

PHARMACIST BOOSTER - 13



PHARMACOLOGY

ADVERSE DRUG EFFECTS

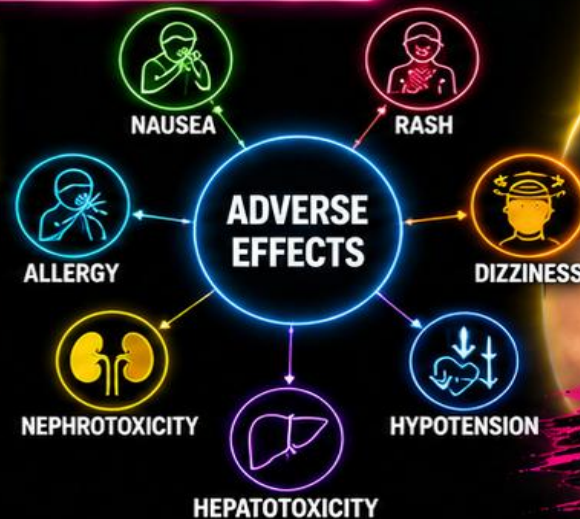


Important for RRB, AIIMS,
ESIC, SEPOY, CISF, GSSSB,
DSSSB, SSC, CGHS etc.



Concept + Revision
कॉन्सेप्ट + रिवीजन

हिंदी + English में



Vijay Sir

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ADVERSE DRUG EFFECTS

Overview / परिचय

ENGLISH



DEFINITION:

Noxious or **unintended** effects produced by drugs.

KEY SECTIONS:

- 1 Predictable and **Unpredictable** reactions
- 2 **ABCDEF** classification of ADRs
- 3 Types of **hypersensitivity** reactions
- 4 Important terms of **dependence** and **abuse**
- 5 **Antidotes** of poisoning
- 6 Human **teratogenic** drugs



Important for **Pharmacology** quick revision.



IMMUNE REACTION
ALLERGY



HYPERSENSITIVITY
REACTIONS



ANTIDOTES OF
POISONING



TERATOGENIC
EFFECTS

हिंदी



परिभाषा:

दवाओं से उत्पन्न **हानिकारक** या **अनचाहे** प्रभाव।

मुख्य बिंदु:

- 1 पूर्वानुमेय एवं **अप्रत्याशित** प्रतिक्रियाएँ
- 2 **ADR** का **A-F** वर्गीकरण
- 3 अतिसंवेदनशीलता प्रतिक्रियाओं के प्रकार
- 4 निर्भरता एवं दुरुपयोग के महत्वपूर्ण शब्द
- 5 विषाक्तता के प्रतिविष
- 6 मानव **टेराटोजेनिक** औषधियाँ



Pharmacology quick revision के लिए महत्वपूर्ण।



Quick Revision Topics: **ADRs** • **Hypersensitivity** • **Antidotes** • **Teratogenic Drugs**

PREDICTABLE vs UNPREDICTABLE REACTIONS

Type A and Type B / प्रकार A एवं प्रकार B

ENGLISH

1 Type A / Predictable / Augmented

- 1 Dose-related and predictable
- 2 Seen with therapeutic use
- 3 Side effects: unwanted effects at therapeutic dose
- 4 Secondary effects: primary action causes other effects
- 5 Toxic effects: due to overdose or chronic use

2 Type B / Unpredictable / Bizarre

- 1 Non-dose-related and unpredictable
- 2 Not related to pharmacological action
- 3 Drug allergy: immune-mediated local or systemic response
- 4 Idiosyncrasy: genetically determined unusual drug response

TYPE A

PREDICTABLE /
AUGMENTED

THERAPEUTIC DOSE



DESIRED
THERAPEUTIC
EFFECT



SIDE EFFECTS



MAY OCCUR AT
THERAPEUTIC DOSE

VS

TYPE B

UNPREDICTABLE /
BIZARRE

IMMUNE RESPONSE
(ALLERGY)



