



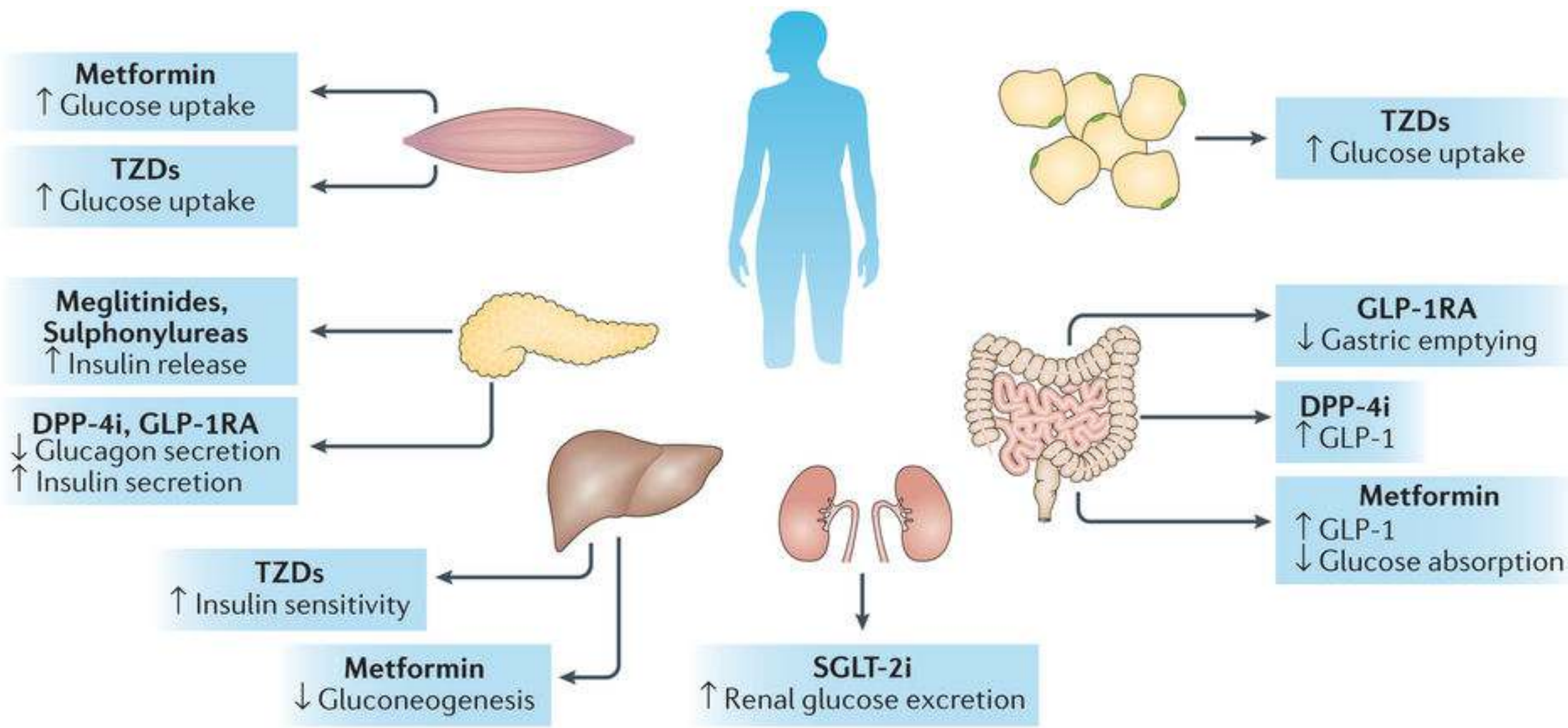
# How do diabetes medications work?

