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Routes of Administration - Record Simulation

Practical 8 - Pharmacology simulation and data practical

Aim

To compare administration-route records without performing live dosing.

Principle

Route affects absorption, onset and exposure; feasibility and welfare depend on species, formulation and trained technique. A computed amount does not establish a safe route, concentration or volume.

Materials and Requirements

- Supplied anonymised teaching traces or datasets
- Study design, controls, units and instrument calibration records
- Ethics and welfare records where the original study involved animals
- Approved method or teaching-data pack and a dated record sheet

Procedure

1. Define the preparation or dataset, study question and method version. Record identities, units and the criteria to be used before examining the outcome.
2. Identify the study question, experimental unit, controls and original approval or data provenance. This notes exercise uses records or simulation; it is not authorisation to perform animal procedures.
3. Review supplied oral, intravenous, intraperitoneal, subcutaneous and other authorised-route records, noting their scientific purpose.
4. Check formulation identity, route, timing, weight basis and record consistency against the original authorised instruction.
5. Use a simulator or diagram to map documentation requirements and identify missing training, compatibility or monitoring evidence.
6. Summarise independent experimental units, variability, exclusions and limitations; retain all original traces and data.
7. Retain the original observations and calculations. State deviations, missing information and the limits of the conclusion; do not replace measured values with expected results.

Observations and Record

Enter actual measurements or the supplied teaching data. Record the method, material identity, conditions and units.

Group / preparation	Condition / time	Raw endpoint	Derived result / interpretation
Vehicle / baseline	Record	Enter	Evaluate
Reference condition	Record	Enter	Evaluate
Test condition	Record	Enter	Calculate

Calculations

- For checking an existing authorised order: amount = stated amount per unit body mass x recorded body mass
- Volume = authorised amount / preparation concentration

Worked Example

Illustrative dimensional check: a fictional record requires 0.50 mg from a 2.0 mg/mL preparation, giving 0.25 mL mathematically. This is not a recommended route, animal dose or allowable volume.

Result and Interpretation

• Deliver a route-comparison and documentation table, including the limitations of extrapolating between routes.

Precautions

• Apply replacement, reduction and refinement to study planning.
• Any live work requires the current institutional and Indian CCSEA/IAEC framework, trained staff and an approved protocol.
• Do not convert a teaching calculation into an unapproved animal or patient procedure.

Viva Questions and Answers

Does equal dose give equal exposure across routes?

Absorption and first-pass effects can differ.

Why check concentration?

It determines the volume associated with the recorded amount.

Can a calculation establish welfare suitability?

Species-specific authorised procedures and supervision are separately required.

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