Case Study Puzzles – Pharmacology Unit 1

* Introduction & scope of pharmacology

* Routes of drug administration (advantages, disadvantages)

* Absorption, bioavailability, distribution

* Biotransformation & metabolism of drugs

* Excretion routes

* General mechanisms of drug action & factors modifying drug action

1. Route of Administration

A 70-year-old stroke patient has difficulty swallowing tablets. The doctor suggests bypassing the oral route to ensure rapid action of the drug.

Puzzle: Which alternative route of administration would be best, and why?

2. Drug Absorption

A patient takes an antacid along with an oral antibiotic. Later, the antibiotic shows poor therapeutic effect.

Puzzle: How did the antacid interfere with the absorption of the antibiotic?

3. Bioavailability

A hypertensive patient is prescribed propranolol orally. Only 30% of the drug reaches systemic circulation due to first-pass metabolism.

Puzzle: What is this phenomenon called, and which organ is mainly responsible?

4. Drug Distribution

A malnourished patient with very low plasma albumin is given a highly protein-bound drug like warfarin.

Puzzle: What risk does this patient face, and why?

5. Drug Metabolism

A patient with chronic liver disease is prescribed diazepam. He shows prolonged sedation.

Puzzle: Which phase of drug metabolism is impaired, and why does this prolong the drug's action?

6. Enzyme Induction & Inhibition

A patient taking warfarin develops bleeding after starting erythromycin.

Puzzle: Which pharmacokinetic process has been altered, and how did erythromycin interact with warfarin?

7. Drug Excretion

A patient with chronic kidney disease is given gentamicin (an aminoglycoside antibiotic). Soon, toxicity symptoms appear.

Puzzle: Why did gentamicin accumulate in this patient?

8. Mechanism of Drug Action

A patient with hypertension is treated with propranolol, a beta-blocker, which reduces heart rate and blood pressure.

Puzzle: Which type of receptor-mediated mechanism explains propranolol's action?

9. Factors Modifying Drug Action

A 5-year-old child and a 65-year-old man are both given the same dose of morphine. The child quickly metabolizes it, while the elderly patient shows toxicity.

Puzzle: Which factors are responsible for this difference in drug action?

10. Drug Interaction

A patient on antihypertensive drugs consumes alcohol and experiences severe dizziness and a sudden drop in blood pressure.

Puzzle: Which type of drug interaction has occurred here, and what is the underlying mechanism?