**Anticonvulsant drugs**

*(Antiepileptic drugs)*

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**QBANK SESSION**

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**Summary**

Anticonvulsant drugs are classified as either first-generation (classic) agents or second-generation agents. Second-generation anticonvulsants are usually better tolerated and have a broader therapeutic range than classic anticonvulsant drugs. The choice of drug is guided by the type of [seizure](https://next.amboss.com/us/article/RR0l5f#Z34c7e6b1cab99047c956783229d49b59). First-line treatment for [focal seizures](https://next.amboss.com/us/article/iR0J5f#Z5bad57bf6fb0e7d13b19dbe3b042b15f) includes, e.g., [lamotrigine](https://next.amboss.com/us/article/-N0Ddg" \l "Z9334b8d5fd714d3a60ba25bf269766c8) or [levetiracetam](https://next.amboss.com/us/article/-N0Ddg" \l "Z104858d1d95706e85b2239729453f885), while [valproate](https://next.amboss.com/us/article/-N0Ddg#Zfe47f4f5fb7f8de32f7919dc8909896e) is used for [generalized seizures](https://next.amboss.com/us/article/RR0l5f#Z78ed1843244ca259945a92840fc6b3ca). While all anticonvulsants have dose-dependent side effects on the [central nervous system](https://next.amboss.com/us/article/lp0vpS#Z0111aade770ed6f7d136b455de1d6c1f) (e.g., [somnolence](https://next.amboss.com/us/article/br0Hfh#Z76f6d92711de6f72ff03aafa7a3a963d), [nausea](https://next.amboss.com/us/article/7J04vS#Z2f0b48ef2acaab783b03e4c8d2404f90)), select agents also have other side effects (e.g., gingival hyperplasia caused by [phenytoin](https://next.amboss.com/us/article/-N0Ddg#Ze338d98a64b4a810c498bff53f4eea2f)). Anticonvulsants are also used for [pain management](https://next.amboss.com/us/article/xN0EWg#Z04036123bf992e2ea414321b2a6f5cbd) (e.g., [carbamazepine](https://next.amboss.com/us/article/-N0Ddg#Zb42030a33ee6196d376ee73775500933) or [gabapentin](https://next.amboss.com/us/article/-N0Ddg#Z938c7ff58d074545cd0caa95ce8b32f6)) and as [mood stabilizers](https://next.amboss.com/us/article/4P03UT#Z0f6c36a065109a07c92466be9f090e03) in [bipolar disorders](https://next.amboss.com/us/article/4P03UT#Z7ac94b20d5320cb1cd96aa7469eae69c) ([valproate](https://next.amboss.com/us/article/-N0Ddg#Zfe47f4f5fb7f8de32f7919dc8909896e)).

For more information on the treatment of [generalized seizures](https://next.amboss.com/us/article/RR0l5f#Z78ed1843244ca259945a92840fc6b3ca), see [treatment of epileptic seizures](https://next.amboss.com/us/article/RR0l5f#Z6835795797a9990627be38cde838532f).

NOTES

FEEDBACK

**Overview**

Anticonvulsant drugs inhibit neural activity (**↓ neural excitation**, **↑ neural inhibition**) and increase the [seizure](https://next.amboss.com/us/article/RR0l5f#Z34c7e6b1cab99047c956783229d49b59) threshold by interacting with specific [receptors](https://next.amboss.com/us/article/qo0C1S#Z3ff0122a3c004eebed96e9db47e16ea4) and ion channels.