UNPREDICTABLE
REACTIONS



NOT RELATED TO DOSE /
NOT PREDICTABLE

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1 प्रकार A / पूर्वानुमेय / ऑगमेंटेड

- 1 डोज से संबंधित और पूर्वानुमेय
- 2 चिकित्सीय उपयोग में दिखाई देती है
- 3 Side effects: चिकित्सीय मात्रा पर अनचाहे प्रभाव
- 4 Secondary effects: मुख्य क्रिया से अन्य प्रभाव
- 5 Toxic effects: ओवरडोज या दीर्घकालीन उपयोग से

2 प्रकार B / अप्रत्याशित / बिज़ार

- 1 डोज से असंबंधित और अप्रत्याशित
- 2 औषधि की सामान्य pharmacological क्रिया से संबंधित नहीं
- 3 Drug allergy: प्रतिरक्षा-जनित स्थानीय या systemic प्रतिक्रिया
- 4 Idiosyncrasy: आनुवंशिक रूप से असामान्य प्रतिक्रिया



Type A = Predictable • Type B = Bizarre

ADR CLASSIFICATION (A-F)

Augmented to Failure of Therapy / A से F वर्गीकरण

ENGLISH

A

A – Augmented:

Dose-dependent, predictable

Example: hypoglycemia from sulfonylureas



B

B – Bizarre:

Dose-independent, unpredictable

Example: penicillin allergy



C

C – Chronic:

Occurs with long-term use

Example: peptic ulcer from NSAIDs



D

D – Delayed:

Appears after long time

Example: teratogenicity from thalidomide



E

E – End-of-treatment:

Withdrawal after stopping drug

Example: morphine withdrawal



F

F – Failure of therapy:

Lack of expected therapeutic effect

Example: ineffective antibiotic treatment



A



B



C



D



E



F



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A

A – Augmented:

डोज-निर्भर, पूर्वानुमेय

उदाहरण: सल्फोनाइलयूरिया से hypoglycemia



B

B – Bizarre:

डोज-स्वतंत्र, अप्रत्याशित

उदाहरण: penicillin allergy



C

C – Chronic:

लंबे समय के उपयोग से

उदाहरण: NSAIDs से peptic ulcer



D

D – Delayed:

लंबे समय बाद दिखाई देती है

उदाहरण: thalidomide से teratogenicity



E

E – End-of-treatment:

दवा बंद करने पर withdrawal effects

उदाहरण: morphine withdrawal



F

F – Failure of therapy:

अपेक्षित therapeutic effect का अभाव

उदाहरण: ineffective antibiotic treatment



Remember: A • B • C • D • E • F = Key ADR Classification



HYPERSENSITIVITY REACTIONS

Type I to Type IV / प्रकार I से प्रकार IV

ENGLISH

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1  **Type I – Immediate / Anaphylactic**

- Humoral
- Soluble antigen
- Mediator: **IgE**
- Effector: **mast cell**
- **Examples:** anaphylaxis, asthma, atopic dermatitis

