“Lyme Disease, The Stones Left Unturned
“Why am I still sick?”

Brought to you by:
The Center for Bio Individualized Medicine™
Finding Answers Through Genetics and Integrative Medicine
8420 West Chester Pike, Ste 2, Upper Darby, PA 19082
Dr. Jess P. Armine
Shawn Bean, B.S.
bioindividualmed@gmail.com
(610) 449 9716
Tonight’s Agenda

1. Introduction of the Speakers
2. Brief History of Lyme Disease and Symptom Complexes
3. Various Tests, their efficacies and interpretations
4. Usual treatments
5. Explanation of why clinical illness remains even though the “bugs” may be eradicated
6. What can be done to achieve Complete Healing
7. Questions and Answers
TONIGHT’S SPEAKERS
Dr. Jess P. Armine

- Dr. Jess P. Armine holds licenses as a Doctor of Chiropractic and a Registered Nurse. He is trained in Chiropractic, Methylation, Genetic Research, Neuro-Endo-Immunology, Functional Medicine, Nutrigenomics, Applied Kinesiology, Cranial Manipulation, and Nutritional Counseling. He has been a health care provider for over 39 years.
- Via his experience and eclectic training, he has a broad based knowledge of traditional and alternative/complementary health care. He has treated many clients with Chronic Illnesses, Multiple Chemical Sensivities, MTHFR issues, PANDAS, Chronic Fatigue, Chronic Pain, Gastrointestinal Imbalances (Leaky Gut), Autistic Spectrum Disorders, and more!
- Dr. Armine is also a R.N. with extensive experience in Emergency and Critical Care.
- Dr. Armine is one of the few specialists in the United States specializing in correlating the Genetic SNPs (single nucleotide polymorphisms) with Neuro-Endo-Immunology, Acquired Mitochondrial Dysfunction and Cell Wall Integrity to identify hidden imbalances and he develops INDIVIDUALIZED treatment plans specific to the history and physiology of the individual patient.
- Dr. Armine constantly researches about the latest findings in genetics and functional medicine.
Shawn Bean
Nutritional Biochemist

- As engaged under the direct medical supervision of the physicians with whom he collaborates, Shawn has provided indispensable knowledge and value that considers endocrine, neurological, psychological and immune system disorders. Nutritional and supplemental interventions are formulated into a therapeutic protocol that compliments and enhances the physician’s standard conventions.

- Shawn Bean is a specialist in clinical nutrition who has several years of experience working with challenging medical cases. He possesses a Bachelor of Science in Exercise Science from West Chester University and has earned numerous certifications from the World Institute of Integrative Health Science. He also has a certification in neuro-endo-immunology, NLP, and clinical hypnotherapy. Shawn specializes in alternative medicine including biochemistry and neurology of autism, depression, chronic fatigue, weight loss, nutrition, GI imbalances, environmental toxicity, hormones, genetic mutations, as well as, lifestyle modifications.

- Shawn is one of the few specialists in the United States specializing in Genetic SNPs (single nucleotide polymorphisms). Over the past several years, he has collaborated with medical professionals and clients locally, nationally, and internationally to help them identify hidden imbalances. He is also proud to have a supporting role at MTHFR Support to help educate the public, as well as medical professionals, about the latest findings in genetics and functional medicine. Shawn’s passion to help and desire to educate people has made a profound effect on numerous lives.
Lyme Disease

HISTORY AND SYMPTOMS
Lyme is EVERYWHERE!

- Incredible But True! Lyme Disease is in over 80 Countries!

- The Subantarctic is a region in the southern hemisphere just north of the Antarctic Circle which contains the Campbell Islands and îles Crozet. According to the "Encyclopedia of the Antarctic Vol.1" (ed: B. Riffenburg, 2007 p.335), "The zoonosis Lyme disease is caused by the spirochaete *Borrelia burgdorferi*, which is carried by sea birds transmitted by *Ixodes* ticks. It has been found through DNA analysis in ticks on the Campbell Islands and the îles Crozet. King penguins on the îles Crozet have antibodies to *B. burgdorferi*.”

Lyme Disease

- Lyme disease is a bacterial infection that is spread through the bite of one of several types of ticks.

