

Bioavailability

Bioavailability refers to the proportion of a drug or other substance that enters the bloodstream when it is introduced into the body and is thus able to have an active effect.

Key Points

- **Absolute bioavailability** compares the bioavailability of the same drug given via a non-intravenous route (e.g., oral) to its bioavailability when given intravenously (IV). IV administration is considered 100% bioavailable.

^ Formula: ^
| **Absolute Bioavailability** = $\left(\frac{\text{AUC}_{\text{non-IV}}}{\text{AUC}_{\text{IV}}} \times \frac{\text{Dose}_{\text{IV}}}{\text{Dose}_{\text{non-IV}}} \right) \times 100$ |

- **Relative bioavailability** compares the bioavailability of two different formulations of the same drug.

Factors Affecting Bioavailability

- First-pass metabolism
- Drug formulation (e.g., tablet vs. liquid)
- Solubility
- Gastrointestinal pH and motility
- Presence of food
- Enzyme activity or transport proteins in the gut/liver

Clinical Relevance

- Important in dosing decisions
- Affects therapeutic equivalence of generic vs. brand-name drugs
- Relevant in drug design and pharmacokinetics studies

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Last update: **2025/03/21 22:58**

