PIPADOR REVISION

MRCOG Part 1 Revision Notes

Pharmacodynamics

PHARMACOLOGY • LECTURE 365

VISUAL EXAMINATION REVISION NOTES

2026 Edition

365

MRCOG PART 1 REVISION NOTES | PHARMACOLOGY

Pharmacodynamics

Drug targets, receptor types, agonists and antagonists, dose–response, tolerance and therapeutic index

Affinity	Efficacy	EC50	TI
Binding strength	Response once bound	Potency	TD50 / ED50

■ KEY FACTS: Learning objectives

- Define pharmacodynamics, receptor types and drug–receptor interactions.
- Describe agonists, partial agonists, antagonists and dose–response relationships.
- Describe tolerance, therapeutic index and O&G examples.

365.1 Drug targets

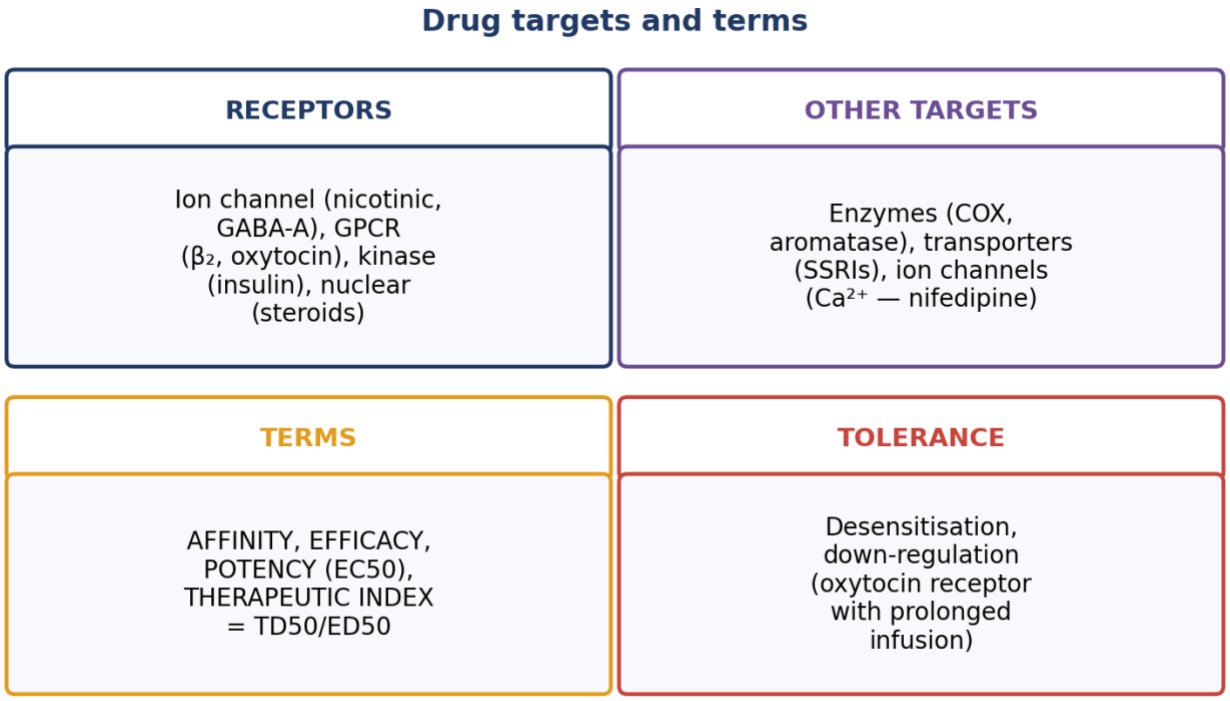


Figure 365.1 — Drug targets and terms

Receptor type	Speed	O&G examples
Ligand-gated ion channel	Milliseconds	Nicotinic (neuromuscular blockers), GABA-A (benzodiazepines, propofol), NMDA ($MgSO_4$, ketamine)
G protein-coupled	Seconds	Oxytocin (Gq), β_2 (Gs — tocolysis), α_1, prostaglandin (EP/FP), opioid (Gi), dopamine D_2 (cabergoline)
Kinase-linked	Minutes	Insulin, growth factors, cytokines (JAK–STAT)

Receptor type	Speed	O&G examples
Nuclear	Hours	Steroids: oestrogen/progesterone (SERMs, mifepristone), glucocorticoids, thyroid hormone

