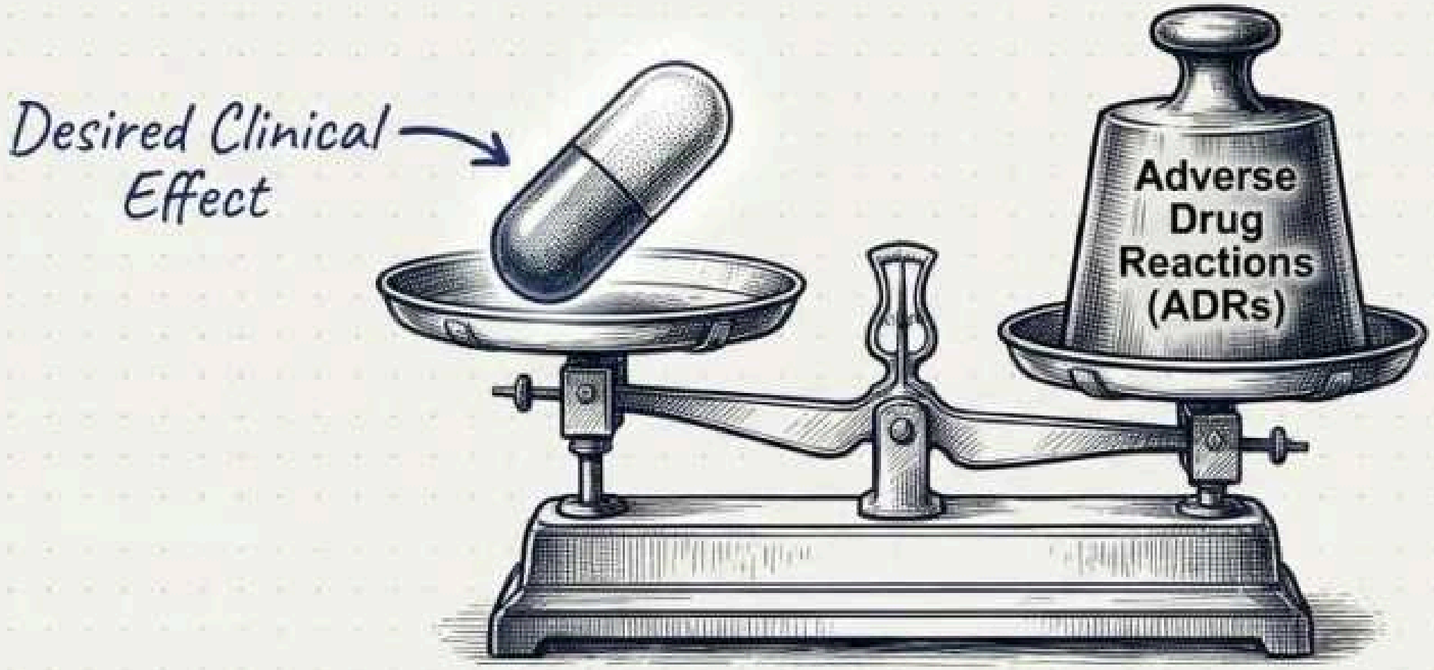
Every medicine with a clinical effect carries the risk of an unwanted effect.

¶ 5.1

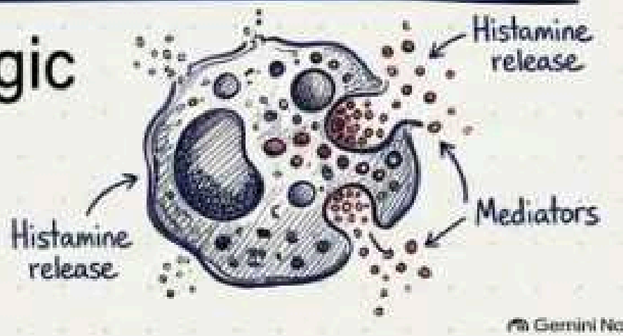


- ADRs are a leading cause of illness and hospital admissions.
- Risk is especially high in older populations taking multiple medications.

Understanding this balance is the most practical part of pharmacology—and why medical professionals verify medicines so rigorously.

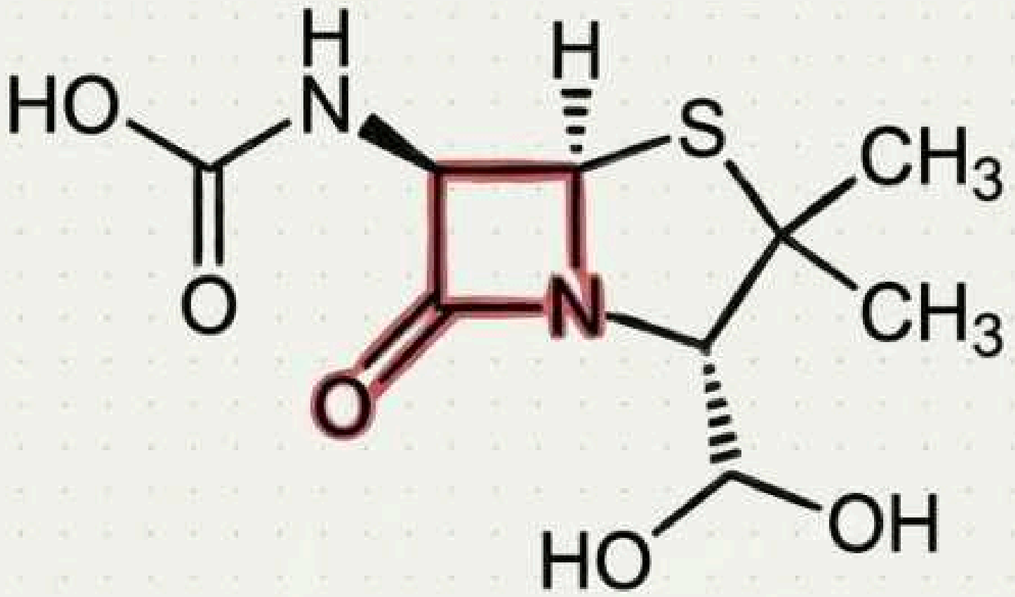
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Categorizing adverse reactions: Predictable vs. Unpredictable.

