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AARM
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Financial Disclosure: Employee of Allergy Research Group

Non-CME/ 1 CE

Comprehensive, Integrative Approach to Neurodegenerative Conditions
Disclosures

• Born Naturopathic Associates, Inc.
  • Co-owner and medical director
    • www.bornnaturopathic.com

• Allergy Research Group LLC
  • Head of new product development, product manager and editor-in-chief of Focus Newsletter
  • Clinical Education
    • Thought Leader

• International Society for Naturopathic Medicine
  • President, Advisor and Lead Educator
    • http://isnm-us.org/
Objectives

- Functional approach to assessment
- Functional/naturopathic, evidence-based approach to improve patient outcomes via
  - Diet
  - Nutrition
  - Botanicals
- Understand and implement, how a thorough integrative approach can often slow down the progression of neuronal degeneration, strengthen the central and peripheral nervous systems, decrease oxidative stress and optimize mitochondrial function.
Nuances

• Neurodegeneration (ND) is an umbrella term for a range of conditions which primarily affect the neurons in the human brain, but can also affect the spinal cord and peripheral nerves.

• ND are thought to be incurable and debilitating conditions that result in progressive degeneration and/or death of nerve cells.
ND Examples

- Alzheimer’s disease (AD) and other dementias
  - Dementias are responsible for the greatest burden of neurodegenerative diseases, with Alzheimer’s representing approximately 60-70% of dementia cases.
- Parkinson’s disease (PD) and PD-related disorders
- Prion disease
- Motor neuron diseases (MND)
- Huntington’s disease (HD)
- Amyotrophic lateral sclerosis (ALS)
- Spinal muscular atrophy (SMA)
- Multiple Sclerosis (MS)
What do they have in common?

- Progressive degeneration and/or death of neurons and axons in the CNS.
  1. Affecting many of your body's activities, such as balance, movement, talking, breathing, swallowing and heart function.
  2. Oxidative stress
  3. Inflammation
  4. Mitochondrial dysfunction/degeneration

Knowing these, leads to strategic interventions, regardless of the disease.


Is there anything that can be done?! 

• A naturopathic/integrative approach can often slow down the progression of the neuronal degeneration, as well as strengthen the central and peripheral nervous systems, decrease oxidative stress and optimize mitochondrial function.
Where to even begin?

• **Assess toxic exposures**
Toxic Exposures, Cont.

• Heavy metals
  • Blood & Urine

• Acute: exposure to large amounts of heavy metals at one time, or on a routine daily basis.

