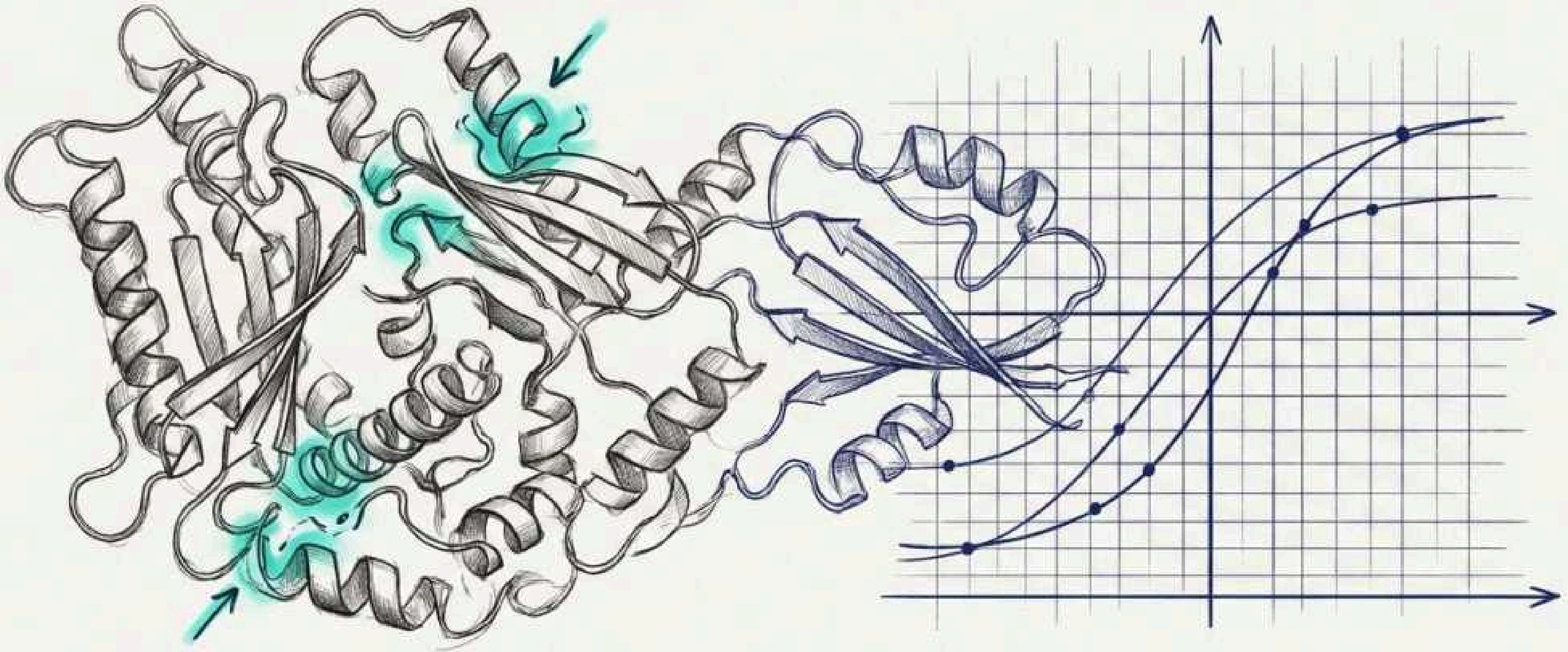
# MED 511 B Lecture 1: Drugs and Their Targets

## Receptors, Agonists, the Dose-Response Curve, and the Therapeutic Index

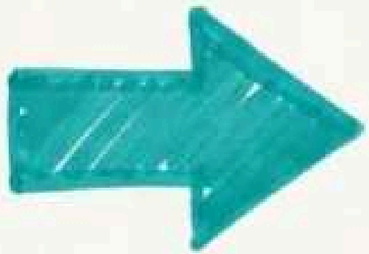


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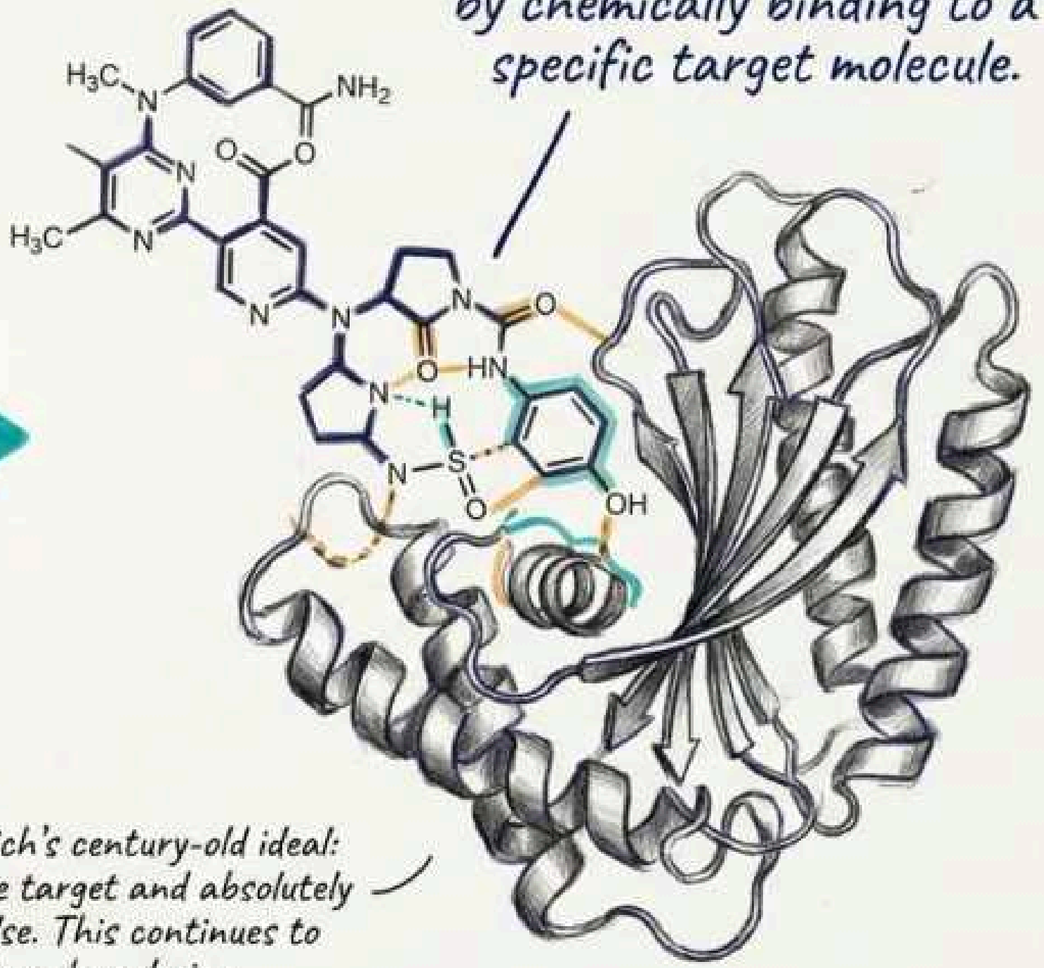
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# The Ideal “Magic Bullet” Target