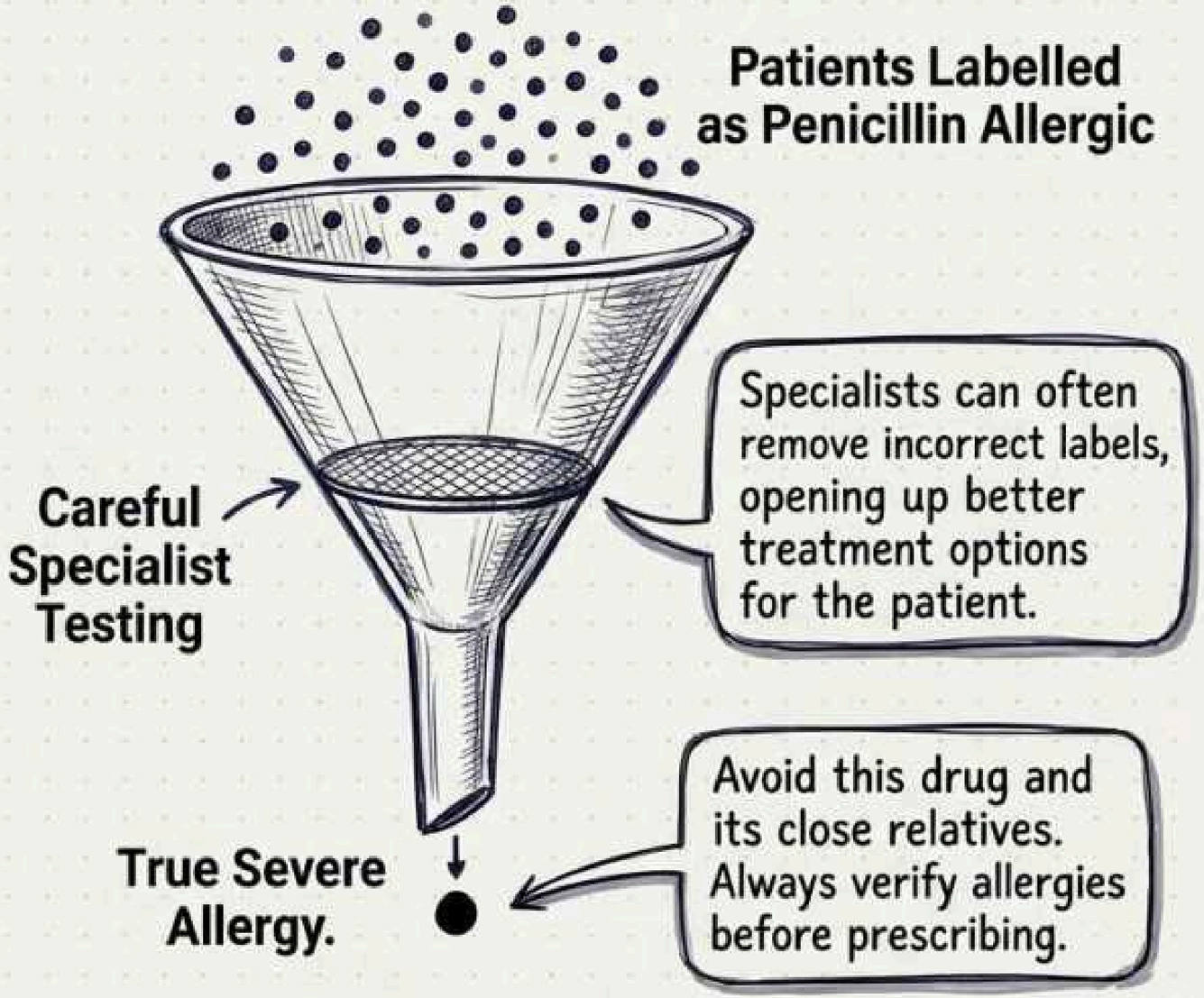
	Predictable Extensions (Type A)	Unpredictable Reactions (Type B)
Relationship to Dose	Directly related	Not clearly related
Predictability	Expected from known pharmacological actions	Not predictable from main action
Frequency	Most common	Less common, but serious
Management	Often managed by adjusting dose	Often requires stopping/ avoiding the drug
Clinical Examples	Dizziness (low BP) or Bleeding (blood thinners) 	Severe allergic reactions 

Gemini Notebook

Drug allergy is an immune reaction, but clinical labels often overestimate true prevalence.



