COGS 107B

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Office Hours: Fridays Before Section 10am - 11:50
Mandeville Coffee Cart
Week 8

Midterm 3 Topics:

- Learning
- Memory
- Motor Control
- Prefrontal Cortex & Attention

Learning and memory are dense and incorporate a lot of previous topics. Study early.

Midterm 3 is non-cumulative 3/15/18 @ lecture time OR the assigned date for this final
Learning

Key terms:

Strength / Potentiation / Depression (depotentiation) [Presynaptic & Postsynaptic]
Learning

What is STPD and how do neuromodulators set the context for it?

- **no ACh, no NE (as in NREM sleep)**
- **ACh + NE (as in waking)**
- **NE, no ACh (??)**
- **ACh, no NE (e.g., REM sleep)**

*Graphs showing synaptic change and spike-timing (post minus pre) for different conditions.*
Learning

How is the circuit of the Amygdala set up to allow for associative memory?

How does STDP play a role?
Learning

Why could NE - blockers potential help remedy PTSD?

![Graph showing placebo and propranolol reactivation over days 1 to 4 with acquisition, extinction, and test phases.](image-url)
Memory

What are the 4 types of memories discussed in lecture?

What brain regions are they associated with?

Associative

Explicit (Episodic/Declarative)

Implicit / procedural

Working
Memory Impacts on the Brain

What do the rat studies in motor memory (Nitz & Chiba studies) and in perceptual (Auditory) memory tell us about how the brain stores information?
Spatial Navigation to the Rescue

Why is it thought that hippocampus activity is *explicit* memory

Why is it thought the Basal Ganglia activity is *implicit* memory

Which neuromodulator predicts activity in both regions?

What are Prospective/Retrospective/Generalized place fields?
Prefrontal Cortex and Working Memory

How do cue-responsive and behavior-responsive neurons suggest working memory?

Adapted from Chafee and Goldman-Rakic, JNP, 1998.
A Note on Neuromodulators

We are seeing different mixes of neurotransmitter being present causing vastly different effects on neuron - neuron communication.

\[
\text{Acetylcholine (ACh)} + \text{Dopamine} = ?? \\
\text{Acetylcholine (ACh)} + \text{Norepinephrine (NE)} = ??
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