Experiment no. 10

Aim: Effects of skeletal muscle relaxants using Rota-rod apparatus

References

1. Goodman, L. S., & Gilman, A. (2018). *Goodman and Gilman's The Pharmacological Basis of Therapeutics* (13th ed.). McGraw-Hill Education.
2. Dunham, N. W., & Miya, T. S. (1957). A note on a simple apparatus for detecting neurological deficit in rats and mice. *Journal of the American Pharmaceutical Association*, 46(3), 208–209.
3. Turner, R. A. (1965). *Screening Methods in Pharmacology*. Academic Press.

Objective

To evaluate the impact of skeletal muscle relaxant drugs on motor performance and coordination in rodents using the Rota-Rod apparatus.

Materials Required

- Laboratory rodents (e.g., mice or rats)
- Skeletal muscle relaxants (e.g., Diazepam, Baclofen)
- Rota-Rod apparatus
- Saline (control solution)
- Stopwatch
- Data recording sheets
- Anesthetic agents (if necessary)
- Personal protective equipment (PPE: gloves, goggles, lab coat)

Experimental Methodology

1. Animal Preparation: Acclimate animals to the lab environment for at least 1 hour before testing. Handle rodents gently to minimize stress and variability.

2. Training and Baseline Measurement: Train animals on the Rota-Rod for 2–3 days before experimentation. Record the baseline fall-off time (in seconds) to ensure familiarity and establish control performance.

3. Drug Administration: Administer the muscle relaxant either intraperitoneally (i.p.) or orally, based on the protocol. Inject the control group with the same volume of saline solution.

4. Post-Administration Testing

- At defined intervals (15, 30, 60, 90 minutes post-dose), place each animal on the Rota-Rod.
- Record the fall-off time at each interval.
- Maintain consistent speed of rotation across all tests.
- If a rodent falls off three consecutive times without staying for the minimum period, note as "loss of coordination."

5. Post-Experiment Monitoring: Observe animals for recovery from drug effects. Provide proper housing and care in accordance with animal ethics guidelines.

Sample Data Table

(*Assuming Diazepam as the test drug*)

Time (minutes)	**Fall-Off Time (seconds)**	**Observations**
	Control Group	Test Group
Baseline	120	120
15	115	90
30	110	60
60	108	40
90	105	35

Discussion

1. Fall-Off Time: A reduction in fall-off time in the test group indicates impaired motor coordination, confirming the muscle relaxant effect. The control group remains relatively stable, demonstrating that changes in the test group are drug-induced.

2. Dose-Response Relationship: The magnitude of coordination loss often correlates with the dose and pharmacodynamics of the drug administered.

3. Additional Observations: Record any sedative effects, behavioral changes, or physical signs of toxicity.

Conclusion

The Rota-Rod apparatus effectively demonstrates the muscle relaxant properties of pharmacological agents by evaluating their effects on motor balance and coordination. This method is useful for preclinical screening of CNS depressant drugs and skeletal muscle relaxants.

Precautions

- Follow all ethical and institutional animal care guidelines.
- Ensure consistent rod speed across all tests.
- Handle animals carefully to reduce stress-induced variability.
- Use aseptic techniques for drug administration.