2  **Type II – Cytotoxic**

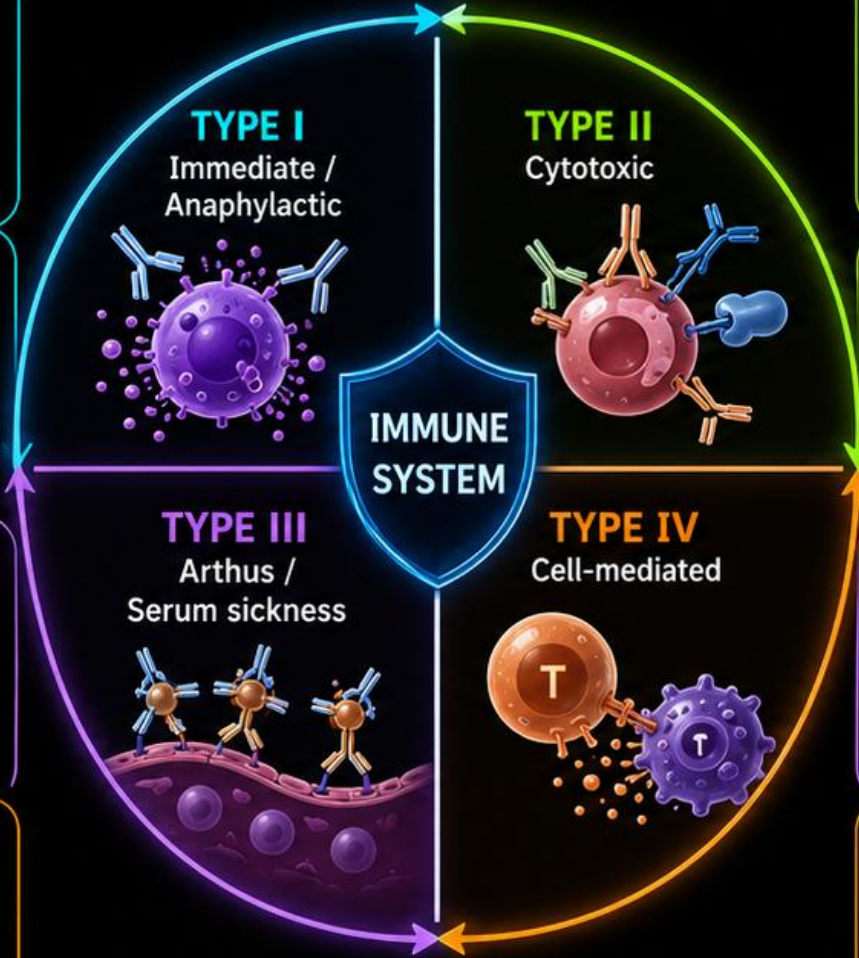
- Humoral
- Cell-surface antigen
- Mediator: **IgG, IgM**
- Effector: **ADCC + complement** mediated cytotoxicity
- **Examples:** transfusion reaction, Rh incompatibility, hemolytic anemia

3  **Type III – Arthus / Serum sickness**

- Humoral
- Soluble antigen
- Mediator: **Ag-Ab complex** and **IgG**
- Effector: **complement activation + inflammation**
- **Examples:** Arthus reaction, serum sickness, rheumatoid arthritis, Stevens-Johnson syndrome

4  **Type IV – Cell-mediated**

- Delayed
- Soluble or bound antigen
- Mediator: **T-cell**
- Effector: **macrophage activation / cell cytotoxicity**
- **Examples:** tuberculin test, leprosy, dermatitis



1  **प्रकार I – तात्कालिक / अनफिलिनटिक**

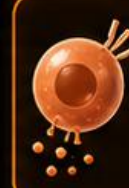
- Humoral
- Soluble antigen
- Mediator: **IgE**
- Effector: **mast cell**
- **उदाहरण:** anaphylaxis, asthma, atopic dermatitis

2  **प्रकार II – Cytotoxic**

- Humoral
- Cell-surface antigen
- Mediator: **IgG, IgM**
- Effector: **ADCC + complement** mediated cytotoxicity
- **उदाहरण:** transfusion reaction, Rh incompatibility, hemolytic anemia

3  **प्रकार III – Arthus / serum sickness**

- Humoral
- Soluble antigen
- Mediator: **Ag-Ab complex** और **IgG**
- Effector: **complement activation + inflammation**
- **उदाहरण:** Arthus reaction, serum sickness, rheumatoid arthritis, Stevens-Johnson syndrome

4  **प्रकार IV – Cell-mediated**

- Delayed
- Soluble या bound antigen
- Mediator: **T-cell**
- Effector: **macrophage activation / cell cytotoxicity**
- **उदाहरण:** tuberculin test, leprosy, dermatitis

I = IgE • II = Cytotoxic • III = Immune Complex • IV = T-cell

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RECOMMENDED FOR YOUR PREPARATION





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IMPORTANT TERMS - I

Dependence, Psychology, Reinforcement / निर्भरता, मनोवैज्ञानिक निर्भरता, Reinforcement