(See Medicine 504 B for general allergy mechanics).

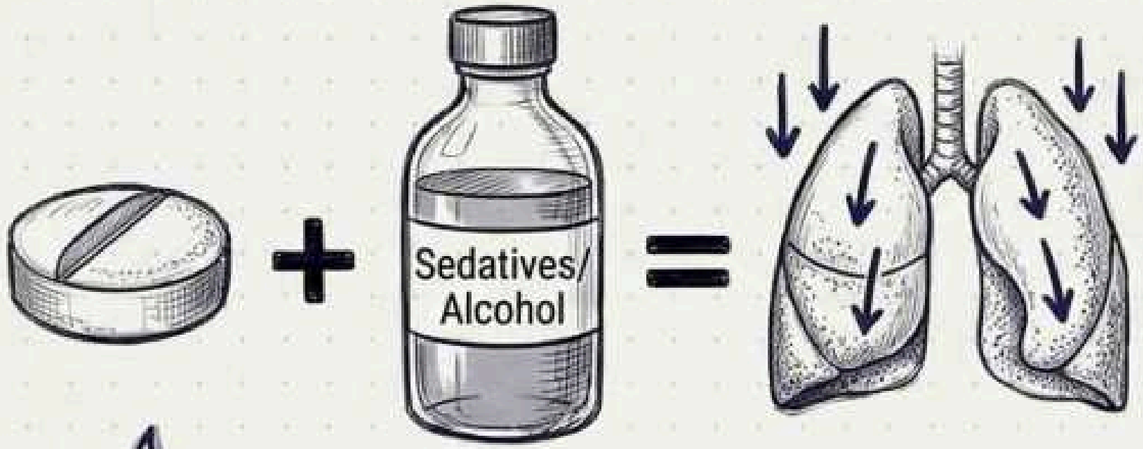


Gemini Notebook

Drug interactions: What drugs do to each other vs. what the body does to the drugs.

Pharmacodynamic Interactions

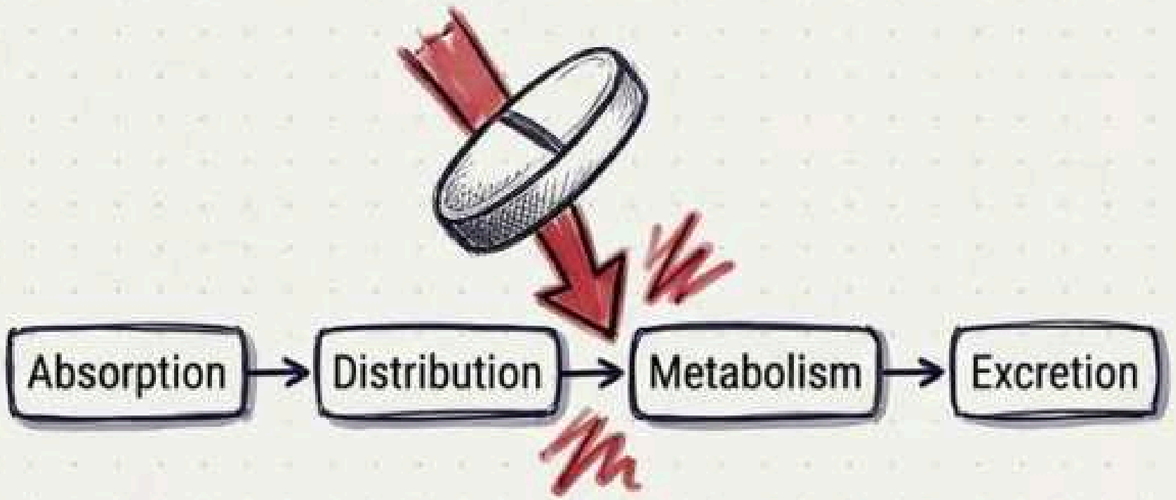
Two drugs combining effects at the target site.



[Opioid] + [Sedatives / Alcohol] = [Dangerously Depressed Breathing]