- **Lyme disease** (*Lyme borreliosis*) is an infectious disease caused by at least three *species* of *bacteria* belonging to the *genus Borrelia*. *Borrelia burgdorferi* is the main cause of Lyme disease in *North America*, whereas *Borrelia afzelii* and *Borrelia garinii* cause most *European* cases.

- Texas (being Texas) had to have it’s own strain....hence Borellia Lonestari....The Lonestar Tick

  - *Wikipedia*
Ticks

Know your ticks
Three of at least 16 reported species of ticks found in Wisconsin.

Lone star
Female ticks have a white dot or star on their back.

Wood (American dog)
One of the most common types of ticks in Wisconsin.

Deer (Blacklegged)
Deer ticks are known to transmit Lyme Disease.

SOURCE:
Department of Entomology, University of Wisconsin-Madison

Approx. size

Approx. size

Approx. size

JASON KLEIN - State Journal
Routes of Infection

- **Tick bite** (*Myth: the tick has to be attached for 36-48 hrs. before it can transmit the microorganism...some studies are showing as little as 30 min...when in doubt, check it out!*)
- From infected parents, breastfeeding from infected parent (Hotly debated)
  [http://www.lymedisease.org/resources/children.html](http://www.lymedisease.org/resources/children.html)
- **Organ transplant**
- **Blood transfusion** or receiving blood from other parasitic insects
- New evidence that there can be **sexual transmission**
  [http://afmr.org/Western](http://afmr.org/Western)
When In Doubt...Check It Out!

If you find an embedded Tick and you remove it...take it to the doctor. The tick can be submitted to the lab to test for Lyme Disease.
What to Look for...The “Bulls Eye Rash”

But this rash **DOESN’T** always happen and the presence or history of this rash **SHOULD NOT** be used as an exclusion criteria!
Lyme Disease - clinical stages

• Stage 1 (Early localized): days
  – erythema migrans rash at tick bite site
• Stage 2 (Early disseminated): weeks
  – flu-like illness,
  – cardiac, neurologic
• Stage 3 (Late) - months to years:
  – Lyme arthritis
  – Encephalopathy or Neuropathy

(c) 2005, Robert A. Kalish, M.D.
Symptoms

- Because the bacteria spreads through the blood to tissue, joints, bone marrow, organs and the brain (CNS), the symptoms are both numerous and varied. They can include:

Flu-like symptoms:
- Headache
- Fatigue
- Fever
- Chills
- Sore throats
- Muscle aches

Hearing loss

Paralysis of face

Heart complications:
- Rapid or slow heart rate
- Chest pain

Syncope, palpitations, dyspnea

Insomnia

Hot, swollen, painful joints

Psychological complications (long term):
- Depression
- Dementia

Rash at the site of the tick bite:
- Itching
Lyme Disease: Adult Symptoms

Fast Facts
- Lyme is fastest growing vector-borne disease
- 85% do not recall tick bite
- Less than 70% of people develop a rash
- Treatment should begin without testing if rash is present
- Lab tests may be negative in the first 4-6 weeks

Early symptoms
- Flu-like illness (fever, chills, sweats, muscles aches, fatigue, nausea and joint pain)
- Rash (10% have EM rash)
- Bell's palsy

Later Symptoms
- Headache
- Stiff neck
- Light or sound sensitivity
- Cognitive impairment
- Sleep disturbance
- Depression, anxiety, or mood swings
- Arthritis
- Fatigue
- Abdominal pain, nausea, diarrhea
- Chest pain, palpitations
- Shortness of breath
- Tingling, burning or shooting pains

CHILDREN'S SYMPTOMS
Children's Symptoms

Lyme pediatric specialist Charles Ray Jones, MD, compiled a list of common symptoms of infection in his young patients:

- severe fatigue unrelieved by rest
- insomnia
- headaches
- nausea, abdominal pain
- impaired concentration
- poor short-term memory
- inability to sustain attention
- difficulty thinking and expressing thoughts
- difficulty reading and writing
- being overwhelmed by schoolwork
- difficulty making decisions
- confusion
- uncharacteristic behavior
- outbursts and mood swings
- fevers/chills
- joint pain
- dizziness
- noise and light sensitivity

Dr. Jones has also documented congenital, or gestational, Lyme disease in some children who were infected in utero or by breastfeeding. *In these patients his suspicion is raised when the child has:*

- frequent fevers
- increased incidence of ear and throat infections
- increased incidence of pneumonia
- irritability
- joint and body pain
- poor muscle tone
- gastroesophageal reflux
- small windpipe (tracheomalacia)
- cataracts and other eye problems
- developmental delay
- learning disabilities
- psychiatric problems

http://www.lymedisease.org/resources/children.html
Lyme disease testing

THE GOOD, THE BAD, & THE UGLY
Testing...Here Thar Be Dragons Matey!

