

Name:

Presynaptic plasticity homework (100 pts):

1. Define the paired-pulse ratio (5 pts)
2. What information do you get from PPR? (5 pts) What does an increase in PPR mean? (5 pts)
3. Name one mechanism of paired pulse facilitation. (5 pts)
4. Name one mechanism of paired pulse depression. (5 pts)

You are performing an experiment where you record an electrically stimulated post-synaptic potential. You see the response in facilitating! Exciting. Please answer the following questions about your experiment. (15 pts)

1. If you were a wizard, how could you transform this response to be depressing?
2. What do you predict a facilitating synapse will mean for the activity in your postsynaptic cell? How would you test that?

Think about one form of presynaptic plasticity we learned from class. Tell me about the three main features of this plasticity, using the terminology we discussed. How is it INDUCED? How is it EXPRESSED? How does it PERSIST (and for how long?) (30 pts)

Caffeine is an antagonist at the Adenosine A1 receptor. Chronic caffeine intake (at extremely high levels in rodents) can even down-regulate A1A-R expression levels. How might caffeine, through A1A-R interactions only, affect presynaptic plasticity? (15 pts)

Presynaptic boutons have smooth ER and can release calcium from stores under certain conditions. What might this release of calcium from internal stores inside the presynaptic bouton do to synaptic transmission? Consider the timing of calcium release, the location and amount in your answer. (20 pts)