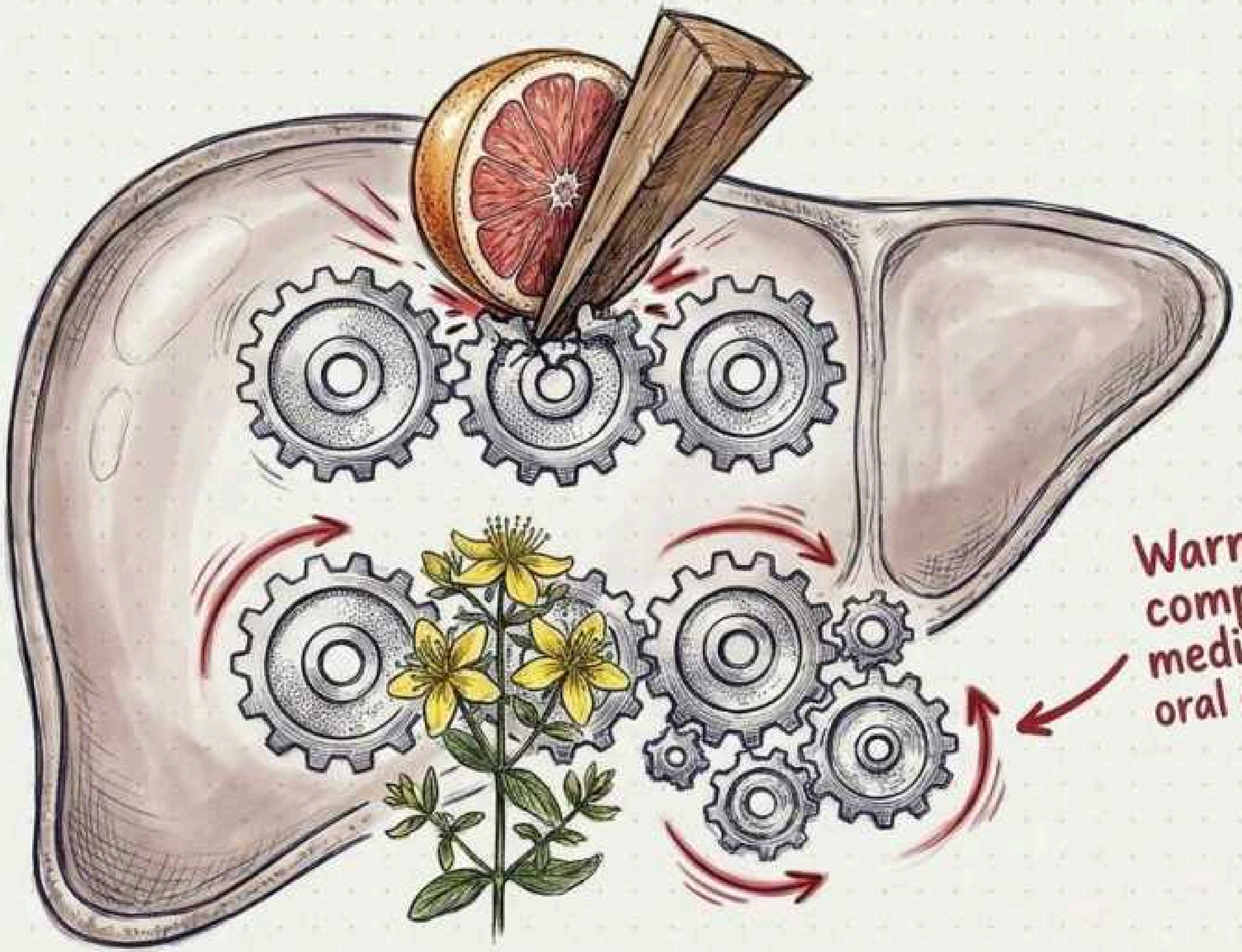
Pharmacokinetic Interactions

One drug alters the body's processing of another.



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CYP Enzyme interactions can either bottleneck or accelerate drug clearance.



Inhibition

Induction

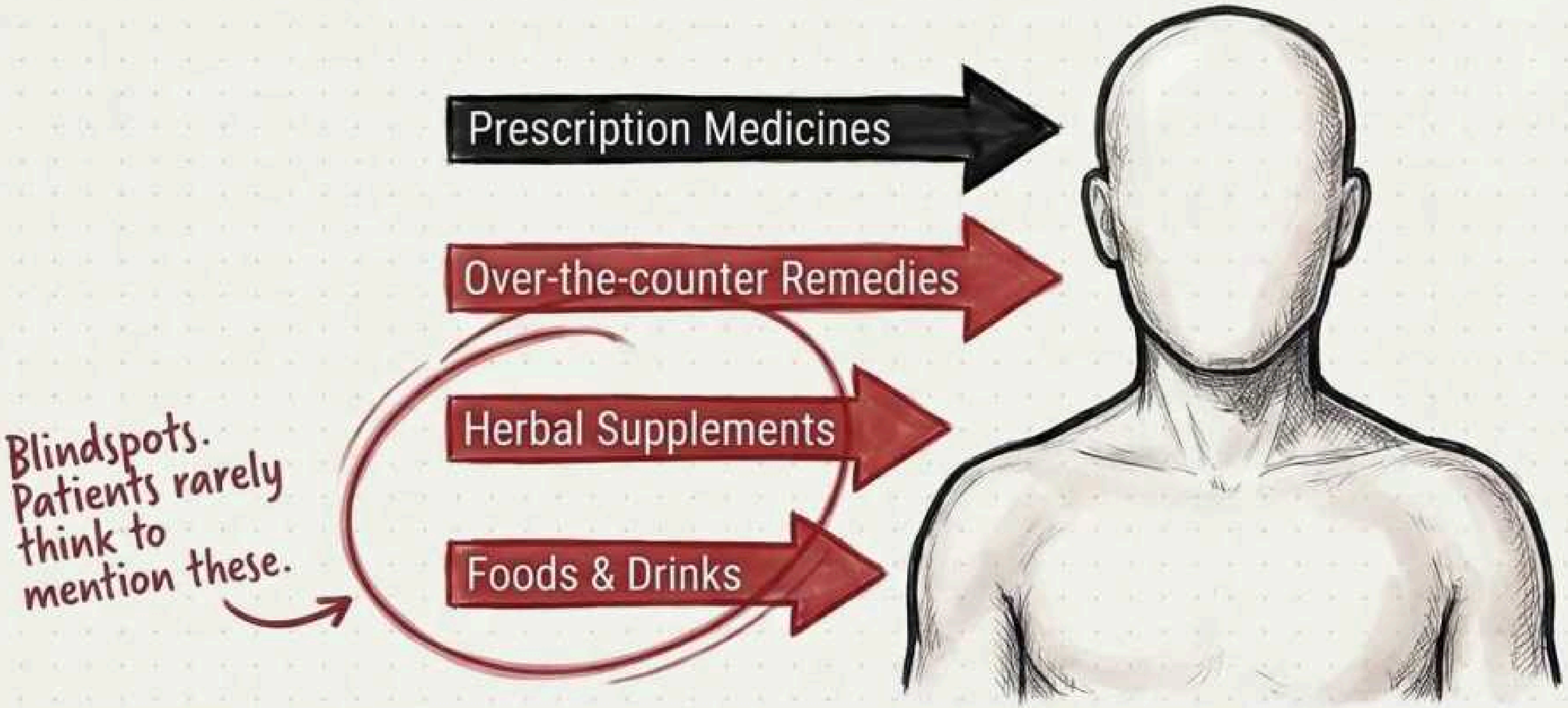
Enzyme Induced (e.g., drug builds up to higher, potentially toxic levels.

