The Cell Danger Response
Part One
(The Bridge Between Stress and Illness)

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The Center for Bio-Individualized Medicine™
Finding Answers Through Genetics and Integrative Medicine

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Metabolic features of the cell danger response

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Available at: http://goo.gl/uYxddW
Acknowledgement

I want to thank Dr. Ben Lynch for allowing me to use many of his slides from SHEICON2015 in this lecture.

Benjamin Lynch, ND
Pioneer, Innovator, Researcher, Clinician, Helluva Nice Guy!

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The First Concept

HOMEOSTASIS
Importance of homeostasis

- To maintain internal environment of organisms especially higher vertebrates in a steady and balanced state.
- To establish optimum condition of organisms
What our bodies are trying to do

Head toward Homeostasis
Previously...
we established that:

- cells are the basic unit of life
- cells that work together = tissues
- tissues that work together = organs
- organs that work together = a body
Nothing will work...

IF THE CELLS DON’T WORK
...not Methylation...
(That’s right, the dreaded MTHFR)
...not the Biopterin Pathway...
(Neurotransmitters)
...not Trans-sulfuration...

(Glutathione)
...not Nothin.
Not No How!

(Iconic phrase from, “The Wizard of Oz”)
We (You & I) Have Always Wondered... Is There a Common Ground?

- Why do we remain ill despite treatments that gets others well?

- I think that my providers are just guessing... are they treating the wrong thing?

- Is their premise wrong? Are they treating the wrong thing(s), in the wrong order, at the wrong times, perhaps?
**Remember This Slide?**
Common Symptoms... Perhaps Common Causation?

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Chronic Lyme</th>
<th>Fibromyalgia</th>
<th>ME/CFS</th>
<th>Dysautonomia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Chronic Pain</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Mood Changes</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Confusion/ Brain Fog</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Numbness Tingling</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Sensitivity to light</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Inflammation</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

And we said, “Root Cause Analysis” was indicated...
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)

I say to you now:
Even root cause(s) MUST have commonality!!
Are You Ready?
Here it is!

THE CELL DANGER RESPONSE (CDR)

Naviaux, R.K., Metabolic features of the cell danger response, Mitochondrion (2013), http://dx.doi.org/10.1016/j.mito.2013.08.006

Courtesy of/Used with permission: Benjamin Lynch, ND (SHEICON2015)
What is...

*The Cell Danger Response?*

- Metabolic response of the cell to protect itself (and thereby the host) from harm
- The basis of re-establishing homeostasis

*Protective Amulet*
Mismatch between:

Available Resources

Functional Capacity
What activates the Cell Danger Response?

Chemical/Physical
- Heavy Metals
- BPA, Benzene
- Heat, Salt
- Shock, Radiation
- Trauma

Microbial
- Mold, Fungi
- Bacteria, Parasites

Psychological
- Yelling, abuse
- Isolation, abandonment
- PTSD
Where does this all happen?

The Mitochondria
The Mitochondria
The Canaries in the Coal Mine

- The mitochondria's rapid metabolism (and ability to monitor electron flow and sulfur oxidation) makes them ideal to act as generalized cell "danger alarms."

- Any trace heavy metals will trigger a mitochondrial response that is similar to a viral infection.

- Also, synthesized molecules such as those found in dyes, pesticides, drugs, and industrial chemicals are highly electrophilic and will cause "electron steal" that will activate a CDR.

-- courtesy of/used with permission: Benjamin Lynch, ND (SHEICON2015)
The **CDR** results in a Cascade of Changes...

(Wonder where we’ve heard *that* phrase before? Hmmm?)
...changes in:

- Cellular Electron Flow
- Cellular fluidity
- O2 Consumption
- Vitamin Availability
- Metal Homeostasis
...changes in

Redox

Lipid Dynamics

Creation of Proteins

Bioenergetics

Protein Folding and aggregation
CDR Results in:

- Heart Disease
- Parkinson’s
- Cancer
- Epilepsy
- Food/Chemical Sensitivities

Auto Immune Disorders:

- Chronic Traumatic Encephalopathy
- Traumatic Brain Injury

Degenerative Disorders:

- Autism
- ADD/ADHD
- Asperger’s

ASD (Autism Spectrum Disorder):

- Bipolar
- Tourette’s
- PTSD
- Schizophrenia

Neuropsychiatric Disorders:
The Body’s “First Wave” Response to CDR

- Release of metabolic intermediates:
  - ATP
  - ADP
  - Kreb’s Cycle Intermediates
  - Oxygen
  - ROS

- Sustained by Purinergic Signaling *(No...We Won’t Go There)*

- ROS vs RUS

Rats (of) Unusual Size
When the Danger has Passed...