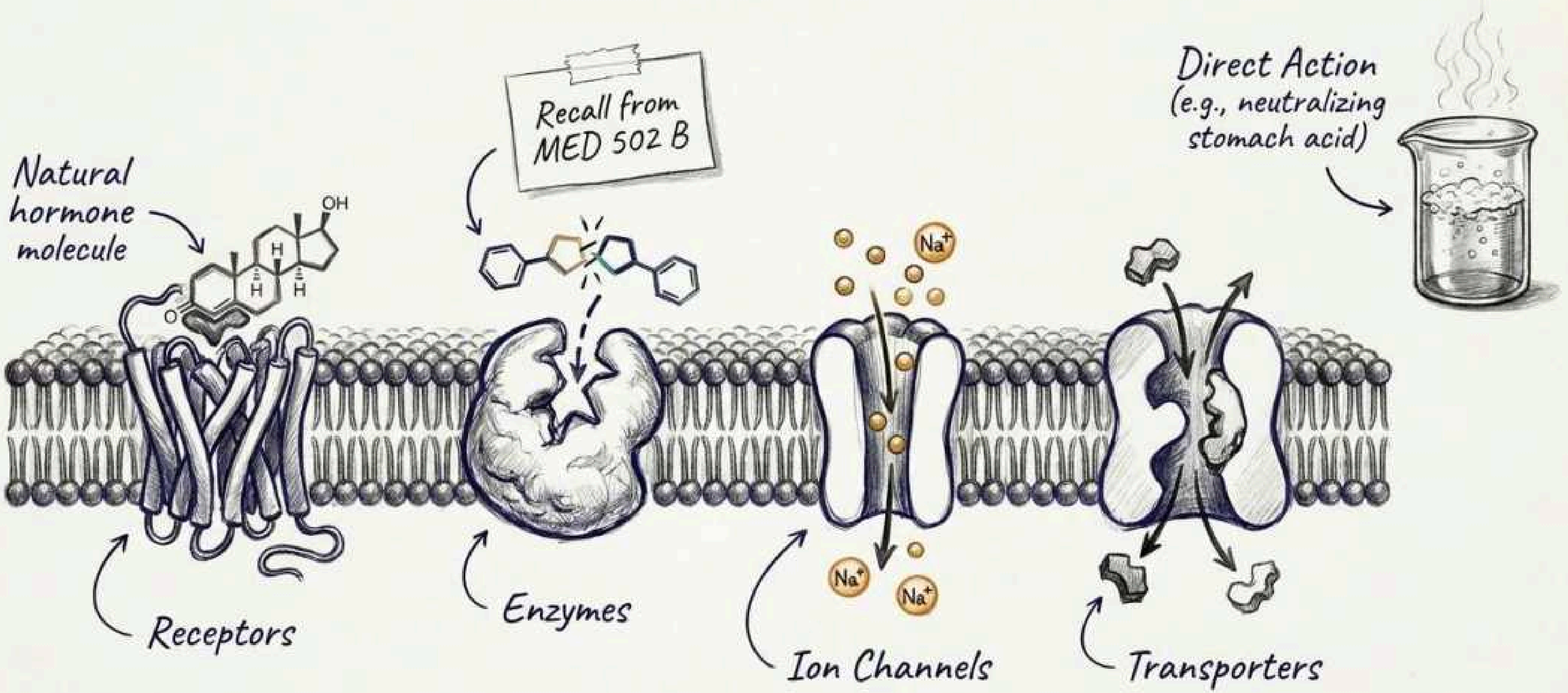
A drug changes body function by chemically binding to a specific target molecule.




Paul Ehrlich’s century-old ideal: aim at the target and absolutely nothing else. This continues to drive modern drug design.

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# The Four Main Drug Targets

