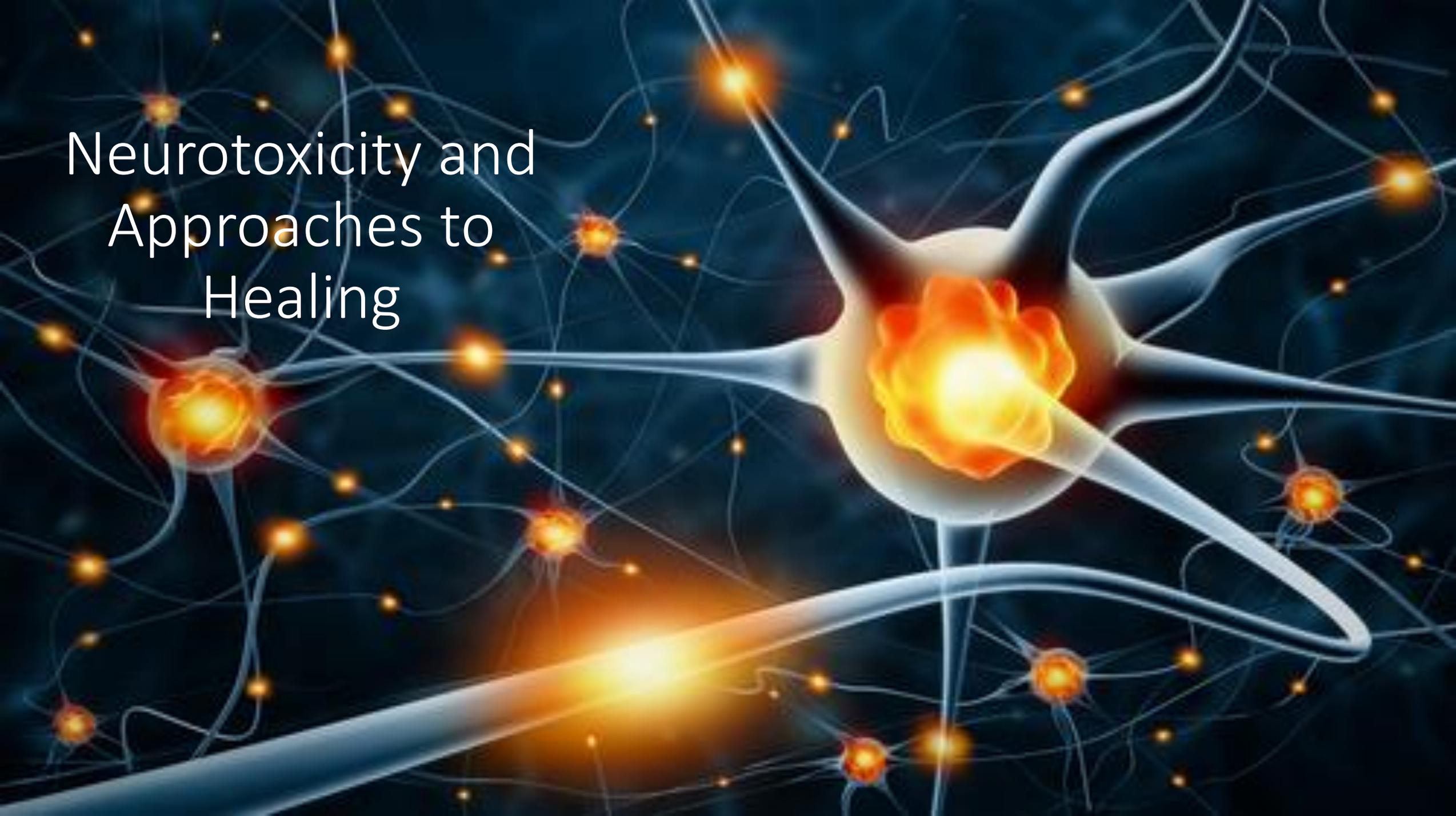


# Neurotoxicity and Approaches to Healing





# Your Body's "Protective Shields"



## Primary protective shields

- Magnesium
- Lithium
- Zinc, copper
- Selenium
- Molybdenum
- Iron
- B-complex
- Plant-based antioxidants
- Glutathione
- Vitamin D

## Activity

Neuroprotective, protects against toxins, antioxidant

Supports detoxification of sulfites, aldehydes, drugs, toxins

Protects against lead, oxygenation, antioxidant (catalase)

Detoxification, energy production, glutathione, antioxidants

Supports detoxification, energy production, antioxidants

Supports detoxification, energy production, antioxidant

Supports detoxification, energy production, glutathione

# Basic Pathophysiology

- During the first 10 days following a TBI, known as the acute phase, excessive release of glutamate occurs.
- Current medications do little more than treat symptoms.
- They do not promote healing, do not inhibit cell death or any neurodegenerative process, and are often associated with negative side effects.