Note: Grapefruit juice inhibits enzymes in the gut wall

Warning: Can compromise medications like oral contraceptives.

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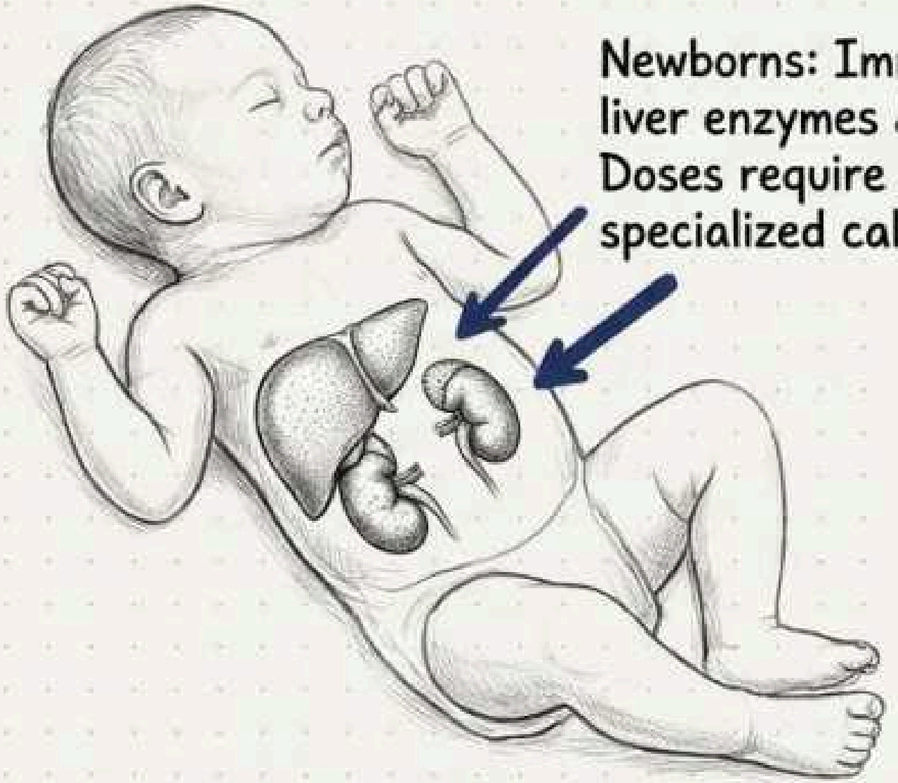
Unseen chemical inputs dictate systemic outcomes.



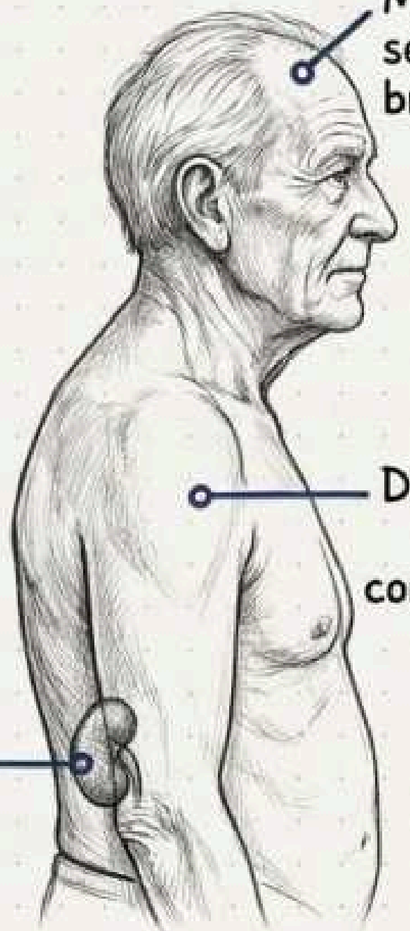
Telling doctors and pharmacists about *everything* consumed is one of the simplest, most effective ways to avoid interaction harm.