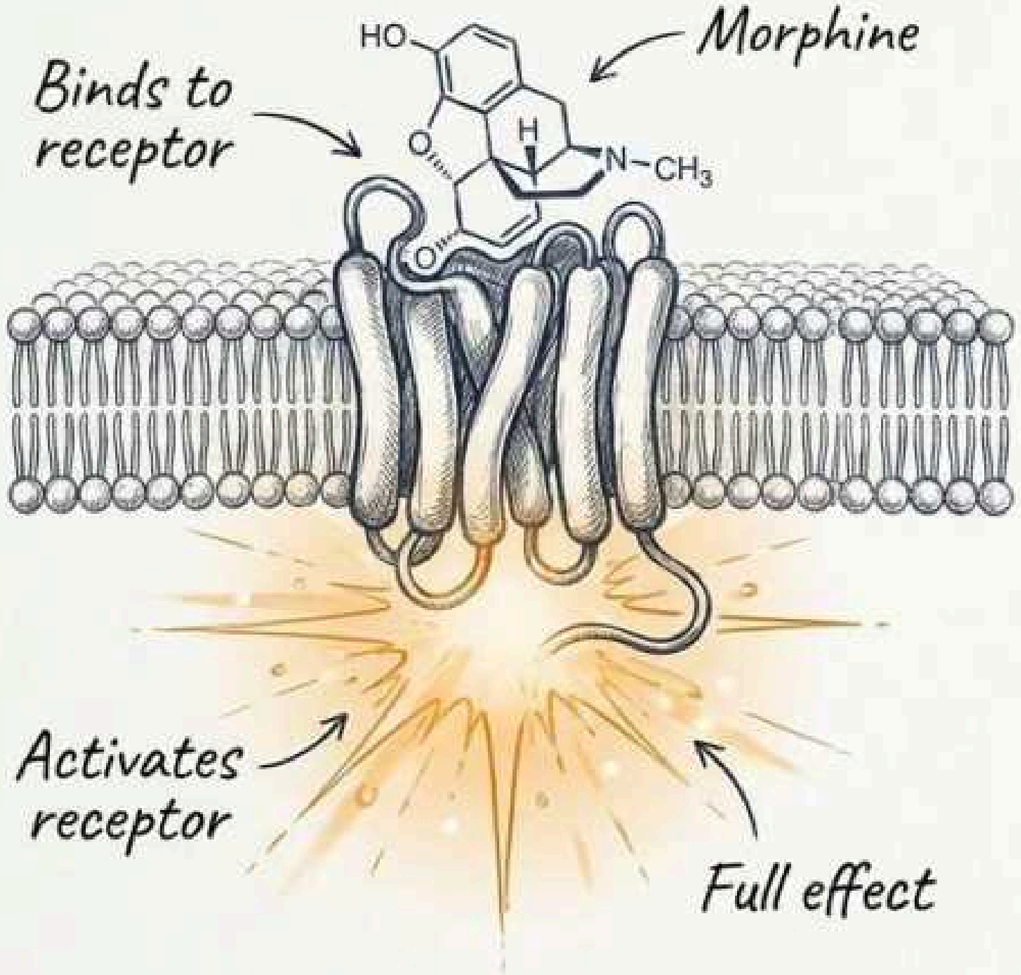



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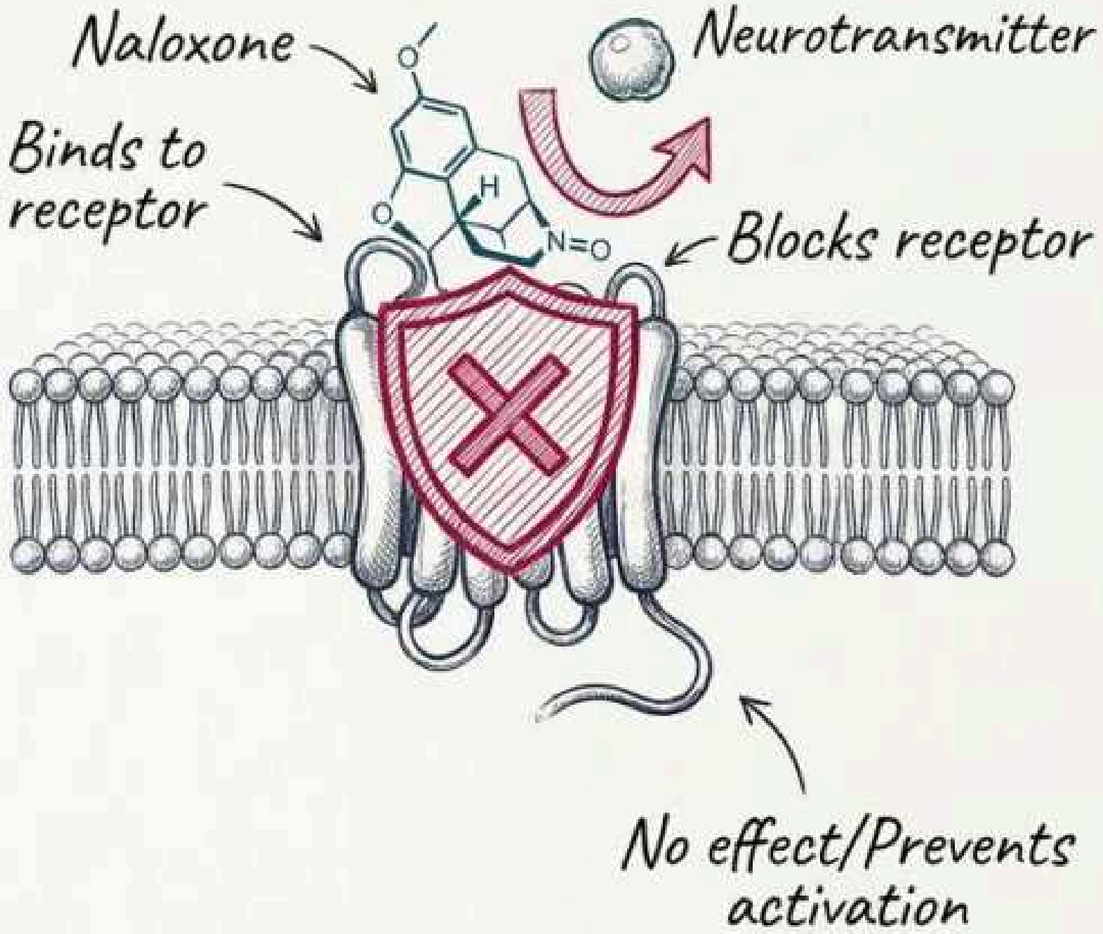
# Agonists vs. Antagonists



