Digoxin	High BA (>70%) *BA ⇑by ABx like erythromycin, gut flora changes* Very large Vd **Unchanged renal excretion** HL = 40hrs
Lidocaine	Weak base: pKa 7.5-9 Very poor BA (<5%) HL 1-2hrs (longer in liver failure) Liver metab (metabs amide bond) + renal excretion SE: CNS, CVS, GIT Unionised - cross cell membrane to access internal aspect Ionised - most active on Na channel
Nolaxone	Pure antagonist at Mu HL 1-2hr (longer if PO) ⇑⇑FPM IV – opioid reversal 1-3 minutes
Theophylline	Narrow TI SEs: CVS (arrhythmia, ⇓BP), CNS (stimulation → seizures)
Sotalol	100% BA No liver metab, **unchanged renal excretion** Racemic mixture: β-blocker, K-blocker
Salbutamol	INH / NEB / PO / IV Inhaled – fast + complete absorption **Peak action 15mins**, persists 4 hours **High FPM**, some unchanged renal excretion (no lung metab) HL 4-6hrs
Ipratropium	Faster onset of action than salbutamol (<5mins), but peak action later (at hours)
Warfarin	100% BA 99% protein bound ⇓Vd Liver metab **HL = 36hr** 12 hr delayed onset action
Adenosine	HL < 10s Rapid metab by adenosine deaminase in RBCs + endothelial cells GPCR → ⇑K, ⇓Ca ⇓Effect with: theophylline ⇑Effect with: dipyridamole
Nifedipine	Fastest onset of action of DHPs < 20mins **Fecally excreted (no renal)** CCBs in general: ⇑⇑FPM ⇑⇑Plasma protein binding **Extensive liver metab**
GTN	High FPM Liver metab, renal excretion

	Tolerance due to: ⇓sulfhydral groups, systemic compensation Drug free interval GTN → 1,2 glyceryl dinitrate + NO SE: metHb
Propanolol / metoprolol	Low BA (<50%, dose dependent) due to FPM Liver metab High lipid soluble, crosses BBB ⇑Vd HL = 4hr Propanolol = more lipid soluble than metoprolol LA actions Most β-blockers have low lipid solubility, propranolol is an exception
Adrenaline	IV/IM/Neb (not PO) **Doesn't cross BBB** Onset: seconds Duration: 2 minute Metab MAO (nerve terminal), COMT (nerve terminal + circulating) → VMA, excreted in urine β1=β2=α1=α2 Low dose mainly β (Norad α1=α2 > β1>β2)
Carbamazepine	PD: Na blocker, anticholinergic P450 metab, and inducer **Active metabolites** SE: cerebellar, anticholinergic, P450 interaction, SIADH
Benzos	⇑BA ⇑Vd Liver metab Active metabs (except lorazepam / oxazepam) Lipid soluble (cross BBB) No P450 induction/inhibition
Barbiturates	Liver metab + renal excretion Only phenobarbitone has significant unchanged renal excret
Phenytoin	PD: Na, Ca, Glutamine, GABA ⇑BA ⇑Plasma protein bound ⇓Vd First/zero-order kinetics depending on dose Liver metabolism, renal excretion Long HL (needs loading dose) – 15hrs SE: IVI → CVS collapse, cerebellar, hair + gums

Valproate	PD: Na, GABA, NMDA ⇑BA ⇑Protein bound ⇓Vd Hepatic metab P450 inhib Fully ionized at body pH SEs: hepatotoxic, teratogenic, ⇓P450, TCP
Amitriptiline	Well absorbed Average BA = 50% ⇑FPM Liver metab ⇑*Tissue* protein binding → ⇑Vd SEs: sedation, seizure, arrhtymia, ⇓BP, anticholinergic
Lithium	100% absorption + BA No metabolism, unchanged renal excretion Vd = TBW HL = 20hrs Low TI 25%⇓ in renal clearance with diuretics / NSAIDs SE: **GI**, Neuro (**tremor**, ataxia), DI, ⇓thyroid, oedema
Suxamethonium	Rapid onset (30-60s) Short duration (2-8mins) Half life 2 mins (affected by liver, not renal) Rapid hydrolysis by **plasma + liver cholinesterase** SE: ⇓BP, ⇑K, MH, arrhtymia, muscle ache, ⇑IOP, ⇑gastric pressure Low dose – parasympathetic (⇓HR, ⇓CO) High dose – sympathetic (⇑HR, ⇑CO) NMJ block promoted by • Hypothermia • Acidosis • Long-term steroid use • Gentamicin
Rocuronium **(similar for vecuronium)**	IV Rapid onset (45-60s) Duration: 35mins Short HL – 80 mins ⇓Vd Liver metabolism **Excretion: liver (90%), renal (10%)** Dose approx 1mg/kg
Pancuronium	Longer duration of action the rocuronium **Mainly renal excretion (unchanged)**

	Some biliary excretion
Atracurium	Non-sepcific esterases Hoffman elimination (increased with fever / alkalosis) → Rapid metabolism independent of liver/renal function
Atropine	Tertiary amine IV/PO/nebulized Good PO absorption Crosses BBB ⇑Vd **Liver metab + unchanged renal excretion (60%)** HL = 2hrs
Morphine	⇑FPM ⇑Vd Liver conjugation M3G – neurotoxic → seizures M6G – analgesic Renal excretion
Methadone	Slower tolerance Slower dependence Milder but longer withdrawal ⇑BA **½-life 25-50hrs** No active metabolites Mu-receptor agonist Antagonist at NMDA and monoamine uptake sites
SSRIs	High tissue protein binding ⇑Vd Long HL
Antidepressants	Rapid oral absorption Hepatic metabolism Renal clearance
Diazepam	**<100% BA** **High protein binding** HL 20-40hrs Liver metabolism, active metabolites
Metronidazole	Good PO absorption **99% BA** Liver metab, renal excretion Low protein binding HL = 7 hrs
Erythromycin	Excreted unchanged in **bile + faeces**
Ceftriaxone	Excreted unchanged in **bile + urine**
Tetracyclines	Variable absorption – depends on GI contents (⇓ with Ca / alkaline) 40-80% protein bound Wide distribution but NOT CSF Chelates Ca and binds bone **Not metabolised** **Excreted in bile + urine** **Enterohepatic recirc** (Doxy, no renal elimination)