**Overview of first-generation anticonvulsants  [1]**

MAXIMIZE TABLETABLE QUIZ

| **Overview** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **Agent** | **Indication** | **Mechanism of action** | **Adverse effects** | **Contraindications** | **Interactions** |
| **Valproate** | * First-line long-term treatment for [tonic-clonic](https://next.amboss.com/us/article/RR0l5f#Z39768e930bb5fa124e30a7cbab2dc9b2) [generalized seizures](https://next.amboss.com/us/article/RR0l5f#Z78ed1843244ca259945a92840fc6b3ca) * Partial (focal) [seizures](https://next.amboss.com/us/article/RR0l5f" \l "Z34c7e6b1cab99047c956783229d49b59) * Absence [epilepsy](https://next.amboss.com/us/article/RR0l5f" \l "Z33e671e67fe6fe4a955c629c4efb3de7) * Treatment of established [status epilepticus](https://next.amboss.com/us/article/RR0l5f#Zf96bfae8816f17025782f0439045efc1) [2] * [Myoclonic seizures](https://next.amboss.com/us/article/RR0l5f#Zc819b6cf649177966aac75d349ee1890) * [Migraine prophylaxis](https://next.amboss.com/us/article/hi0crf#Z9cc0577a6b0e73dec88efacceb22713a) * [Bipolar disorder](https://next.amboss.com/us/article/4P03UT#Z7ac94b20d5320cb1cd96aa7469eae69c) | * Inhibits GABA transaminase → ↑ [GABA](https://next.amboss.com/us/article/lp0vpS#Z6625804b83e4ca0c92651a2763692086) → ↓ neuronal excitability * Inactivates Na+ channels and [Ca2+](https://next.amboss.com/us/article/Hg0K92#Z96f09f8b59b6467bac2f983358a263bb) channels | * Gastrointestinal upset * [**Tremor**](https://next.amboss.com/us/article/x30Ekf#Z31783b886c5b864e996ac90b710d2de9) * [**Alopecia**](https://next.amboss.com/us/article/tk0XpT#Z34a7ac981a032456d9d61547c3e30857) * [Pancreatitis](https://next.amboss.com/us/article/SS0y_2#Z6dc222965ad0be9a5f2c005b35e25334) * Weight gain * [**Teratogenicity**](https://next.amboss.com/us/article/V40GRT#Z94fc7dcf0faf77af8f9cae385d9050d8)   + Especially [neural tube defects](https://next.amboss.com/us/article/el0xDT#Z055c25fa28c4eb8c6bb0672e557eef80) (contraindicated in women of childbearing age/[pregnancy](https://next.amboss.com/us/article/dO0orT#Zeba6f488931dd463917047bb9c5f18f4)) )   + See [pharmacotherapy during pregnancy](https://next.amboss.com/us/article/dm0oeg" \l "Z3d340e0c351e8a2825b96a24c165a5ec) * Hepatotoxicity (usually occurs during the first 6 months of treatment): [LFT](https://next.amboss.com/us/article/Ln0wFg#Zec7198aab35043cf581b97bde4bf916f) should be regularly performed in people taking [valproate](https://next.amboss.com/us/article/-N0Ddg#Zfe47f4f5fb7f8de32f7919dc8909896e)  [3] * [Cytochrome P450 inhibition](https://next.amboss.com/us/article/7N04cg#Z22d03846ca028f44ee5da263066b1d28)  [4] * Rash * [Dizziness](https://next.amboss.com/us/article/fH0kph#Z2902ea08bfe4d834c405462f8fae0720) * Sedation * [Ataxia](https://next.amboss.com/us/article/BR0z6f#Zf80a28124dec1e83d16823b0ca5e4295) * [Thrombocytopenia](https://next.amboss.com/us/article/wT0hG2#Zdab14a350ac311c7a2589ab7d48358ad) (may manifest as easy [bruising](https://next.amboss.com/us/article/ph0LUf#Z89769da4ff0ee7f0552bfe73232d6078)) * [Agranulocytosis](https://next.amboss.com/us/article/ln0vtg#Z46db40fbe4484a3cc0d3c656da4bba2c) | * [Pregnancy](https://next.amboss.com/us/article/dO0orT#Zeba6f488931dd463917047bb9c5f18f4) (especially [valproate](https://next.amboss.com/us/article/-N0Ddg#Zfe47f4f5fb7f8de32f7919dc8909896e) and [carbamazepine](https://next.amboss.com/us/article/-N0Ddg#Zb42030a33ee6196d376ee73775500933)) | * [Cytochrome P450 inhibition](https://next.amboss.com/us/article/7N04cg#Z22d03846ca028f44ee5da263066b1d28) |
