, which render it particularly vulnerable to toxic attack. However, the homeostatic mechanisms inherent in the hypothalamus-pituitary-adrenal axis mean that only the most catastrophic effects are recognized as adrenal disruption, such as in the case of etomidate. In order to detect potentially significant but milder forms of toxic disruption of adrenal function a new approach is needed; this requires the use of more sophisticated approaches than simply measuring one hormone at one time point.

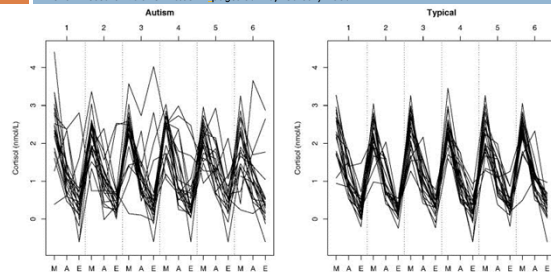


Effect of chronic stress on adrenals

- May be direct effect of endocrine disrupting toxins
- May be secondary effects due to stress from another system
 - Purinergic
 - Immune/infections
 - Increased excitotoxicity

Dysregulation of the Diurnal Rhythm in ASD

Autism Research volume 2 Issue 1, pages 39–49, February 2009



Effects of soy lecithin phosphatidic acid and phosphatidylserine complex (PAS) on the endocrine and psychological responses to mental stress

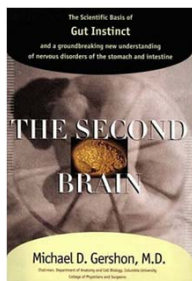
Treatment with 400 mg PAS resulted in a pronounced blunting of both serum ACTH and cortisol, and salivary cortisol responses to the TSST (Trier Social Stress Test).

With regard to the psychological response, 400 mg PAS seemed to exert a specific positive effect on emotional responses to the TSST.

□ Stress. 2004 Jun;7(2):119-26.

The Other Brain

- The GI system contains about 100 million neurons, more than either the spinal cord or the peripheral nervous system
- 95% of the body's serotonin is in the gut
- SSRI medications can cause nausea, diarrhea, and constipation. But, low doses of SSRIs can be used to treat nausea, diarrhea, and constipation.



Stress and Friendly Bacteria

Prenatal stress alters the bacterial colonization of the gut in infant monkeys. Stress reduced the overall numbers of bifidobacteria and lactobacilli. (Bailey, 2004)

Exposure to stress in mice reduces the number and diversity of commensal microbial populations while leading to increased colonization by *Citrobacter rodentium*. (Bailey, 2010)

Gut Brain Axis

- A bidirectional communication system between the brain and gastrointestinal systems.
- Communication occurs along immunologic, neural, and biochemical pathways.
- Gut microbiota can effect both brain development and behavior.
- Stress also can alter the composition of gut microbiota.

Collins SM, Bercik P. The relationship between intestinal microbiota and the central nervous system in normal gastrointestinal function and disease. *Gastroenterology*. 2009 May;136(6):2003-14. Epub 2009 May 7. Review.

Reduced anxiety-like behavior and central neurochemical change in germ-free mice

Neurogastroenterology & Motility
Volume 23, Issue 3, pages 255-261, March 2011

- **Key Results** Germ-free mice, compared to SPF mice, exhibited basal behavior in the EPM that can be interpreted as anxiolytic. Altered GF behavior was accompanied by a decrease in the N-methyl-D-aspartate receptor subunit NR2B mRNA expression in the central amygdala, increased brain-derived neurotrophic factor expression and decreased serotonin receptor 1A (5HT1A) expression in the dentate granule layer of the hippocampus.
- **Conclusions & Inferences** We conclude that the presence or absence of conventional intestinal microbiota influences the development of behavior, and is accompanied by neurochemical changes in the brain.

