Exploring the Science of Addiction

Log on to: http://gslc.genetics.utah.edu/units/addiction and explore this module to find the answers to the questions below.

Hint: the Search feature on this website may or may not help you find what you are looking for; it is best to go through the module to find the answers.

1. On the brain below, roughly sketch in and label: A) the Reward Pathway, B) the area of the brain responsible for behavior and C) the area of the brain responsible for memory.

a. The components of the Reward Pathway are

b. The Reward Pathway is responsible for
Drugs Alter the Brain’s Reward Pathway

2. Categorize the Drugs of Abuse

<table>
<thead>
<tr>
<th>Stimulant</th>
<th>Depressant</th>
<th>Other</th>
</tr>
</thead>
</table>

3. Observe the mice at the Mouse Party
   a. Where is the action of each drug taking place?
   b. All of the drugs affect the natural balance of neurotransmitters in the brain. T  F

Drug Delivery Methods

4. Name two reasons why the method of drug delivery is an important factor in addiction

5. Color in the PET scan images of the normal-functioning brain and the brain of a cocaine addict below

PET Images Showing Brain Activity:
Beyond the Reward Pathway

6. Aside from memory, motivation and reward, what other functions controlled by the brain would you expect drugs that interfere with dopamine to affect?

How Drugs Can Kill

7. Complete the table below

<table>
<thead>
<tr>
<th>Class of Drug</th>
<th>How it kills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polydrug Cocktails</td>
<td></td>
</tr>
<tr>
<td>(i.e. Alcohol &amp; Heroin)</td>
<td></td>
</tr>
<tr>
<td>Heroin &amp; other Opiate</td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td></td>
</tr>
<tr>
<td>Nicotine</td>
<td></td>
</tr>
<tr>
<td>Stimulants</td>
<td></td>
</tr>
<tr>
<td>-Cocaine</td>
<td></td>
</tr>
<tr>
<td>-Methamphetamine</td>
<td></td>
</tr>
</tbody>
</table>

Genetics is an Important Factor in Addiction

8. Become the Pedigree Investigator and list the risk factors for nicotine addiction present in the Marshall family

Timing and Circumstances Influence Addiction

9. Name two reasons why the adolescent brain is particularly susceptible to developing a lifetime drug addiction
Environmental Risk Factors for Addiction

10. Fill in the circles below with the appropriate risk factors

- Community
- Peers
- School
- Family
Summary

11. Fill in the boxes below to explain how each contributes to our new understanding of addiction:

- Natural Reward Pathways Exist in the Brain
- Drugs Alter the Reward Pathway
- The New Science of Addiction: Genetics and the Brain
- Timing and Circumstances Influence Addiction
- Genetics is an Important Factor in Addiction