| **Carbamazepine [5]** | * First-line treatment for [focal seizures](https://next.amboss.com/us/article/iR0J5f#Z5bad57bf6fb0e7d13b19dbe3b042b15f) * First-line [treatment of trigeminal neuralgia](https://next.amboss.com/us/article/ii0Jrf#Z97df51c09a37c0c8d9e24c92027b6ff1) * Second-line treatment for generalized [tonic-clonic](https://next.amboss.com/us/article/RR0l5f#Z39768e930bb5fa124e30a7cbab2dc9b2) [seizures](https://next.amboss.com/us/article/RR0l5f#Z34c7e6b1cab99047c956783229d49b59) | * Inactivates Na+ channels | * Gastrointestinal symptoms (e.g., [nausea](https://next.amboss.com/us/article/7J04vS#Z2f0b48ef2acaab783b03e4c8d2404f90), [vomiting](https://next.amboss.com/us/article/7J04vS#Z2f0b48ef2acaab783b03e4c8d2404f90), [diarrhea](https://next.amboss.com/us/article/6M0jpg#Z51b67b2885f849894721232a6bf6d273)) * Rash * [Hyponatremia](https://next.amboss.com/us/article/rg0f92#Z482f3cc1cfc32af07678821b7e06fb08), hyperhydration, and [edema](https://next.amboss.com/us/article/SM0yLg#Z4d691ca388c1f715da27ec368c5c7171) (due to [**SIADH**](https://next.amboss.com/us/article/zT0rt2#Z849dca7797cad193a13bd0c4d86128bc)) * [DRESS syndrome](https://next.amboss.com/us/article/bs0Hth#Z0a5a570644776cd8880ae14f14498dd5) * Blood count abnormalities (e.g., **[agranulocytosis](https://next.amboss.com/us/article/ln0vtg" \l "Z46db40fbe4484a3cc0d3c656da4bba2c)**, [aplastic anemia](https://next.amboss.com/us/article/6T0j72#Z29436f8465776b6bdd235b45db5aeab5)) * [**Teratogenicity**](https://next.amboss.com/us/article/V40GRT#Z94fc7dcf0faf77af8f9cae385d9050d8)**during the**[**first trimester**](https://next.amboss.com/us/article/dO0orT#Z20c7f66d3b5d0ce771fe82b5d645e665) ([cleft lip](https://next.amboss.com/us/article/FM0gqg#Zc9c6445b3f574d9f697f3a5fe6ff74a9)/[palate](https://next.amboss.com/us/article/jp0_6S#Z281012acfe74769bb5123dd3d8770405), [spina bifida](https://next.amboss.com/us/article/el0xDT" \l "Z685cf8801a24d93ccc61b6da66a05402)) (see [pharmacotherapy during pregnancy](https://next.amboss.com/us/article/dm0oeg#Z3d340e0c351e8a2825b96a24c165a5ec)) * [Folate](https://next.amboss.com/us/article/Ao0ReS#Z831a74f0b4bc9aed491551ad68d1dc11) depletion * [Diplopia](https://next.amboss.com/us/article/uO0p8T#Z2b0b94a21ad82a9282c086920366c1a6) * [Ataxia](https://next.amboss.com/us/article/BR0z6f#Zf80a28124dec1e83d16823b0ca5e4295) * Hepatotoxicity * [**Stevens-Johnson syndrome**](https://next.amboss.com/us/article/uL0pzg#Z6d8f0e7f377b30353480cefd0f1919e1) * **Induces [cytochrome P450](https://next.amboss.com/us/article/7N04cg" \l "Za39bdea0ca617cb09a303b8c3f6364ff)** * [Dizziness](https://next.amboss.com/us/article/fH0kph#Z2902ea08bfe4d834c405462f8fae0720) * Sedation | * Strong induction of [cytochrome P450](https://next.amboss.com/us/article/7N04cg#Za39bdea0ca617cb09a303b8c3f6364ff) |
| **Ethosuximide** | * First-line for [absence seizures](https://next.amboss.com/us/article/jR0_5f#Z84445f9bf9203c148ad6809c64e170f2) | * Inhibition of voltage-gated calcium channels (T-type) in [neurons](https://next.amboss.com/us/article/lp0vpS#Zeb508d67af399f2b2da18e8b2cc5eed8) of the [thalamus](https://next.amboss.com/us/article/-60DnS#Zd64bfb19d2d1ca43c42b4d2c203deb2f) | * Gastrointestinal symptoms * Allergic [skin](https://next.amboss.com/us/article/W60PPS#Z84ffaf83e57bb0cc8eb7c50bbc266078) reactions ([urticaria](https://next.amboss.com/us/article/ek0x5T" \l "Z89dbca68be341e03b5fb59777b93067e), [Stevens-Johnson syndrome](https://next.amboss.com/us/article/uL0pzg#Z6d8f0e7f377b30353480cefd0f1919e1)) * [Pancytopenia](https://next.amboss.com/us/article/Ln0wFg#Z8e20b73baa901db582feedc7c8a267df) * Fatigue * [Headache](https://next.amboss.com/us/article/YL0nwg#Z67ba0252fff6842349617790ed19ae54) * [Myopia](https://next.amboss.com/us/article/cp0aoS#Z0aed440ffa4d84d7c97fba6d5d823159) * Sedation * [Dizziness](https://next.amboss.com/us/article/fH0kph#Z2902ea08bfe4d834c405462f8fae0720) | * Increases serum levels of [phenytoin](https://next.amboss.com/us/article/-N0Ddg#Ze338d98a64b4a810c498bff53f4eea2f) |
