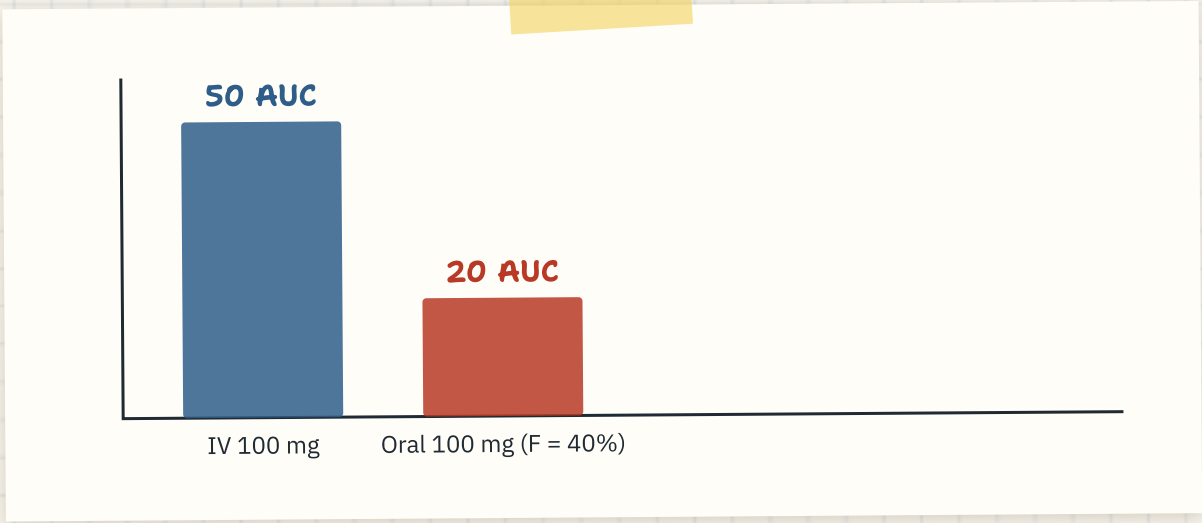
First pass and oral F

Explain first pass; calculate oral F from AUC



Step by step

1. Divide each AUC by its own dose
2. Divide the oral value by the IV value
3. Read the result as a fraction or percent
4. Check that oral F is not above 100%

ABSOLUTE ORAL BIOAVAILABILITY

$$F = (AUC_{oral} / dose_{oral}) \div (AUC_{IV} / dose_{IV})$$

equal doses: F = AUC oral ÷ AUC IV; IV F = 100% by definition

Route	First pass?
Oral	Yes: gut wall, portal vein, liver
Intravenous	No: straight into the blood
Sublingual	No: tongue drains to the SVC
Transdermal	No: skips the portal vein

Routes and the first pass

Rule of thumb

F ≈ fraction absorbed × (1 − hepatic extraction ratio), ignoring gut-wall loss

Fully absorbed, extraction ratio 0.8: about 20%

High first-pass drugs have a low oral F

Exam traps

- ! Comparing the doses alone is not F.
- ! Skipping the dose correction on either arm.
- ! Multiplying the two ratios instead of dividing.

First-pass metabolism and bioavailability: calculating oral F from AUC

Video, written lesson, practice question and sources: medservatory.com/usmle-step-1/pharmacology-principles-autonomic/first-pass-metabolism-bioavailability-auc

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