Stress and the Gut

- When young rats are separated from their mothers, the layer of cells that line the gut becomes weakened and more permeable.
- Dr. Mayer Emeran, professor of physiology and psychiatry at UCLA reports that 70 percent of his patients with chronic GI disorders had early childhood traumas.
- He has also found that the majority of patients with anxiety and depression have some alteration in their GI functions.

Probiotics as Psychotropics

Emerging literature is showing the beneficial effect of oral probiotics on mood and anxiety symptoms.

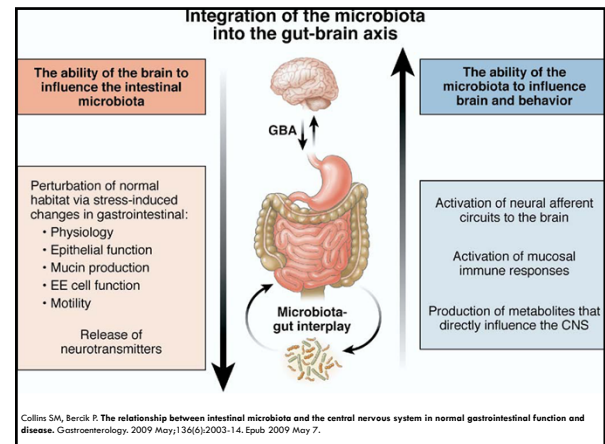
In a double blind, placebo-controlled randomized parallel group study, daily use of probiotics reduced psychological distress. (Messauadi, 2010)

A number of studies have shown the anti-anxiety effects of probiotic use in patients with medical conditions. (Silk, 2009; Sullivan 2009; Patel, 2008; O'Brien, 2004)

Ingestion of *Lactobacillus* strain regulates emotional behavior and central GABA receptor expression in a mouse via the vagus nerve

Proceedings of the National Academy of Sciences, 2011

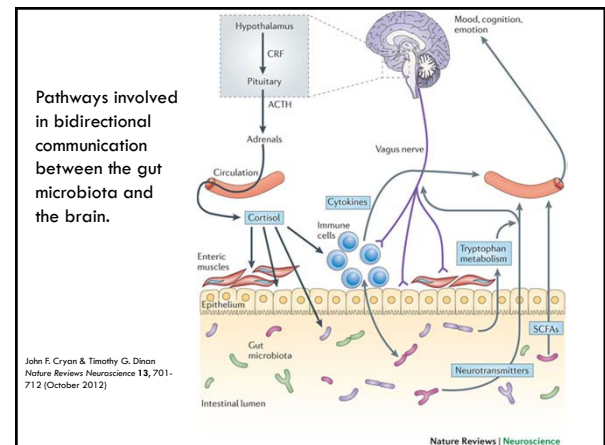
- Chronic treatment with *L. rhamnosus* (JB-1) induced region-dependent alterations in GABA_{B1b} mRNA in the brain. GABA is the major inhibitory neurotransmitter in the brain.
- *L. rhamnosus* (JB-1) reduced stress-induced corticosterone and anxiety- and depression-related behavior.
- The neurochemical and behavioral effects were not found in vagotomized mice



Chronic gastrointestinal inflammation induces anxiety-like behavior and alters central nervous system biochemistry in mice.

Mice infected with a noninvasive parasite, *Trichuris muris*, exhibited colonic inflammation and anxiety-like behavior that was associated with decreased hippocampal BDNF messenger RNA, elevated tumor necrosis factor, and an elevated kynurenine/tryptophan ratio.

- Treatment with etanercept resulted in normalized behaviors, reduced cytokine and kynurenine levels, but no change in BDNF expression.
- Treatment with *Bifidobacterium longum* normalized behavior and BDNF mRNA levels but did not affect cytokine or kynurenine levels.
- *Gastroenterology*. 2010 Dec;139(6):2102-2112.e1. Epub 2010 Jun 27.



Effects of the enteric bacterial metabolic product propionic acid on object-directed behavior, social behavior, cognition, and neuroinflammation in adolescent rats: Relevance to autism spectrum disorder.

