P-1.152

Developing A Neuron Mimic Liposome and Characterizing the Effects of Gadolinium Exposure in Relation to Mri Contrast Agents

Spencer Lisowski [1]

[1] University of Calgary, Calgary, Canada

Gadolinium has been documented to accumulate in specific brain regions after the administration of gadolinium-based contrast agents for MRI imaging. Gadolinium is primarily trivalent in solution and, with a similar size and shape, outcompetes calcium for many biological functions by blocking ion channels and disturbing metal homeostasis. This research focuses on characterizing the effects of gadolinium on biologically relevant brain lipids. Lipid monolayers are analyzed by compression isotherms, compressibility modulus, and Brewster angle microscopy to assess changes in rigidity, compressibility, and the organization of lipid domains. Bilayer membranes are investigated by Multidimensional Spectral Phasor analysis of the dye Laurdan, incorporated into liposomes to indicate metal effects on fluidity and hydration. Moreover, the impact of Gadolinium on bilayer permeability is assessed by the leakage of encapsulated dye from liposomes. With these biophysical techniques, we have shown that gadolinium affects the rigidity, compressibility, and domain formation of lipid monolayers. The liposome experiments indicate that gadolinium rigidifies, dehydrates, and increases membrane permeability. Metal effects on both model systems strongly depend on the structure of the lipids.