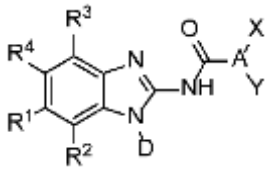
CLAIMS

1. A Kv7 channel activator or a pharmaceutically acceptable salt thereof for use in treating a medical condition in a patient, wherein the Kv7 channel activator or pharmaceutically acceptable salt there of is to be administered to the patient without producing an adverse event that is commonly associated with an antiseizure medication in that person.

2. Use of an effective amount of a Kv7 channel activator or a pharmaceutically acceptable salt thereof in the manufacture of a medicament for treating a medical condition in a patient without producing an adverse event that is commonly associated with an antiseizure medication in that patient.

3. The use according to Claim 1 or 2, wherein the adverse event comprises somnolence, nausea, abdominal pain, balance disorder, dizziness, headache, irritability, anxiety, a mood change, memory impairment, sensory disturbance, speech disorder, or a combination thereof.

4. The use according to any one of Claims 1 to 3, wherein the Kv7 channel activator has the following chemical formula:



wherein

D is optionally substituted C_{2-5} alkyl or optionally substituted phenyl, wherein the optional substituents are selected from $-CH_3$ and F;

A is C_{1-6} alkyl;

X is H, F, $-CH_3$, $-CF_3$, $-SCF_3$, pyridinyl, optionally substituted C_{1-3} alkyl, optionally substituted phenyl, or optionally substituted cyclobutyl, wherein the optional substituent is F;

Y is H, F, -OH, or $-CH_3$;

R^1 is H, C_{3-4} hydroxyalkyl, -CN, -OH, $-CF_3$, $-OCHF_2$, optionally substituted C_{3-5} heterocyclyl, optionally substituted C_{1-5} alkyl, optionally substituted C_{1-7} alkoxy, $-NR^AR^B$, or halogen, wherein the optional substituents are selected from -OH and F;

R^2 is H, halogen, -CN, $-OCH_3$, $-COR^A$, $-CF_3$, $-OCF_3$, optionally substituted C_{1-2} alkyl, wherein the optional substituents of R^2 are selected from $-OCH_3$ and $-COR^A$;

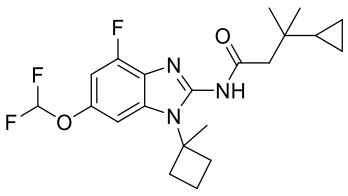
R^3 is H, halogen, $-CF_3$, $-OCHF_2$, $-OCF_3$, or $-OCH_3$;

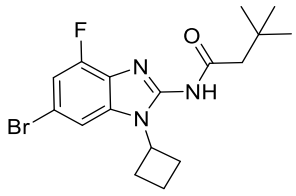
R^4 is H, halogen, or C_3 hydroxyalkyl; and

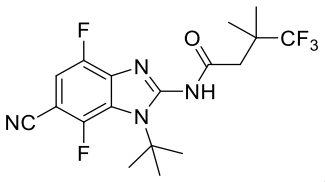
R^A and R^B are CH_3;

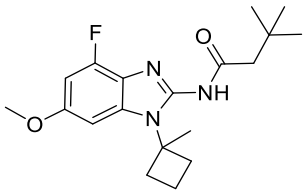
or a pharmaceutically acceptable salt thereof.

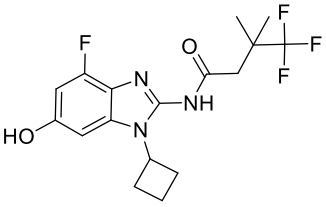
5. The use according to any one of Claims 1 to 4, wherein the Kv7 channel activator has the following chemical formula:

