

**The Brain:
Understanding Neurobiology
Through the Study of Addiction**

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- used advanced imaging techniques to identify in awake humans the specific brain circuits that are involved in craving, euphoria, and

The Essence of Drug Addiction

As with any other medical disorder that impairs the function of vital organs, repair and recovery of the addicted brain depends on targeted and effective treatments that must address the



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Using the Web Site



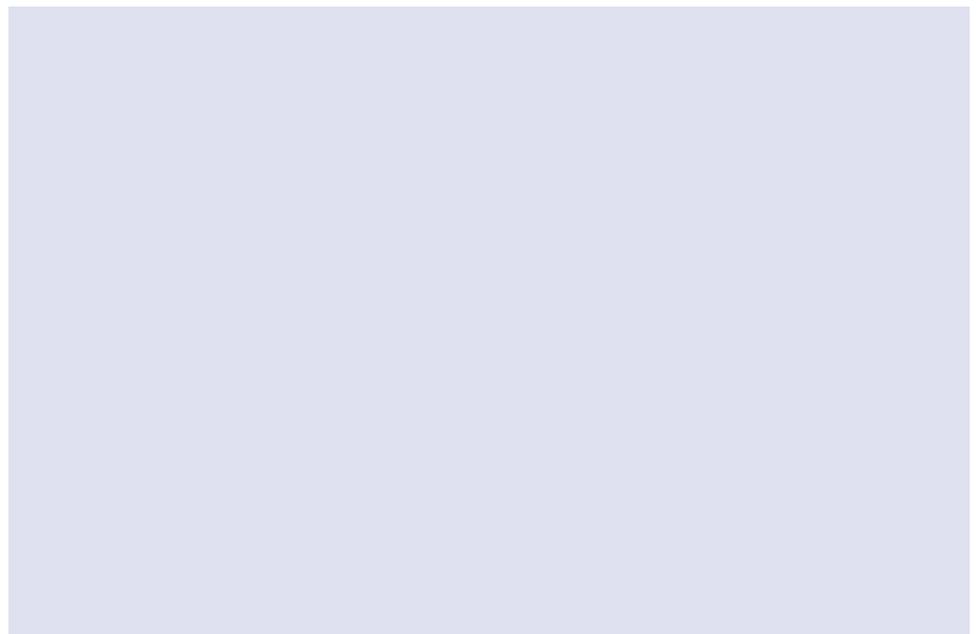


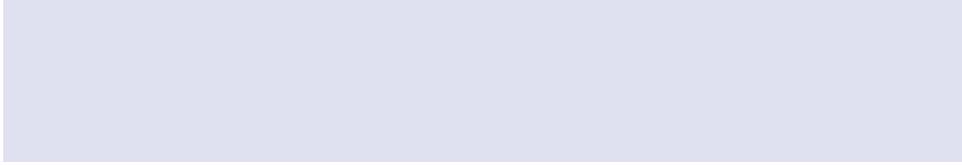
Background Information

The brain processes a huge amount of information in a remarkably efficient manner. Think about driving a car. It is something that you do every day, and yet it is a complex task that involves a lot of information processing. The brain has to process a lot of information in a very short amount of time. This is why the brain is often described as a "supercomputer".

Different Neuroimaging Techniques Provide Different Information about the Brain

PET scanning is a major neuroimaging technique used







Lesson 1 Organizer: PRINT VERSION

What the Teacher Does	Procedure Reference

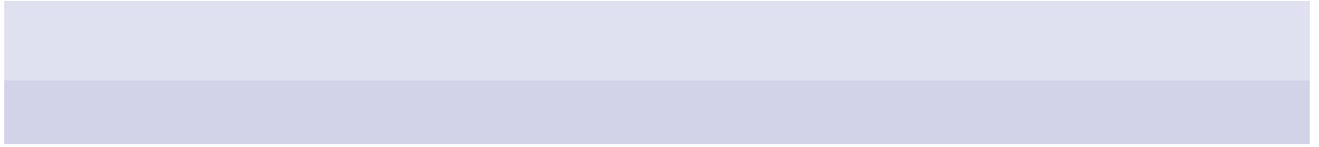




Figure 2.2: 

5. When students understand that the brain is composed of neurons



6. **Once the groups have finished revising their summaries, hold a class discussion and put together a summary of how neurotransmission**

Sample Answers to Master 2.7

Question 1. Why is saline applied to the resting neuron?