## Agonist

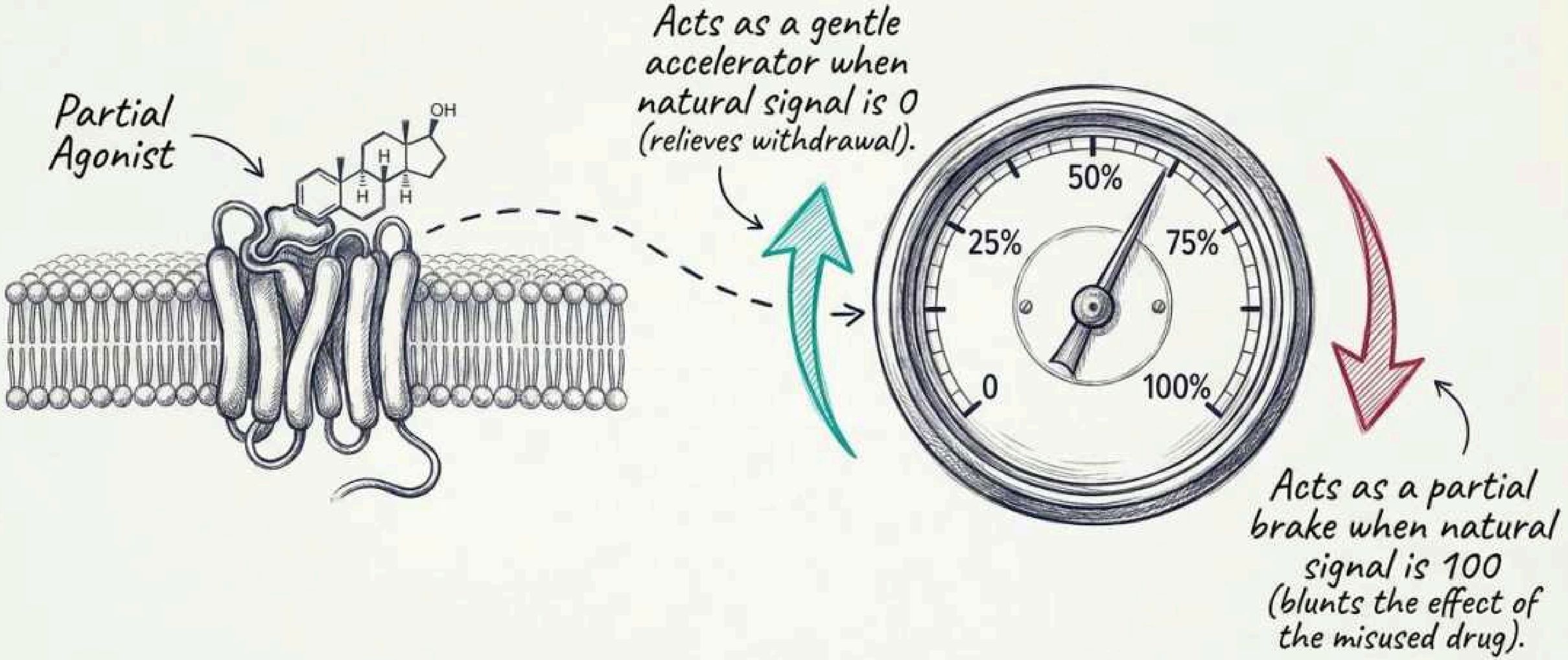



## Antagonist



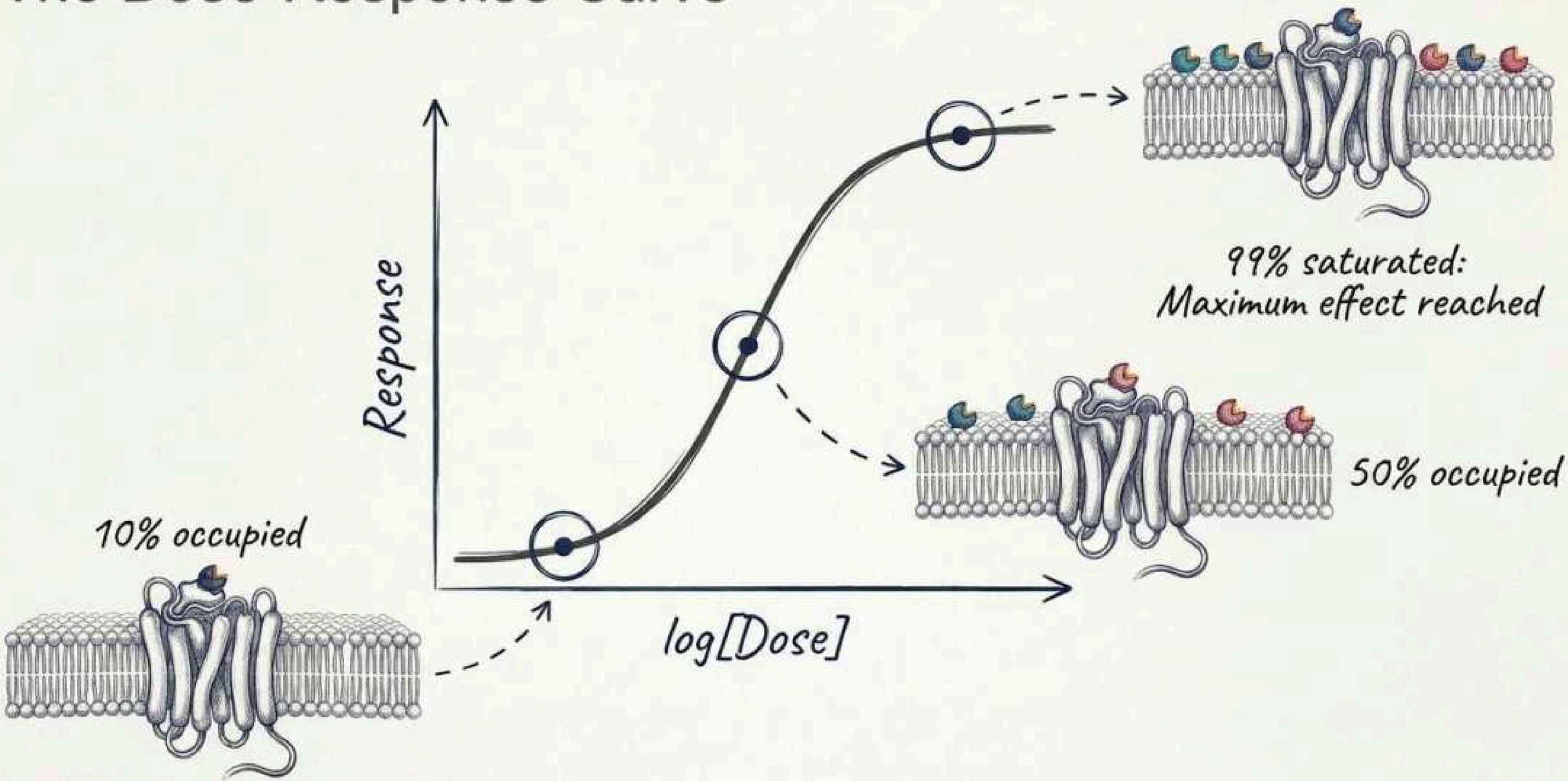

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# The Partial Agonist Paradox



