The Low Glutamate Diet as a Treatment for Gulf War Illness

Dr. Kathleen Holton
Nutritional Neuroscience Lab
American University
Rationale

• Three of the major exposures from the GW (low-dose chemical agents, pesticides, and pyridostigmine bromide (PB) pills) cause downstream release of glutamate, leading to neurotoxicity
  • These also induce blood-brain barrier (BBB) permeability
    • Also caused by head trauma, infection, and significant stress
• The low glutamate diet has previously been shown to significantly reduce symptom load in FM (similar multisymptom profile)
  • Those w/ dietary glutamate sensitivity tend to have past exposures increasing the likelihood of BBB permeability
  • BBB permeability increases dietary glutamate’s access to the brain
• Thus, we hypothesized potential similar benefits for veterans w/ GWI
Innovation

• To our knowledge, this is the first dietary intervention shown to dramatically reduce the symptom burden in GWI.

• The diet is unique, in that it aims to concurrently reduce excitotoxicity, oxidative stress, and neuroinflammation in the brain.
  • Healthy whole-food diet
  • Removes sources of free glutamate (mostly food additives)
  • Increases intake of nutrients known to protect against excitotoxicity
  • Increases intake of all dietary antioxidants and minerals necessary for antioxidant enzyme systems to function
Significance

• The effect size ($d=1.16$) was considered “very large”
  • **73% were considered improved** based on PGIC
• We observed *highly* significant improvements in *every single measure* after one month on the low glutamate diet
  • Included highly significant reductions in **overall symptom number** (avg of 9 symptoms remitted), **pain, fatigue**, measures of **depression, anxiety and PTSD**
  • Also saw significant improvements in **cognitive function, QOL, and BP**
  • **Systemic IL-1β** was also significantly reduced, and overall reduction in the inflammatory cytokines IL-1β, IL-6, and TNF-α accurately predicted improvement on the low glutamate diet in 76.5% of cases
    • IL-1β and TNF-α can both increase glutamate release and decrease glutamate re-uptake leading to enhanced excitotoxicity
Considerations for Treatment Utility

• No FDA approval needed!

• Low-cost treatment option with no side effects plus other potential benefits for diet related conditions (BP, diabetes, heart disease, etc.)

• Dietary treatment could be rolled out to veterans via VA dietitians
  • Would require funding for training VA dietitians, creation of training materials, etc.
  • Could easily be piloted in a smaller number of VA facilities first