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Isolated-Heart Trace Interpretation

Practical 8 - Pharmacology simulation and data practical

Aim

To interpret supplied isolated-heart rate and contraction traces.

Principle

An isolated-heart preparation measures responses under its recorded perfusion and experimental conditions. Rate and contractile amplitude are distinct endpoints, and baseline drift can confound apparent effects.

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. Use supplied traces only; identify species, perfusion record, temperature, calibration and timing without preparing tissue.
4. Measure baseline and defined response windows with matched time and vehicle controls.
5. Calculate rate from the calibrated time axis and amplitude from the appropriate transducer scale.
6. Compare effects with recovery or washout records and discuss preparation viability and model limitations.
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

- Heart rate (beats/min) = counted beats / observed seconds x 60
- Amplitude change (%) = (test - baseline)/baseline x 100

Worked Example

Illustrative 12 beats in 6 s give 120 beats/min. Amplitude changing from 10 to 12 calibrated units gives +20%. Do not infer a patient treatment effect from the trace.

Result and Interpretation

• Provide labelled trace segments, rate and amplitude results and control interpretation.

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

What is chronotropy?

An effect on heart rate.

What is inotropy?

An effect on contractile force under the defined measurement.

Why use time controls?

Preparation behaviour can drift independently of the test condition.

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