| **Phenytoin, fosphenytoin** | * [Tonic-clonic](https://next.amboss.com/us/article/RR0l5f#Z39768e930bb5fa124e30a7cbab2dc9b2) [seizures](https://next.amboss.com/us/article/RR0l5f" \l "Z34c7e6b1cab99047c956783229d49b59) * Only rarely used for long-term treatment of [focal seizures](https://next.amboss.com/us/article/iR0J5f#Z5bad57bf6fb0e7d13b19dbe3b042b15f) * Treatment of established [status epilepticus](https://next.amboss.com/us/article/RR0l5f#Zf96bfae8816f17025782f0439045efc1)[2] | * Inactivation of Na+ channels * Zero-order elimination (i.e., constant rate of drug eliminated) | * **[Hirsutism](https://next.amboss.com/us/article/AO0RET" \l "Zc371355193435f37a79914efcd4de609)** * Hyperpigmentation of [skin](https://next.amboss.com/us/article/W60PPS" \l "Z84ffaf83e57bb0cc8eb7c50bbc266078) ([melasma](https://next.amboss.com/us/article/6k0jKT" \l "Zbcf60b99d40b1ac803d7c48aee6c1f3c)) * **Gingival hyperplasia** * [Nystagmus](https://next.amboss.com/us/article/o500Og#Z388411e626342a6deb8900e90f68de39) * [Osteopenia](https://next.amboss.com/us/article/cT0ap2#Zb28d9123c8c2bb408428a90d5598906f) * [Megaloblastic anemia](https://next.amboss.com/us/article/6T0j72#Z85cbfcba498065a7bca66f0cc39f9d61) due to ↓ [folate](https://next.amboss.com/us/article/Ao0ReS" \l "Z831a74f0b4bc9aed491551ad68d1dc11) absorption * Peripheral neuropathy * [**Stevens-Johnson**](https://next.amboss.com/us/article/uL0pzg#Z6d8f0e7f377b30353480cefd0f1919e1)**syndrome** * [Drug-induced lupus erythematosus](https://next.amboss.com/us/article/dT0op2#Zdf4ad4f64517596ab2b5adaec4e26f3f) * [DRESS syndrome](https://next.amboss.com/us/article/bs0Hth#Z0a5a570644776cd8880ae14f14498dd5) * Intoxication: sedation, [diplopia](https://next.amboss.com/us/article/uO0p8T" \l "Z2b0b94a21ad82a9282c086920366c1a6), [ataxia](https://next.amboss.com/us/article/BR0z6f" \l "Zf80a28124dec1e83d16823b0ca5e4295), [arrhythmias](https://next.amboss.com/us/article/7S04af" \l "Ze688ba61de47d1456aee769e72c55a4c) * **Induction of cytochrome P-450 enzymes** * [Teratogenic](https://next.amboss.com/us/article/V40GRT#Z94fc7dcf0faf77af8f9cae385d9050d8): **[fetal hydantoin syndrome](https://next.amboss.com/us/article/dm0oeg" \l "Z8325eebf33793188352c7e16a72e0f35)** * [Hypothyroidism](https://next.amboss.com/us/article/cg0a82#Z3fd41eef8b8ce3cec9c7eda727b6d1ce)  [6] * Sedation * [Dizziness](https://next.amboss.com/us/article/fH0kph#Z2902ea08bfe4d834c405462f8fae0720) * Rash * Hepatotoxicity | * Induction of [cytochrome P450](https://next.amboss.com/us/article/7N04cg" \l "Za39bdea0ca617cb09a303b8c3f6364ff) |
| **Phenobarbital** | * First-line treatment in [neonates](https://next.amboss.com/us/article/a40Q3T" \l "Z6f0fa51eb81a7d03aa179eab82aacab8) * [Tonic-clonic](https://next.amboss.com/us/article/RR0l5f#Z39768e930bb5fa124e30a7cbab2dc9b2) [generalized seizures](https://next.amboss.com/us/article/RR0l5f" \l "Z78ed1843244ca259945a92840fc6b3ca) * [Focal seizures](https://next.amboss.com/us/article/iR0J5f#Z5bad57bf6fb0e7d13b19dbe3b042b15f) * [Status epilepticus](https://next.amboss.com/us/article/RR0l5f#Zf96bfae8816f17025782f0439045efc1) | * GABAA[agonist](https://next.amboss.com/us/article/7N04cg#Zf82b0b9262366f2b5031a517d5e8c951) → ↑ [GABA](https://next.amboss.com/us/article/lp0vpS#Z6625804b83e4ca0c92651a2763692086) action | * Cardiorespiratory depression * Tolerance and dependence * Sedation * **Induces cytochrome P-450** |
| [**Benzodiazepines**](https://next.amboss.com/us/article/CN0qWg#Zf884f2b003a5889d564461961fb1abc3) | * First-line for [status epilepticus](https://next.amboss.com/us/article/RR0l5f" \l "Zf96bfae8816f17025782f0439045efc1) * Second-line treatment for [eclampsia](https://next.amboss.com/us/article/VO0GrT" \l "Z1cd389e5f8c9445b8c4eb10ef10e0cf2) | * Indirect GABAA [agonist](https://next.amboss.com/us/article/7N04cg#Zf82b0b9262366f2b5031a517d5e8c951) → ↑ [GABA](https://next.amboss.com/us/article/lp0vpS#Z6625804b83e4ca0c92651a2763692086) action | * Sedation and dependence (see [benzodiazepines](https://next.amboss.com/us/article/CN0qWg#Zf884f2b003a5889d564461961fb1abc3)) * Tolerance * Respiratory depression | * Alcohol, [opioids](https://next.amboss.com/us/article/yN0ddg#Z434daecbc44532c03b0313928f0c321d), sedatives: ↑ [CNS](https://next.amboss.com/us/article/lp0vpS#Z0111aade770ed6f7d136b455de1d6c1f) depression |