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Age dictates drug handling: The physiological extremes.



Newborns: Immature liver enzymes & kidneys. Doses require precise, specialized calculation.



More sensitive brains

Different body composition

Reduced kidney function

Polypharmacy



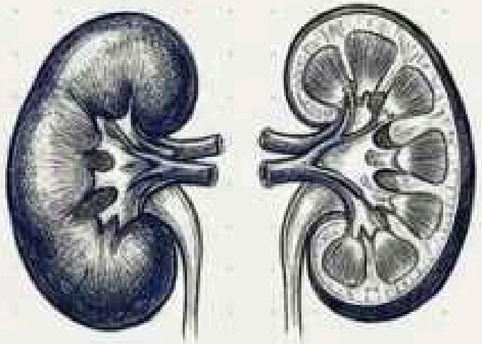
Requires regular medicine reviews.

Stopping unneeded medicines is a hallmark of good care.

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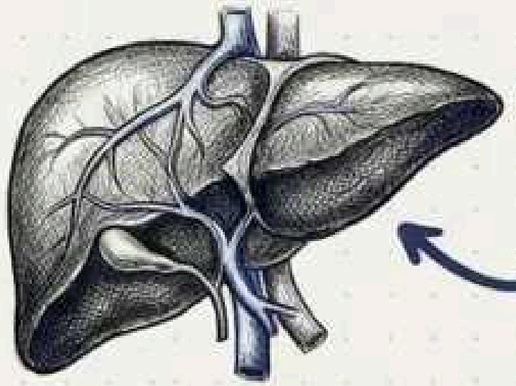
Disease states rewrite standard pharmacokinetic principles.

¶ 5.8



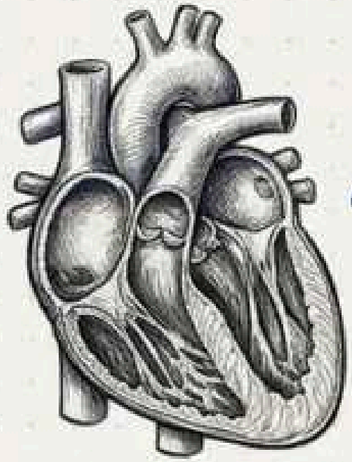
Kidney Disease

→ Slows removal of renally cleared drugs.



Liver Disease

→ Slows metabolism & reduces drug-binding proteins.



Heart Failure

→ Reduces blood flow delivery to liver and kidneys.



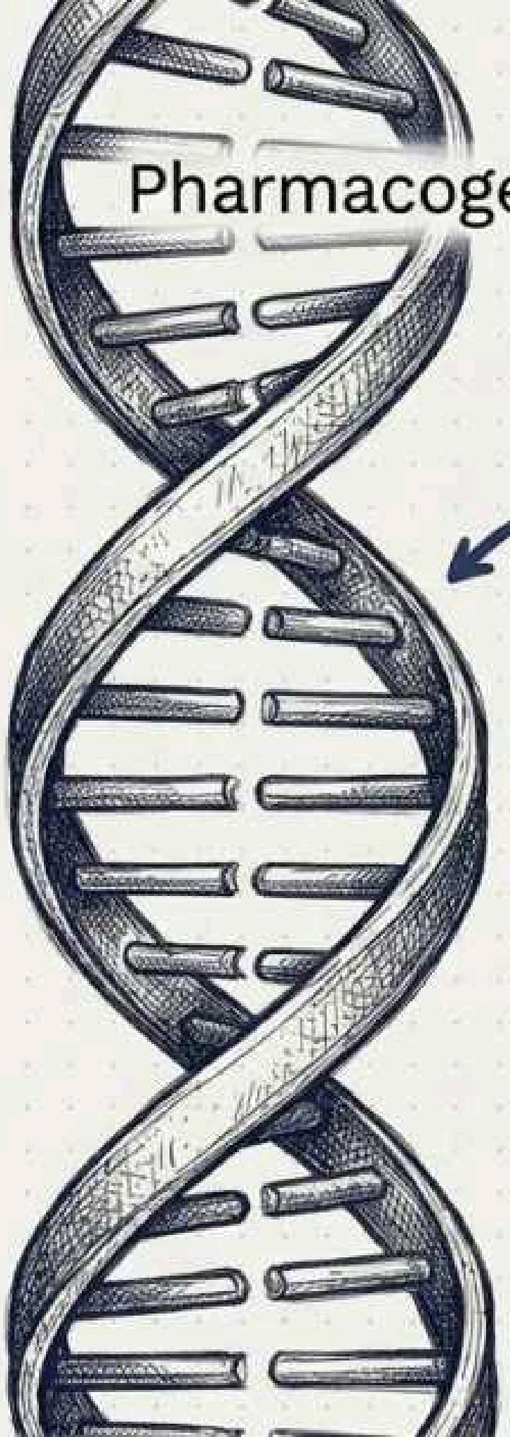
Pregnancy

→ Changes almost every aspect of pharmacokinetics; specific risks to developing baby.