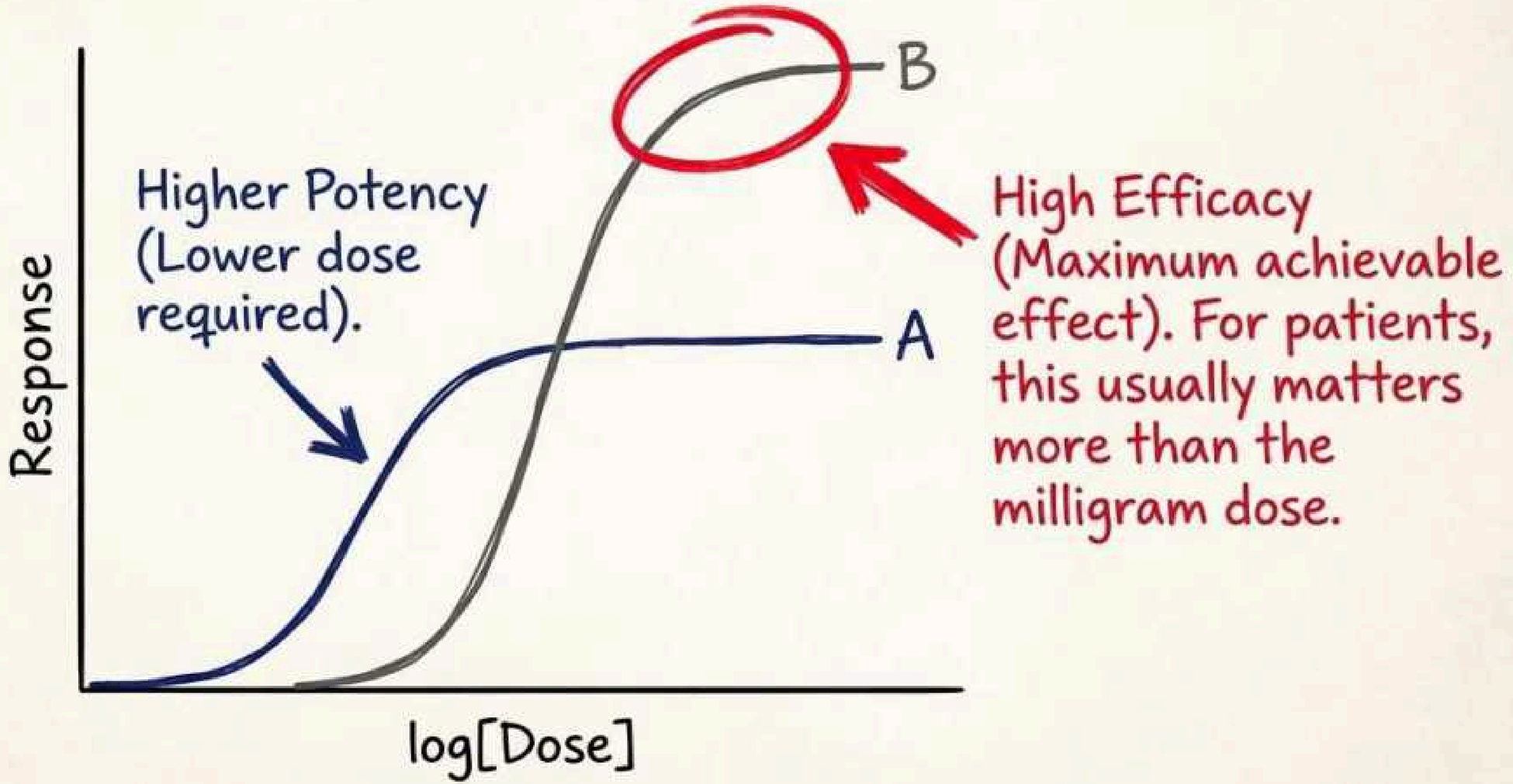

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# The Dose-Response Curve




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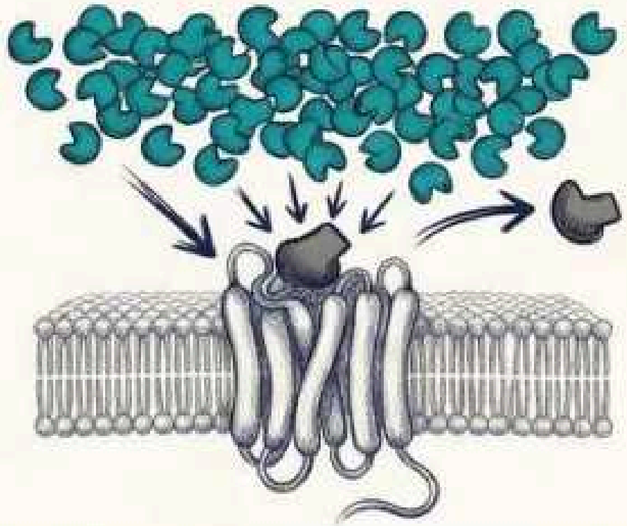
# Potency vs. Efficacy




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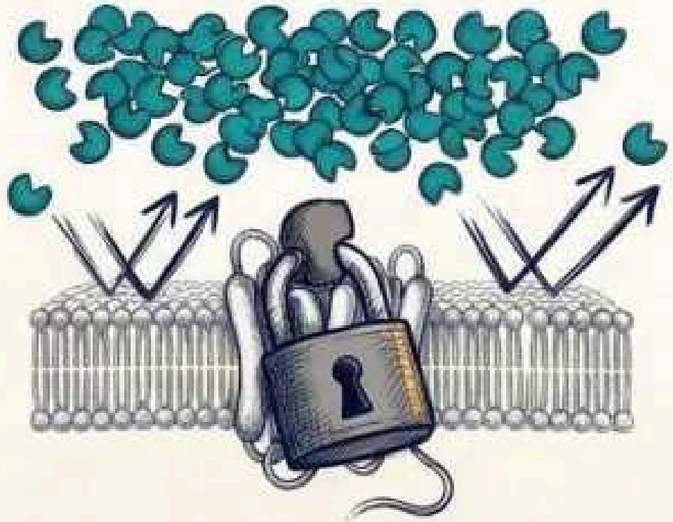
# Competitive vs. Irreversible Antagonists

## Competitive



Can be overcome by enough agonist (Recall enzyme inhibitors from MED 502 B).

