

Aim: Effect of Drugs on Locomotor Activity Using Actophotometer

References:

1. Goodman, L. S., & Gilman, A. (2018). Goodman and Gilman's The Pharmacological Basis of Therapeutics (13th ed.). McGraw-Hill Education.
2. Turner, R. A. (1965). Screening Methods in Pharmacology. Academic Press.
3. Kulkarni, S. K. (1999). Handbook of Experimental Pharmacology. Vallabh Prakashan.

Objective:

To evaluate the effect of various drugs on the locomotor activity of rodents using an actophotometer.

Materials and Methods:

Materials:

1. Rodents (e.g., mice or rats)
2. Drugs for testing (e.g., CNS stimulants like amphetamine, CNS depressants like diazepam)
3. Actophotometer (digital or manual)
4. Control solution (e.g., saline)
5. Anesthetic agents (if required)
6. Personal protective equipment (gloves, lab coat, goggles)
7. Stopwatch
8. Data recording sheets

Method:

1. Preparation of Animals:

- Acclimate the rodents to the laboratory environment for at least one hour before the experiment.
- Handle the animals gently to minimize stress.

2. Baseline Measurements:

- Place each rodent in the actophotometer for a specified period (e.g., 5 minutes) to record baseline locomotor activity.

- The actophotometer counts the number of times the animal interrupts the light beams, giving a measure of locomotor activity.

3. Drug Administration:

- Administer the test drug intraperitoneally or orally, depending on the experimental design.

- Administer a control solution (e.g., saline) to the control group.

4. Observation and Data Recording:

- Place the animals in the actophotometer at specific time intervals (e.g., 15, 30, 60, 90 minutes) after drug administration.

- Record the locomotor activity (number of beam interruptions) during a fixed observation period (e.g., 5 minutes).

5. Post-Experiment Care:

- Monitor the animals until they fully recover from any drug effects.

- Provide appropriate post-experiment care as per ethical guidelines.

Results:

Sample Result Table:

Time (minutes)	Locomotor Activity (Beam Interruptions)		Observations
	Control Group	Test Group	
Baseline	300	310	
15	295	250	
30	290	200	
60	285	150	
90	280	100	

Note: This table assumes the test group is administered diazepam, a CNS depressant known to reduce locomotor activity.

Discussion:

1. Locomotor Activity:

- A decrease in beam interruptions indicates reduced locomotor activity, often due to CNS depressant effects of the drug.

- Conversely, an increase in beam interruptions would indicate increased activity, as seen with CNS stimulants.

2. Dose-Response Relationship:

- Higher doses of CNS depressants typically result in greater reductions in locomotor activity.

- Higher doses of CNS stimulants result in increased locomotor activity until toxic effects occur.

3. Behavioral Observations:

- Note any additional behavioral changes such as sedation, hyperactivity, stereotypic behaviors, or other side effects.

Conclusion:

The experiment demonstrates the impact of various drugs on locomotor activity using the actophotometer. Understanding these effects is crucial for evaluating the therapeutic and side effects of CNS-active drugs.

Precautions:

- Ensure ethical treatment of animals as per institutional guidelines.

- Use consistent conditions for all tests to ensure reliable results.

- Handle animals gently to minimize stress and variability in results.