**Overview of second-generation anticonvulsants  [1]**

MAXIMIZE TABLETABLE QUIZ

| **Overview** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Agent** | | **Indication** | **Mechanism of action** | **Adverse effects** | **Contraindications** | **Interactions** |
| **Lamotrigine** | | * First-line treatment for long-term therapy of [focal seizures](https://next.amboss.com/us/article/iR0J5f#Z5bad57bf6fb0e7d13b19dbe3b042b15f) * Second-line treatment for [generalized seizures](https://next.amboss.com/us/article/RR0l5f#Z78ed1843244ca259945a92840fc6b3ca) and [absence seizures](https://next.amboss.com/us/article/jR0_5f#Z84445f9bf9203c148ad6809c64e170f2) * [Mood stabilizer](https://next.amboss.com/us/article/4P03UT#Z0f6c36a065109a07c92466be9f090e03) for [treatment of bipolar disorder](https://next.amboss.com/us/article/4P03UT#Z573e9d7b68038eb6911a3e73bedb8520) | * Inhibition of voltage-gated Na+channels → ↓ [glutamate](https://next.amboss.com/us/article/lp0vpS#Z0555ea6b157157d3843b24e686403f7f) release | * Rash, [exfoliative dermatitis](https://next.amboss.com/us/article/4k03LT" \l "Za45a91a80d364214542d6bc96b51f4a7), or rarely, **Stevens-Johnson syndrome** (slow titration is necessary to prevent [skin](https://next.amboss.com/us/article/W60PPS#Z84ffaf83e57bb0cc8eb7c50bbc266078) and mucous membrane reactions) * [Hemophagocytic lymphohistiocytosis](https://next.amboss.com/us/article/Lf0w52#Zcec0974cf89949d91612dc583619e606) * Rarely hepatotoxic or [nephrotoxic](https://next.amboss.com/us/article/Og0Iv2" \l "Zdff31ca0dfaab4b6273b6e44c25b8cca) * Blurry [vision](https://next.amboss.com/us/article/cp0aoS" \l "Z8473446b734702b73ac2972b7bbf7bf7) * Gastrointestinal symptoms * Sedation * [Dizziness](https://next.amboss.com/us/article/fH0kph#Z2902ea08bfe4d834c405462f8fae0720) * [DRESS](https://next.amboss.com/us/article/bs0Hth#Z0a5a570644776cd8880ae14f14498dd5) Syndrome | * Hypersensitivity | * Coadministration of [carbamazepine](https://next.amboss.com/us/article/-N0Ddg#Zb42030a33ee6196d376ee73775500933), [phenobarbital](https://next.amboss.com/us/article/-N0Ddg#Zf062af48cd10bc3a870303bc7c55a946), [phenytoin](https://next.amboss.com/us/article/-N0Ddg#Ze338d98a64b4a810c498bff53f4eea2f) → ↑ clearance |
| **Tiagabine** | | * [Focal seizures](https://next.amboss.com/us/article/iR0J5f#Z5bad57bf6fb0e7d13b19dbe3b042b15f), with or without impairment of consciousness (adjunctive therapy) | * Inhibits [GABA](https://next.amboss.com/us/article/lp0vpS#Z6625804b83e4ca0c92651a2763692086) reuptake → ↑ [GABA](https://next.amboss.com/us/article/lp0vpS#Z6625804b83e4ca0c92651a2763692086) | * [**Dizziness**](https://next.amboss.com/us/article/fH0kph#Z2902ea08bfe4d834c405462f8fae0720) * Gastrointestinal upset: [nausea](https://next.amboss.com/us/article/7J04vS" \l "Z2f0b48ef2acaab783b03e4c8d2404f90), [vomiting](https://next.amboss.com/us/article/7J04vS" \l "Z2f0b48ef2acaab783b03e4c8d2404f90), [diarrhea](https://next.amboss.com/us/article/6M0jpg" \l "Z51b67b2885f849894721232a6bf6d273) * Insomnia * Drowsiness * Weight changes |
