First Hope

COMPLETE NOTES

Click here to visit our website

PHARMACY PRACTICAL NOTES

Complete subject and semesters are available on FirstHope app only.

Scan or click here

Click here to get the app >

Available on Google Play

JOIN THE FIRSTHOPE COMMUNITY

Join our Telegram channel

Click here to join Telegram >

Scan or click here

@FirstHopeNotes

Instagram

@firsthope.official

Click here to follow >

YouTube channel

FirstHope-Pharmacy / Live streams

Click here to watch >

WhatsApp channel

Follow FirstHope on WhatsApp

Click here to join >

FirstHope website

firsthope.co.in

Click here to visit >

B.Pharm / D.Pharm / M.Pharm / Pharm.D

Complete subjects and semesters are available in the FirstHope app.

Comparison of Protein Binding Between Two Drugs

Practical 8 - Practical study

Aim

To compare unbound fractions of two model drugs using an approved equilibrium-dialysis or ultrafiltration dataset.

Principle

Only unbound concentration is used in the binding-fraction calculation. Membrane adsorption, volume shifts, equilibration and nonspecific losses can bias a separation; measured recovery must therefore accompany the binding estimate.

Materials and Requirements

- Supplied total and unbound concentration data or an approved nonclinical model
- Qualified separation system, protein matrix and protein-free controls
- Suitable assay and recovery controls
- 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. Record protein concentration, buffer, pH, temperature, incubation condition and separation method for both drugs.
3. Measure total concentration and the separated unbound fraction, correcting for dilution and volume changes according to the method.
4. Evaluate membrane adsorption and mass balance with appropriate protein-free and recovery controls.
5. Calculate unbound and bound fractions for independent preparations at matched total concentrations.
6. 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.

Drug / control	Total concentration	Unbound concentration	Unbound / bound fraction
Drug A	Enter mg/L	Enter mg/L	Calculate
Drug B	Enter mg/L	Enter mg/L	Calculate
Protein-free recovery	Input amount	Recovered amount	Calculate

Calculations

- Unbound fraction fu = Cu / Ctotal
- Bound fraction = 1 - fu; bound (%) = 100 x (1 - fu)

Worked Example

Illustrative A: total 10 mg/L, unbound 1 mg/L gives fu = 0.10 and 90% bound. B: total 10 mg/L, unbound 3 mg/L gives fu = 0.30 and 70% bound.

These comparisons apply to the measured conditions. Concentration-dependent binding and different clinical matrices can change the result.

Result and Interpretation

- Report replicate variability, recovery and the conditions of the comparison.
- Do not convert a binding result directly into a clinical dose recommendation.

Precautions

- Check for protein leakage and membrane adsorption.
- Avoid interpreting poor recovery as binding.
- Keep protein and separation conditions matched.

Viva Questions and Answers

What is fu?

The unbound concentration divided by the total concentration.

Why use a protein-free control?

It helps detect nonspecific losses to the device.

Is binding always concentration independent?

Saturable binding can make the fraction change with concentration.

First Hope

COMPLETE NOTES

Click here to visit our website

PHARMACY PRACTICAL NOTES

Complete subject and semesters are available on FirstHope app only.

Scan or click here

Click here to get the app >

Available on Google Play

JOIN THE FIRSTHOPE COMMUNITY

Join our Telegram channel

Click here to join Telegram >

Scan or click here

@FirstHopeNotes

Instagram

@firsthope.official

Click here to follow >

YouTube channel

FirstHope-Pharmacy / Live streams

Click here to watch >

WhatsApp channel

Follow FirstHope on WhatsApp

Click here to join >

FirstHope website

firsthope.co.in

Click here to visit >

B.Pharm / D.Pharm / M.Pharm / Pharm.D

Complete subjects and semesters are available in the FirstHope app.