AIM: Examining the Impact of Antianxiety and Depression Medications on Experimental Animals Using an Actophotometer

REFERENCE:

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INTRODUCTION:

The Actophotometer is a device used in pharmacology to evaluate the effects of drugs on the locomotor activity of experimental animals, such as mice. In this context, it is used to assess the activity of antianxiety and depression drugs. One of the substances often used in these experiments is caffeine, a central nervous system (CNS) stimulant known to increase locomotor activity.

REQUIREMENTS:

Apparatus: Actophotometer, weight machine, syringe, Mice Cage

Animal: Mice (20-30 gm)

Drugs: Chlorpromazine (0.3 mg/ml), (Caffeine 3 mg/kg)

PRINCIPLE:

The principle of the Actophotometer experiment is based on the influence of CNS acting drugs on the locomotor activities in man and animals. The CNS depressant drugs such as barbiturates and alcohol reduce the motor activity while the stimulants such as caffeine and amphetamines increase the activity. The locomotor activity can be an index of wakefulness (alertness) of mental activity. The locomotor activity (horizontal activity) can be easily measured using an actophotometer which operates on photoelectric cells which are connected in circuit with a counter. When the beam of light falling on the photo cell is cut off by the animal, a count is recorded.

Caffeine: Caffeine is a central nervous system (CNS) stimulant. In this experiment, it is used to increase the locomotor activity of the experimental animals. When administered, it leads to an

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increase in the motor activity, indicating its CNS stimulant property. This serves as a control substance to demonstrate the stimulant effect on the CNS.

Chlorpromazine: Chlorpromazine is a CNS depressant. It is used in this experiment to decrease the locomotor activity of the experimental animals. When administered, it leads to a reduction in the motor activity, indicating its CNS depressant property. This serves as a control substance to demonstrate the depressant effect on the CNS.

OBSERVATION TABLE:

Sr. No.	**Body Wt.**	**Treatment**	**Locomotor activity (scores) in 10 min.**		
			Before	**After treatment**	**% Change Activity**
		Mean			
		Mean			

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INFERENCE:

Sr. No.	Body Wt.	Treatment	Locomotor activity (scores) in 10 min.		
			Before	After treatment	% Change Activity
1.	20	Chlorpromazine	135	69	46.92
2.	22	Chlorpromazine	164	84	48.78
3.	25	Chlorpromazine	140	79	43.57
4.	20	Chlorpromazine	155	80	48.39
5.	23	Chlorpromazine	160	74	53.75
		Mean	**150.8**	**77.2**	
1.	20	Caffeine	135	185	37.03
2.	22	Caffeine	160	205	28.125
3.	25	Caffeine	140	189	35
4.	20	Caffeine	155	195	25.80
5.	23	Caffeine	160	200	25
		Mean	**150**	**194.8**	

*Observation table after completion of the experiment can be downloaded by clicking tab (RJPT SimLab)

DISCLAIMER: "The results provided here are only for reference or comparison purposes. Students are expected to perform the experiment and record their actual observations."

PROCEDURE:

1. Divide the mice into two groups of six each.
2. Weigh each mouse and give them a number.
3. Turn on the Actophotometer and place each mouse in the activity cage for 10 minutes. Record the initial activity score for all mice.
4. For Group 1, give each mouse chlorpromazine (1 ml/100 g) using a new syringe each time. After injecting, place the mouse in an empty cage and dispose of the syringe.
5. For Group 2, give each mouse Caffeine (3 mg/kg) using a new syringe each time. After injecting, place the mouse in an empty cage and dispose of the syringe.
6. Wait for 30 minutes.
7. Re-test each mouse from both groups for 10 minutes. Note the difference in activity before and after the drug administration.
8. Calculate the percentage decrease in motor activity.

RESULTS:

The results of the experiment are interpreted based on the change in locomotor activity. A reduction in locomotor activity score indicates the CNS depressant property of the drug, while an increase

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in locomotor activity score indicates the CNS stimulant property of the drug. In this case, chlorpromazine and caffeine were noted to produce CNS depressant and CNS stimulant effects respectively.

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