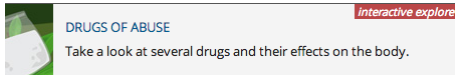


The Science of Addiction: Genetics and the Brain Webquest

Part 1:



Click here to begin (might need a laptop not ipad)

Complete this chart. Focus on what you DON'T REMEMBER FROM HEALTH CLASS. If you know it already you do not need to write it down! Start with ALCOHOL and go in order of the chart please.

<i>Name of Drug</i>	<i>Classification and Chance of Addiction</i>	<i>Effects on Body and Behavior</i>	<i>Effects on Brain</i>	<i>Withdrawal Symptoms</i>
<i>What is a depressant?</i>				
Alcohol				
<i>What is a stimulant?</i>				
Cocaine				
<i>What is a hallucination?</i>				
Hallucinogens Psilocybin Mescaline LSD				
<i>What are opiates?</i> <i>AKA Narcotics</i>				
Heroin				

<i>Name of Drug</i>	<i>Classification and Chance of Addiction</i>	<i>Effects on Body and Behavior</i>	<i>Effects on Brain</i>	<i>Withdrawal Symptoms</i>
<i>Marijuana</i>				
<i>MDMA</i>				
<i>Meth</i>				
<i>Pick Another Drug To Research (if you wish)</i>				
<i>Pick Another Drug To Research (if you wish)</i>				

Now scroll back to the top and click on “The Science of Addiction: Genetics and the Brain”

Part 2:



Click here to continue (ipad aok)

1. What is the fastest way that a drug gets to the brain? _____
2. What is the second fastest way that a drug gets to the brain? _____
3. How does rapid delivery change your brain?
4. How has knowledge on delivery methods help those who are addicted?

Now scroll back to the top and click on “The Science of Addiction: Genetics and the Brain”

Part 3:



Click here to continue

5. Addictive drugs affect brain pathways involving reward. What **neurotransmitter** is the fuel of the reward pathway?
_____.
6. This neurotransmitter creates a huge jolt of _____.
7. Life naturally brings jolts. However, natural jolts are not as dangerous as drugs. How come?
8. What is tolerance?
9. As people continue to use drugs more areas than just the reward pathway are influenced. Explain how.
10. It is a good idea to stop using addictive drugs, obviously. However, the brain does not necessarily turn back to 100% normal. Explain why.

Now scroll back to the top and click on “The Science of Addiction: Genetics and the Brain”



BEYOND THE REWARD PATHWAY

[learn more](#)

Learn how drugs affect other pathways in the brain.

Part 4:

[Click here to continue \(ipad aok\)](#)

11. As you learned on the previous screen, psychoactive drugs impact the reward pathway and the **dopamine system**. But there are other pathways in the brain that are impacted. **First, what is a pathway?**

12. There are 3 other pathways that dopamine impacts. Describe them here (you DO NOT need to know the fancy brain region names - but its ok if you write them down.)

13. Serotonin is another neurotransmitter affected by many drugs of abuse, including _____, _____, _____ and _____.

14. Serotonin plays a role in many brain processes, including:

15. Problems with the serotonin pathway are linked to:

16. Glutamate and GABA (gamma-aminobutyric acid) are the brain's most plentiful neurotransmitters. Over half of all brain synapses use glutamate, and 30-40% use GABA.


Since GABA is _____ and glutamate is _____, both neurotransmitters work together to control many processes, including the brain's overall level of _____.

17. Many of the drugs of abuse change the balance of glutamate or GABA, exerting tranquilizing or stimulating effects on the brain. Drugs that increase GABA or decrease glutamate are _____. Those that decrease GABA or increase glutamate are _____.

18. Name some of the drugs that fall into the categories above:



Now scroll back to the top and click on "The Science of Addiction: Genetics and the Brain"


Part 5:  **HOW DRUGS CAN KILL**
Many drugs can result in death by overdose. [learn more](#)



Click here to continue (ipad aok)

19. Why do most people overdose?
20. What combinations are especially dangerous?
21. Cocaine can kill you in a variety of what ways?

Now scroll back to the top and click on “The Science of Addiction: Genetics and the Brain”

Part 6:  **MOUSE PARTY**
Look inside the brains of mice on drugs. [interactive explore](#)



Click here to continue (might need computer)

Harry the Heroin Mouse

Neuroscience Review: What does an inhibitory neurotransmitter do?

What does heroin **mimic**?



What does heroin **bind to**?

Heroin turns off dopamine inhibition and dopamine floods the synapse. What is the result of this flooding?

Why is **morphine**, a drug related to heroin, used as a pain-killer?

Edward the Ecstasy Mouse

What are **serotonin** transporters responsible for doing?

Is ecstasy an **agonist** or **antagonist** for serotonin? How do you know this?

What is the result of the transporter becoming “confused”?



What happens to the excess **serotonin**? What is the result?

Ecstasy affects **serotonin** pathways responsible for:

Alice the Alcohol Mouse

Inhibitory neurotransmitters called **GABA** are responsible for what?

What is the function of **glutamate**?

How does alcohol deliver a “double sedative punch”?

Alcohol particularly affects what areas of the **brain**?



Carlisle the Cocaine Mouse

What are dopamine transporters responsible for?

What does **cocaine** do to the transporters? Be specific.

Where does **cocaine** concentrate? (2 brain location)

Why are cocaine users so fidgety?



Mike the Marijuana Mouse

Cannabinoid receptors turn off the release of what?

What is THC? What does THC do? What does it mimic?

Anandemid is known to be involved in:



Laurent the LSD Mouse

LSD acts almost exclusively on _____. LSD resembles _____ and elicits its effect by binding to _____.



Why does LSD have complex sensory effects?

LSD and other hallucinogens excite a particular region of the brain known as the _____. What is this brain part responsible for?

Marcus the Meth Mouse

What NT does meth mimic?

Why is meth so addicting?