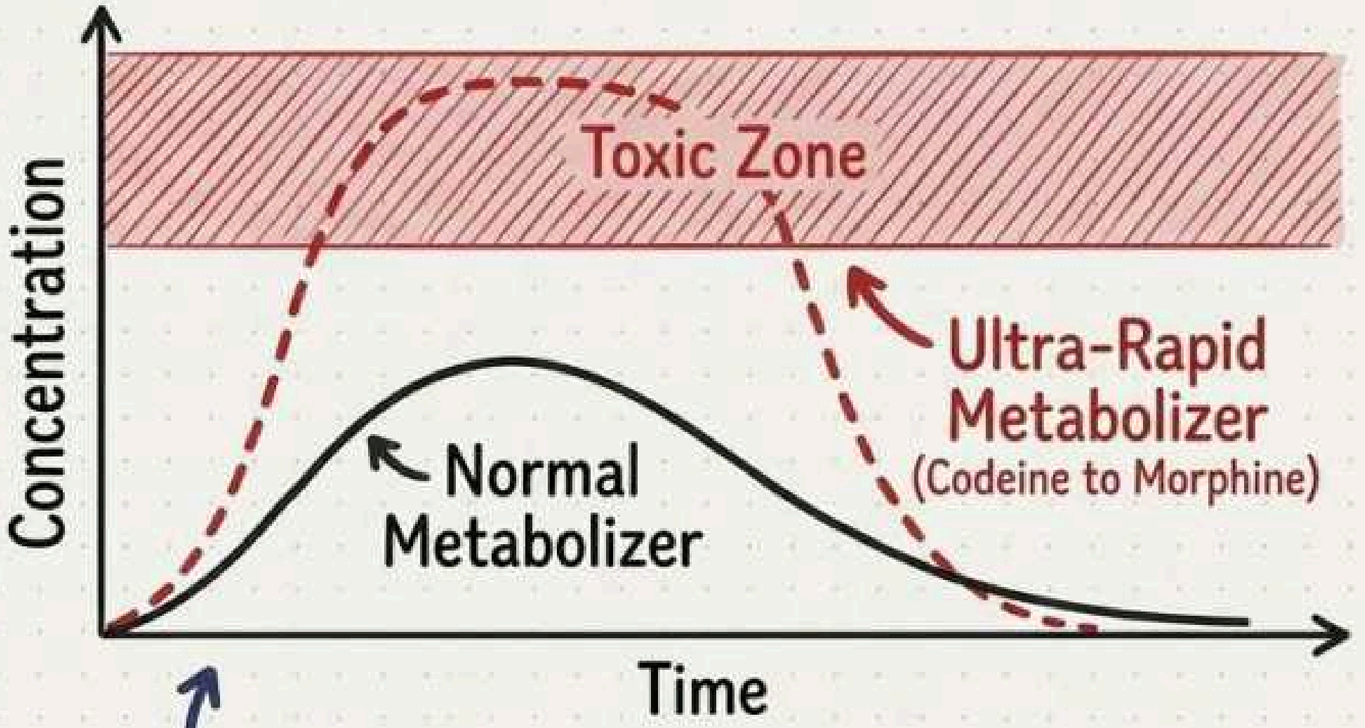
Standard dosing fails here. Prescribers must return to first principles of absorption, distribution, metabolism, and excretion (Lectures 2 & 3).

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Pharmacogenomics: Genetic variants dictate metabolic velocity.



CYP Enzyme Variants
(See Medicine 503 B)