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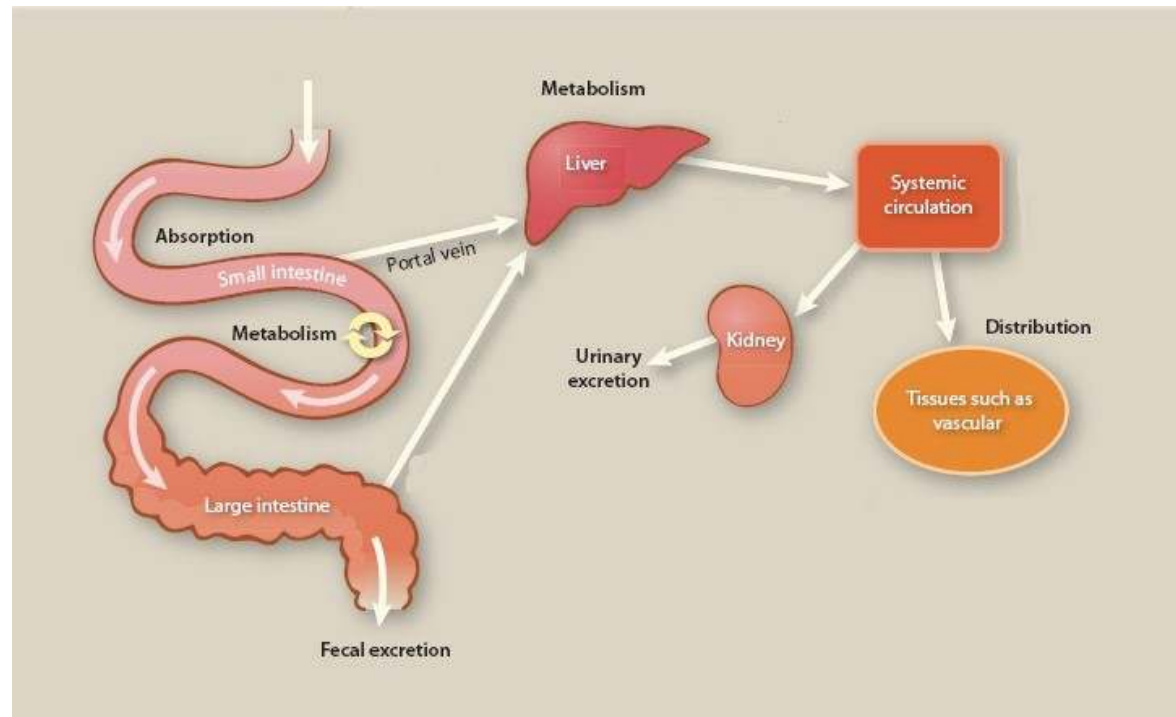
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# Pharmacokinetics

- Study of drug absorption, distribution, metabolism and elimination over time
- Goals: enhance efficacy and decrease toxicity of a patient's drug therapy