What the Teacher Does	Procedure Reference
Discuss the descriptions of neurotransmission as a class and generate a consensus summary of neurotransmission.	Page 54 Step 6
Remind students of the reward system and inform them that the neurons in the reward system use a neurotransmitter called dopamine.	Page 54 Step 7

Activity 3: Do All Neurotransmitters Have the Same Effect?











5. Ask students to work in pairs. Distribute cans of the appropriate soft drink, one to each student. Instruct students to follow the directions on the master, and remind them to continue to sit at rest. They can talk to their partner or work on Activity 3 in this lesson, but they

Question 6. Explain why the different ways of taking drugs cause different behavioral responses.

Taking drugs by inhalation causes a very rapid increase in the level

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What the Teacher Does	Procedure Reference
<p>Discuss the results of the investigation with the class. Use the following questions to guide the discussion.</p> <ul style="list-style-type: none">• Did your heart rate go up, down, or stay the same after you	

Drug Abuse and Addiction



Photo: Corel

Overview

At a Glance

hepatitis B and hepatitis C are much more common among drug addicts than in the general population. Hepatitis B and C are liver infections that can lead to liver disease and cancer. The risk of contracting these infections is significantly higher for people who inject drugs, especially if they share needles or other injection equipment. This is because the virus can survive in used needles for up to 6 weeks. The risk is also higher for people who have sex with multiple partners or who have had sex with someone who has had sex with multiple partners. The risk is also higher for people who have had sex with someone who has had sex with multiple partners. The risk is also higher for people who have had sex with someone who has had sex with multiple partners.

Guidelines for the Use of Animals in Scientific Research

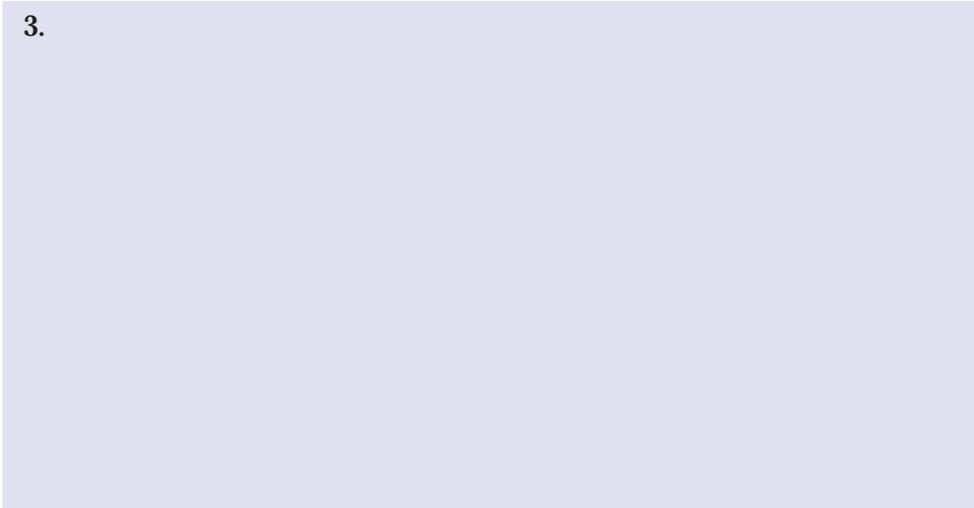
Scientists who use animals as research subjects must abide by federal polic(u)-r ha-1(u-21(t)g-9(eo-2(v)8(n)3(e)-8(a).



- Is everyone's transition, or switch, level the same?

- 3. Reveal the remaining section of Master 4.5 and have students read the case studies.**
- 4.**

3.