| **Levetiracetam** | | * First-line treatment for long-term therapy of [focal seizures](https://next.amboss.com/us/article/iR0J5f#Z5bad57bf6fb0e7d13b19dbe3b042b15f) * [Generalized seizures](https://next.amboss.com/us/article/RR0l5f#Z78ed1843244ca259945a92840fc6b3ca) | * Not fully understood * Blockage of SV2A [receptor](https://next.amboss.com/us/article/qo0C1S#Z3ff0122a3c004eebed96e9db47e16ea4) → [GABA](https://next.amboss.com/us/article/lp0vpS#Z6625804b83e4ca0c92651a2763692086) and/or [glutamate](https://next.amboss.com/us/article/lp0vpS#Z0555ea6b157157d3843b24e686403f7f) release modulation and inhibition of voltage-gated [Ca2+](https://next.amboss.com/us/article/Hg0K92#Z96f09f8b59b6467bac2f983358a263bb) channels | * [Lethargy](https://next.amboss.com/us/article/br0Hfh#Z77c4f329d4e1028bea9901be93bbe0ca), fatigue * [Nausea](https://next.amboss.com/us/article/7J04vS#Z2f0b48ef2acaab783b03e4c8d2404f90) * [Headache](https://next.amboss.com/us/article/YL0nwg#Z67ba0252fff6842349617790ed19ae54) * Psychiatric symptoms (e.g., personality changes) * Sedation * [Dizziness](https://next.amboss.com/us/article/fH0kph#Z2902ea08bfe4d834c405462f8fae0720) | * No significant interactions |
| **Gabapentinoids** | **Pregabalin (tentative FDA approval)** | * Drug combination for long-term treatment of [focal seizures](https://next.amboss.com/us/article/iR0J5f#Z5bad57bf6fb0e7d13b19dbe3b042b15f) * [Neuropathic pain](https://next.amboss.com/us/article/xN0EWg#Za2e0dee7f1ae6063796b14dddf7658ee) * Neuralgia after [herpes infection](https://next.amboss.com/us/article/Mf0M52" \l "Z25a0fac127a5e5bf5af2a361ff614aeb) * [Generalized anxiety disorder](https://next.amboss.com/us/article/kP0mUT#Z8524f1b5598e7ce2792ed5d58aad123a) | * Inhibition of presynaptic P/Q-type [Ca2+](https://next.amboss.com/us/article/Hg0K92#Z96f09f8b59b6467bac2f983358a263bb) channels via action on the α2δ-subunit → ↓ [Ca2+](https://next.amboss.com/us/article/Hg0K92#Z96f09f8b59b6467bac2f983358a263bb) intracellular flow → ↓ [glutamate](https://next.amboss.com/us/article/lp0vpS#Z0555ea6b157157d3843b24e686403f7f) release [1] * Does not bind to [GABA](https://next.amboss.com/us/article/lp0vpS#Z6625804b83e4ca0c92651a2763692086) [receptors](https://next.amboss.com/us/article/qo0C1S#Z3ff0122a3c004eebed96e9db47e16ea4) despite being a [GABA](https://next.amboss.com/us/article/lp0vpS#Z6625804b83e4ca0c92651a2763692086) analog | * [Somnolence](https://next.amboss.com/us/article/br0Hfh#Z76f6d92711de6f72ff03aafa7a3a963d) * [Nausea](https://next.amboss.com/us/article/7J04vS#Z2f0b48ef2acaab783b03e4c8d2404f90) * [Ataxia](https://next.amboss.com/us/article/BR0z6f#Zf80a28124dec1e83d16823b0ca5e4295) * Impaired [vision](https://next.amboss.com/us/article/cp0aoS" \l "Z8473446b734702b73ac2972b7bbf7bf7) * Weight gain |