Behav Brain Res. 2011 Feb 2;217(1):47-54

Possible Infectious Causes of Anxiety and Obsessive Compulsive Behaviors

- Clostridia species
 - Propionic Acid
- Bartonella
- Borrelia
- Streptococcus
- PANDAS
- PITANDS
- *Toxoplasma gondii*

In ASD, these infections are often chronic and difficult to diagnosis with conventional tests.

PANDAS



Pediatric Autoimmune Neuropsychiatric Disorder Associated with Streptococcus

- Onset of obsessive compulsive behaviors and/or tics in a child following a strep throat .
- Usually has a sudden onset and episodic course
- Antibodies to strep cross react with proteins in the brain
- One study demonstrated that in mice with a propensity to autoimmune illnesses, exposure to streptococcus induced antibodies led to repetitive behaviors. (Yaddanapudi, 2010)
- Association with group A Beta-hemolytic streptococcal infection and/or elevated ASO and AntiDNAse Ab titers
- Treatment with antimicrobials and immune modulators

Mitochondria and Anxiety

Behav Brain Res. 2005 Dec 7;165(2):172-80. Epub 2005 Aug 10

Increased anxiety-like behaviors and mitochondrial dysfunction in mice with targeted mutation of the Bcl-2 gene: further support for the involvement of mitochondrial function in anxiety disorders.

One of the major modulators of mitochondrial function is Bcl-2 proteins imbedded in the inner mitochondrial membrane.

Mutant mice have reduced mitochondrial Bcl-2 levels, and although they have no gross behavioral abnormalities, they demonstrate a significant increase of anxiety-like behaviors.

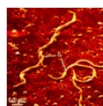
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Lyme Disease

Caused by *Borrelia burgdorferi*

Early Symptoms:

EM rash
Joint pains
Chills
Fever
Fatigue
facial palsy (paralysis)



Late Stage or Chronic:

Arthritis and swelling of joints
cardiac abnormalities
central nervous system (CNS)
involvement leading to cognitive (mental) disorders.

Mitochondrial Diseases and Psychotropic Medications

- Patients with psychiatric symptoms and mitochondrial disorders tend to be resistant to treatment with conventional psychotropics and may deteriorate with psychotropic medications.
- Both atypical and typical antipsychotic medications have the potential to deteriorate complex I of the electron transport chain
- Valproic acid depletes carnitine and decreases beta-oxidation in the liver.

Anglin, R et al. **Treating Psychiatric Illness in Patients With Mitochondrial Disorders.** *Psychosomatics* 51:179, March-April 2010

Possible Role for *Toxoplasma gondii* in the Etiology of OCD

Psychiatry Res. 2010 May 15;177(1-2):263-5. Epub 2010 Jan 27.

- Toxoplasmic encephalitis (TE) is a common presentation of *Toxoplasma gondii* infection.
- Parasitic infection, transmitted by cats.
- In a recent study, patients with OCD (47.62%, n=42) were much more likely to have *T. gondii* antibodies than healthy controls (19%, n=100).

Magnesium

- In a mouse model, plasma and brain magnesium levels were significantly correlated with several anxiety related behavioral parameters. (Laarakker, 2011)
- The NMDA/glutamate pathway has been demonstrated to be involved in the anxiolytic-like activity of magnesium. (Poleszak, 2008)
- Additionally, benzodiazepine/GABA receptors have also been shown to be involved in the anxiolytic-like effects of magnesium. (Poleszak, 2008)

Zinc Deficiency

- There is a growing body of literature supporting the association between zinc and ADHD, anorexic behaviors, depression, and anxiety.
- Zinc plays a role in serotonin and glutamate activity as well as oxidative stress.
- Zinc deficient animals exhibit anxiety like behaviors.
- Rats fed a zinc deficient diet were shown to have higher levels of corticosterone following exposure to stress.