Sample Answers to Questions on Master 5

Case Study: Ruth **Question 1. What disease does**

Ruth is addicted to heroin. Addiction is a chronic

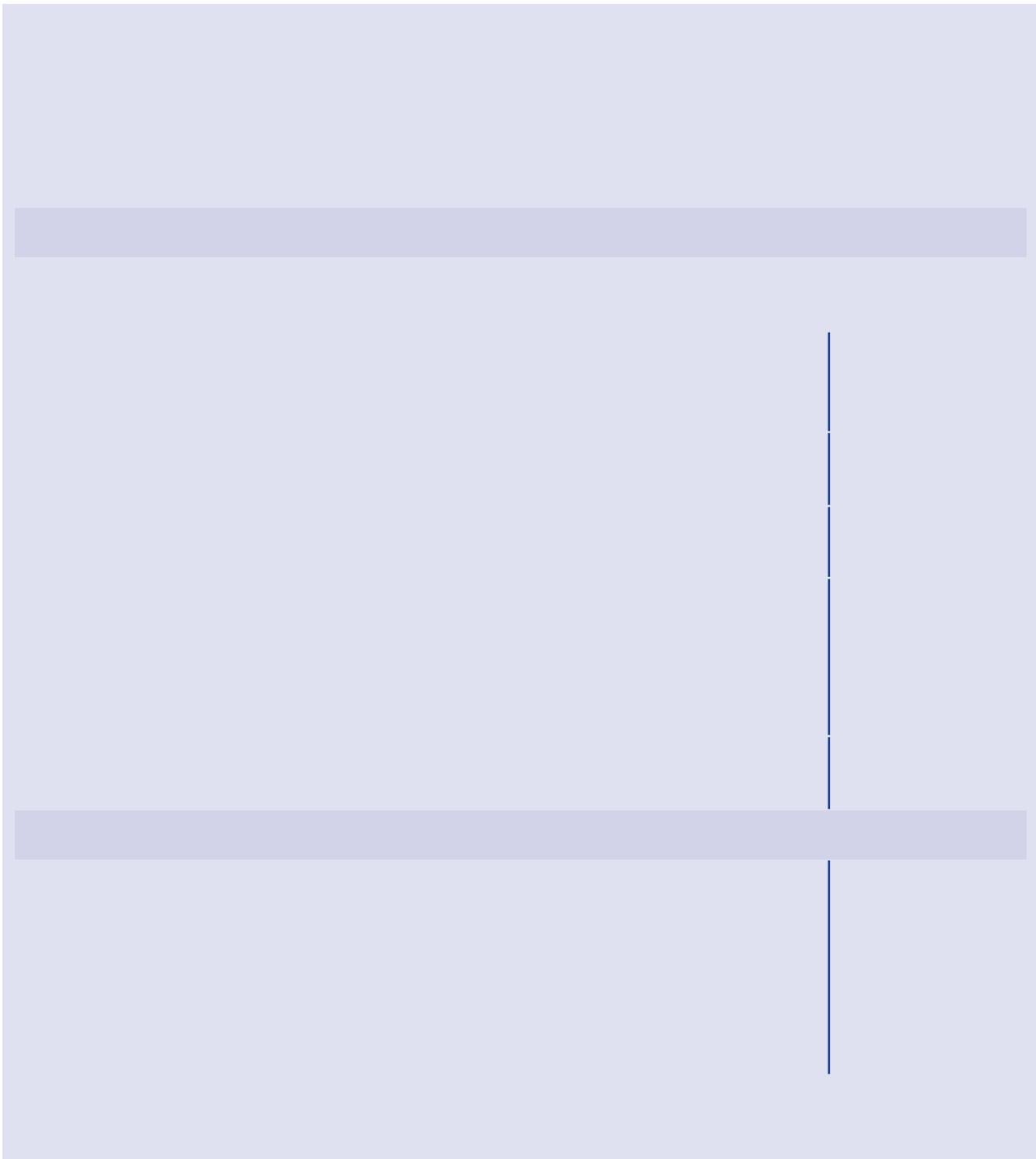
Question 2. How did the disease change the indivi

Question 5. What did the individual do that impaired his or her recovery?

Carol didn't follow her doctor's advice after the initial period and then ignored her doctor's suggestion that she get additional help from other specialists.

elp





References

Introduction to the Module

- 1.

