

**Neurobiology BIOL 3360**  
**Project Rubric**

**Team:** \_\_\_\_\_

	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
<b>Team (20%)</b>				
<i>Cohesiveness</i> (10 points)	Ties together information from all sources. Paper flows from one section to the next. Demonstrates an understanding of the relationship among material obtained from all sources.	Ties together information from all sources. Paper flows with only some disjointedness. Demonstrates an understanding of the relationship among material obtained from all sources.	Sometimes ties together information from all sources. Paper does not flow - disjointedness is apparent. Does not demonstrate an understanding of the relationship among material obtained from all sources.	Does not tie together information. Paper does not flow and appears to be created from disparate sections. Does not demonstrate understanding of one section to the next.
	10                      9	8	7	6                      ---                      0
<i>Sources &amp; Citations</i> (7 points)	Sources include both general background sources and specialized sources from peer-reviewed journals. All web sites utilized are authoritative. Cites all information obtained from other sources. CSE citation style is used in both text and bibliography.	Appropriate general and specialized sources are used. All web sites utilized are authoritative. Cites most data obtained from other sources. CSE citation style is used in both text and bibliography.	Does not include general and/or specialized sources. All web sites utilized are credible. Cites some data obtained from other sources. Citation style is either inconsistent or incorrect.	Not all web sites utilized are credible, and/or sources are not current. Does not cite sources.
	7	6	5	4                      ---                      0
<i>Spelling &amp; Grammar</i> (3 points)	No spelling and/or grammar mistakes.	Minimal spelling and/or grammar mistakes.	Noticeable spelling and grammar mistakes.	Unacceptable number of spelling and/or grammar mistakes.
	3	2	1	0

Adapted from: <https://ctfe.gmu.edu/teaching/grading/sample-rubric-for-grading-a-research-paper>

	Excellent			Good		Fair		Poor	
<b>Individual (80%)</b>									
<i>Goal Focus</i> (20 points)	The specific project goal addressed by the author focused narrowly enough for the scope of this assignment. Author met and/or exceeded all aspects of the goal stated in the project outline.			The project goal(s) are addressed. Author met aspects of the goal stated in the project outline.		The project goal(s) were addressed but not described with enough detail.		The project goal(s) were not addressed and/or were not clearly defined.	
	20	19	18	17	16	15	14	13	0
<i>Research</i> (20 points)	The evidence comes from a wide variety of valid sources. The bibliography reflects appropriate sources and reflects multiple views.			The evidence comes from valid sources. The bibliography is complete. The evidence used reflects multiple views.		Valid sources are inconsistently used. The bibliography is missing some pieces.		The evidence seldom comes from valid sources. The bibliography is missing significant information.	
	20	19	18	17	16	15	14	13	0
<i>Thinking</i> (20 points)	Statements made are pertinent to the topic and are logical and supported with evidence.			Statements are pertinent to the topic and are logical and reasonably supported.		Statements are not consistently pertinent, logical, or supported.		Statements made are not pertinent and are rarely, if at all, logical and supported.	
	20	19	18	17	16	15	14	13	0
<i>Integration of Knowledge</i> (20 points)	Individual sections demonstrate that the author fully understands and has applied concepts learned in the course. Concepts are integrated into the writer's own insights. The writer provides concluding remarks that show analysis and synthesis of ideas.			Individual sections demonstrate that the author, for the most part, understands and has applied concepts learned in the course. Some of the conclusions, however, are not supported in the body of the paper.		Individual sections demonstrate that the author, to a certain extent, understands and has applied concepts learned in the course.		Individual sections do not demonstrate that the author has fully understood and applied concepts learned in the course.	
	20	19	18	17	16	15	14	13	0

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## Poster Rubric

	Excellent	Good	Fair	Poor
<b>Poster Content (10 points)</b>	<b>10 - 9</b>	<b>8</b>	<b>7</b>	<b>6 - 0</b>
Relevant <b>background information</b> and <b>motivation</b> for topic choice. Fluency in <b>cellular/molecular</b> and/or <b>physiological mechanisms</b> . Provides explanation of <b>previous research</b> and <b>current treatments</b> associated with topic. Describes <b>novel treatment</b> or preventative measure. Overall significance of the topic is clear and written for a general scientific audience.				
<b>Poster Display (10 points)</b>	<b>10 - 9</b>	<b>8</b>	<b>7</b>	<b>6 - 0</b>
Poster is creative in arranging, packaging and displaying information. Figures (graphs, charts, tables, pictures, etc.) were effective in their ability to convey scientific information.				
<b>Poster Narration (5 points)</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2 - 0</b>
Presentation was concise and effective in providing an overview of the poster content. All content was explained clearly and for a general audience.				
<b>Questions and Answers (5 points)</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2 - 0</b>
Responses to queries were appropriate and clear.				

Modified from: [www.igert.org](http://www.igert.org)

Comments:

Clearly circle the correct option.