Cope, et al. Curr Opin Clin Nutr Metab Care. 2010 Nov;13(6):685-9

Omega-3 supplementation lowers inflammation and anxiety in medical students: A randomized controlled trial.

Kiecolt-Glaser JK, et al. Brain Behav Immun. 2011 Jul 19. [Epub ahead of print]

- The participants, 68 medical students, received either n-3 (2.5g/d, 2085mg EPA and 348mg DHA) or placebo. Compared to controls, those students who received n-3 showed a 14% decrease in lipopolysaccharide (LPS) stimulated interleukin 6 (IL-6) production and a 20% reduction in anxiety symptoms, without significant change in depressive symptoms.
- These data suggest that n-3 supplementation can reduce inflammation and anxiety even among healthy young adults.

Chromium and Blood Sugar Regulation

- Chromium influences neurotransmitters levels and blood sugar regulation.
- Chromium deficiency may result in symptoms of anxiety, irritability, and fatigue secondary to dips in blood sugar.
- In a study of patients with atypical depression, chromium supplementation helped with increased appetite, increased eating, carbohydrate craving, and diurnal variation of feeling. (Docherty, 2005)

Omega 6/Omega 3 Balance

- Human beings evolved on a diet ratio of omega-6 to omega-3 essential fatty acids of approximately 1:1.
In Western diets, the ratio is 15/1 to 16.7. This promotes the development of numerous diseases including inflammatory and autoimmune diseases.
Omega-3 fatty acids have anti-inflammatory effects while omega-6 acids do not.
Biomed Pharmacother. 2006 Nov;60(5):503-7. Epub 2006 Aug 28. Evolutionary aspects of diet, the omega-6/omega-3 ratio and genetic variation: nutritional implications for chronic diseases.
- Vegetable oils contain high amounts of omega-6 relative to omega-3 fatty acids. The top offenders are grape seed, cottonseed, safflower, corn and sunflower oils.
Corn oil has an omega-6 to omega-3 ratio of 49:1

Pyridoxine

Pyridoxine (vitamin B6) is involved in the formation of neurotransmitters such as GABA, serotonin, dopamine, and norepinephrine.

In rats, pyridoxine deficiency is associated with sympathetic outflow and hypertension.
(Paulose, 1988)

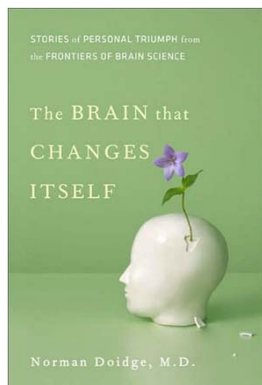
Neurogenesis and Cellular Plasticity: A Final Common Pathway

- Neurogenesis the birth of new neurons. Occurs primarily in the lateral ventricles and hippocampus.
- Neurogenesis appears to be important for learning and memory formation.
- The SSRI medications increase neurogenesis
- Exercise, Rhodiola rosea, and an enriched environment also enhance neurogenesis.

Revolution in thinking in brain science

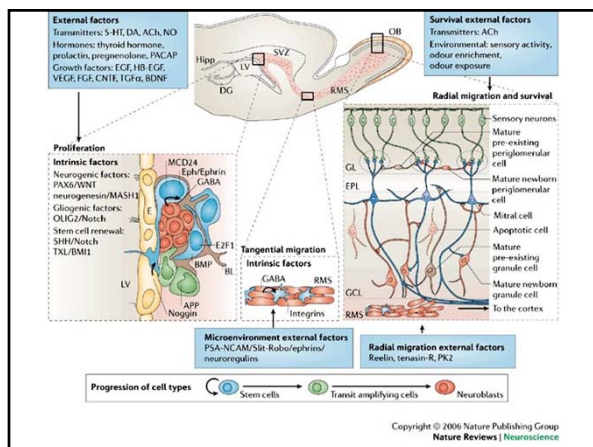
The idea of the brain as 'plastic' and changing replaces an earlier notion of the brain as a fixed machine.