• Chronic: long-term exposure to lower levels of heavy metals
  • gray area

• Other toxicants


https://www.cdc.gov/exposurereport/
### Chelating Agents


<table>
<thead>
<tr>
<th>Chemical name (common names, abbreviations)</th>
<th>Structure</th>
<th>Activation metabolism</th>
<th>Coordination (binding) groups</th>
<th>Elements chelated</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,3-bis(sulfanyl)butanedioic acid (Dimercaptosuccinic acid; Succimer; Dimercaptosuccinic acid; DMSA; Suizimer; Tin Salt; Succiupal; Chemet)</td>
<td><img src="structure1.png" alt="Structure" /></td>
<td>Excretion via urine &gt;90% as DMSA—cysteine disulfide conjugates.</td>
<td>Oxygen and sulfhydryl</td>
<td>Lead Arsenic Mercury Cadmium Silver Tin Copper</td>
</tr>
<tr>
<td>Sodium 2,3-bis(sulfanyl)propane-1-sulfonate (Sodium Dimercaptopropanesulfonate; DMPS; Uniapol; Danapal; Uniapal; (+)-DMPS; (-)-DMPS)</td>
<td><img src="structure2.png" alt="Structure" /></td>
<td>84% of IV dose excreted through urine</td>
<td>Oxygen and sulfhydryl</td>
<td>Mercury Arsenic Lead Cadmium Tin Silver Copper Selenium Zinc Magnesium</td>
</tr>
<tr>
<td>2-[2-[bis(carboxymethyl)amino]ethyl]-(carboxyethyl)amino]acetic acid (Ethylene diamine tetraacetic acid; EDTA; Edathamil; Endrate; Verseine acid; Sequestrol; Tiriplex; Havidote; Chelex; Versene; Calcium Disodium Versenate (edetate calcium disodium injection, USP)</td>
<td><img src="structure3.png" alt="Structure" /></td>
<td>Not metabolized. Excreted unchanged, generally coordinated with a different divalent cation</td>
<td>Oxygen</td>
<td>Lead Cadmium Zinc (Mercury thought to be too strongly bound in tissues to be mobilized, but this is not clinical experience)</td>
</tr>
<tr>
<td>(2S)-2-amino-3-methyl-3-sulfanylbutanoic acid (3-Sulfanyl-D-valine; Penicillamine; D-Penicillamine; Caprmine; Depen; Penicillamine; Mercapt; Artamine; Caprenil; Perdolat; Trolovol)</td>
<td><img src="structure4.png" alt="Structure" /></td>
<td>Rarely excreted unchanged; excreted mainly as disulfides</td>
<td>Oxygen, hydroxyl, sulfhydryl, and amine</td>
<td>Copper (Wilson's disease) Arsenic Zinc Mercury Lead</td>
</tr>
<tr>
<td>2,3-bis(sulfanyl)propan-1-ol (Dimercaprol; British Anti-Lewisite; BAL; 2,3-Dimercaptopropanol; Sulfactant Dicaprol; Dimersol; Antoxol; Panobal; Dithioglycerol; Dithioglycerol)</td>
<td><img src="structure5.png" alt="Structure" /></td>
<td>Excreted unchanged in urine</td>
<td>Sulphhydryl and hydroxyl</td>
<td>Arsenic Gold Mercury Lead (BAL in combination with CaNa₂, EDTA)</td>
</tr>
</tbody>
</table>
**Blood Tests**

### Routine Panels
- CBC w/ diff, CMP, Lipids, Thyroid

### Iron Panel
- Ferritin, TIBC, % sat, serum iron

### Hormones
- Testosterone, Estrogen, DHEA-S, Pregnenolone
  - Baulieu EE. Neurosteroids: of the nervous system, by the nervous system, for the nervous system. Recent Prog Horm Res. 1997;52:21-32.
Blood Tests, Cont.

**Nutrients**
- MMA, RBC Folate, Vitamin E, Carnitine, Vitamin D

**Inflammatory Markers**
- ESR, CRP, hs-CRP

**Homocysteine**

**Coenzyme Q10**
Where else to look?

➢ Tick-borne illnesses
➢ EBV
➢ CMV
➢ HSV-6
➢ H. pylori
➢ Stool testing


Inflammation in neurodegenerative diseases

Sandra Amor,1,2 Fabiola Puentes,2 David Baker2 and Paul van der Valk1
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Summary

Neurodegeneration, the slow and progressive dysfunction and loss of neurons and axons in the central nervous system, is the primary pathological feature of acute and chronic neurodegenerative conditions such as Alzheimer’s disease and Parkinson’s disease, neurotropic viral infections, stroke, paraneoplastic disorders, traumatic brain injury and multiple sclerosis. Despite different triggering events, a common feature is chronic immune activation, in particular of microglia, the resident macrophages of the central nervous system. Apart from the pathogenic role of immune responses, emerging evidence indicates that immune responses are also critical for neuroregeneration. Here, we review the impact of innate and adaptive immune responses on the central nervous system in autoimmune, viral and other neurodegenerative disorders, and discuss their contribution to either damage or repair. We also discuss potential therapies aimed at the immune responses within the central nervous system. A better understanding of the interaction between the immune and nervous systems will be crucial to either target pathogenic responses, or augment the beneficial effects of immune responses as a strategy to intervene in chronic neurodegenerative diseases.
Damage

