Half-life from Blood and Urine Data

Experiment 15 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To analyse the assigned half-life from blood and urine data experiment or teaching dataset.

Principle

A terminal blood-concentration slope and urinary unchanged-drug excretion-rate slope can estimate elimination under appropriate assumptions. Urine concentration alone is not an excretion rate.

Requirements

- Institution-assigned experimental method and coded in-vitro or supplied pharmacokinetic data.
- Calibrated analytical readings or supplied concentration table, calculator and plotting tools.

Procedure

1. Blood dataset

Fit the valid terminal ln(concentration)-time region and record its slope.

2. Urine dataset

Calculate interval unchanged amount and excretion rate; assign it to the interval midpoint as the specified method requires.

3. Estimate

Fit the appropriate terminal log-rate region and compare constants with the blood result.

4. Assess differences

Consider collection, model and measurement limitations before attributing a difference to a real biological change.

Observations and Record

Record component	Value
Terminal blood slope	_____
Urine interval amount / duration	_____
Terminal excretion-rate slope	_____
Ke / half-life	_____
Agreement / limitation	_____

Worked Example

The numbers below are illustrative; enter your own observations in the record.

- Interval excretion rate = interval unchanged amount / interval duration. For the appropriate terminal first-order region, Ke = −slope of ln(rate) versus time. t1/2 = 0.693/Ke.
- Example: unchanged amount 4 mg over 2 h gives 2 mg/h. A valid terminal slope of −0.1 h−1 gives a half-life of 6.93 h.

Result

Dataset / method: ____. Calculated outcome and units: ____. Comparison: ____. Assumption or limitation: ____.

Precautions

- Record units, sampling times, dilution and the assumptions of the selected model.
- Use supplied human/animal data or the approved in-vitro teaching method; no new human/animal dosing or surgical preparation is prescribed.
- Keep an illustrative calculation separate from the actual result and do not use it as an individual patient dosing instruction.

Viva Questions and Answers

1. Why state model assumptions?

The derived parameter is valid only when the data and model satisfy them.

2. What accompanies a pharmacokinetic result?

Its units, dataset, calculation method and relevant limitation.

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