Serine Racemase Expression During Post-Natal Development and Involvement of SR-Expressing Neurons in Fear Extinction Learning

**BACKGROUND**
- Affects 1% of the population
- Severe symptoms make it a leading cause of disability worldwide
- Suicide and comorbidity rates are high
- Complex pathophysiology --> difficult to treat
- NMDARs: Ionotropic glutamate receptors responsible for synaptic plasticity
- NMDARs blocked/enhanced --> LTP decreases/increases
- SCZ brains show NMDAR hypofunction
- NMDARs require two agonists: glutamate and glycine/D-serine
- SR-/- mice show schizophrenic pathology

**EXPERIMENT AIMS**
1. How does SR expression change throughout postnatal development in wild-type mice?
2. Do fear learning and fear extinction activate discrete neural networks comprised of SR+ neurons?

**EXPERIMENT 1**
- As age increases, % SR+ neurons increases
- The brain regions show different growth rates/patterns
- At P8, NAc expression is double that of any other brain region
- By P25/29, all regions show ~50% expression

**EXPERIMENT 2**
- Sham Female increased freezing behavior
- Sham Female, Experimental Female and Experimental Male all showed unusual spiking freezing pattern
- Possible explanations
  - Estrous cycle
  - Experimental condition disturbances

**FUTURE STUDIES**
- Molecular mechanisms underlying increases in SR expression
- Reasons for the varying expression patterns and their effects on development
- Finish counting and analyze SR involvement in fear learning
- Reproduce unusual spiking patterns
- Explore possible reasons for spiking