- ELISA (Enzyme Linked Immuno-Sorbent Assay) (Ig, IgG)
- Western Blot (to separate and identify proteins. In this technique a mixture of proteins is separated based on molecular weight, and thus by type, through gel electrophoresis. These results are then transferred to a membrane producing a band for each protein. [http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3456489/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3456489/)
- Polymerase chain reaction (PCR) (multiplies DNA)
- ITT™ (T cell responses in patients who have been exposed to a *B. burgdorferi* spirochete)
- Cytokine Analysis (iSpot Lyme™) Cytokine proteins (IFN-γ) are captured near the cells that secreted them, and are then detected using a color reagent
- Lyme Culture Blood Test™ Advanced Laboratory Services, Inc.
- Indirect findings on other lab tests
Problems: False Positives and False Negatives

- The most common tests measure the patient’s antibody response to infection (ELISA). When your body is invaded by the Lyme spirochetes, your immune system makes antibodies to fight the infection. Tests that measure antibody levels are indirect tests because they measure the body’s response to infection rather than the presence of the bacteria themselves.

- During the first 4-6 weeks after exposure, most people have not developed the antibody response that the test measures.

- Doctors commonly order an ELISA first to screen for the disease and then confirm the disease with a western blot. However, current ELISA tests are not sensitive enough for screening and may miss over half the true cases.

- Because of this, the best antibody test to use for diagnosis is the western blot.
Western Blot

- The read-out from the western blot looks like a bar code. The pattern produced by running the test with your blood is compared to a template pattern that represents known cases of Lyme disease. If your blot has bands in the right places, and the right number of bands, it is positive. Some of the bands are more significant than others.

- Different criteria from different sources are used to determine the presence of Lyme.

- Because the computer reads the test, you're at the "mercy" of the computer’s criteria. The reputation of the lab comes into play here.
Don’t Believe the Computer!!!

With Human Eyes, the WB meets CDC criteria
Hong Kong: 27 year old female with recalcitrant anxiety

Results for this specimen:

- Serotonin
- GABA
- Glutamate
- PEA
- Dopamine
- Norepinephrine
- Epinephrine
### Interpretation of the Western blot—More is not necessarily better.

<table>
<thead>
<tr>
<th>Band kDa</th>
<th>Band importance</th>
<th>IgG</th>
<th>IgG</th>
<th>IgM</th>
<th>IgM</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Thought to be specific</td>
<td>Ma et al 2 of 6</td>
<td>CDC 5 of 10</td>
<td>Ma et al 2 of 5</td>
<td>CDC 2 of 3</td>
</tr>
<tr>
<td>22</td>
<td>Thought to be specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23-25</td>
<td>OSP-C highly specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Not specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Thought to be specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>OSP-A highly specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>OSP-B highly specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Thought to be specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Thought to be specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Non-specific flagella</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Non-specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>Non-specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>66</td>
<td>Non-specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>73</td>
<td>Non-specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>88</td>
<td>Thought to be specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>93</td>
<td>Thought to be specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Engstrom found 2 of 5 bands to be highly sensitive and specific for Lyme disease (Engstrom 1995), while 46 of 66 symptomatic pediatric patients with a history of bulls eye rash and tick bite were negative by CDC criteria (Fawcett 1995 Rheumatology Symposia Abstract #1254). The CDC criteria are intended only for surveillance purposes, not diagnosis. Many physicians interpret the Western blot based on the number and specificity of the patient’s bands. See also (Ma et al 1989).
PCR

- Polymerase chain reaction (PCR) multiplies a key portion of DNA from the Lyme bacteria so that it can be detected. While PCR is highly accurate when the Lyme DNA is detected, it produces many false negatives. This is because Lyme bacteria are sparse and may not be in the sample tested.
The iSpot Lyme™ test detects *B. burgdorferi*-specific T cell responses in patients who have been exposed to a *B. burgdorferi* spirochete. Individuals who have been infected harbor *B. burgdorferi*-specific immune cells (T cells) in their bloodstream. Typically, these T cells can be detected before an antibody response. The T cell response to Lyme infection is detectible about 2 weeks after the tick bite, and lasts approximately 2-3 months after the acute phase of infection. *B. burgdorferi*-specific memory T cells develop and may last for years.