- Sequence of anti-inflammatory and regenerative pathways are activated to:
  - Reverse CDR
  - Promote Healing

BUT...
If CDR Persists

Whole Body Metabolism is affected

Gut Microbiome is trashed

All Organ Systems suffer

Behavioral Changes occur

...the result.
CHRONIC ILLNESS PROBLEMS

My chronic pain is like your stupidity: we can’t see it but we both know it is there.

livingwellwithchronicillness.wordpress.com
What Else?!!!!

Naviaux, R.K., Metabolic features of the cell danger response, Mitochondrion (2013), http://dx.doi.org/10.1016/j.mito.2013.08.006
There’s More (much more)...

We Have Just Scratched The Surface

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Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less.

Marie Curie

Part Deux

DEEPER KNOWLEDGE HEALING STRATEGIES
Mixtures of chemical and biological threats can have synergistic effects, and the total load of danger triggers can influence the magnitude and form of the CDR. When danger is detected, mitochondria alter cellular metabolism to help shield the cell from further injury.

These pathways are immature in newborns and growing children (Wood et al., 2010), leading to effects that are not limited to inflammation and innate immunity in peripheral tissues, but can also alter neurodevelopment (Landrigan et al., 2012) and increase the risk of other chronic childhood diseases.

The acute CDR produces at least 8 functional changes: 1) it shifts cellular metabolism from net polymer synthesis to monomer synthesis to prevent the hijacking and assembly of cellular resources by intracellular pathogens, 2) it stiffens the membranes of the cell and circumscribes an area of damage to limit pathogen egress, 3) releases antiviral and antimicrobial chemicals into the pericellular environment, 4) increases autophagy and mitochondrial fission to remove intracellular pathogens, 5) changes DNA methylation and histone modification to alter gene expression, 6) mobilizes endogenous retroviruses and other mobile genetic elements like the long interspersed nuclear elements (LINEs) to produce genetic variations, 7) warns neighboring cells and distant effector cells of the danger, and 8) alters the behavior of the host to prevent the spread of infection to kin and sleep patterns to facilitate healing (Fig. 1).
<table>
<thead>
<tr>
<th>Disease</th>
<th>Species</th>
<th>Antipurinergic drug</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism</td>
<td>Mice</td>
<td>Suramin</td>
<td>Naviaux et al. (2013)</td>
</tr>
<tr>
<td>Spinal cord injury</td>
<td>Rats</td>
<td>Brilliant Blue G</td>
<td>Peng et al. (2009)</td>
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<td>Traumatic brain injury</td>
<td>Rats and Mice</td>
<td>MRS2179</td>
<td>Choo et al. (2013)</td>
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<tr>
<td>Ischemic brain injury</td>
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<td>Kharlamov et al. (2002)</td>
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<td>Glutamate excitotoxicity</td>
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<td>Bezvenyuk et al. (2000)</td>
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<td>Mice</td>
<td>A438079</td>
<td>Engel et al. (2012)</td>
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<td>Suramin</td>
<td>Sahu et al. (2012)</td>
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<tr>
<td>Chronic pain</td>
<td>Rats</td>
<td>P2X3-15h</td>
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<td>Suramin</td>
<td>Novales-Li (1996)</td>
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<td>Lupus erythematosis</td>
<td>Mice</td>
<td>Suramin</td>
<td>Ballok and Sakic (2008)</td>
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<tr>
<td>Restenosis after angioplasty</td>
<td>Rabbits</td>
<td>Suramin</td>
<td>Gray et al. (1999)</td>
</tr>
<tr>
<td>Duchenne cardiomyopathy</td>
<td>Mice</td>
<td>Suramin</td>
<td>de Oliveira Moreira et al. (2013)</td>
</tr>
<tr>
<td>Heart failure</td>
<td>Rats</td>
<td>Apyrase</td>
<td>Marina et al. (2013)</td>
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<tr>
<td>Alcoholic liver disease/cirrhosis</td>
<td>Rats</td>
<td>Suramin</td>
<td>He et al. (2013)</td>
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<td>Suramin</td>
<td>Cicko et al. (2010)</td>
</tr>
<tr>
<td>Diabetic kidney disease</td>
<td>Rats</td>
<td>Suramin</td>
<td>Korrapati et al. (2012)</td>
</tr>
</tbody>
</table>

Suramin: Anti Parasitic Drug
Apyrase: Used to treat Trichomonas
How to Fix CDR...

(Hint: it’s all about the Cell.)
Always Remember...

When ‘i’ is replaced by ‘we’
Even ‘illness’ becomes ‘wellness’

...we are in this TOGETHER!!
How to Contact Us for More Information & Consultation:

Dr. Armine and Shawn Bean consult with clients worldwide:
E-mail: bioindividualmed@gmail.com
Fill in contact form at www.methylationsupport.com
Phone: 610 449 9716
Want To Learn About Your SNP’s?!

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- Cynthia Smith & Sterling Hill created SNPBits Compendium (physical [$54.99] and digital [$24.99] versions), this is your Go-to reference for SNP information in one location: https://lifezonewellness.selz.com/categories/snpbits-compendium