Adeno-associated Virus Alters Levels of Immune Proteins in the Brain

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Introduction
• Viruses are widely used tools in neuroscience research
• Among the most commonly used viruses are forms of adeno-associated virus (AAV)
• Recent studies reveal that several immune proteins perform critical, non-immune functions in the nervous system
• It is unknown whether viral injections may still be changing the levels of immune proteins in the brain
• Determining how viruses can affect non-immune proteins is critical to optimizing viruses as research and clinical tools in global health settings

Objective of the Study
To explore whether viral injections may affect the structure and/or function of the central nervous system by disrupting non-immune functions of immune proteins in the brain

Discussion
• In injected areas, virus persistently upregulates multiple immune proteins
  • Sham: increase in C3a only
  • Vehicle: decrease H-2K and C3a in somatosensory cortex, increase in H-2K and C3 in motor cortex
• In non-injected hippocampus, viral injections have no net effect on immune protein levels
  • Vehicle downregulates fyn
  • Sham downregulates multiple immune proteins

Future Directions
This year I will work with the AAV virus to learn more of how this particular virus can alter important, non-immune functions in the brain. In particular, I am interested in determining if dysregulation of these proteins’ non-immune functions may contribute to increased cancer risk following viral infection.

Conclusion
• Viral injections persistently dysregulate immune proteins in multiple regions of the central nervous system
  • Could potentially alter circuit anatomy and physiology
• Un-operated and vehicle controls will help isolate the circuit effects of virally-delivered tools from the circuit effects of the virus itself

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