### Antigen

<table>
<thead>
<tr>
<th>Antigen</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DbpA</td>
<td>Early stage antigen: Contributes to spirochete dissemination within the host</td>
</tr>
<tr>
<td>OspC</td>
<td>Early stage antigen: Appears shortly after tick bite and transfer of the spirochete</td>
</tr>
<tr>
<td>VlsE-1</td>
<td>Marker of acute Lyme Disease: Upregulated in the host particularly during immune response</td>
</tr>
<tr>
<td>p100</td>
<td>Late stage antigen</td>
</tr>
</tbody>
</table>
iSpot Lyme™

- When peripheral blood mononuclear cells (PBMCs) from a B. burgdorferi-infected patient are exposed to B. burgdorferi protein antigens (A), B. burgdorferi-specific T cells are activated and secrete small proteins called cytokines (B). T cells that are not specific for B. burgdorferi do not become activated. iSpot Lyme™ measures the cytokine IFN-γ secreted by the patient’s T cells.

- **Cytokine proteins (IFN-γ) are captured near the cells that secreted them, and are then detected using a color reagent.**

- Sources of inflammation other than Lyme disease may also cause IFN-γ spots to form. This is taken into account and compensated for by size-gating. Size-gating is a way to screen out other sources of inflammation that appear as smaller spots.
Lyme Cytokines

Note the Baseline First

If baseline is negative, then the upregulated stimulated cytokines confirm exposure to Lyme.

If baseline is high, upregulation of the stimulated cytokines may be false positive.
Lyme Blood Culture

- A new chapter in the Lyme disease controversy opened in September 2011 when Advanced Laboratory Services, Inc, announced the commercial availability of a new culture test for *Borrelia burgdorferi*. Some Lyme patient advocacy groups and physicians began encouraging patients to have the $595 test, but others are concerned about the early commercialization of the still-unvalidated test. This concern may result in changes to how the US Food and Drug Administration (FDA) regulates so-called "homebrew" or laboratory-developed tests (LDTs).

- Physicians on all sides of the Lyme disease arena agree that a reliable culture test for active *Borrelia* infection would be a breakthrough. They differ on whether it is a good idea to market a blood test to consumers before it has been validated, peer-reviewed, published, reviewed by the FDA, or widely vetted by infectious disease experts with experience in *Borrelia* infections. [http://www.medscape.com/viewarticle/778482](http://www.medscape.com/viewarticle/778482)

- *This test was developed and its performance characteristics determined by Advanced Laboratory Services. It has not been cleared or approved by the U.S. Food and Drug Administration.* [http://www.advanced-lab.com/spirochete.php](http://www.advanced-lab.com/spirochete.php)
Lyme Controversy


- Several countries do not recognize Lyme as a legitimate disease (AUS). Most countries do not recognize the existence of chronic lyme disease

- Why??? Because there is no money in curing chronic illness but plenty of money in treating it. This goes for all chronic illnesses (cancer, chronic fatigue syndrome, fibromyalgia, etc.), not just Lyme disease
How to Diagnose Lyme?

- History, history, history
- Clinical findings
- Results of testing

*Rely on the preponderance of evidence...Not Just The TESTS!*
USUAL TREATMENTS AND THEIR EFFECTIVENESS
Usual treatments

- Treatment for Lyme ranges from oral to IV antibiotics, short and long term. Botanicals, herbals, etc.
- Enter the LLMD.
- To speak on this area, I will ask Shawn Bean for commentary.
I have been treated for Lyme disease.

**WHY AM I STILL SICK?**
Acute vs. Chronic Disease Thinking

**Acute illness**
- No long term damage to the cells
- The immune system is working relatively well
- Given antibiotic you bring the number of microorganisms down to a manageable level
- The immune system takes care of the rest

**Chronic illness**
- The infection has been present for a lengthy period of time resulting in:
  - Leaky gut syndrome with resultant immune dysregulation
  - Leaky cells (hyper permeable cells secondary to cell wall damage) and impairment of cellular function
  - Neurotransmitter imbalances leading to mood disorders
  - Lack of immune system function Leading to autoimmune diseases
  - Cell/neurotransmitter receptor dysfunction leading to dysautonomias (POTS, MCAD, OI, and numerous others)
Why Am I Still Sick?

