

## SUPPLEMENTARY MATERIAL

### A Suggested Handout

## **PSYC 314 Biopsychology**

### **In this demonstration, you will:**

- A. Learn about the “poppy seeds defense” and assess its validity using scientific methodology.
- B. Relate the findings to learned concepts (e.g., pharmacokinetics & pharmacodynamics).
- C. Apply the findings to its real-life applications and societal implications.

\* For this demonstration, we will collect data that represents our entire class. You will analyze the data, answer the questions below, and submit the handout individually.

### **Background:**

Opioids are a group of drugs that belong to a class known as **narcotic analgesics**. Opioid drugs (such as opium, heroin, morphine, methadone, and oxycodone) reduce pain without producing unconsciousness and create a sense of relaxation, well-being, and euphoria. They promote sleep and at high doses, can lead to coma and death. Repeated use can cause tolerance physiological dependence. In the last few decades there has been an increase in opioid prescriptions for chronic pain, use of fake or tempered opioid prescriptions, and availability of illicit opioids such as fentanyl. In accordance, overdose deaths involving opioids have almost tripled since 2000 (The opioid epidemic; Meyer & Quenzer, 2019).

Opium is prepared when the milky juice taken from the seed capsule of the opium poppy plant (*Papaver somniferum*) before ripening is dried and powdered. The main active ingredient in opium is morphine, but codeine, thebaine, etc. can also be isolated from it. Poppy seeds are used in bakery products, baking ingredients and edible oils.



Poppy sees muffins. ©Dr. Flaisher-Grinberg

Opioid use can be assessed in samples of blood/serum, sweat, hair, urine, and oral fluid. “The poppy seed defense” suggests that eating poppy seeds can cause an individual to appear positive for opioid use in routine drug tests. Is it just a myth or can this possibility be true? **Let’s see:**

### **Part 1. Pharmacokinetics: Testing the “poppy seed defense”**

#### Materials:

One poppy seed (experimental) or chocolate chip (control) muffin + One oral fluid drug test kits.

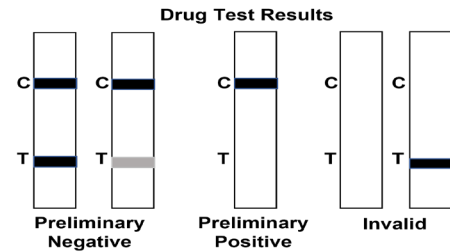
#### Procedure:

- a. Identify your condition (experimental or control) and take the corresponding muffin. If you **play sports / work in a job** that conducts random drug tests – you belong to the **control condition**. If you have any food allergies, take medications that interact with food, or don’t want

to eat the muffin, please become a part of our **control** group. If you already consumed a poppy seed-containing food product today, please let me know.

b. Ingest the bakery product within < 2 min. Do not wash your mouth, eat, or drink anything until the end of the demonstration. Wait 20 min. Start completing the handout in the meanwhile.

c. Collect oral fluid: Remove sponge from bag, place it in your mouth. Swab all areas of your mouth (left and right cheeks, top and bottom of tongue). **Let the sponge soak with oral fluid ~ 3 min.** Gently press it with your teeth: make sure that no “hard” spots are left.



-Place in collector, press shut, wait for flow, and read:

d. Mark your condition on the attached note (without your name) and pass forward:

I belong to the <input type="checkbox"/> experimental <input type="checkbox"/> control condition	
My data suggest that I am <input type="checkbox"/> positive <input type="checkbox"/> negative to opioid consumption	
I am negative to opioid consumption, but my opioid detection line is faint <input type="checkbox"/>	

e. Use our class-collected data (see table below) to answer the following questions.

