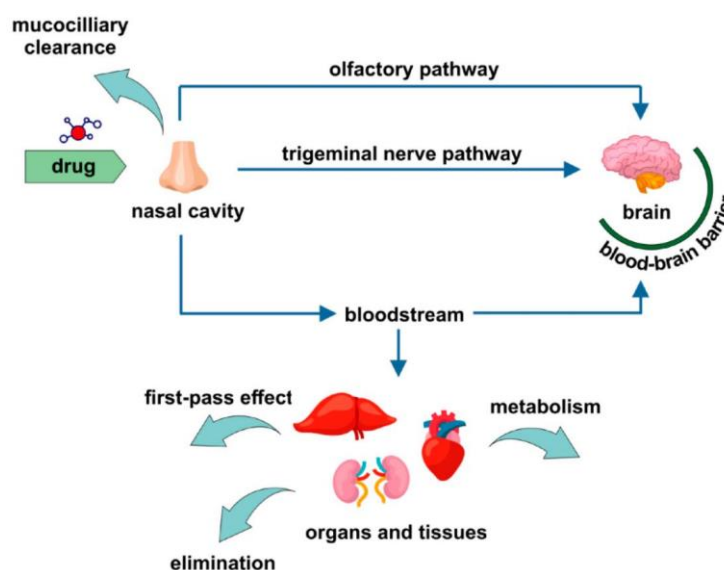


**BP 604 T. BIOPHARMACEUTICS AND PHARMACOKINETICS**

**UNIT 1**

**CASE STUDY PUZZLES**

**11. The Poor Nasal Absorption**



A nasal spray intended for rapid migraine relief fails to provide quick action during severe nasal congestion. Explain how physiological conditions affect non-per oral drug absorption.

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**12. The Pediatric Distribution Puzzle**

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	Drug/Dosage form	Age differences	PK alterations
<b>Absorption</b>	Poorly soluble drugs Sustained release formulations	 ↓ Intestinal transit and the bile concentration	↓ $C_{max}$ and ↓ AUC
	Weak acids/ bases	 ↓ Gastric pH	↑ $C_{max}$ for weak acids ↓ $C_{max}$ for weak bases
<b>Distribution</b>	Hydrophilic drugs	 ↑ $V_d$	
	Lipophilic drugs	↑ Body fat	↑ $V_d$
	Highly protein-bound drugs	 ↓ Plasma proteins	↑ the free fraction of drug in plasma ↑ $V_d$
<b>Metabolism</b>	Extensively metabolized	 Liver size and ontogeny	↑ hepatic clearance of drugs
	Drugs metabolism by specific pathways e.g., UDP glucuronosyl transferase		
	Drugs that are metabolized within the gut	 Bacterial colonization of the intestine	↑ $C_{max}$ and ↑ AUC
<b>Excretion</b>	Drugs that are excreted in urine	 Larger relative size of kidney	↑ renal clearance in infants and children
	Drugs that are susceptible to tubular transport	 Ontogeny of tubular transporters	↑ renal clearance of drugs

