

AIM :

To study the effect of hepatic microsomal enzyme induction on the duration of action of pentobarbital sodium.

REQUIREMENTS :

Animal : Mice (20-25 g)

Solutions : 1. Phenobarbitone sodium (Dose: 50mg/kg ip, once a day for 5 days. Prepare a stock solution containing 5mg/ml of the drug and inject 1 ml/100 g of body weight of animal. Prepare fresh solution every day).

2. Pentobarbital sodium (Dose: 45mg/kg ip. Prepare a stock solution containing 4.5 mg/ml of the drug and inject 1ml/100 g of body weight of animal).

PRINCIPLE :

- The drugs which induce hepatic microsomal oxidative enzyme system enhance the metabolism of other drugs.
- As a result in the presence of an enzyme-inducer the duration of action of second drug will be reduced.
- This has significant clinical relevance because when more than one drug is administered at a time one drug may modify the action of another through the microsomal enzyme inducing property.

- The common drugs which induce hepatic microsomal enzyme system are phenobarbitone and meprobamate.
- Co-administration of any drugs with either of these drugs may affect the disposition of the second drug and therefore, the desired pharmacological effects.

1. Weigh and number the mice.



2. Divide them into two groups, each comprising of at least 6 mice.



3. To the first group inject phenobarbitone once daily for 5 days.



4. To the second group inject distilled water, similarly, for 5 days.



5. One hour after the last dose of phenobarbitone on the 5th day, inject Pentobarbital to both the groups.



6. Note the onset and duration of sleep due to pentobarbital in both the groups.

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OBSERVATIONS :

Sr. No.	Body weight (g)	Treatment	Dose (mg/Kg, i.p.)	Onset of action (min)	Duration of action (min)	reduction in sleep time	
1	20	Pentobarbital	45	10	25	37.5	
2	22			12	25		
3	22			9	28		
4	21			8	26		
5	20			8	25		
6	22			10	23		
Mean				9.5	25.33		
1	20	Phenobarbitone + Pentobarbital	50 + 45	8	15		
2	23			10	17		
3	22			9	16		
4	21			11	15		
5	20			10	16		
6	22			8	16		
Mean				9.33	15.83		

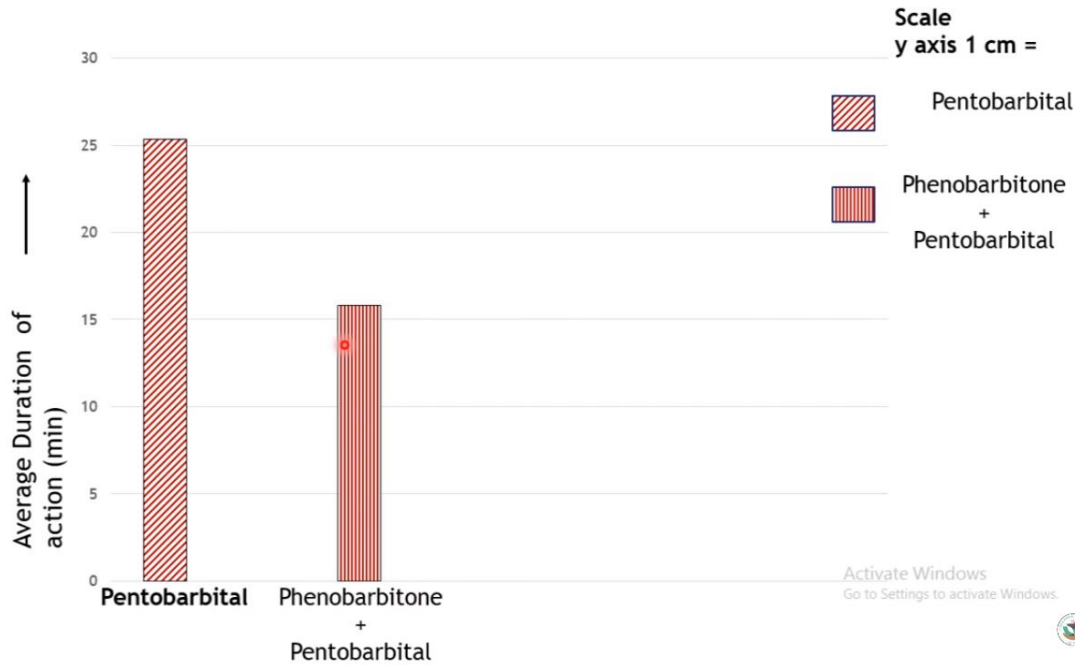
CALCULATIONS :

$$\begin{aligned} \% \text{ reduction in sleep time} &= \frac{\text{Duration of action without Phenobarbitone} - \text{Duration of action with Phenobarbitone}}{\text{Duration of action without Phenobarbitone}} \times 100 \\ &= \frac{25.33 - 15.83}{25.33} \times 100 \\ &= 37.5 \end{aligned}$$

GRAPH :

Plot a graph of

y axis : Average Duration of action (min) in Pentobarbital and Phenobarbitone + Pentobarbital treated group



INFERENCE :

The animals pretreated with phenobarbitone sleep for shorter duration of time as compared to animals treated with distilled water due to reduction in duration of action as a result of microsomal enzyme induction.

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REFERENCE

S. K. Kulkarni; Handbook of Experimental Pharmacology; 4th Edition; Vallabh Prakashan; 128 - 129.