Renal Clearance Calculation

Experiment 16 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To analyse the assigned renal clearance calculation experiment or teaching dataset.

Principle

Renal clearance relates unchanged-drug excretion rate to plasma concentration on a matching time basis. It differs from the total elimination clearance.

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. Read records

Enter urinary concentration, collection volume/duration and the matching plasma concentration.

2. Calculate urine flow

Divide collection volume by duration using suitable units.

3. Calculate clearance

Divide the unchanged-drug excretion rate by the matched plasma concentration.

4. Assess

Check timing, completeness, units and whether the drug was measured unchanged before interpreting the value.

Observations and Record

Record component	Value
Urine concentration	_____
Collection volume / duration	_____
Plasma concentration / timing	_____
Excretion rate	_____
Renal clearance	_____

Worked Example

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

- CLrenal = Curine × urine flow / Cplasma. Concentration units must match.
- Example: Curine = 0.10 mg/mL, flow = 1 mL/min and Cplasma = 0.002 mg/mL give CLrenal = 50 mL/min.

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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