Fluoroquinolones	Mainly unchanged renal excretion (Not moxifloxacin)
Penicillin	Most tissue conc = serum (not CNS or prostate) **Renal (mainly secretion 90%)** HL bepen = 30mins Biliary secretion
Gentamicin	IV/IM/topical ⇓Vd **Not metabolized** **Renal elimination** **HL = 2hrs** Once daily administration Resistance: due to transferase mutation
Sulphonylureas	⇑BA Hepatic metab, renal excretion ⇑**Protein binding** HL = 12hrs
Metformin	Well absorbed ½ life 1.5-3 hrs No plasma protein binding **No metabolism** **Unchanged renal excretion**
Paracetamol	Well absorbed from GIT **Peak plasma levels within an hour** **HL = 2-3 hrs** 95% gluronidation + sulfation 5% P450 metabolism (N-hydroxylation) → NAPQI Glutathione converts NAPQI → mercapturic acid Toxic dose 200mg/kg
Aspirin	pKa 3.5 Rapid absorption from stomach + SI **Aspirin → salicylic acid + acetic acid** (hydrolysis by serum/tissue esterases) ⇑**albumin binding** ⇓Vd Liver metab, renal excretion **First / Zero order metabolism (dose dependent)** **HL < 30mins but effect outlasts HL** Alkaline diuresis
Ketamine	**Highly lipid soluble** Crosses BBB Rapid onset of action Rapid offset due redistribution **Liver metabolism**, active metabolites Inactive metabs excreted in urine
Propofol	IV admin only Rapid distribrution + redistribution → rapid onset / offset 1) Brain + viscera, 2) muscle, 3) fat Distribution ½-life = 4 mins Elimination ½-life = <20mins

	Duration of action < 10mins **Liver metab + some other mechanism of clearance (?)** Urinary excretion
Thiopentone	Rapid distribution + redistribution Plasma:brain equilibrium < 1 min High lipid solubility Crosses BBB
Ibuprofen	Organic acid, low pKa (accumulate @ inflammation ⇓pH) Good PO absorption BA 50-75% **99% protein bound** HL 1-2hrs Diclofenac has shortest HL
Ethanol	Rapid absorption from GIT Peak at 30mins Vd = TBW Metab in liver: AD + MEOS **Zero-order metab** Excretion: lungs, urine
Antipsychotics	Good oral absorption **High FPM** **High plasma protein binding** Cross BBB well Liver metabolism
0.9% NaCl	9 g of NaCl per litre of water **154 mmol/L sodium** 154 mmol/L chloride **Osmolality = 308 mosm/L** pH = 5.0
Hartmanns	**131 mmol/L of sodium** **111mmol/L of Chloride** **29mmol/L of lactate** **5mmol/L of potassium** 2mmol/L of **calcium** (but 4mEq/L due to the +2 valence) **Osmolarity of 279mOsm/L**
Carbimazole vs. PTU	PTU has shorter ½ life PTU more strongly protein bound – safer in pregnancy PTU has lower BA (carbimazole = 100%)
PPIs	Inactive prodrug Acid protected enteric coating **BA = 50%** **High FPM** Rapid hepatic metabolism **HL < 1hr** Weak bases, pass into parietal cell, concentrated 1000x Only works on actively secreting pumps Block acid secretion for up to 24hrs
Mg	Uses: Pre-eclampsia/eclampsia, bronchodilation, arrhythmia SEs: flushing/sweating, N/V

	Arrhythmia, ⇓BP, CV collapse Muscle weakness/paralysis, loss of deep tendon reflexes, resp paralysis
Nitrous oxide	Low solubility ⇓Solubility, ⇓blood:gas PC, ⇑onset-offset, ⇑MAC, ⇓metabolism Rapid equilibration with brain PD: CNS, myocardial depression, resp depression, ⇑**ICP**, ⇓GFR
Rivaroxaban	BA > 80% ⇓Vd ⇑**Plasma protein binding** Predominantly **renal excretion** (some liver) HL effected by renal impairment Rapid onset-offset
Dabigatran	**Poor BA** Renal elimination (needs dose adjustment) Rapid onset offset
Amiodarone	BA 50% Hepatic metabolism Fast + slow phase of elimination – slow is weeks HL = 58 days Effects for months Inhibits P450
Rifampicin	Inhibits DNA dependent RNA polymerase Good PO absorption **Excreted through liver + bile with enterohepatic recirc** Poor BBB penetration unless meninigitis
Ondansetron	Adjust dose in hepatic failure BA = 60%
Ocreotide	Parentral (IV/IM/SC) – bolus + infusion in UGI bleed HL 80mins Liver metabolism + UNCHANGED renal excretion (Longer HL than somatostatin – 3mins)
Activate charcoal	Large SA No good for: lithium, alcohols, corosives, cyanide Repeated doses: theophylline
Paracetamol	HL 2-3hrs BA = 75% Liver metab, renal excretion Clearance relatively unaffected by renal function Slightly protein bound