ANIMAL MODELS OF GWI

- Direct examination of tissue (especially brain) is a key advantage
- Persistent molecular, cellular and functional effects associated with individual and combined exposures/conditions encountered in the Gulf War can be evaluated
- Specific hypotheses can be tested
- Therapeutic interventions can be evaluated

"SOME HOW TO'S" OF ANIMAL MODELS OF GWI

- In toxicology: Dose X Hazard = Risk (we are not fully informed on dose or hazard for GWI)
- Exposures should mirror possible culprits...not just alone but in combination, as was likely in the Gulf War (e.g. sarin surrogates, PB, permethrin, DEET, chlorpyrifos, dichlorvos, etc.)
- Contributing factors should be considered (e.g. gender, physiological and environmental variables)

HOW TO'S" (continued)

- GWI is persistent over decades now; animal models should reflect this persistence, not just effects of acute exposures.
  - (this sounds challenging but think of persistent effects we accept and study: learning and memory, drug tolerance, addiction, seizure susceptibility, sensitization to drugs...to name just a few)
- Therapeutic testing: Use animals to test potential therapies of GWI
- Translational value: Regardless of the endpoints examined in a given GWI animal model, consideration should be given to sample blood with the aim of biomarker development for comparison to blood data from ill veterans