	Number of participants who tested 'positive'	Number of participants who tested 'negative'
Experimental group		
Control Group		

1. Explain what was the (scientific) question that was asked in class, how was it assessed (what was the assessment method that we used), what did we find (what were our results), and what you can conclude, based on our class demonstration \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. What is the relevance of your findings to our/your own life? Explain your answer \_\_\_\_\_

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\_\_\_\_\_

3. Which pharmacokinetic processes occur in our body when opioids are/are not detected in our oral fluid following the consumption of poppy seeds? Use learned terminology (e.g., **ADME**)

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4. The “Substance and Abuse Mental Health Services Administration” (SAMHSA) of the US “Department of Health and Human Services” has established a cutoff of 30 ng/mL codeine/morphine in oral fluid drug test kits. The oral fluid drug test kits used for this demonstration use a cutoff of 40 ng/ml. Some available oral fluid test kits use a 10 ng/ml cutoff. What would be the advantages/disadvantages of the different test kit? Explain your answer.

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5. Our findings could be altered by the number of muffins consumed by subjects. Suggest a study that could test this scientific question \_\_\_\_\_

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6. Our findings could be altered by other factors relevant to the participants or to the experimental design. Suggest a factor that could affect our findings and describe a study that could test that scientific question \_\_\_\_\_

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### **Part 2. Pharmacodynamics:**

7. Choose one of the following opioid drugs (heroin, morphine, codeine, oxycodone, fentanyl, methadone), and use credible resources (add your resources as references) to describe the drug’s binding site within the nervous system (e.g., receptor type), effect on the binding site (agonist/antagonist), beneficial, toxic and potentially lethal effects. Try to include the drug’s therapeutic index

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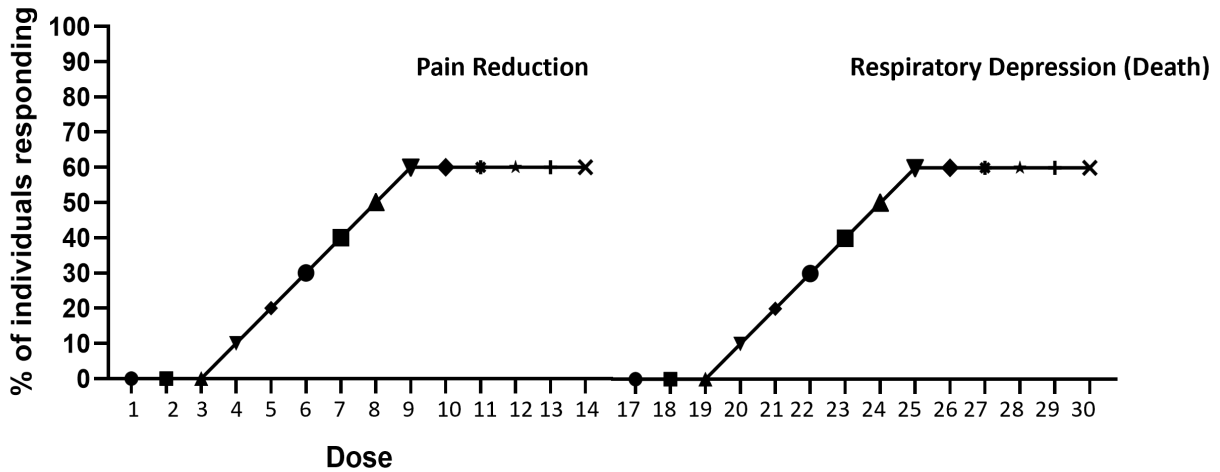
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8. The drug Naloxone (Narcan) is used to rescue individuals suffering from an opioid overdose. Use credible resources (add your resources as references) to describe the drug's binding site within the nervous system and its effect on the binding site (agonist/antagonist) \_\_\_\_\_

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9. Dr. X developed a new narcotic drug. Humanely testing its behavioral effects in lab animals, she created the following DR curve, describing the effects of different drug doses, expressed as mg/kg. Complete the requested information below:



The drug's ED50 is \_\_\_\_\_

The drug's LD 50 is \_\_\_\_\_

The drug's TI is \_\_\_\_\_

10. Compared to a drug which TI is 4, is this drug safer? Explain your answer \_\_\_\_\_

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