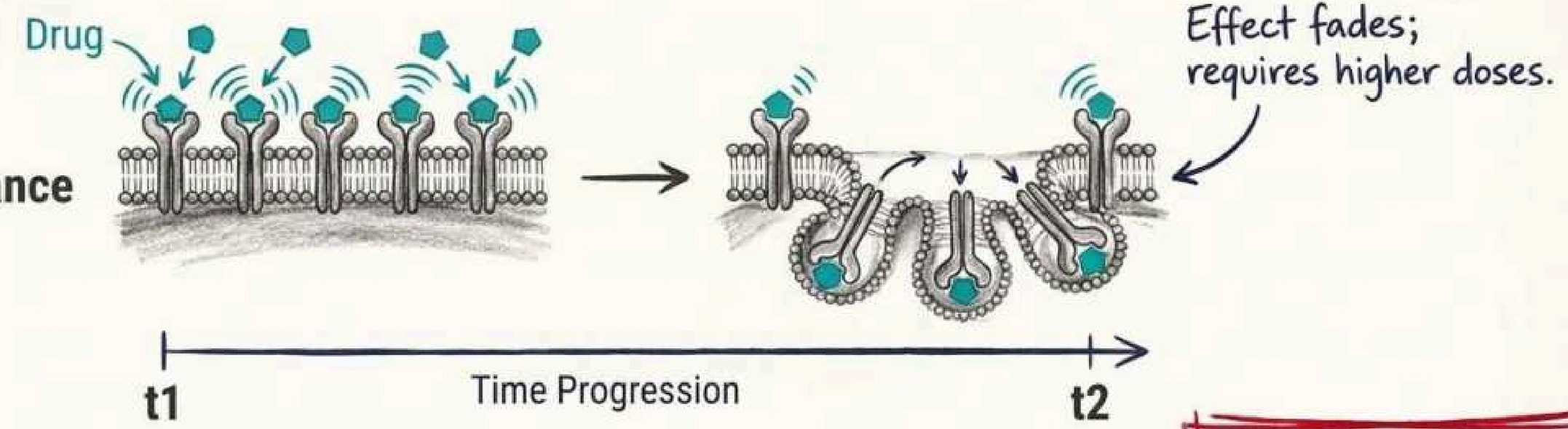
## Irreversible

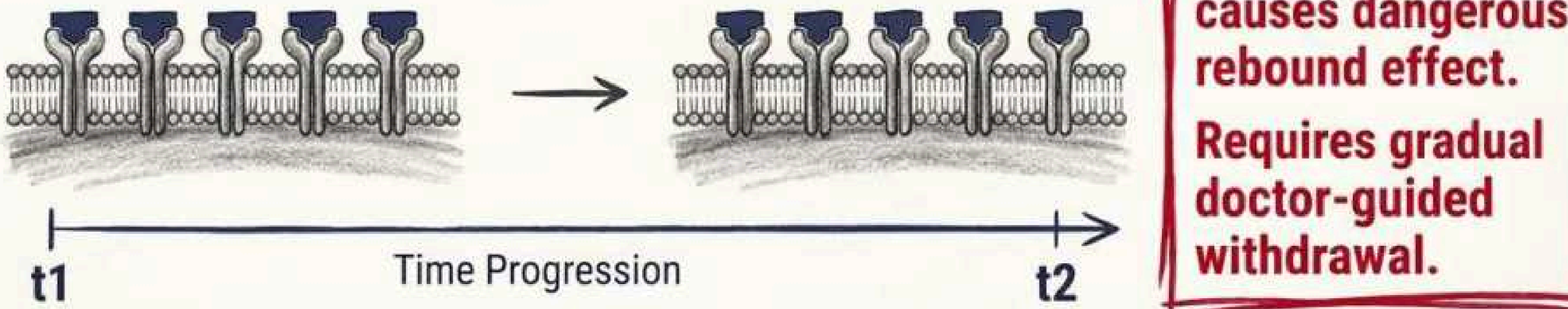


Binds permanently or elsewhere. Cannot be overcome.

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# Receptor Adaptation: Tolerance & Rebound



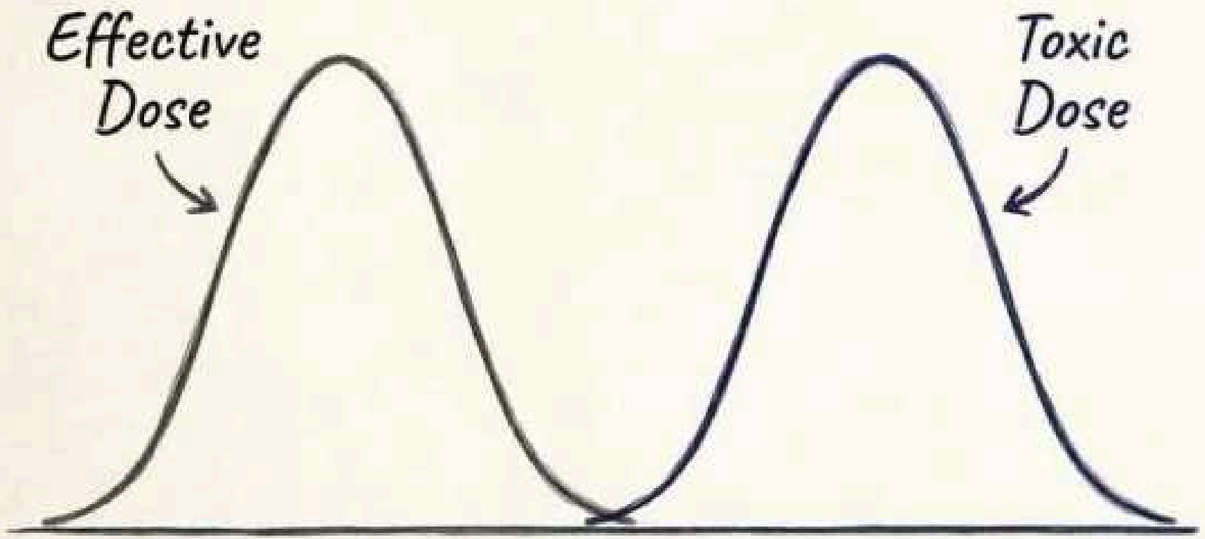

**Sudden cessation causes dangerous rebound effect.**

**Requires gradual doctor-guided withdrawal.**

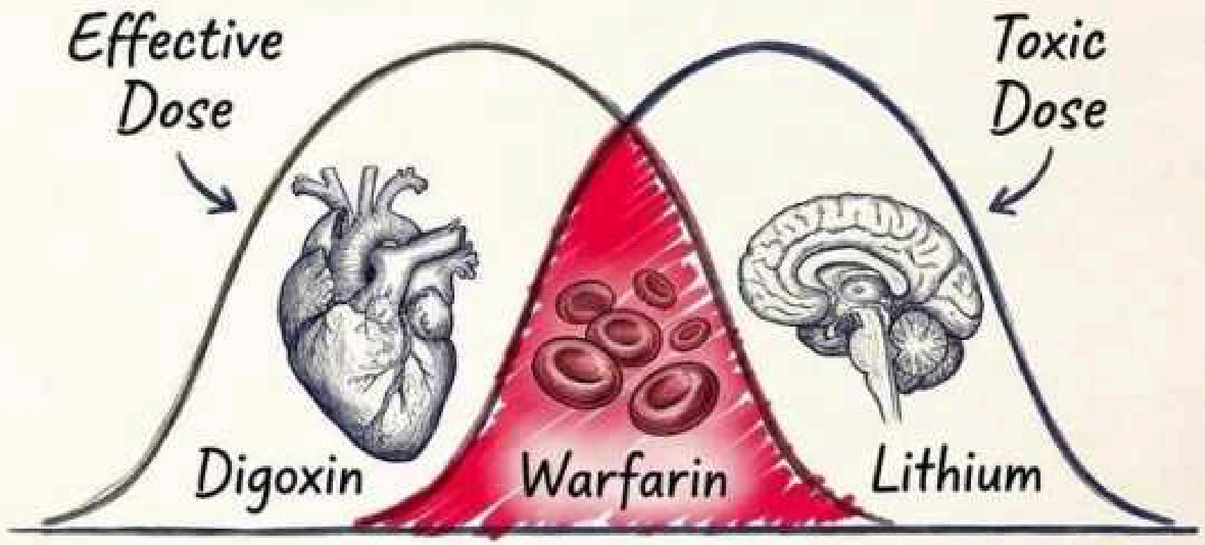
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# The Therapeutic Index (TI)