1 Drug Dependence

- 1 Drug use becomes **more important** than **basic needs**
- 2 Often starts with **euphoria, recreation**, or **withdrawal** from **reality**



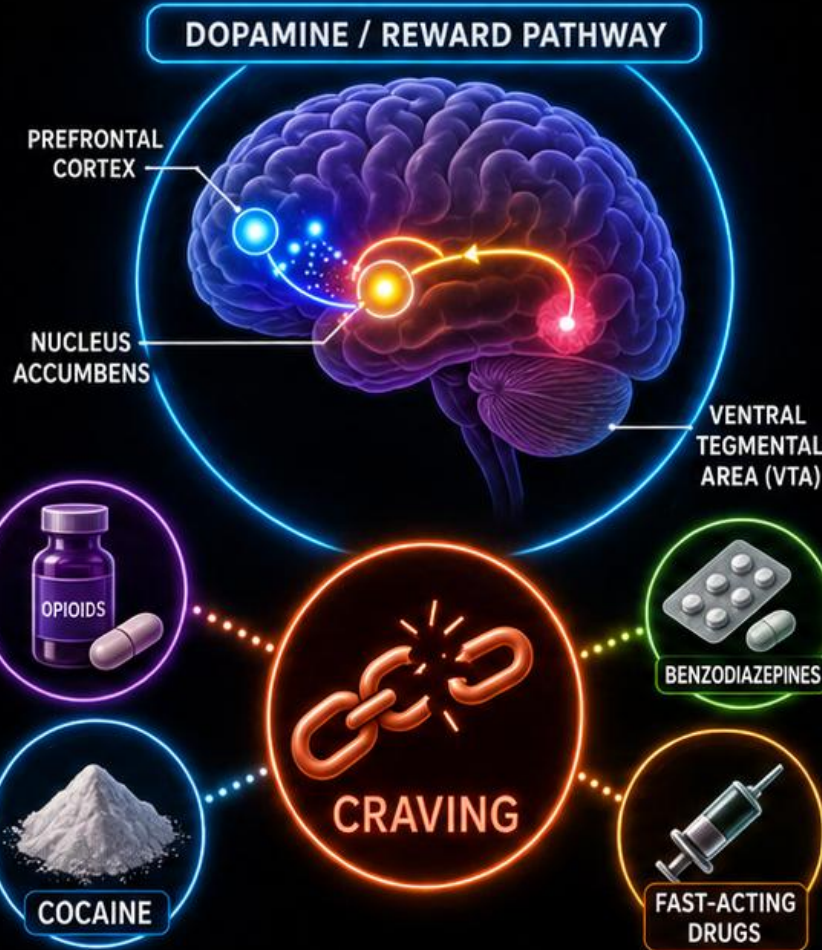
2 Psychological Dependence

- 1 Belief that **well-being** is possible **only with the drug**
- 2 **Emotional discomfort** occurs without it
- 3 Desire progresses to **craving**



3 Reinforcement

- 1 **Pleasurable** effect that drives **repetitive use**
- 2 **Opioids** and **cocaine** = **strong** reinforcers
- 3 **Benzodiazepines** = **weak** reinforcers
- 4 **Fast-acting** drugs are **more** reinforcing



1 Drug Dependence

- 1 जब **drug use** व्यक्तिगत संतुष्टि हेतु **basic needs** से अधिक महत्वपूर्ण हो जाए
- 2 शुरुआत **euphoria, recreation** या **reality** से **escape** से हो सकती है



2 Psychological Dependence

- 1 यह विश्वास कि दवा के बिना **well-being** संभव नहीं
- 2 दवा न मिलने पर **emotional discomfort**
- 3 इच्छा धीरे-धीरे **craving** बन जाती है



3 Reinforcement

- 1 आनंददायक प्रभाव जो बार-बार उपयोग को बढ़ाता है
- 2 **Opioids** और **cocaine** = **strong** reinforcers
- 3 **Benzodiazepines** = **weak** reinforcers
- 4 **Fast-acting** drugs अधिक reinforcing होते हैं