❖ For the most part:
  ➢ Chronic illness is being treated like an acute illness
  ➢ The expectation is that the body's immune system and homeostatic mechanisms will simply return to normal by virtue of the fact that the bugs have been eliminated
  ➢ This is the basic error and why the bugs are allowed to regrow and continue their damage to the body's physiology

❖ Root Cause(s) and Downstream Effects
  ➢ Often, Lyme disease is considered the single root cause of the chronically ill patients entire condition
  ➢ The long-term effect of Lyme disease will have allowed other infections to take root (parasites, candida, SIBO, are examples). Ergo, at this stage there are multiple "root causes".
  ➢ The "downstream effects" of these root causes (mood disorders, dysautonomias, autoimmune diseases, and the other thousands of ways that Lyme disease can express) are treated as separate, independent illnesses without consideration of the pathophysiology concerned meaning that the treatment of the aforementioned usually injures and weakens the body further
The Take Away

- If you do not elucidate and treat the root causes and you do not elucidate and treat all of the downstream effects your patient will be forever ill

- To achieve complete healing you need to work with the healthcare provider that can "put it all together".

- You need....
A Detective
"Listen to your patient, he is telling you the diagnosis“

Sir William Osler, Bt

Founder Father of Johns Hopkins Medical Center


LET’S LOOK AT ONE OF OUR CASES

CASE STUDY
Case Study

- 8 Year Old Female with visual distortions. Mom initially contacted presenter with the possible need for Irlen Glasses due to visual distortions.

- Also c/o “bad gut”. Pain upon eating gluten, soy or almost anything else.

- After questioning, Hallucinations (Auditory, Olfactory & Visual) were identified.

- Advised mom to obtain a standard work up for 2 basic reasons:
  - Sometimes there are conditions that are easily corrected or are better treated by a different specialist. And...
  - Olfactory hallucinations are secondary to a brain tumor, unless proven otherwise
Standard Medical Work Up

**Standard work-up**

- Brain CT
- MRI
- Labs for thyroid, CBC, Complete Medical Profile, etc.

- **Mom was instructed to return to me if the tests were negative for pathology or signs of obvious illness.**

- **In other words, if she was to be placed on anti-psychotics, let me help.**

**Results:**

- CT of the Brain-negative for pathology.
- MRI of the brain-negative for pathology
- Entire laboratory analysis within reference ranges (A.K.A.-Normal)
- The only treatment options offered were progressive use of psychotropic agents leading to atypical antipsychotic medications.
- Outlook: GUARDED No expectation of a normal life.
What Now? There are So Many Possibilities... We Need Direction

ROOT CAUSE ANALYSIS
Root Cause Analysis Throughout Time

1975 Psycho-Neuro-Immunology
Robert Adler, MD (PNI)

1990 Gottfried Kellerman, PhD
Neuro-Endo-Immunology (NEI)

2013 Shawn Bean & Dr. Jess Armine
Bio-Individualized Medicine (BIM)
Bio-Individualized Medicine

- Bio-Individualized Medicine takes genetics and integrative medicine to a new level. By combining the knowledge of Neuro-Endo-Immunology, epigenetics/nutrigenomics, acquired (secondary) mitochondrial dysfunction and cell wall integrity, the practitioner trained and experienced in this arena has the capability of identifying and treating not only the root cause(s) of dysfunction but also attending to the "downstream" effect. That is, fixing whatever the primary causative agent did to the body.

- A different way of looking at symptoms…getting to the bottom of what is ailing the body.
We Looked at Her Genetic Studies

- **Polymorphisms (SNPs) can raise your index of suspicion for multiple conditions**
EXCITATION CAN CAUSE THESE SYMPTOMS, WHICH SNPS ARE IMPORTANT TO CONSIDER

COMT, MAO

SNPS slow down the metabolism (drainage) of catecholamines and eventually, they will “overflow”


INCREASED GLUTAMATE CAN CAUSE EXCITATION

What SNPs can cause that?