$$TI = \frac{\text{Toxic Dose}}{\text{Effective Dose}}$$



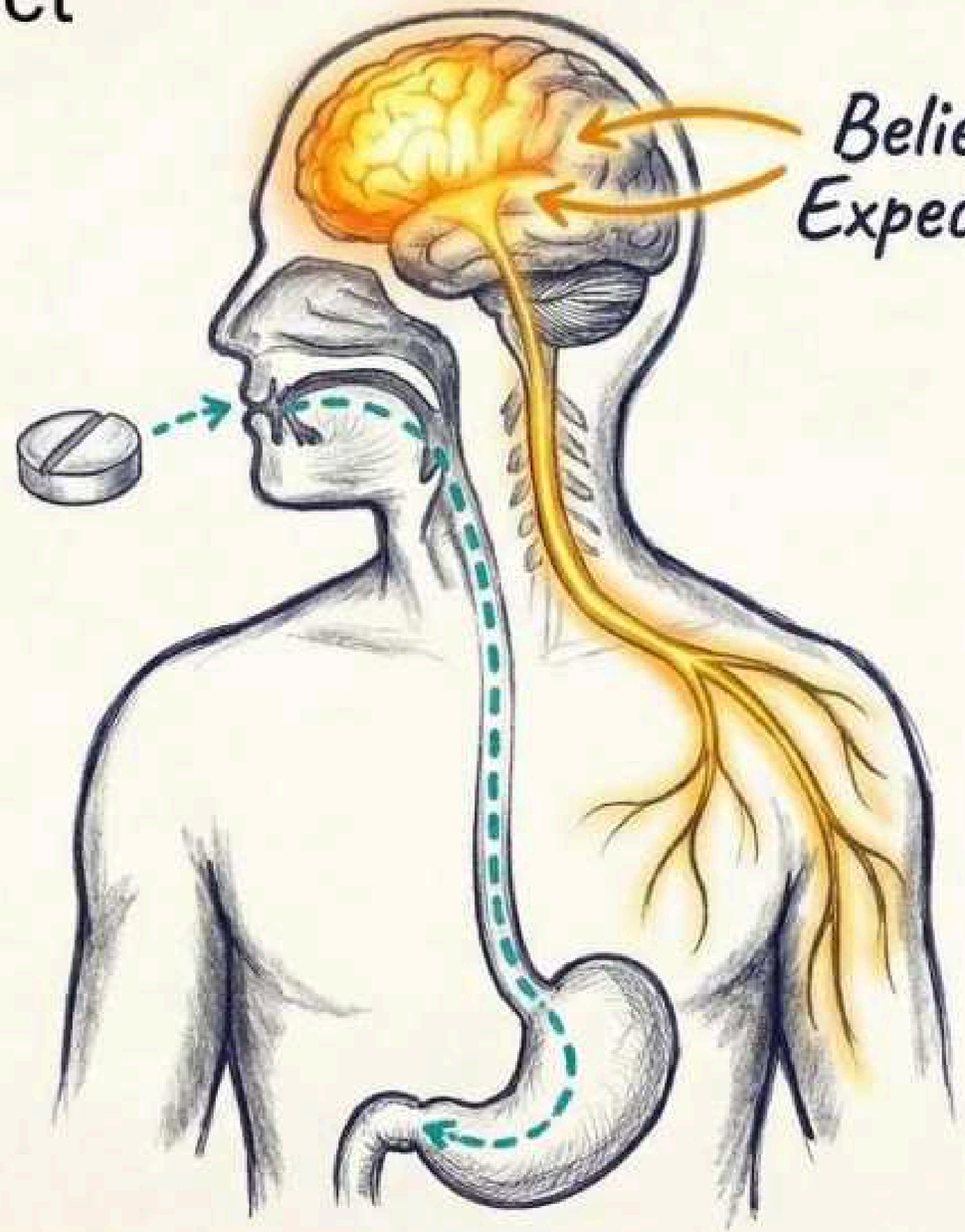

Relatively Forgiving




Narrow Index: Requires careful dosing and blood tests to maintain safe levels.