Dependence • Craving • Reinforcement

IMPORTANT TERMS - II

Physical Dependence, Abuse, Addiction / Physical dependence, abuse, addiction

ENGLISH



PHYSICAL DEPENDENCE

- 1 Physiological adaptation requiring continuous drug presence
- 2 Withdrawal / abstinence syndrome on sudden discontinuation



DRUG ABUSE

- 1 Excessive or unapproved use deviating from social norms
- 2 Continuous use = regular use for constant effect
- 3 Occasional use = recreation or high



DRUG ADDICTION

- 1 Compulsive use with loss of control and drug-seeking behavior
- 2 Relapse common even after withdrawal
- 3 Can occur without physical dependence (e.g., amphetamine, cocaine, LSD)



DRUG HABITUATION

- 1 Mild dependence; withdrawal causes slight discomfort



PHYSIOLOGICAL DEPENDENCE

- 1 Increased amount of drug needed to produce desired effect



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PHYSICAL DEPENDENCE

- 1 शरीर की ऐसी adaptation जिससे drug की निरंतर उपस्थिति आवश्यक हो
- 2 दवा अचानक बंद करने पर withdrawal / abstinence syndrome



DRUG ABUSE

- 1 दवा का अत्यधिक या अनुचित उपयोग जो social norms से अलग हो
- 2 Continuous use = लगातार उपयोग
- 3 Occasional use = recreation या high के लिए उपयोग



DRUG ADDICTION

- 1 नियंत्रण खोकर compulsive drug use और drug-seeking behavior
- 2 Withdrawal के बाद भी relapse सामान्य
- 3 Physical dependence के बिना भी हो सकता है (amphetamine, cocaine, LSD)



DRUG HABITUATION

- 1 हल्की निर्भरता; withdrawal पर केवल हल्की असुविधा



PHYSIOLOGICAL DEPENDENCE

- 1 वांछित प्रभाव हेतु मात्रा बढ़ानी पड़ती है



Abuse

Addiction

Withdrawal

Habitation

ANTIDOTES OF POISONING – PART I

1 to 10 / 1 से 10

ENGLISH



ANTIDOTE (ENGLISH)

- 1 **Acetaminophen** — N-acetylcysteine, Methionine
- 2 **Aspirin** — Sodium bicarbonate
- 3 **Anticoagulant** — Vitamin K
- 4 **Atropine** — Physostigmine
- 5 **Arsenic** — Dimercaprol
- 6 **Benzodiazepines** — Flumazenil
- 7 **Beta blocker** — Glucagon + Calcium
- 8 **Cyanide** — Hydroxycobalamin / amyl nitrite / sodium thiosulfate / sodium nitrite
- 9 **Calcium channel blocker** — Calcium
- 10 **Carbon monoxide** — Hyperbaric oxygen



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विषहर (ANTIDOTE)

- 1 **Acetaminophen** — N-acetylcysteine, Methionine
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- 8 **Cyanide** — Hydroxycobalamin / amyl nitrite / sodium thiosulfate / sodium nitrite
- 9 **Calcium channel blocker** — Calcium
- 10 **Carbon monoxide** — Hyperbaric oxygen



High-yield antidotes for exams



ANTIDOTES OF POISONING – PART II

11 to 20 / 11 से 20

ENGLISH



ANTIDOTES (11 TO 20):

- 11 Carbamates → Atropine
- 12 Copper → D-penicillamine
- 13 Ergot alkaloids → Nitroprusside
- 14 Ethylene glycol → Fomepizole
- 15 Isoniazid → Pyridoxine
- 16 Iron → Desferrioxamine, Deferiprone
- 17 Hydrogen sulfide → Amyl nitrite
- 18 Heparin → Protamine sulfate
- 19 Heavy metals → Dimercaprol / BAL, EDTA
- 20 Lithium → Hemodialysis



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विषहर (11 से 20):

