LAB Heart Rate in Daphnia

Inquiry: What effect do certain chemicals have on heart rate in Daphnia?

Introduction: Stimulants and depressants are chemicals that change the activity of body organs. One of their effects in humans and other animals is to speed or slow heart rate. In this lab you will design an experiment to test the effects of four chemicals on the heart rate of Daphnia, a water flea. Based on the chemicals’ effects, you will classify them as stimulants or depressants. Be sure to account for the following in your procedure: a) how you will determine Daphnia heart rate; b) what materials you will use; c) what controls you will use; and d) how you will record your results.

Objectives: ■ PREDICT the effects of various chemicals on heart rate in Daphnia.
■ DESIGN an experiment to test the effects of certain chemicals on heart rate.
■ MEASURE the heart rate of Daphnia after it is exposed to a chemical and COMPARE that rate to the control rate.
■ CLASSIFY the chemicals tested in the experiment as stimulants or depressants.

Prelab Activities

Concepts: Review the sections in your text about stimulants and depressants and their effects on biological processes. Study the diagram of Daphnia. Prepare a slide of Daphnia for microscopic examination. Have your teacher check your procedure before you begin. Prepare a chart for recording your observations and results. Formulate a hypothesis to predict the effect of different chemicals on heart rate in Daphnia.

Tech Talk: Be sure you understand the meaning and use of the following words before proceeding with the lab.

depressant stimulant

Materials You May Use

Daphnia culture
slides and coverslips
dissecting microscope
water
various chemicals to test: adrenaline,
aspirin, crushed diet pills (over-the-counter),
cola, ethyl alcohol solutions (2% and 5%)
pipettes
clock with second hand
paper towels

Antennae
Compound eye
Heart
Brood pouch
Intestine
Laboratory Notebook    Heart Rate in *Daphnia*

Hypothesis: ____________________________________________________________

Materials

List the materials you will use in your experiment.

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________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Procedure

List the steps of the procedure you will follow.

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### Data Record

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Beats/min.</th>
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<tbody>
<tr>
<td>1.</td>
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<td>6.</td>
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**Other observations:**

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### Analyses and Conclusions

1. IDENTIFY the chemicals you tested that increased heart rate in *Daphnia*.

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2. IDENTIFY the chemicals you tested that decreased heart rate in *Daphnia*.

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3. CLASSIFY the chemicals you tested as depressants or stimulants.

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