

Mouse Party

Abstract

An optional worksheet to use in conjunction with the interactive online activity of the same title located in *The New Science of Addiction: Genetics and the Brain* module on our website ([url above](http://gslc.genetics.utah.edu)). Students analyze lab mice to view the molecular mechanisms by which various drugs disrupt the synapse.

Learning Objectives

- ▶ Drugs disrupt the natural action of neurotransmitters at the synapse.
- ▶ Each drug has a different way of disrupting the synapse.

Logistics

Time Required

▶ **Class Time:**
50 minutes

▶ **Prep Time:**
10 minutes

Materials

Student handouts, computers with internet access

Prior Knowledge Needed

Synapse, neurotransmitters

Appropriate For:

Primary Intermediate Secondary College

Credits

Molly Malone, Genetic Science Learning Center
Pete Anderson, Genetic Science Learning Center (illustrations)

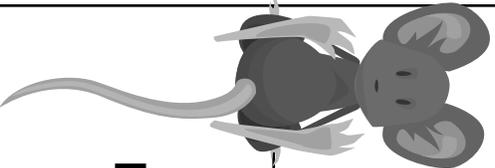
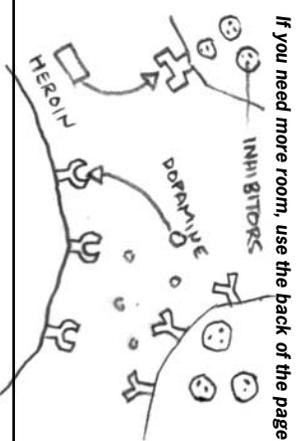
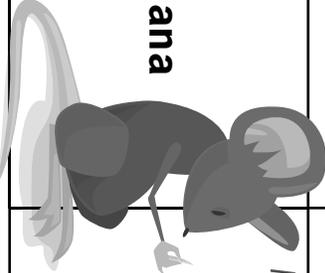
Funding

Funding for this module was provided by a Science Education Drug Abuse Partnership Award (SEDAPA) from the National Institute on Drug Abuse, a component of the National Institutes of Health, Department of Health and Human Services.

Mouse Party

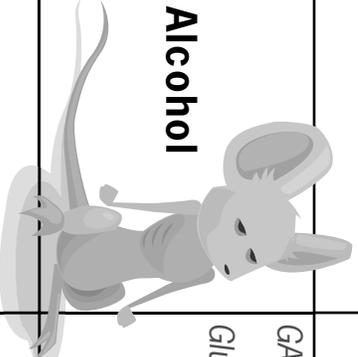
Answer Key

Log on to <http://gslc.genetics.utah.edu/units/addiction> and observe the Mouse Party. Fill in the table below, creating a sketch that summarizes the action of each drug in the “Summary Illustration” column.

Drug	Neurotransmitter(s) Involved	Action of Drug	Summary Illustration
 <p>Heroin</p>	<p>Inhibitory Neurotransmitters Dopamine</p>	<p>Binds to opiate receptors, shutting down the release of inhibitory neurotransmitters. This causes dopamine to flood the synapse.</p>	<p><i>If you need more room, use the back of the page</i></p> 
<p>Ecstasy</p>	<p>Serotonin</p>	<p>Taken up by serotonin transporters. The transporters become “confused” and transport serotonin out of the cell into the synapse. The serotonin becomes trapped in the synapse, repeatedly binding to receptors and exciting the cell.</p>	
<p>Marijuana</p> 	<p>Inhibitory Neurotransmitters Dopamine</p>	<p>Binds to cannabinoid receptors and turns off the release of inhibitory neurotransmitters. Excess dopamine floods the synapse.</p>	

Mouse Party

Answer Key

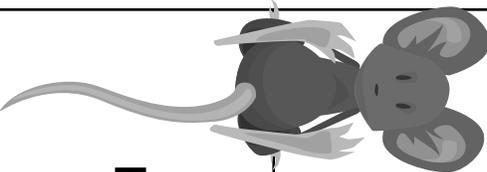
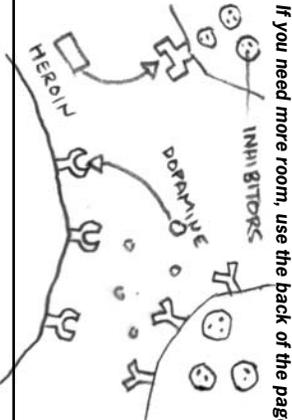
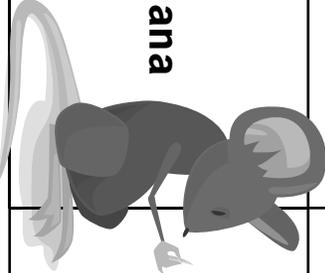
Methamphetamine	Dopamine	Taken up by dopamine transporters and pushes dopamine out of vesicles. The transporters reverse action and pump dopamine into the synapse where it becomes trapped and repeatedly binds to receptors.	
Alcohol 	GABA Glutamate	Increases the inhibitory effects of GABA. Binds to glutamate receptors, preventing glutamate from binding to and exciting the cell.	
Cocaine	Dopamine	Blocks dopamine transporters. Excess dopamine becomes trapped in the synapse where it repeatedly binds to receptors and overstimulates the cell.	
_SD 	Serotonin	Mimics serotonin and binds to serotonin receptors. Can be inhibitory or excitatory.	

Name _____

Date _____

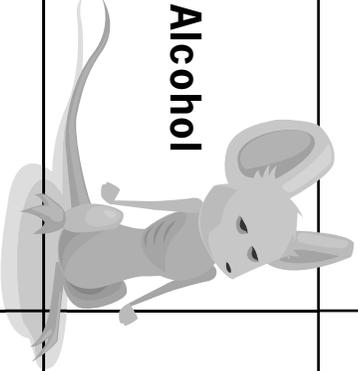
Mouse Party Neural Data Matrix

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Drug	Neurotransmitter(s) Involved	Action of Drug	Summary Illustration
 Heroin			 <p><i>If you need more room, use the back of the page</i></p>
Ecstasy			
Marijuana			

Name _____

Date _____

Methamphetamine			
Alcohol 			
Cocaine			
LSD 