SBI4U/OAC Name: _____

SYNAPTIC TRANSMISSION WORKSHEET

(pp. 566-569)

Fill in the Blanks:

When action potentials reach the _____ zone of a neuron, they usually induce the neuron to release one or more _____. These are _____ molecules that _____ across chemical synapses. Synapses may occur between 2 _____ or between a _____ and a _____ cell or _____.

Neurotransmitter molecules are stored in synaptic _____ in the cytoplasm of the _____synaptic cell (neuron). Gated channels for _____ ions open with the arrival of an _____ _____. An _____ (influx / efflux?) of calcium ions occurs. When they flow in, _____ _____ are induced to fuse with the neuron membrane and the neurotransmitter is then released into the _____ _____.

Neurotransmitters diffuse across and bind with specific _____ _____ on the membrane of the _____synaptic cell (neuron). Binding changes the _____ of the proteins, so that a _____ opens up to their interior. _____ now diffuse through the channels.

How the postsynaptic cell (neuron) responds depends on: the _____ of neurotransmitter; its _____ in the cleft; the particular kinds of _____ and gated _____ in the postsynaptic cell; and whether the channels are primed to _____.

If a neurotransmitter has an "excitatory" effect, it drives the postsynaptic cell's membrane toward the _____ of an _____ _____. If it has an "inhibitory" effect it drives the membrane _____ from _____.

Questions (answer on note paper):

1. What positive ion is likely to enter the postsynaptic neuron to cause depolarization to excite a neuron to fire an action potential?

2. What negative ion is likely to enter the postsynaptic neuron to cause hyperpolarization to inhibit production of an action potential?

3. Briefly state the function of the following neurotransmitters and neuromodulators:
   - serotonin, norepinephrine, dopamine, GABA, substance P, endorphin

4. Explain the effects of *Clostridium botulinum* and *Clostridium tetani* on the nervous system.