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Rat ECG Interpretation

Practical 10 - Pharmacology simulation and data practical

Aim

To measure and interpret supplied rat ECG intervals with species-appropriate context.

Principle

Pressure and ECG are different signals. Calibration, baseline, timing, species and measurement method determine valid interpretation; a pressure waveform alone does not identify an arrhythmia.

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 traces and calibration, anaesthesia and source-study records without conducting invasive recording.
4. Measure systolic and diastolic pressures and rate over defined stable windows.
5. Identify ECG waves and intervals only where signal quality and the species-specific reference permit.
6. Compare matched conditions and document artifacts, baseline changes and independent-unit variation.
7. Summarise independent experimental units, variability, exclusions and limitations; retain all original traces and data.
8. 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

- Pulse pressure = systolic - diastolic pressure
- Approximate MAP = diastolic + (systolic - diastolic)/3 when the approximation is appropriate

Worked Example

Illustrative pressure 120/80 mmHg gives pulse pressure 40 mmHg and approximate MAP 93.3 mmHg.
The example is arithmetic, not a normal range for an anaesthetised animal or a clinical diagnosis.

Rat ECG worksheet

- Record lead configuration, time and voltage calibration, source-study anaesthesia, temperature and rate.
- Measure RR, PR, QRS and QT where identifiable; use the justified species- and rate-specific interpretation rather than importing human diagnostic cutoffs.
- Illustrative RR = 0.15 s gives rate 400/min. It is a timing calculation, not a claimed normal value.

Result and Interpretation

- Report the measured signals and limitations rather than applying human reference ranges to all species.

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

Why calibrate pressure?

Raw transducer output needs a valid pressure conversion.

Is the MAP approximation universal?

Waveform and rate can make it unsuitable; direct integration may be needed.

Why review ECG separately?

Electrical timing and pressure are distinct measurements.

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