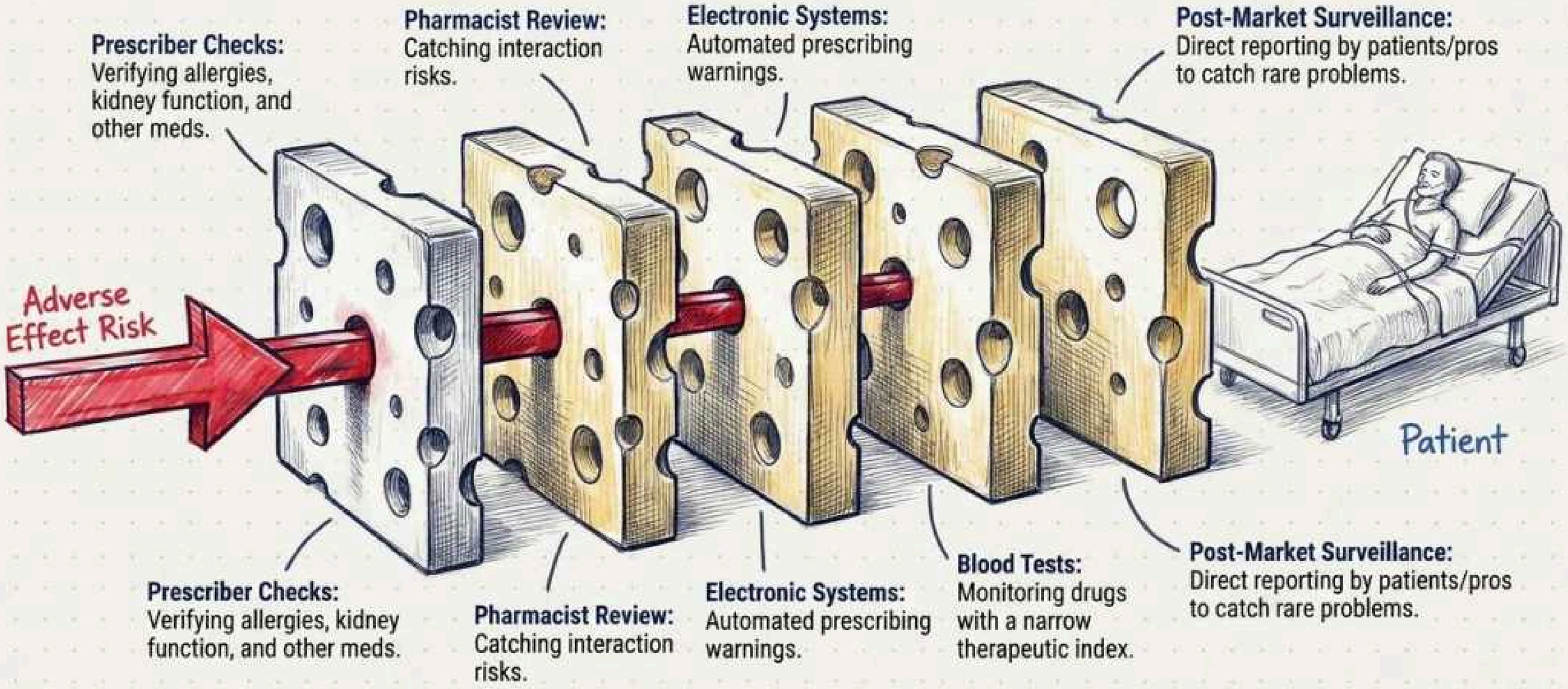


Because rapid converters receive dangerous amounts of morphine from normal doses, codeine is no longer recommended for children in many countries.

Pre-treatment genetic testing is becoming a standard risk-mitigation tool.

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The systemic safeguards protecting patients from adverse events.



Gemini Notebook

Application Question: The Grapefruit Paradox.

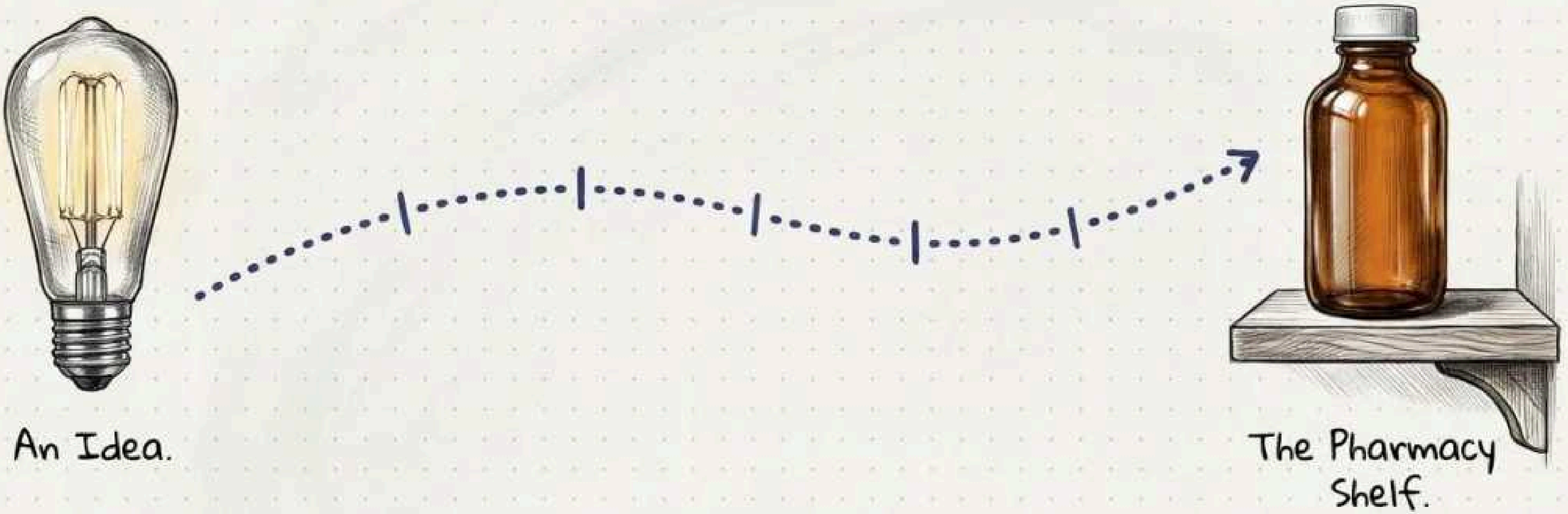


Explain how drinking grapefruit juice could raise the level of a medicine in the blood, using what you have learned about CYP enzymes and first-pass metabolism.

Disclaimer: As always, questions about your own personal medicines belong exclusively with your pharmacist or doctor.

Gemini Notebook

Looking forward: The lifecycle of a medicine.



In the final lecture, we will explore the complete journey of how a new medicine travels from initial conception to real-world availability.

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