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| **Drug** | **Examples** | **Mechanism** | **Uses** | **Side effects** |
| **Opioids** | Morphine  Fentanyl  Codeine  Loperamide  Methadone  Meperidine  Dextromethorphan  Diphenoxylate | **Opioid receptor agonist**  (delta, kappa, mu)  **Open K+, close Ca2+**  (decr. AP transmission)  Inhibit release of:  ACh, Substance P,  Glutamate, NE, 5-HT | **Pain**  **Cough suppression**  (dextromethorphan)  **Diarrhea**  (loperamide, diphenoxylate)  Acute pulmonary edema  **Heroin maintenance**  (methadone) | Addiction  **Respiratory depression**  **Constipation**  **Miosis**  Tolerance  (not to constipation/miosis)  Treat w/ **naloxone, naltrexone**  (opioid antagonists) |
| Pentazocine | Kappa agonist  Mu antagonist | Moderate-severe pain | **Opioid withdrawal**  (if taking full antagonist) |
| Butorphanol | Kappa agonist  Mu partial agonist | Severe pain  **Less respiratory depression**  (than full agonist) | Opioid withdrawal  (if taking full agonist)  **Overdose not reversed easily** |
| Tramadol | **Very weak agonist**  **Inhibit 5-HT, NE reuptake** | Chronic pain | **Decreases seizure threshold**  **Serotonin syndrome** |
| **Barbituates** | Phenobarbital  Pentobarbitol  Thiopental  Secobarbital | Bind GABA Cl- channel  **Incr. duration** of opening  Hyperpolarize neuron | **Sedative** for:  Anxiety, insomnia  Seizures  Induce anesthesia | **Contraindicated in porphyrias**  CV/CNS/pulm depression  **P450 inducer**  Treat w/ supporting respiration |
| **Benzodiazepines** | Diazepam  Lorazepam  Triazolam  Temazepam  Oxazepam  Midazolam  Chlordiazepoxide  Alprazolam | Bind GABA Cl- channel  **Incr. freq.** of opening  Hyperpolarize neuron | Anxiety  Spasticity  **Status epilepticus**  **Eclampsia**  **Alcohol withdrawl**  Night terrors  Sleepwalking  General anesthetic  **Hypnotic** (insomnia) | Dependence  **CNS depression w/ alcohol**  Less pulm depression than barbituates  Treat w/ **flumazenil** (can precip. seizures) |
| **Nonbenzo-**  **Hypnotics** | Zolpidem  Zaleplon  Eszopiclone | Bind **GABA** channel  (**BZ1 subtype**)  **Less psychomotor depress.**  **Less amnesia**  **Less dependence risk** | **Insomnia**  (sleep cycle less affected  than w/ benzos) | **Ataxia**  Headaches  Confusion  Treat w/ **flumazenil** |