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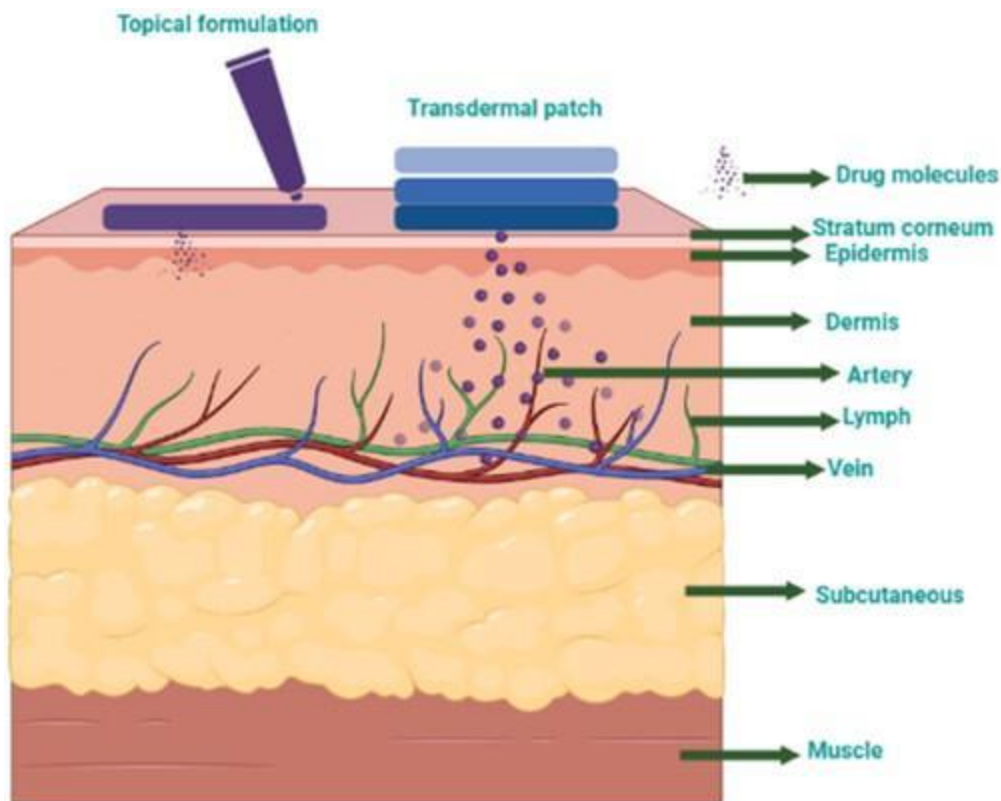
A water-soluble antibiotic requires a higher dose per kilogram in infants than in adults. Explain how body water composition affects drug distribution in pediatric patients.

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**13. The Delayed Transdermal Effect**

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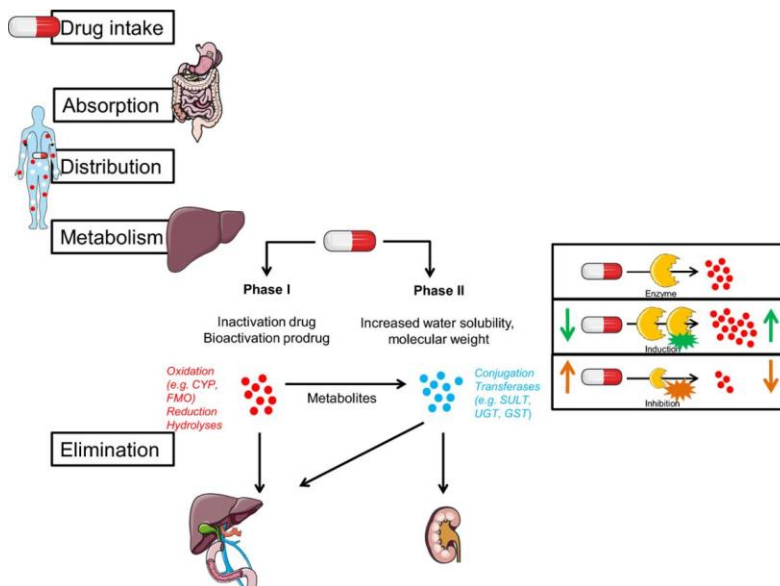
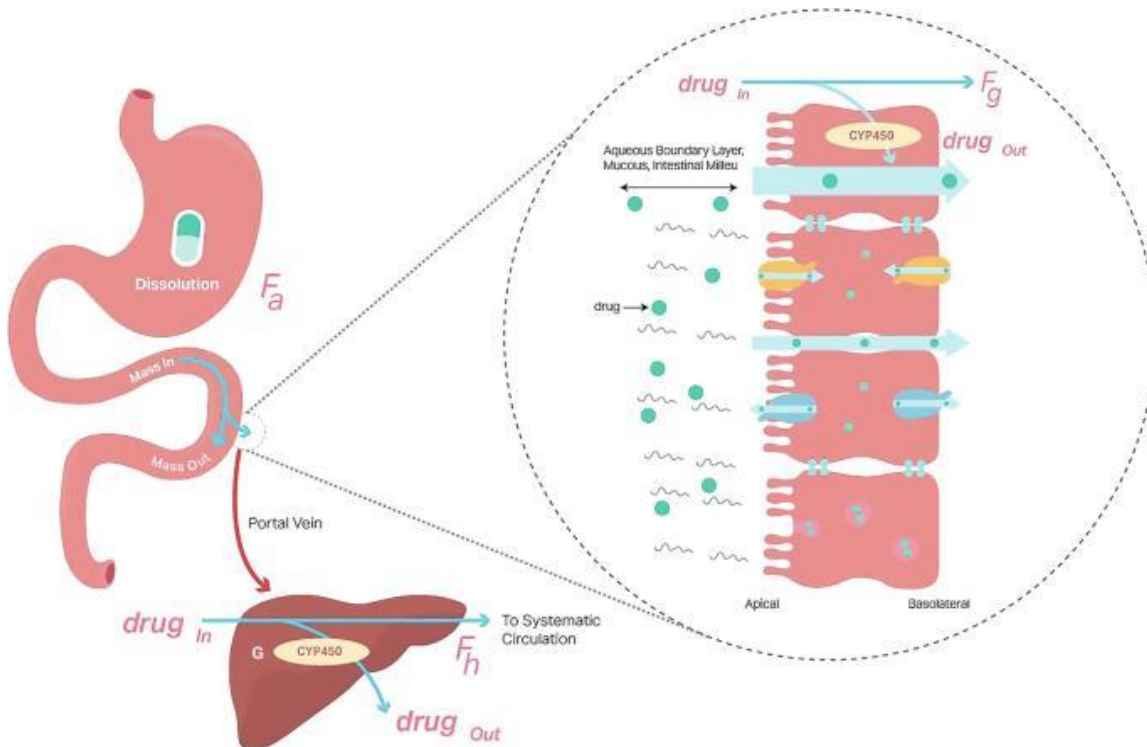
A patient using a transdermal patch notices delayed therapeutic effect during cold weather. Explain how skin blood flow influences drug absorption.