# Magnesium Essential for Neuronal Repair

- Brain magnesium levels fall rapidly following the acute phase of a TBI, and replenishing levels to their normal values has been shown to prevent and reverse neurological injury.
- Magnesium supplementation (400-800 mg/d) promotes healing, has been shown to promote rapid recovery from moderate to major depression.

# Lithium

## Essential for Neuronal Repair

- Nutritional doses of lithium from 5-40 mg/d have been used since the 1970s to treat depression, reduce stress, headaches, migraines, chronic pain, alcoholism, drug addiction, stroke, neuroprotection, and suicide prevention.
- Nutritional deficiencies result from poor diet or lithium antagonists such as caffeine or alcohol, which promote the loss of many water soluble nutrients (e.g. magnesium, lithium, zinc, B-vitamins, and vitamin C).

An important micronutrient – a small amount is all you need for broad-spectrum neuroprotection.

- In HIGH-doses: 100-340 mg per day, lithium acts as a drug.
- In SMALL-doses: 1-20 mg per day, lithium acts a nutrient.
- In small, nutritional amounts, lithium has positive effects on mood, sleep, healing, and has “anti-stress” properties.

# Zinc

## Essential for Neuronal Repair

- Zinc is needed for healthy brain function. Protects against heavy metals, and promotes cadmium elimination.
- Zinc has been shown to possess anti-depressive effects similar to those of magnesium and lithium.
- Zinc deficiency increases oxidative stress and contributes to general inflammation, while Zinc supplementation can reverse this.
- Supplementing with Zinc during the acute and subacute phases of TBI also decreases the damaging effects of oxidative stress and inflammation.

# Magnesium, Lithium, and Zinc: Essential for Neuronal Healing and Repair

- All three minerals are needed for neuronal healing processes and modulation of the body's excitatory NMDA receptor.
- Magnesium and zinc are cofactors in more than 600 chemical reactions in the human body.
- Lithium increases the antioxidant boosting, neuroprotective transcription factor Nrf2.

# Magnesium, Lithium, and Zinc

## The Holy Triad For Brain Recovery and Healing

- **Symptoms of magnesium and zinc deficiency include:**
  - Depression, irritability, fatigue, sensitivity to stress, and cognitive impairment
  - Impaired healing and neurogenesis, and decreased neuronal survival
  - Sleep problems, lack of restful sleep, and low testosterone
- **Symptoms of lithium deficiency include:**
  - Depression, irritability, sensitivity to stress, and cognitive impairment
  - Impaired healing and neurogenesis, and decreased neuronal survival
  - Sleep problems, lack of restful sleep

# Magnesium, Lithium, and Zinc

## The Holy Triad For Brain Recovery and Healing

- Replenishing these nutrients is important in all phases of TBI.
- Including the chronic phase, to prevent cell damage as well as to stimulate the healing process by increasing neural growth factors such as BDNF and stem-cell mobilization.

# Iron

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## Key benefits

- Important for healthy brain function
- Is essential for thyroid function
- Protects against lead exposure
- Essential for energy production
- Promotes a healthy mood

**Recommended dose:** from dietary source unless you have a diagnosed deficiency.

- Best forms: gluconate, glycinate, amino acid chelate.
- Optimal ferritin level: 30 – 150 mg/dL.