- 11 विष: Carbamates — Antidote: Atropine
- 12 विष: Copper — Antidote: D-penicillamine
- 13 विष: Ergot alkaloids — Antidote: Nitroprusside
- 14 विष: Ethylene glycol — Antidote: Fomepizole
- 15 विष: Isoniazid — Antidote: Pyridoxine
- 16 विष: Iron — Antidote: Desferrioxamine, Deferiprone
- 17 विष: Hydrogen sulfide — Antidote: Amyl nitrite
- 18 विष: Heparin — Antidote: Protamine sulfate
- 19 विष: Heavy metals — Antidote: Dimercaprol / BAL, EDTA
- 20 विष: Lithium — Antidote: Hemodialysis



Memorize antidote pairs



ANTIDOTES OF POISONING – PART III

21 to 31 / 21 से 31

ENGLISH



- 21 **Lead** — DMSA / Calcium disodium EDTA
- 22 **Methanol** — Ethanol
- 23 **Methemoglobinemia** —
High-dose O₂ + methylene blue
- 24 **Mercury** — Unithiol / Egg albumin
- 25 **Opioids** — Naloxone, Naltrexone
- 26 **Organophosphate** —
Atropine, Pralidoxime
- 27 **Salicylate** — Alkaline diuresis
with sodium bicarbonate
- 28 **Theophylline / caffeine** — Esmolol
- 29 **Uranium, plutonium** — DTPA
- 30 **Digitalis** — Lignocaine
- 31 **Fomepizole** — Methanol



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- 21 **लीड (Lead)** — DMSA / Calcium disodium EDTA
- 22 **मेथेनॉल** — Ethanol
- 23 **मेटहीमोग्लोबिनिमिया** —
High-dose O₂ + methylene blue
- 24 **मर्करी (Mercury)** — Unithiol / Egg albumin
- 25 **ओपिओइड्स (Opioids)** — Naloxone, Naltrexone
- 26 **ऑर्गेनोफॉस्फेट (Organophosphate)** —
Atropine, Pralidoxime
- 27 **सैलिसाइलेट (Salicylate)** —
Alkaline diuresis with sodium bicarbonate
- 28 **थियोफीलेन / कैफीन** — Esmolol
- 29 **यूरेनियम, प्लूटोनियम** — DTPA
- 30 **डिजिटैलिस** — Lignocaine
- 31 **फोमेपिजोल (Fomepizole)** — Methanol



Antidotes save lives



HUMAN TERATOGENIC DRUGS

Key examples and exam punch / मुख्य उदाहरण एवं एग्जाम पंच

ENGLISH



- 1 **Alcohol** — low IQ baby, growth retardation, fetal alcohol syndrome
- 2 **Antithyroid drugs** — fetal goiter, hypothyroidism
- 3 **Androgen** — virilization, limb / esophageal / cardiac defects
- 4 **ACE inhibitor** — organ hypoplasia, growth retardation, fetal loss
- 5 **Carbamazepine** — neural tube defects
- 6 **Isotretinoin** — craniofacial, heart & CNS defects, hydrocephalus
- 7 **Indomethacin / aspirin** — premature closure of ductus arteriosus
- 8 **Lithium** — fetal goiter, cardiac abnormalities
- 9 **Methotrexate** — cleft palate, hydrocephalus, fetal death



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- 1 **Alcohol** — low IQ baby, growth retardation, fetal alcohol syndrome
- 2 **Antithyroid drugs** — fetal goiter, hypothyroidism
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- 7 **Indomethacin / aspirin** — ductus arteriosus का समयपूर्व closure
- 8 **Lithium** — fetal goiter, cardiac abnormalities
- 9 **Methotrexate** — cleft palate, hydrocephalus, fetal death