1. Neurons comprise two types of processes: axons and dendrites. What is the major difference between the two?
  - A. Dendrites are of uniform diameter throughout while axons taper to a point.
  - B. Dendrites receive incoming signals from other neurons while axons carry the output of the neurons.
  - C. A cell body gives rise to a single dendrite and multiple axons.
  - D. Dendrites travel long distances while axons taper to a point.
  
2. What is the function of a neurotransmitter receptor in the dendritic membrane?
  - A. Release synaptic vesicles
  - B. Detect neurotransmitters
  - C. Destroy extra neurotransmitter left in the synaptic cleft
  - D. Form gap junctions
  
3. What is retrograde axoplasmic transport?
  - A. Movement of material from axon terminal to soma
  - B. Movement of material from soma to axon terminal
  - C. Movement of material within the synaptic terminal
  - D. Movement of material among axon collaterals
  
4. What is resting membrane potential?
  - A. Difference in electrical charge across the membrane at rest
  - B. Generation and conduction of action potential at rest
  - C. Positive charge inside the membrane with respect to outside at rest
  - D. Isolation of the cytosol from extracellular fluid
  
5. Which of the following is the major charge carriers involved in the conduction of electricity in neurons?
  - A. Anions
  - B. Cations
  - C. Ions
  - D. Ionic bonds
  
6. Which force other than the ionic concentration gradient determines the equilibrium potential for an ion?
  - A. Selective ionic permeability
  - B. Sodium potassium pump
  - C. Electrical resistance
  - D. Electrical conductance

7. How do action potentials differ from passively conducted electrical signals?
  - A. Action potentials diminish over distance; passively conducted signals do not diminish over distance
  - B. Action potentials occur only in nerve cells; passively conducted signals occur only in muscle cells
  - C. Action potentials are transmitted over short distances; passively conducted signals are conducted over long distances
  - D. Action potentials are signals of fixed size and duration; passively conducted signals are not signals of fixed size and duration
  
8. What is meant by the action potential threshold?
  - A. Critical level of depolarization required to trigger an action potential
  - B. Critical level of hyperpolarization required to trigger an action potential
  - C. The action potential threshold is the same as the generator potential
  - D. Critical level at which electrical current is injected through a microelectrode
  
9. What is the absolute refractory period?
  - A. The period when the firing frequency is at about 1000 Hz.
  - B. The time period of 1 msec after one action potential is initiated and before the next one is initiated.
  - C. The period when it is difficult to initiate another action potential for several milliseconds due to sodium channel inactivation.
  - D. The period when the membrane potential stays hyperpolarized until the voltage-gated potassium channels close.
  
10. What role do voltage-gated potassium channels play in the action potential?
  - A. Voltage-gated potassium channels maintain the resting membrane potential.
  - B. Voltage-gated potassium channels help depolarize the membrane toward the threshold for an action potential.
  - C. Voltage-gated potassium channels interfere with sodium conductance.
  - D. Voltage-gated potassium channels restore negative membrane potential after the spike.
  
11. How does myelin help increase conduction velocity?
  - A. It provides electrical insulation.
  - B. It makes the membrane more excitable.
  - C. It contains voltage-gated sodium channels.
  - D. It increases axonal diameter.
  
12. Why do action potentials travel in only one direction?
  - A. The membrane just behind the action potential is refractory due to inactivated potassium channels.
  - B. The membrane just behind the action potential is refractory due to inactivated sodium channels.
  - C. The membrane proteins are destroyed when an action potential fires and it takes time to replace them.
  - D. There is not enough sodium in the extracellular space after an action potential has just fired.

- 13.** What types of cells can a neuron communicate with at a synapse?
- A.** Another neuron
  - B.** Muscle cell
  - C.** Glandular cell
  - D.** Another neuron; Muscle cell; Glandular cell
- 14.** What are second messengers?
- A.** Molecules that activate additional enzymes in the cytosol
  - B.** Voltage-gated ion channels
  - C.** Peptide neurotransmitters
  - D.** Special proteins that span a 3-nm gap between two cell membranes
- 15.** Why are G-protein-gated ion channels called “the shortcut pathway”?
- A.** Because they are faster than neurotransmitter-gated ion channels
  - B.** Because they do not involve any other chemical intermediaries
  - C.** Because of their effects on the second messenger cascade
  - D.** Because they activate downstream enzymes that alter neuronal function
- 16.** Which of the following could serve as the ligand in the ligand-binding methods of studying neurotransmitter receptors?
- A.** Agonist
  - B.** Antagonist
  - C.** The same neurotransmitter
  - D.** Agonist, antagonist, and the same neurotransmitter
- 17.** At what point do the somatic sensory axons enter the spinal cord?
- A.** Dorsal roots
  - B.** Ventral roots
  - C.** Dorsal root ganglia
  - D.** Ventral root ganglia
- 18.** Which membrane lies closest to the brain?
- A.** Meninges
  - B.** Dura mater
  - C.** Arachnoid
  - D.** Pia mater

- 19.** Lesions of the corticospinal tracts cause complete paralysis on the contralateral side.
- A.** True
  - B.** False

Questions adapted from:

Bear MF, Connors BW, Paradiso MA. 2007. Neuroscience. Lippincott Williams & Wilkins.