Proposed mechanisms of viral-induced neuronal damage and the outcomes. 1. Infection of neurons with viruses leads to apoptosis, necrosis or autophagy (A). 2. Immune-mediated attack of neurons by viral-specific immunity by, for example, CD8+ T cells, leads to direct cytotoxic death, apoptosis, autophagy (A), dying back of the neurons (B) or neuronal death (C) and myelin damage. 3. Infection of cells (e.g. astrocytes) leads to so-called bystander damage as the result of release of cytokines or reactive oxygen species (ROS) that damage neurons in a variety of ways (A–C).
Insurance & ICD-10

Code their ND condition and symptoms

Hormones

- E34.9 (Endocrine d/o unspec)
- Others that may be applicable

EBV/CMV/HSV-6

- B97.89 (Other viral agents as the cause of diseases classified elsewhere)
- R53.83 (Other fatigue)
Interventions

• Remember the Therapeutic Order!
  • **Diet**
    • **Swank**
    • **Wahls**
  • **General (Mediterranean, GF/CF, Anti-Inflam)**
  • **Green tea**
Interventions, Cont.

✓ Exercise!

✓ Mind/Body

✓ Homeopathy

✓ Osteopathy, Chiropractic, Physiotherapy, Hydrotherapy, PT, OT
✓ Biotherapeutic drainage
Strategies

• Progressive degeneration and/or death of neurons and axons in the CNS.
  1. Affecting many of your body's activities, such as balance, movement, talking, breathing, swallowing and heart function.
  2. Oxidative stress
  3. Inflammation
  4. Mitochondrial dysfunction/degeneration


# Nutrient Interventions

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Dosage</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrient Interventions</td>
<td>Coenzyme Q10 400-800 mg</td>
<td>Acetyl-L-carnitine 500-3000 mg</td>
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<tr>
<td>--------------------------------</td>
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<td>--------------------------------</td>
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<tr>
<td>Nutrient Interventions</td>
<td></td>
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<tr>
<td>------------------------</td>
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<tr>
<td><strong>Citicoline 500-3000 mg</strong></td>
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</tbody>
</table>

| **B12 (as methyl, adenosyl and hydroxocobalamin) 1000-5000 mcg** |

| **Methylcobalamin 25 or 50 mg IM, twice weekly** |
Nutrient Interventions

Lipid Replacement Therapy 3000-6000 mg


Omega 3 & 6 essential fatty acids 2000-6000 mg EPA/DHA, 600-1000 mg GLA

**Nutrient Interventions**

**Whole Coffee Fruit:** 100 mg, BID


**Vitamin D**

- Supplement to levels of 40-50 ng/ml (25(OH)D)
  - Don’t forget A, E and K2

**Mixed Tocopherols and Tocotrienols 400-800 IU & 200-400 mg**

Botanical Interventions

**Curcuma longa** 1000-5000 mg, depending on the form


**Mucuna pruriens** 400-1000 mg, (15% L-Dopa) (caution with those on L-Dopa agonist medications)


**Bacopa monnieri** (30-50% Bacosides) 150-500 mg

**Botanical Interventions**

**Hericium erinaceus** 500-3000 mg

- **Growth Factors:** hericenones (fruit body) & erinacines (mycelium)

**Centella asiatica** (~60% asiatic acid, ~madecassic acid 30%, and ~40% asiaticosides) 60-180 mg

Low Dose Naltrexone

- 0.5 mg – 4.5 mg at bedtime
- https://ldnresearchtrust.org/content/ldn-and-ms
Hormonal Intervention

- Pregnenolone
- DHEA or 7-Keto DHEA
- Testosterone
- Progesterone
- Estrogen
ND are progressive, debilitating diseases, with no known cure.

Be thorough in your evaluation and testing, and triage interventions accordingly.

Keep costs in mind, supplement burden low, slow down progression of disease and improve overall QOL.

• Goal is remission, but keep in mind that may not be possible.
• There will be flares and relapses.

Only bring on 1-3 interventions at a time, increasing dosage until therapeutic targets.
Thank You

Questions?

“Mr. Osborne, may I be excused? My brain is full.”