GAD

<table>
<thead>
<tr>
<th>GAD1</th>
<th></th>
<th>C</th>
<th>CC</th>
<th>+/-</th>
</tr>
</thead>
<tbody>
<tr>
<td>rs2058725</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rs3791851</td>
<td>C</td>
<td>TT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>rs3791850</td>
<td>A</td>
<td>AA</td>
<td></td>
<td>/+</td>
</tr>
<tr>
<td>rs12165692</td>
<td>A</td>
<td>CC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>rs3791878</td>
<td>T</td>
<td>GG</td>
<td></td>
<td>+/-</td>
</tr>
<tr>
<td>rs10432420</td>
<td>A</td>
<td>AA</td>
<td></td>
<td>/+</td>
</tr>
<tr>
<td>rs3828275</td>
<td>T</td>
<td>CC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hettema JM1, An SS, Neale MC, Bukszar J, van den Oord EJ, Kendler KS, Chen X.

B6

L-Glutamine

Glutamate

GAD

GABA

Excitatory Neurotransmitter

Inhibitory Neurotransmitter

(CBIM) 2015
Association between glutamic acid decarboxylase genes and anxiety disorders, major depression, and neuroticism.

Hettema JM¹, An SS, Neale MC, Bukszar J, van den Oord EJ, Kendler KS, Chen X.

Abstract
Abnormalities in the gamma-aminobutyric acid (GABA) neurotransmitter system have been noted in subjects with mood and anxiety disorders. Glutamic acid decarboxylase (GAD) enzymes synthesize GABA from glutamate, and, thus, are reasonable candidate susceptibility genes for these conditions. In this study, we examined the GAD1 and GAD2 genes for their association with genetic risk across a range of internalizing disorders. We used multivariate structural equation modeling to identify common genetic risk factors for major depression, generalized anxiety disorder, panic disorder, agoraphobia, social phobia and neuroticism (N) in a sample of 9270 adult subjects from the population-based Virginia Adult Twin Study of Psychiatric and Substance Use Disorders. One member from each twin pair for whom DNA was available was selected as a case or control based on scoring at the extremes of the genetic factor extracted from the analysis. The resulting sample of 589 cases and 539 controls was entered into a two-stage association study in which candidate loci were screened in stage 1, the positive results of which were tested for replication in stage 2. Several of the six single-nucleotide polymorphisms tested in the GAD1 region demonstrated significant association in both stages, and a combined analysis in all 1128 subjects indicated that they formed a common high-risk haplotype that was significantly over-represented in cases (P=0.003) with effect size OR=1.23. Out of 14 GAD2 markers screened in stage 1, only one met the threshold criteria for follow-up in stage 2. This marker, plus three others that formed significant haplotype combinations in stage 1, did not replicate their association with the phenotype in stage 2. Subject to confirmation in an independent sample, our study suggests that variations in the GAD1 gene may contribute to individual differences in N and impact susceptibility across a range of anxiety disorders and major depression.
Free Radicals (ROS), Roundup, Aldehydes

Suspect difficulty in metabolizing aldehydes.
Also involved in MCS

After questioning and review of labs, the transsulfuration pathway did not seem to express in this patient. When it does express you may see brain fog, high ammonia on lab tests and/or high taurine on NT testing.
FUT2 & IGA

<table>
<thead>
<tr>
<th>Gene</th>
<th>SNP</th>
<th>Allele 1</th>
<th>Allele 2</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUT2</td>
<td>rs482602</td>
<td>G</td>
<td>AG</td>
<td>+/-</td>
</tr>
<tr>
<td>FUT2</td>
<td>rs801339</td>
<td>A</td>
<td>AG</td>
<td>+/-</td>
</tr>
<tr>
<td>FUT2</td>
<td>rs802662</td>
<td>A</td>
<td>AG</td>
<td>+/-</td>
</tr>
</tbody>
</table>

**FUT2 has possible contribution to imbalances in the gut microbiome and B12**

**Tendency toward food allergies especially with leaky gut syndrome**

**IgA Snps**

- | Gene      | SNP      | Allele 1 | Allele 2 | Effect |
- | TRAF1     | rs3281847 | G        | AG       | +/-    |
- | IRF5      | rs4726142 | A        | AG       | +/-    |
- | IGF1R     | rs2729755 | A        | GG       | +/-    |
- | IFIH1 (HLA)| rs1990760 | C        | CT       | +/-    |
- | HLA       | rs8271365 | G        | AG       | +/-    |
- | CFH       | rs8777904 | A        | GG       | +/-    |
- | HLA-DQA2  | rs8275224 | A        | AG       | +/-    |
- | MTC83P1   | rs8275584 | C        | CT       | +/-    |
- | PSMB8 / TAP1 / TAP2 | rs9357155 | A        | GG       | +/-    |
- | HLA-DPB2 / COL11A2P | rs1883414 | A        | GG       | +/-    |
METHYLATION