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| **Drug** | **Mechanism** | **Uses** | **Side effects** |
| **Ethosuximide** | Block **Ca2+** channels  (thalamic T-type) | **Absence** | Urticaria  **Stevens-Johnson syndrome**  Fatigue, headache, GI issues |
| **Benzodiazepines** | Increase **GABA** action | **Status epilepticus**  **Eclampsia** | Sedation  Tolerance  Dependence  Respiratory depression |
| **Phenobarbital** | Increase **GABA** action | Focal seizures  Tonic-clonic  **First line in neonates** | Sedation  Tolerance  Dependence  CV/pulm depression  **P450 inducer** |
| **Phenytoin**  **Fosphenytoin** | Blocks **Na+** channels  **Zero order kinetics** | **Tonic-clonic (first line)**  **Status epilepticus (prophylaxis)**  Focal seizures | **Peripheral neuropathy, nystagmus**, diplopia, sedation  **Stevens-Johnson syndrome, gingival hyperplasia**  **DRESS** (drug reaction w/ eosinophilia & systemic symptoms)  **SLE-like syndrome**, osteopenia  **Megaloblastic anemia**  Teratogenic (**fetal hydantoin syndrome**)  **P450 inducer** |
| **Carbamazepine** | Block **Na+** channels | **Focal seizures (first line)**  Tonic-clonic  **Trigeminal neuralgia** | **Agranulocytosis, aplastic anemia**  Liver toxicity, **P450 inducer**  **Teratogenic**  **SIADH**, diplopia, ataxia  **Stevens-Johnson syndrome** |
| **Valproic acid** | Block **Na+** channels  Block **GABA** transaminase | **Tonic-clonic (first line)**  **Absence**  Focal seizures  **Myoclonic**  **Bipolar, migraine prophylaxis** | **Hepatotoxic** (fatal, measure LFTs) **Pancreatitis**, GI distress  **Neural tube defects** (contraindicated in pregnancy)  Tremor, weight gain |
| **Vigabatrin** | Block G**ABA** transaminase | Focal seizures |  |
| **Gabapentin** | Block **Ca2+** channels | Focal seizures  **Peripheral neuropathy**  **Postherpetic neuralgia** | Sedation, ataxia |
| **Topiramate** | Block **Na+** channels  Increase **GABA** action | Focal seizures  Tonic-clonic | **Kidney stones**  Sedation, weight loss, mental dulling |
| **Lamotrigine** | Block **Na+** channels | Focal seizures  Tonic-clonic  **Absence** | **Stevens-Johnson syndrome**  **(titrate slowly)** |
| **Levetiracetam** | Modulate **GABA** release  Modulate **glutamate** release | Focal seizures  Tonic-clonic |  |
| **Tiagabine** | Block **GABA** reuptake | Focal seizures |  |

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| **Drug** | **Examples** | **Mechanism** | **Side effects** |
| **a-agonists** | Epinephrine (a1)  Brimonidine (a2) | Decr. humor synthesis  (**vasoconstriction**) | **a1: mydriasis**  (not for closed-angle)  Blurry vision, **hyperemia**  **Foreign body sensation**  Allergic reaction, pruritis |
| **B-blockers** | Timolol  Betaxolol  Carteolol | Decr. humor synthesis | No pupillary/vision changes |
| **Diuretics** | Acetazolamide | Decr. humor synthesis  (**inhibits carbonic anhydrase**) | No pupillary/vision changes |
| **Direct**  **Cholinomimetics** | Pilocarpine  Carbachol | Incr. humor outflow  (**ciliary muscle contraction**)  (opens trabecular meshwork  **Pilocarpine opens canal of Schlemm** | **Miosis** (pupil sphincter contraction)  **Cyclospasm** (ciliary muscle contraction) |
| **Indirect**  **Cholinomimetics** | Physostigmine  Echothiophate |
| **Prostaglandins** | Bimatoprost  Lanatoprost | Incr. humor outflow | **Darkens iris**  **Eyelash growth** |

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| **Drug** | **Mechanism** | **Uses** | **Side Effects** |
| **Memantine** | **NMDA antagonist**  Prevent excitotoxicity | Alzheimer | Hallucinations  Dizziness  Confusion |
| **Donepezil**  **Galantamine**  **Rivastigmine**  **Tacrine** | **AChE inhibitors** | Alzheimer | Insomnia  Nausea  Dizziness |
| **Tetrabenazine**  **Reserpine** | **Inhibit VMAT**  Decr. dopamine release | Huntington  (also use haloperidol) |  |
| **Riluzole** | **Decr. glutamate toxicity** | ALS |  |
| **Sumatriptan** | **5-HT1B/1D agonists**  Inhibit trigeminal nerve  Cause vasoconstriction | **Acute migraines**  **Cluster headaches** | **Coronary vasospasm**  (contrain. in CAD, Prinzmetal)  Mild paresthesia |

