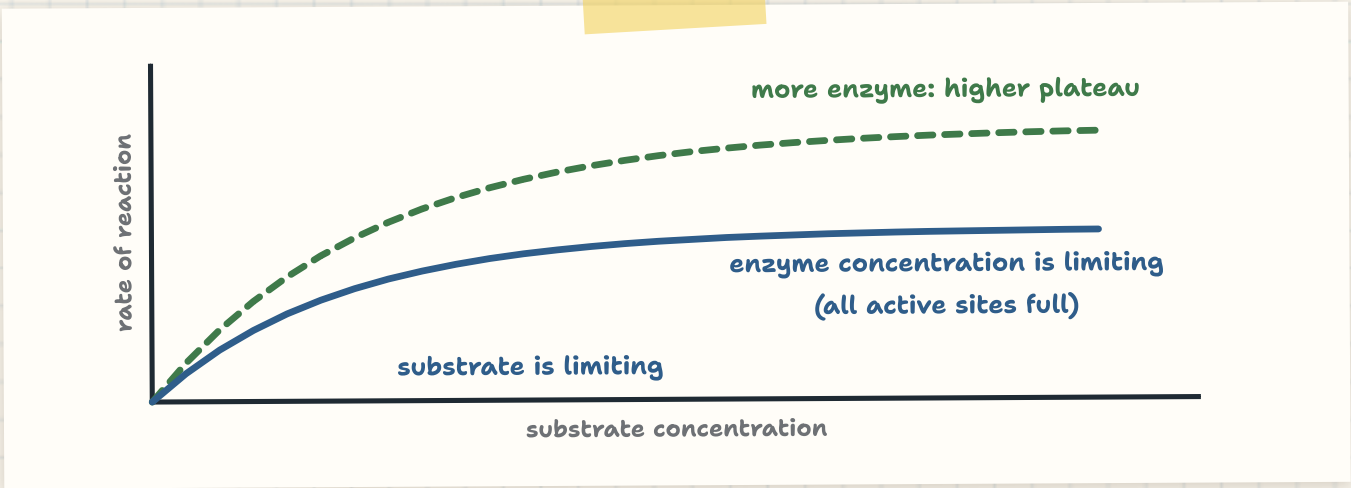
Enzyme Rate Graphs: Why the Plateau

Why the rate-substrate graph plateaus, and what limits the rate before and after.



Key terms

limiting factor	a factor in short supply, so it limits how fast the reaction can go.
substrate concentration	the amount of substrate present; at low values it is the limiting factor.
saturated	virtually every active site is occupied at the same moment.
plateau	the part of the graph where the rate stops rising.
enzyme concentration	the number of enzymes, so the number of active sites; it limits the rate at the plateau.
collisions	contacts between substrate molecules and active sites; more collisions form more enzyme-substrate complexes.

I can...

- [ ] Effects of enzyme concentration and substrate concentration on the rate of enzyme-controlled reactions

EXAM TRAP

Never say the rate levels off because the substrate has run out. It has not: the active sites are all occupied, and enzyme concentration is the limiting factor.

4 marks: what earns them

1. At low substrate concentration, rate increases because more substrate gives more collisions with active sites / more enzyme-substrate complexes formed
   Not: 'more substrate so faster' with no collisions or complexes
2. At the plateau, all the active sites are occupied / enzymes are saturated
   Not: 'the enzymes are full' with no active sites; 'the substrate has run out'
3. Adding more substrate does not increase the rate, because enzyme concentration (number of active sites) is now the limiting factor
   Not: 'substrate is limiting' at the plateau; 'enzymes are used up'
4. Increasing enzyme concentration gives more active sites, so the rate increases / the plateau is higher (if substrate is in excess)
   Not: 'more enzyme so the enzymes work faster'

Remember

Low substrate: substrate limits.
Plateau: enzyme limits (all active sites full).
More enzyme gives a higher plateau.

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