MTHFR 03 P39P  +/-
MTHFR A1298C  +/-
MTHFR A1572G  +/-
MTHFR C677T  +/-
MTHFR G1793A (R594Q)  +/-
MTHFR  +/-
MTHFR  +/-
MTHFR  +/-
MTHFR  +/-
MTHFR  +/-
MTHFR  +/-

MTHFD1 gastrointestinal health http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3047240/
MTHFR ulcerative colitis http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1774509/


MITOCHONDRIAL COMPLEX 1 - THE MOST IMPORTANT

<table>
<thead>
<tr>
<th>NDUFS7</th>
<th>rs2332496</th>
<th>A</th>
<th>AG</th>
<th>+/−</th>
</tr>
</thead>
<tbody>
<tr>
<td>NDUFS7</td>
<td>rs77254913</td>
<td>G</td>
<td>AA</td>
<td>−/−</td>
</tr>
<tr>
<td>NDUFS7</td>
<td>rs1142538</td>
<td>T</td>
<td>TT</td>
<td>+/−</td>
</tr>
<tr>
<td>NDUFS7</td>
<td>rs2756846</td>
<td>T</td>
<td>TT</td>
<td>+/−</td>
</tr>
<tr>
<td>NDUFS7</td>
<td>rs1688067</td>
<td>A</td>
<td>AA</td>
<td>−/−</td>
</tr>
<tr>
<td>NDUFS7</td>
<td>rs2074895</td>
<td>A</td>
<td>AA</td>
<td>+/−</td>
</tr>
<tr>
<td>NDUFS7</td>
<td>rs899959</td>
<td>G</td>
<td>AA</td>
<td>−/−</td>
</tr>
<tr>
<td>NDUFS8</td>
<td>rs4147776</td>
<td>C</td>
<td>AA</td>
<td>−/−</td>
</tr>
<tr>
<td>NDUFS8</td>
<td>rs1122731</td>
<td>A</td>
<td>AG</td>
<td>+/−</td>
</tr>
<tr>
<td>NDUFS8</td>
<td>rs999571</td>
<td>A</td>
<td>AG</td>
<td>+/−</td>
</tr>
<tr>
<td>NDUFS8</td>
<td>rs2074895</td>
<td>C</td>
<td>CT</td>
<td>+/−</td>
</tr>
<tr>
<td>NDUFS8</td>
<td>rs3115546</td>
<td>G</td>
<td>TT</td>
<td>−/−</td>
</tr>
<tr>
<td>NDUFS8</td>
<td>rs1184739</td>
<td>C</td>
<td>AC</td>
<td>+/−</td>
</tr>
<tr>
<td>NDUFS8</td>
<td>rs1051806</td>
<td>T</td>
<td>CT</td>
<td>+/−</td>
</tr>
</tbody>
</table>

NADH-ubiquinone oxidoreductase (NDUFS) -
GSSG will block the entry of the electron donors into the electron transport chain

Complex 1: NDUFS
Complex 3: UQCRC2
Complex 4: COX
Complex 5: ATP synthase

Matrix

Intermembrane space

NADH + H+ → NAD+ → ADP + P1 → ATP

Diagram showing electron transport chain and complexes.
SNPs Indicated Probable Issue in the Following Areas...

Areas/pathways

- Neurotransmitters
- Leaky Gut Syndrome
- Aldehyde Metabolism
- Methylation
- Mitochondrial function

How do we use this information?