6. Villemagne, V., Yuan, J., Wong, D.F., Dannals, R.F., Hatzidimitriou, G., Matthews, W.B., Ravert, H.T., Musachio, J., McCann, U.D.,

Masters

Refer to the *In Advance* section in each lesson for more information about the number of copies required for each master. Masters marked with an asterisk (*) are not needed if you use the Web-based tier (r) 10

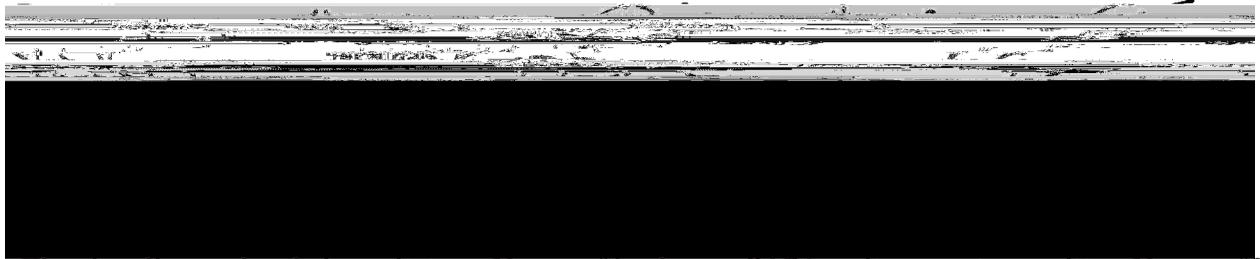


PET Image Tasks

What Happened to Phineas Gage?

Name(s) _____ Date _____

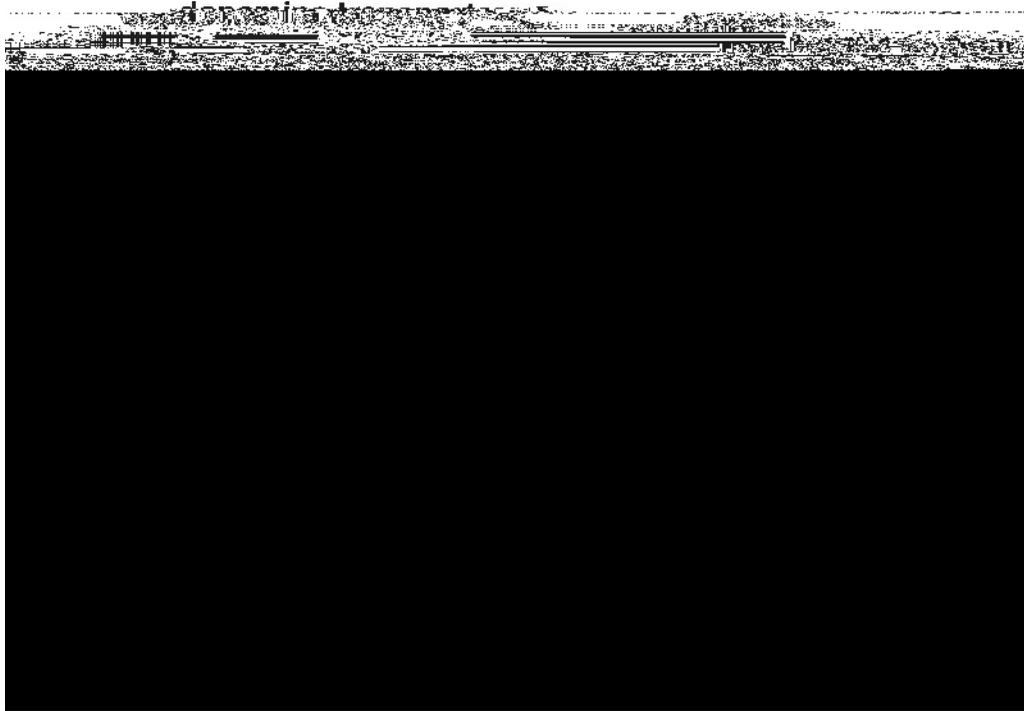
Neurons in Series



D. The signaling molecule is excitatory. Neuron #1 releases GABA as its neurotransmitter. Neuron #2 releases dopamine as its neurotransmitter.

Case	Does the signal molecule excite or inhibit Neuron #1?	Does the activity of Neuron #1 increase or decrease?	Does the amount of neurotransmitter released from Neuron #1 increase or decrease?	What is the name of the neurotransmitter released from Neuron #1?	Is the neurotransmitter released from Neuron #1 excitatory or inhibitory?	Does the activity of Neuron #2 increase or decrease?	Does the amount of dopamine released from Neuron #2 increase or decrease?
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Cocaine Alters Neurotransmission



Worksheet for Rat Experiment Data

Name(s) _____ Date _____

Treatment