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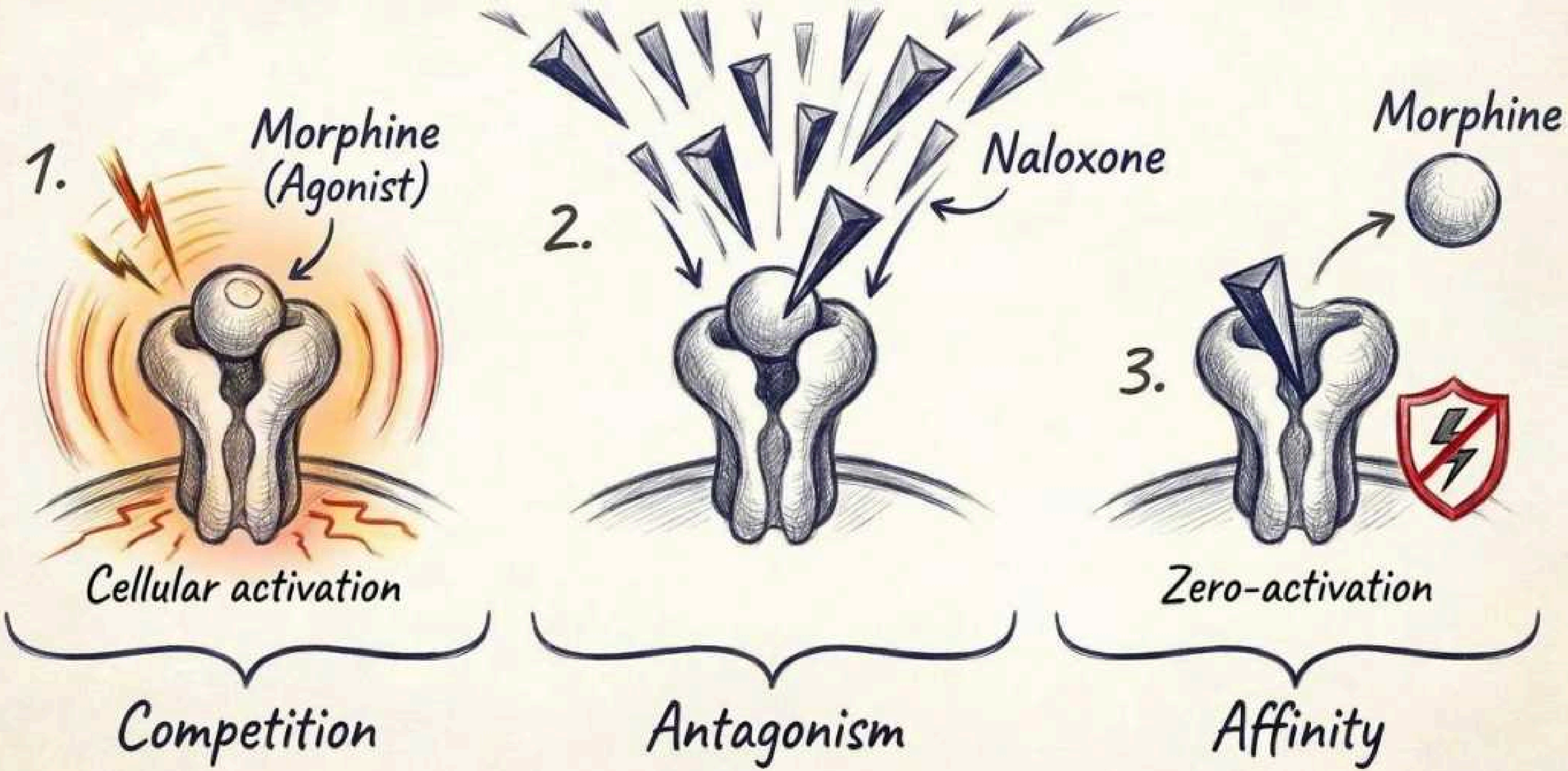
# The Placebo Effect




*Patients are whole beings, not test tubes. Expectation produces real, measurable improvement, requiring all* el *new drugs to be tested against placebos (See Lecture 6).*

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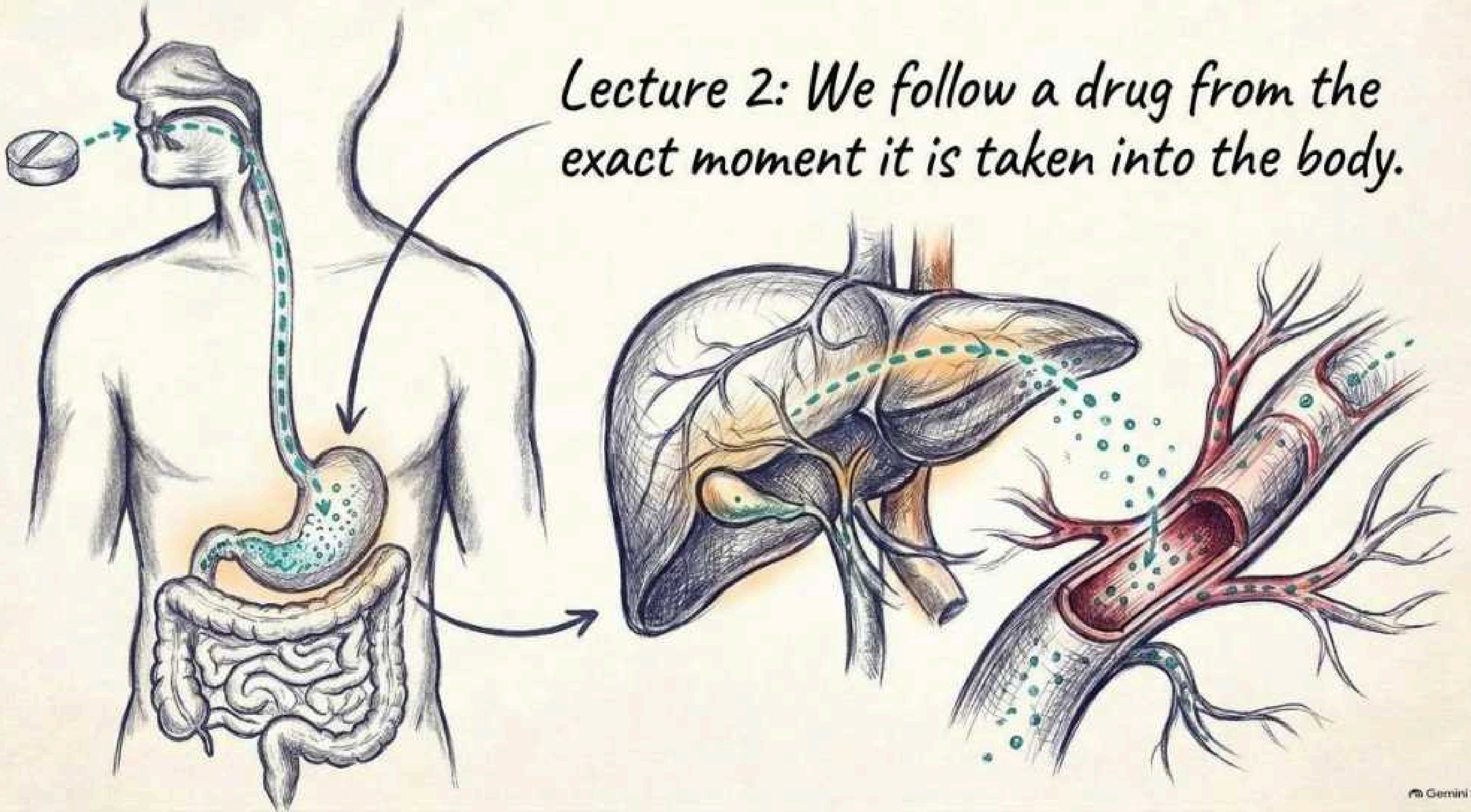
# Synthesis: Reversing the Overdose




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# Coming Next: The Journey of a Drug

*Lecture 2: We follow a drug from the exact moment it is taken into the body.*



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