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**14. The First-Pass Escape**

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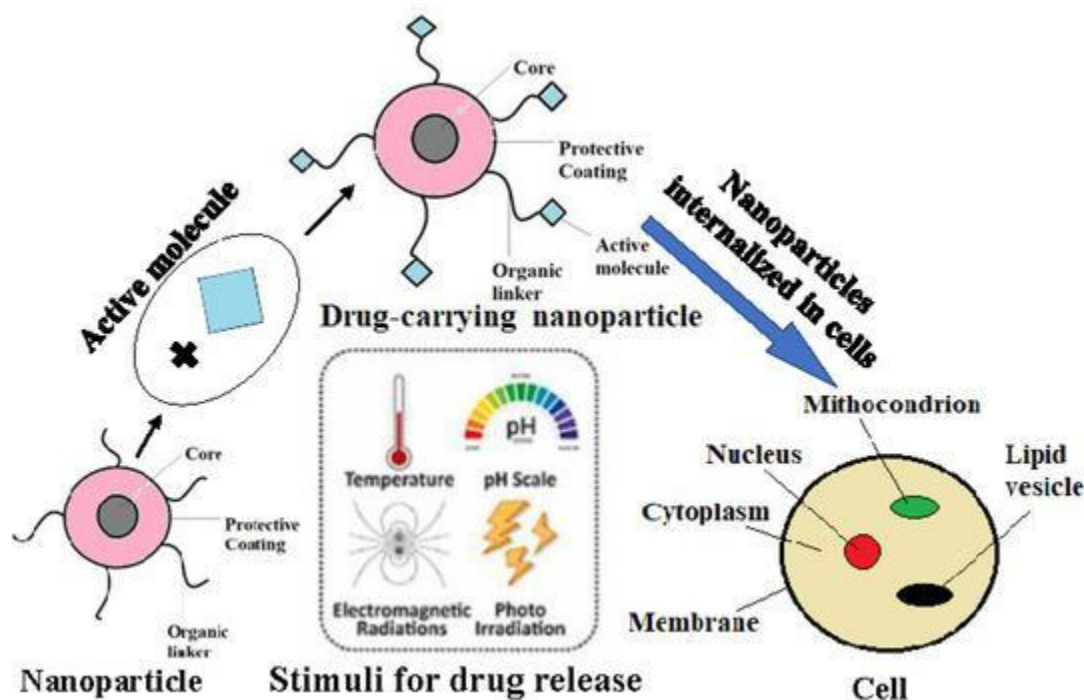
A drug administered orally shows poor bioavailability, but the same drug administered rectally provides better therapeutic action. Discuss the role of first-pass metabolism.

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15. The Tissue Binding Trap



A drug accumulates in bone tissue and continues producing effects even after therapy is discontinued. Explain the role of tissue protein binding in prolonged drug action.