| **Gabapentin** | * Second-line treatment for [focal seizures](https://next.amboss.com/us/article/iR0J5f#Z5bad57bf6fb0e7d13b19dbe3b042b15f) * [Postherpetic neuralgia](https://next.amboss.com/us/article/HR0Kof#Za2b7c2ae552eb925c7c2ba79a1b0c9a2) * Peripheral (poly)neuropathy | * Dry mouth * [Somnolence](https://next.amboss.com/us/article/br0Hfh#Z76f6d92711de6f72ff03aafa7a3a963d), [nausea](https://next.amboss.com/us/article/7J04vS" \l "Z2f0b48ef2acaab783b03e4c8d2404f90) * [Ataxia](https://next.amboss.com/us/article/BR0z6f#Zf80a28124dec1e83d16823b0ca5e4295) * [Dizziness](https://next.amboss.com/us/article/fH0kph#Z2902ea08bfe4d834c405462f8fae0720) * Weight gain | * [Morphine](https://next.amboss.com/us/article/yN0ddg#Zfe51ff4eda6a60caa6637f8ad96d7f3c): ↑ concentrations of [gabapentin](https://next.amboss.com/us/article/-N0Ddg" \l "Z938c7ff58d074545cd0caa95ce8b32f6) |
| **Vigabatrin** | | * Refractory [focal seizures](https://next.amboss.com/us/article/iR0J5f#Z5bad57bf6fb0e7d13b19dbe3b042b15f) (adjunctive therapy) * Monotherapy for [infantile spasms](https://next.amboss.com/us/article/jR0_5f#Z7e909d273a484ecf5eee446f36de8794) ([West syndrome](https://next.amboss.com/us/article/jR0_5f#Z7e909d273a484ecf5eee446f36de8794)) | * Inhibits GABA transaminase irreversibly → ↑ [GABA](https://next.amboss.com/us/article/lp0vpS#Z6625804b83e4ca0c92651a2763692086) | * **Irreversible [vision loss](https://next.amboss.com/us/article/GO0BFT" \l "Zf67a6bdd00a3d6895522210f2c8f5909)** | * None | * Decreases serum levels of [phenytoin](https://next.amboss.com/us/article/-N0Ddg#Ze338d98a64b4a810c498bff53f4eea2f) |
| **Topiramate** | | * Focal and generalized [tonic-clonic](https://next.amboss.com/us/article/RR0l5f#Z39768e930bb5fa124e30a7cbab2dc9b2) [epileptic seizures](https://next.amboss.com/us/article/RR0l5f#Z34c7e6b1cab99047c956783229d49b59) * [Migraine prophylaxis](https://next.amboss.com/us/article/hi0crf#Z9cc0577a6b0e73dec88efacceb22713a) * [Idiopathic intracranial hypertension](https://next.amboss.com/us/article/u30p4f#Z6015a2e006b517dc76d3049d6bb56855) | * Blockage of voltage-gated Na+ channels * ↑ [GABA](https://next.amboss.com/us/article/lp0vpS#Z6625804b83e4ca0c92651a2763692086) | * [**Angle-closure glaucoma**](https://next.amboss.com/us/article/IO0YFT#Z304bac21eb39b894dfe4645b01a2e4ee) * **Weight loss** * [**Kidney stones**](https://next.amboss.com/us/article/qg0Cw2#Z45c7ff4091f4118f9a1659cdec6c8bdd) * Cognitive dysfunction (e.g., decreased verbal fluency, cognitive speed, and working memory) * Sedation * [Dizziness](https://next.amboss.com/us/article/fH0kph#Z2902ea08bfe4d834c405462f8fae0720) * Mood disturbance, depression * [Paresthesia](https://next.amboss.com/us/article/o500Og#Z945b9f13c684a6d5efb4e12182a7acf0) | * Decreases efficacy of [oral contraceptives](https://next.amboss.com/us/article/rt0fU3#Z899aa9dfd6a8c31255c1b74109423c32) |