- Correlate, correlate, correlate! Or, if all the dogs are barking up a tree, don’t yell at the dogs...look up the tree!
- Use the estimated function of the enzymes (snps) and compare them to:
  - Symptoms
  - Personal/family Hx
  - Clinical observations
- Use the estimated function of the enzymes (snps) to:
  - Raise index of suspicion of root cause(s)
  - Help identify downstream effects
  - Determine which tests will solidify diagnoses
  - Ultimately, assist you in creating an individualized, successful treatment plan
Leaky Gut Syndrome
Hints: “bad gut” on history; IgA/IgG/IgE, SHMT, FUT2 SNPS; Food Allergy Testing

Net Result...INFLAMMATION

Source: http://allergytreatmentsservices.com/digestion.html
Microbial Involvement

Hint: COMT, MAO, GAD, clinical signs of neural excitation....always consider multiple bugs

Candida OverGrowth Symptoms

- Anxiety
  - Headaches-Migraines
  - Vaginitis
  - Excessive Fatigue
  - Acne
  - Dizziness
  - Athlete's Foot
  - Low sex drive

- Alcohol Cravings
  - Inability to Concentrate
  - Hyperactivity
  - Mood Swings
  - Sinus Inflammation
  - 'Poor Memory'
  - Cognitive Impairment
  - Learning difficulties

- Itching
  - Eczema
  - Depression
  - PMS
  - Persistent Cough
  - Chronic pain
  - Irritability
  - Muscle weakness
With Human Eyes, the WB meets CDC criteria
Lyme Cytokines

Our Patient

Note the Baseline First

If baseline is negative, then the upregulated stimulated cytokines confirm exposure to Lyme.

If baseline is high, upregulation of the stimulated cytokines may be false positive.
Labs and Dx

Lab

- Child was extensively tested and found to have antibodies to Yeast and HHV6. A positive Western Blot was visualized.
- Numerous food allergies by IgG testing.
  - Concentrations were in Gluten, Dairy and Yeast areas.

Working Diagnoses

- Lyme Disease (neural) leading to neural upregulation
- Yeast overgrowth (gut) releasing acetyl aldehydes (neurological irritant)
- Leaky Gut Syndrome (food allergies, immune upregulation)
- Viral Syndrome (neural upregulation)
Root Cause vs. Downstream Effect...
Ask Yourself...

- Leaky Gut Syndrome can and does lead to immune upregulation/dysregulation. This is evidenced by the numerous food allergies and the patient’s GI symptoms.
  - Can this cause the increase in catecholamines and hallucinations?

- Lyme and HHV6 attack the neural cells.
  - Can this cause the increase in catecholamines and hallucinations?

- Yeast overgrowth causes increased levels of acetylaldehyde. Combined with the NAT2 snps.
  - Can this cause the increase in catecholamines and hallucinations?

- Answer: **Yes to all of the above.**
For This Patient

- **Treatment Consisted of:**
  - Gastrointestinal support
  - Neurotransmitter balancing
  - Adrenal support
  - Eradication of the multiple bugs using non-pharmaceutical methods
Alyssa is now 12
Progressing through puberty without issues
Maintains her diet and lives a normal “tween” lifestyle

Prospect:
A life on antipsychotic meds

Reality:
Hallucinations were a expression of genetic predisposition caused by neural excitation and immune upregulation secondary to infections and leaky gut syndrome.

Result:
A life saved
TO ACHIEVE COMPLETE HEALING
The healthcare provider must

- Be able to look at all aspects of your condition including the root causes and downstream effects
- Most of all have the willingness to think and treat "outside the box"
What We Offer

- Ameliorating the biochemical malfunctions that build up to relapse utilizing:
  - History and appropriate testing to discover the root causes and downstream effects of each individual
  - Developing *Individualized Treatment Plans* that may include:
    - Intravenous Nutritional Therapy (High dose Vitamin C, NAD, Amino Acids, etc) with a high degree of success
    - Targeted Amino Acid Therapy, Neuro Adaptive Amino Acid Therapy
    - Neurotransmitter balancing, to balance mood naturally
    - GI repair to downregulate the immune response.
    - More...

* Protocol is a 4 letter word in our office...we practice Individualized Medicine
Why We Are Different

- We listen to our patients
- We are experienced in determining the root causes and downstream effects of any type of illness
- We develop *individualized treatment plans* based on your specific physiology and pathophysiology
- We do not utilize protocols
- We consistently reassess our patients‘ responses and alter treatment plans based on same
- We have a wide, eclectic, multidisciplinary base
How to Contact Us

Dr. Armine and Shawn Bean can be obtained inside and outside the USA by:

E-mail: bioindivdualmed@gmail.com

Fill in contact form at www.methylationssupport.com

Phone: 610 449 9716
Q&A TIME 😊