365.2 Dose–response

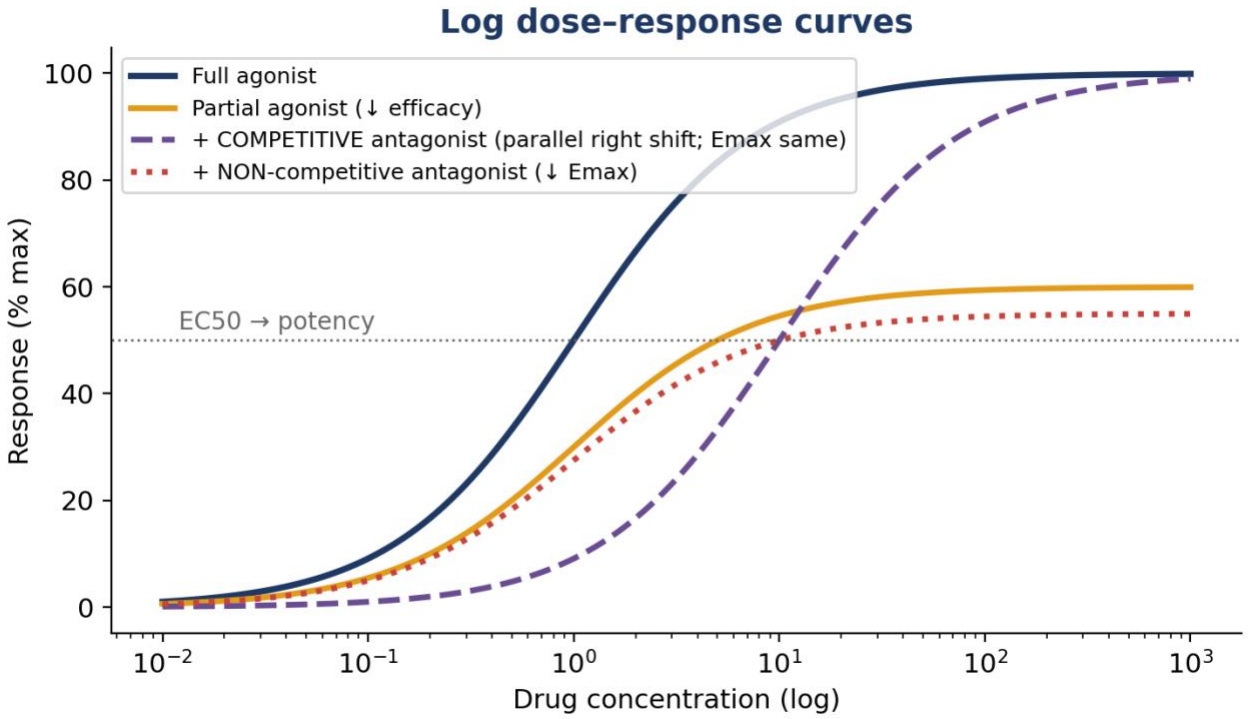


Figure 365.2 — Agonists and antagonists

- **Full agonist**: maximal response (oxytocin, morphine).
  - **Partial agonist**: submaximal even at full occupancy (buprenorphine; SERMs act tissue-selectively).
- **Competitive antagonist**: surmountable, parallel right shift (naloxone, atosiban at oxytocin receptor).
  - **Non-competitive/irreversible**: ↓ maximal response (aspirin on COX — irreversible enzyme acetylation).
- **Inverse agonist**: reduces constitutive activity.
- **Therapeutic index** narrow → monitoring ($MgSO_4$, gentamicin, lithium, warfarin).

365.3 Tolerance and variability

- **Desensitisation/tachyphylaxis**: oxytocin receptor down-regulation with prolonged infusion → atony and PPH after long augmented labour
  - β_2-agonist tolerance.
- **Pharmacogenetics**: CYP2D6 (codeine)
  - TPMT (azathioprine)
  - G6PD (nitrofurantoin, primaquine haemolysis)
  - Pseudocholinesterase deficiency (suxamethonium apnoea).
- Pregnancy alters receptors and sensitivity (e.g. ↑ oxytocin receptors at term; ↓ requirement for local anaesthetic).

365.4 Must-know summary

■ EXAM TIP

- Pharmacodynamics = what the drug does to the body.
- Affinity, efficacy, potency (EC50); TI = TD50/ED50.
- Competitive antagonist → parallel shift; non-competitive → ↓ Emax.
- Oxytocin receptor desensitisation → PPH after prolonged infusion.

■ MNEMONIC / MEMORY AID

'PK = what the body does to the drug; PD = what the Drug Does'.