# Iron Excess (women, >150 ng/mL; men, >200 ng/mL)

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## **Increasingly more common due to the following factors:**

- Iron fortified breakfast cereals and bars
- Multivitamins containing iron
- Vitamin C supplementation
- Alcohol consumption

## **Too much iron can promote:**

- Oxidative stress and inflammation
- Premature aging

# Artificial Sweeteners

## **Aspartame (e.g. Equal, Nutrasweet)**

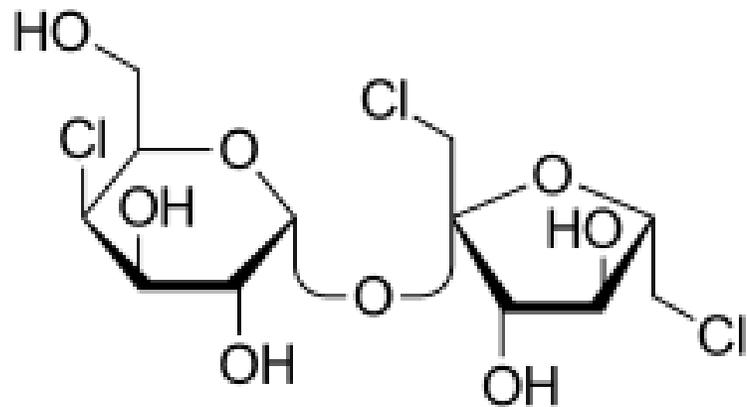
### **Reasons to avoid**

- Is broken down into free form phenylalanine, aspartic acid, and methanol during metabolism in the body.
- Aspartame contains 10% methanol as part of its structure, which is converted into formaldehyde in the body.
- The excess of phenylalanine blocks the transport of important amino acids to the brain contributing to reduced levels of dopamine and serotonin.



# Reasons to avoid

- Has the most reported adverse effects of any food additive reported to the FDA.
- 1 blue-packet of Equal contains 22 mg of aspartame, 2.2 mg of this is methanol.
- Aspartame contains 10% methanol by mass. Methanol is a well-known biological poison, and is especially toxic to your retina, brain, and nervous system.
- Obtained FDA-approval through political means not scientific merit. Was deemed neurotoxic by several FDA scientists, and top neuroscientists, which went ignored.



## Sucralose

### Reasons to avoid

- Chemically speaking, sucralose belongs to a class of organic compounds called chlorocarbons.
- The makers of sucralose, classify it as a “chlorosugar”, making it sound innocuous.
- From a chemist’s perspective, it’s still a chlorocarbon, which release oxidizing, molecular chlorine like bleach.

# Reasons to avoid

- In 2008, Duke University Medical Center published a paper reporting that Splenda (sucralose) significantly decreases beneficial intestinal bacteria.
- Common chlorocarbons include the potent liver toxin, carbon tetrachloride; insecticides, DDT, chlordane, lindane, Agent Orange (used as a herbicide during the Vietnam War), and polychlorinated biphenyls (PCBs).
- Due to its environmental toxicity, and the public outcry against its use, DDT was banned in the U.S. in 1972.
- Typically chlorocarbons possess high-fat solubility, which allows for their accumulation in body tissues, concentrating in fat stores over time due to their poor excretion.

# Burn Pit Exposure

## **Organic compounds and heavy metals**

### **Recommended Tests**

- GPL-TOX Profile (Toxic Non-Metal Chemicals)
  - Tests for 172 different toxic chemicals including organophosphate pesticides, phthalates, benzene, xylene, vinyl chloride, insecticides.
- Holistic Health International – Hair Elements Test (Dr. Amy Yasko)
  - Mercury, arsenic, lead, cadmium, bromine, and essential minerals.

# Mercury Excess (Toxicity)

## **Sources include:**

- Large tuna (e.g. bluefin, big eye, albacore), swordfish, tilefish, farm-raised salmon
- Dental amalgams (silver fillings)
- High fructose corn syrup

## **Too much mercury can promote:**

- Fatigue, depression, brain fog, memory problems, sleep disturbances.
- Oxidative stress and inflammation

# Minimize toxin exposure

## ***Hidden sources of toxins in our environment***

- Personal care products  
parabens/endocrine disruptors
- Processed foods  
GMOs, soups, large fish, pickled ginger  
HFCS, farmed salmon, glyphosate
- Other sources  
Chewing gum, diet and energy drinks, protectants on furniture,  
automobile interiors

# Sweating and Sauna Therapy



- Sweating is one of your body's primary mechanisms for eliminating heavy metals and other toxins.
- Along with essential minerals, sweat is an acknowledged excretory route for toxic metals.
- "Sweating is a long-standing, if recently forgotten, aspect of mercury detoxification."
- Lovejoy (1973) et al. suggested, "sweating should be the initial and preferred treatment of patients with elevated mercury urine levels."

Sears ME, Kerr KJ, Bray RI. Arsenic, cadmium, lead, and mercury in sweat: a systematic review. *J Environ Public Health*. 2012;2012:184745.