You can use the following to remember the features of **PHENYTOIN**: cytochrome **P**-450 interaction, **H**irsutism, **E**nlarged [gums](https://next.amboss.com/us/article/jp0_6S#Z3ab30934681b06d8591bf18cb03ce2d7) (gingival hyperplasia), **N**ystagmus, **Y**ellow-browning of [skin](https://next.amboss.com/us/article/W60PPS#Z84ffaf83e57bb0cc8eb7c50bbc266078) ([melasma](https://next.amboss.com/us/article/6k0jKT#Zbcf60b99d40b1ac803d7c48aee6c1f3c)), **T**eratogenicity, **O**steomalacia, **I**nteracts with [folate](https://next.amboss.com/us/article/Ao0ReS" \l "Z831a74f0b4bc9aed491551ad68d1dc11), **N**europathy

To remember that the most important side effects of etho**SUX**imide are **Steven**-Johnson syndrome, **fat**igue, [**headache**](https://next.amboss.com/us/article/YL0nwg#Z67ba0252fff6842349617790ed19ae54), **AB**dominal upset, and **ALLE**r**G**ies (e.g., [urticaria](https://next.amboss.com/us/article/ek0x5T" \l "Z89dbca68be341e03b5fb59777b93067e)), think of “It **sucks**that **Steven's FAT**her has given everyone a [**headache**](https://next.amboss.com/us/article/YL0nwg#Z67ba0252fff6842349617790ed19ae54)with his **AB**surd **ALLEG**orizations.”

To remember a crucial side effect of **vigaba**trin, think of “**Vi**sion **g**oes **a**way **b**y **a**ccident.”

To remember that **phenoba**rbital is first-line treatment for [neonates](https://next.amboss.com/us/article/a40Q3T#Z6f0fa51eb81a7d03aa179eab82aacab8), think of “**Phenoba**rbital is **pheno**menal for treating **ba**bies.”

To remember that the most common side effects of **top**iramate are **speech**impairment, weight loss (**light**), **cog**nitive impairment, **sed**ation, and [kidney](https://next.amboss.com/us/article/m60VlS#Z517d2cc21845787cbf2c6ff27c21cd8e) **stones**, think of “It leaves you **speech**less how **light**ly the **cog railway** travels through **sed**iments and **stones** to the **top**.”

References:[1][7]

NOTES

FEEDBACK

**Additional considerations**

* Monotherapy should always be the first-line treatment: increase the dosage of the drug to the therapeutic range before initiating combination therapy
* Combination therapy: drugs from different classes and/or with different pharmacologic modes of action for refractory [seizures](https://next.amboss.com/us/article/RR0l5f#Z34c7e6b1cab99047c956783229d49b59) [8]
* For more detailed approaches to [seizure](https://next.amboss.com/us/article/RR0l5f#Z34c7e6b1cab99047c956783229d49b59) treatment and [epilepsy](https://next.amboss.com/us/article/RR0l5f#Z33e671e67fe6fe4a955c629c4efb3de7), see [treatment of epileptic seizures](https://next.amboss.com/us/article/RR0l5f#Z6835795797a9990627be38cde838532f).

References:[7][8]

NOTES

FEEDBACK

**Special patient groups**

**[Pregnancy](https://next.amboss.com/us/article/dO0orT" \l "Zeba6f488931dd463917047bb9c5f18f4) and [breastfeeding](https://next.amboss.com/us/article/iO0JHT" \l "Z7966b678b6b63ef599deeea99cb2b219)**

* Classic anticonvulsants (especially [**carbamazepine**](https://next.amboss.com/us/article/-N0Ddg#Zb42030a33ee6196d376ee73775500933) and **sodium**[**valproate**](https://next.amboss.com/us/article/-N0Ddg#Zfe47f4f5fb7f8de32f7919dc8909896e)!) should be avoided if possible →**[teratogenic](https://next.amboss.com/us/article/V40GRT" \l "Z94fc7dcf0faf77af8f9cae385d9050d8) effects**
* Newer anticonvulsants: lack of medical data and trials during [pregnancy](https://next.amboss.com/us/article/dO0orT#Zeba6f488931dd463917047bb9c5f18f4)  [9]
* The choice of treatment depends on the type of [seizure](https://next.amboss.com/us/article/RR0l5f#Z34c7e6b1cab99047c956783229d49b59) and which substance enables optimal control of [seizures](https://next.amboss.com/us/article/RR0l5f#Z34c7e6b1cab99047c956783229d49b59).
* **Approach**
  + Optimize [seizure](https://next.amboss.com/us/article/RR0l5f#Z34c7e6b1cab99047c956783229d49b59) control prior to [conception](https://next.amboss.com/us/article/vo0AdS#Z6870db6215ef8c4f2f10a95ccf6ff3d4).
  + Avoid multiple therapies.
  + Administer the drug at the lowest dose that controls [seizures](https://next.amboss.com/us/article/RR0l5f#Z34c7e6b1cab99047c956783229d49b59).
  + Monitor plasma drug levels regularly.

NOTES

FEEDBACK

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