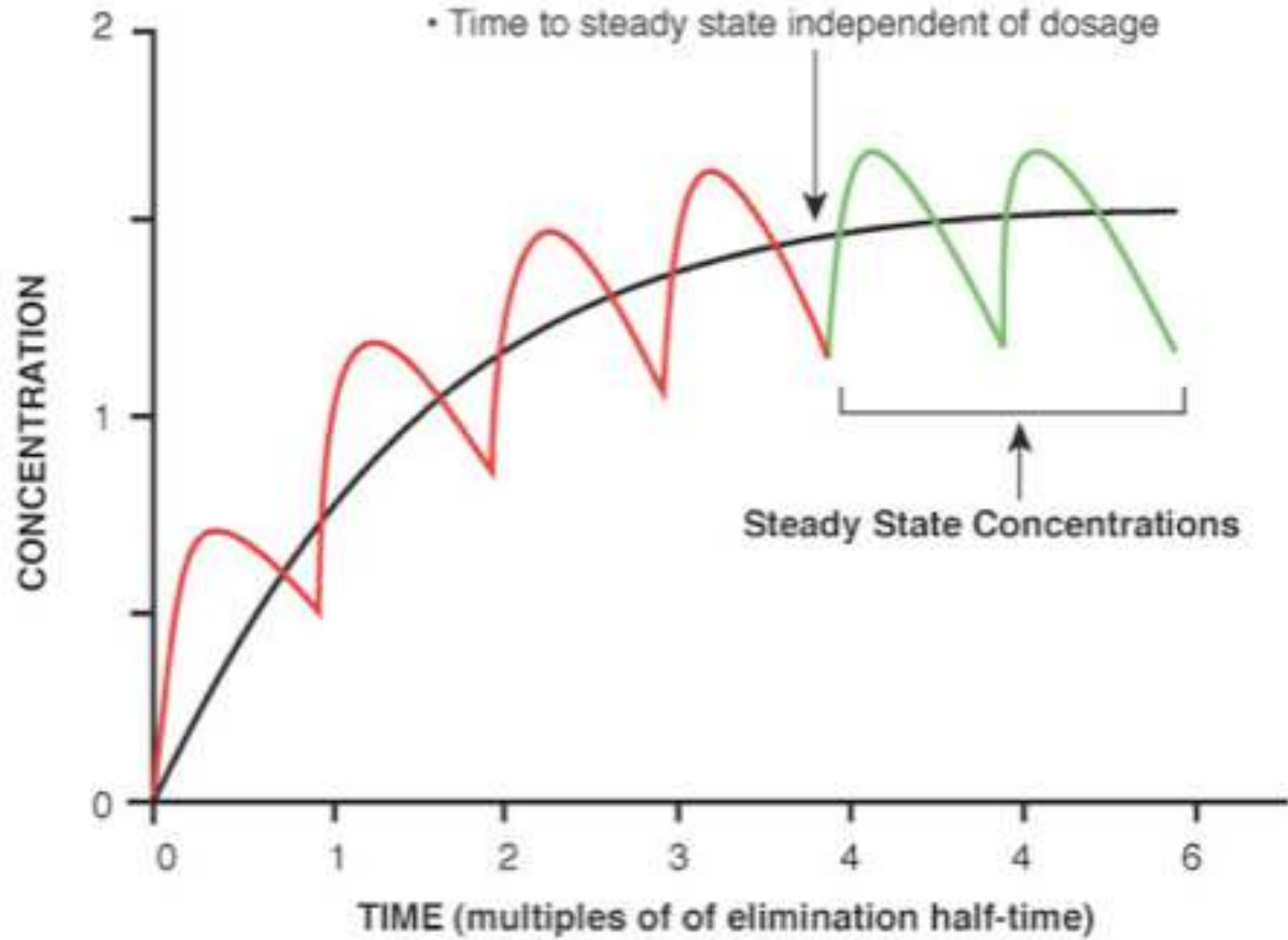


# Half-life & Steady state

- Half-life: how long it takes for the body to get rid of half of the dose (serum drug concentration decrease by 50%)
  - Major determinant of: duration of action, dosing frequency, steady state
- Steady state: 6 half-lives
  - When the amount of drug going in is the same as the amount of drug getting taken out
  - Dependent on half-life

### Steady State

- Attained after approximately four half-times
- Time to steady state independent of dosage



## How does this apply to practice?

- Dosing schedule- qd vs bid/tid/qid
- 2 pills in AM vs 1 pill BID
- Studies have shown once daily dosing is associated with significantly greater compliance compared with multiple daily dosing

## What if a patient misses their dose?

- Generally at 4 half-lives drug concentrations are considered to be below therapeutic threshold
- No longer have a pharmacological effect 4 half-lives after the last dose

Number of half-lives	% of drug remaining	% of drug removed
0	100	0
1	50	50
2	25	75
3	12.5	87.5
4	6.25	93.75
5	3.125	96.875



# Formulations: XL vs ER vs XR

- Extended release
- Drug is released slowly over an extended period
- Advantages:
  - Sustained therapeutic blood levels of the drug
  - Dosed less frequently than regular formulations
  - Reduction in adverse effects
  - Improved patient compliance

# Metformin vs. Metformin XR

	Metformin IR	Metformin XR
Time to max concentration	2-3 hours	7 hours
Duration	6 hours	24 hours

Glipizide  
vs.  
Glipizide XL

	Glipizide	Glipizide XL
Time to max concentration	1-3 hours	6-12 hours
Duration	12 hours	24 hours

# Injectable Medications

- GLP-1 Agonists
- Insulin

What time is best for a patient to take their medications?

- Anytime
- Emphasize patient compliance

# Why is it safe to take multiple diabetes medications together?

- Exceptions:
  - GLP-1 agonists and DPP-4 inhibitors
  - Sulfonylureas and insulin
  - Sulfonylureas and meglitinides

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