Activated charcoal = mechanical antidote

Activated charcoal = mechanical antidote



Anaphylactic shock = severe drug reaction

Anaphylactic shock = गंभीर drug reaction



ADR = noxious change at normal dose

ADR = सामान्य dose पर हानिकारक परिवर्तन



Teratogenic drugs cause developmental defects

Teratogenic drugs भ्रूण में developmental defects उत्पन्न करती हैं



Pregnancy safety is exam-important





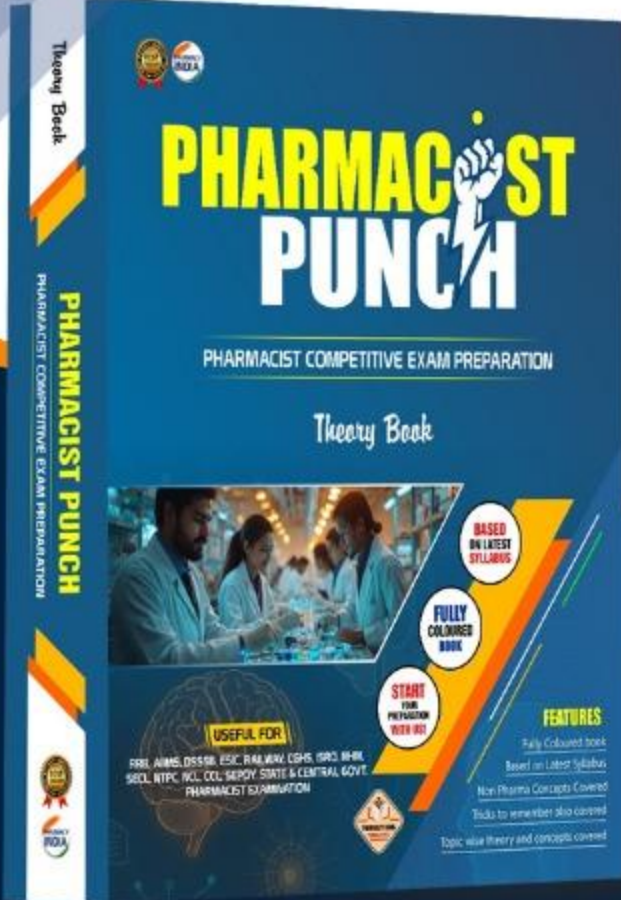
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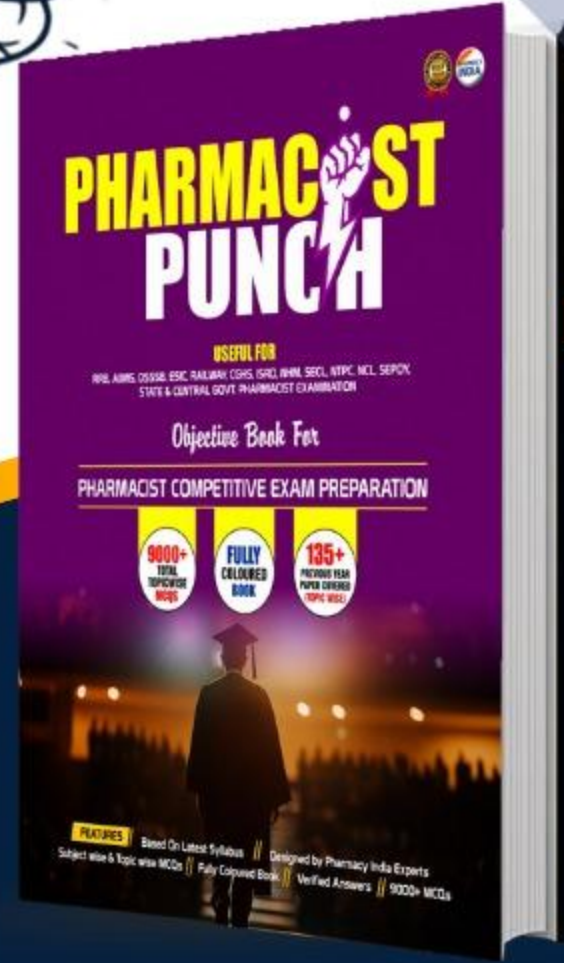
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