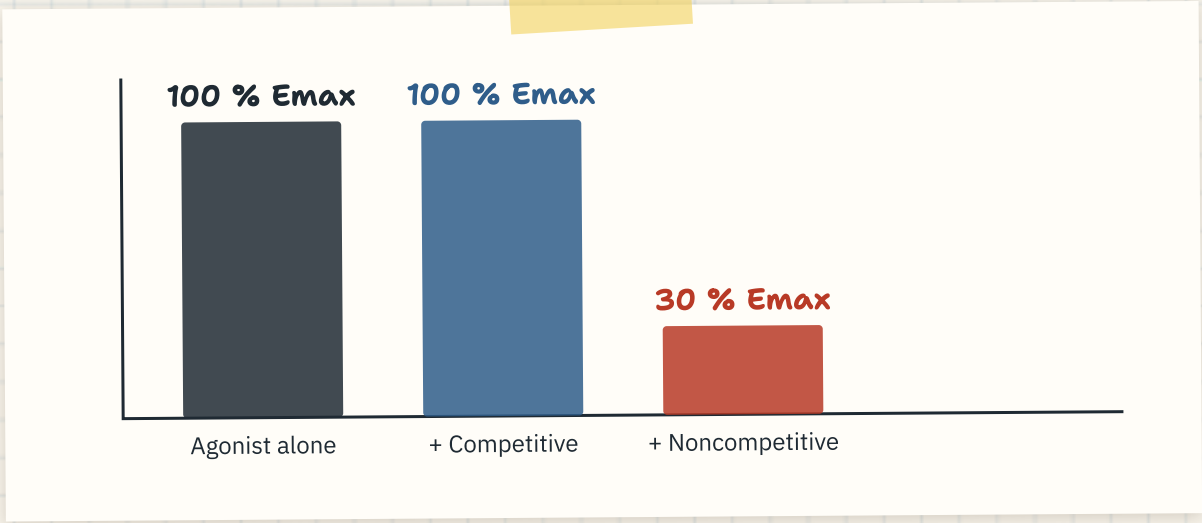
Antagonists and the curve

Competitive vs noncompetitive: EC50 and Emax



Step by step

1. Antagonist: binds, does not activate
2. Competitive: same site, reversible, surmountable
3. Noncompetitive: separate site, insurmountable
4. Irreversible (phenoxybenzamine): covalent, acts like noncompetitive on the graph

	Competitive	Noncompetitive
Site	Same as agonist	Allosteric
Beaten by more agonist	Yes	No
EC50	Rises	Unchanged (exam graph)
Emax	Unchanged	Falls
Curve	Parallel right shift	Lower ceiling

Effect on the agonist dose-response curve

Memory hook

Competitive shifts the curve right
Noncompetitive pushes it down

Exam traps

- Do not read potency from a maximum: a lowered maximum with the EC50 unchanged is not competitive.
- A competing partial agonist is surmountable: the curve shifts right, not down.
- An irreversible antagonist acts like a noncompetitive one on the graph, even at the agonist site.

Competitive vs noncompetitive antagonists: effect on EC50 and Emax

Video, written lesson, practice question and sources: medservatory.com/usmle-step-1/pharmacology-principles-autonomic/competitive-vs-noncompetitive-antagonists

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