Offers hope for a number of psychological neurological conditions in place of a 'neurological nihilism.'



Adaptogens

- Are plant derivatives, not simple compounds such as minerals or vitamins.
- Many have been used in traditional medical systems for centuries to deal with anxiety, fatigue, or trauma.
- Are believed to normalize bodily responses to stress and to help maintain homeostasis by acting in a non-specific manner
- May modulate the immune, antioxidant, hormonal, and nervous systems.



Plant Adaptogens

- Summa (*Pfaffia paniculata*)
- Golden Artic Root (*Rhodiola rosea*)
- Astragalus (*Astragalus membranaceus*)
- Tulsi or Holy Basil (*Ocimum sanctum*)
- Schisandra (*Schisandra chinensis*)
- Ashwaganda (*Withania somnifera*)
- Licorice (*Glycyrrhiza glabra* and *G. uralensis*)

New Approaches To Treating Anxiety

- Approach anxiety, obsessions, and compulsions as symptoms and search for underlying disease states.
- Treatments should be individualized.
- Treat multiple systems and work on more than one level simultaneously for optimal improvement in symptoms.
- Reduce stress in the patient's life.
- Treat the family system whenever possible.

Plant Adaptogens

- Asian ginseng (*Panax ginseng*)
- American ginseng (*Panax quinquefolius*)
- Siberian ginseng (*Eleutherococcus senticosus*)
- Georgian Snow Rose (*Rhododendron Caucasicum*)
- Maca (*Lepidium meyenii*)

Rhodiola rosea



- In rats exposed to cold and hypoxia, Rhodiola root extract increased blood reduced glutathione and SOD activity and maintained cell membrane permeability. (Gupta, 2010)
- In depressive rats, Rhodiola rosea improved serotonin levels in the hippocampus and induced neural stem cell proliferation. (Chen, 2009)

Mitochondrial Cocktail

- CoQ10 or ubiquinone
- Riboflavin
- Niacin
- Thiamin
- Biotin
- Pantothenate
- L-Carnitine
- Creatine monohydrate
- Alpha lipoic acid
- D-Ribose
- Selenium
- Vitamin E
- Vitamin C

Nervines Herbs

- Chamomile
- Hawthorne
- Kava
- Lavender
- Lemon balm
- Linden
- Oats
- Passionflower
- Skullcap
- St. Johns wort
- Valerian
- Verbena

Abascal, K and Yarnell, E. Nervine Herbs for Treating Anxiety. Alternative & Complementary Therapies. December 2004.

It's Not All in Your Head: Treat the Whole Body

- Assess and address:
 - Mitochondrial dysfunction
 - Possible infections and dysbiosis
 - Hormonal imbalances
 - Gastrointestinal disturbances
 - Oxidative stress
 - Detoxification and limit exposure to environmental toxins
 - Fatty acid and cholesterol imbalances
 - Omega 6/omega 3 ratio
 - Low cholesterol

Vitamins, Fats, and Mineral Support for Stress and Anxiety

- Vitamin B6
- Folic acid/5MTHF
- Vitamin B12
- Pantothenic acid
- Vitamin C
- Tyrosine
- Tryptophan
- L-Theanine
- 5HTP
- Omega 3 supplements
- Lecithin
 - Choline
- Phosphatidylserine
- Magnesium
- Zinc
- Chromium
- Trace Minerals
- Iodine
- Sea or Himalayan Salt

Holistic Approach to Anxiety Disorders

- Spending time in nature/grounding
- Light treatments
- Mindfulness
- Coherent breathing
- Bodywork
- Movement therapies
- Exercise
- Psychotherapy
- Spirituality/prayer
- Homeopathic treatments

Treat the Whole Family

- Family members share similar genetics, environmental exposures, and diets.
- Consider the stress of caring for a child with chronic medical and behavioral issues as well the as lack of validation by the conventional medical community of autism as a whole body based and biomedical condition.
- Consider PTSD in parents.