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| **Drug** | **Examples** | **Mechanism** | **Uses** | **Side effects** |
| **Ergot dopamine agonists** | Bromocriptine | Increase dopamine | Parkinson  **Restless leg syndrome** |  |
| **Non-ergot**  **Dopamine agonists** | Pramipexole  Ropinirole |
| **Increase dopamine** | Amantadine | Incr. dopamine release  Decr. dopamine reuptake | Parkinson | **Livedo reticularis**  Ataxia |
| **Levodopa** | L-DOPA  Carbidopa | **Block peripheral conversion**  (inhibits DOPA decarboxylase)  **Reduce side effects** (nausea) | Parkinson | Arrhythmias  Dyskinesia (on dose)  Akinesia (off dose) |
| **COMT-inhibitors** | Entacapone  Tolcapone | Inhibit **peripheral** COMT  (prevent peripheral breakdown)  Inhibit **peripheral/central** COMT  (incr. dopamine levels) | Parkinson |  |
| **MAO inhibitors** | Selegiline | Inhibit **MAO-B** | Parkinson | Enhance L-dopa side effects |
| **Anticholinergic** | Benztropine | **Antimuscarinic** | Improve tremor, rigidity  **No effect on bradykinesia** |  |

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| **Drug** | **Examples** | **Mechanism** | **Effects/Uses** | **Side effects** |
| **Inhaled anesthetics** | Desflurane  Halothane  Enflurane  Isoflurane  Sevoflurane  Methoxyflurane  N2O | Unknown | CV/pulm depression  Nausea/emesis  Incr. cerebral blood flow  (via decr. metabolism) | **Halothane: hepatotoxic**  **Methoxyflurane: nephrotoxic**  **Enflurane: proconvulsant**  **N2O: expansion of trapped gas**  **Malignant hyperthermia**  (induce fever, contractions)  Treat w/ dantrolene |
| **Intravenous anesthetics** | Barbituates | Incr. GABA action  **Rapidly redistributes in tissues**  (quickly terminates effects) | **Anesthesia induction**  Short procedures | Sedation, tolerance, dependence  CV/pulm depression  **P450 inducer** |
| Benzodiazepines | Incr. GABA action | **Endoscopy**  Decr. BP  Anterograde amnesia | Severe respiratory depression |
| Ketamine | **Block NMDA receptor**  (PCP analog) | **Dissociative anesthetic**  **CV stimulant**  Incr. cerebral blood flow | Disorientation  **Hallucination**  **Bad dreams** |
| Propofol | Potentiates **GABAA** | ICU sedation (**rapid induction**)  Less postop nausea |  |
| Opioids | Bind opioid receptors | General anesthesia  (morphine, fentanyl) | Respiratory depression  **Constipation, miosis** |
| **Local anesthetics** | Procaine  Cocaine  Tetracaine  Benzocaine | Block Na+ channels  Most effective w/ rapid firing | **Minor surgeries**  Use amides for ester allergies  **Given w/ vasoconstrictors**  (decr. bleeding)  **Less effective in infected tissues**  (require alkaline environment)  Block small/myelinated first | **Bupivacaine: CV toxicity**  **Cocaine: arrhythmias**  **Benzocaine: methemoglobinemia**  **Hyper/hypo-tension**  **CNS excitation** |
| Lidocaine  Mepivacaine  Bupivacaine |
| **Depolarizing**  **NM blockers** | Succinylcholine | **Strong ACh agonist**  **Phase 1: sustained depolarization (no antidote)**  **Phase 2: desensitize receptors (reversed by AChE inhibitors)** | Surgical muscle paralysis  Mechanical ventilation  **Selective for motor nicotinics** | **Hypercalcemia**  **Hyperkalemia**  **Malignant hyperthermia** |
| **Nondepolarizing**  **NM blockers** | Tubocurarine  Atracurium  Mivacurium  Pancuronium  Vecuronium  Rocuronium | **Competitive ACh antagonist** | Reverse w/:  **Neostigmine (give w/ atropine)**  Edrophonium  Other AChE inhibitors |
| **Dantrolene** | | **Bind ryanodine receptor,** prevent Ca2+ release from SR | **Malignant hyperthermia**  **Neuroleptic malignant syndrome** |  |
| **Baclofen** | | Activate **GABAB** in spinal cord, induce muscle relaxation | **Muscle spasms** |  |
| **Cyclobenzaprine** | | **Skeletal muscle relaxant** (central acting) | **Muscle spasms** | **Anticholinergic effects** (similar to TCAs) |