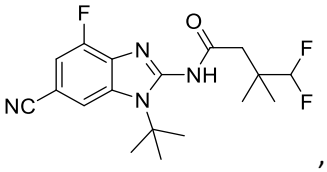


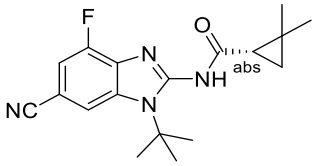
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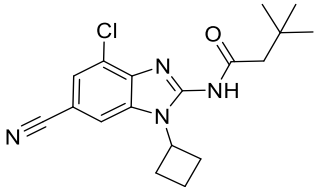
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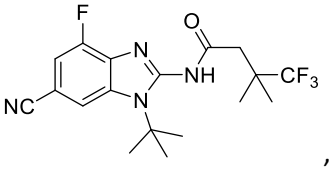
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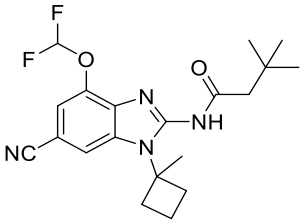
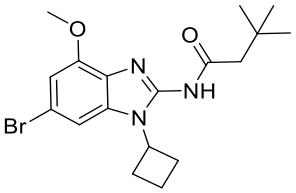
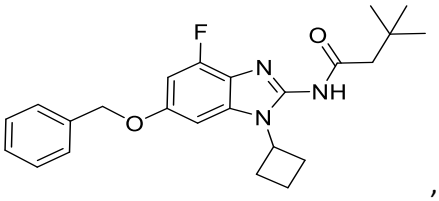
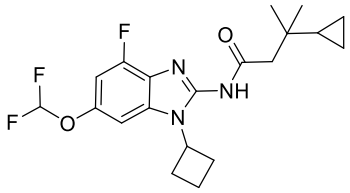
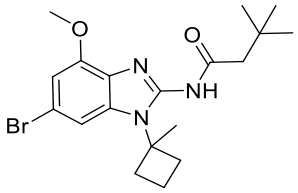
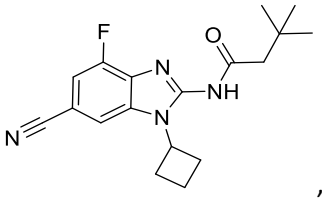
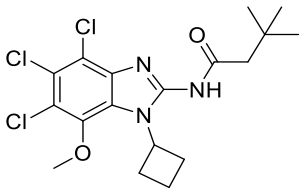
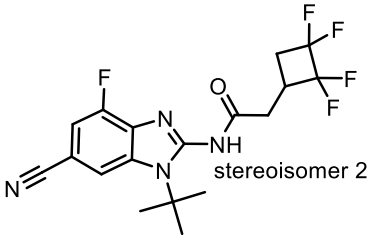
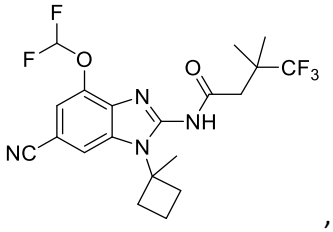
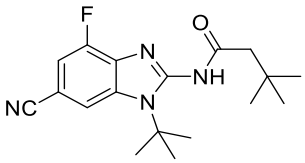
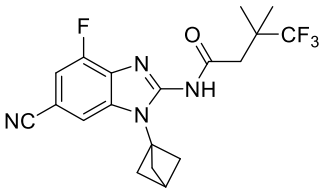
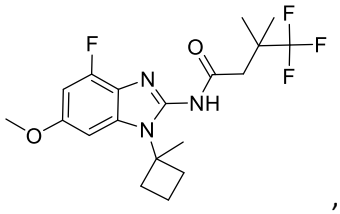
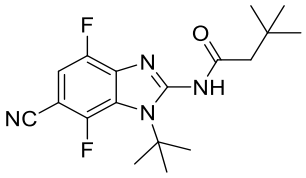
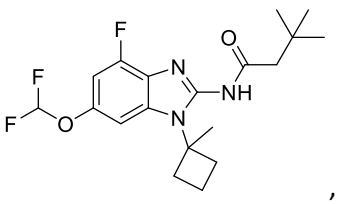
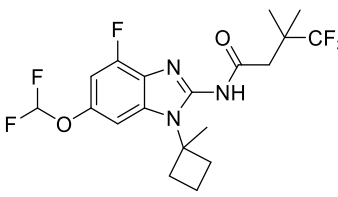
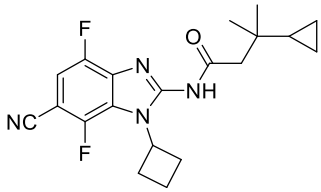
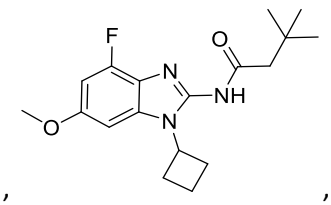
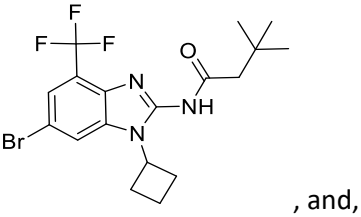
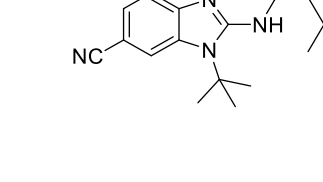
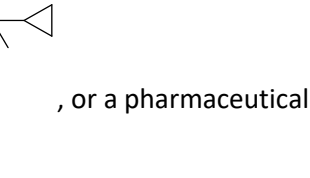
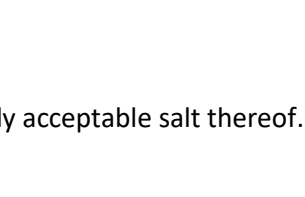
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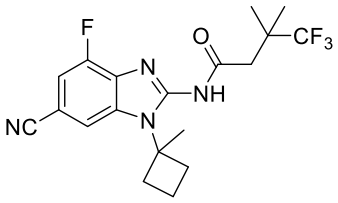
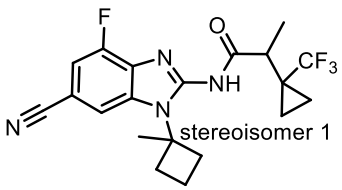
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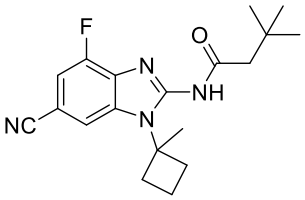
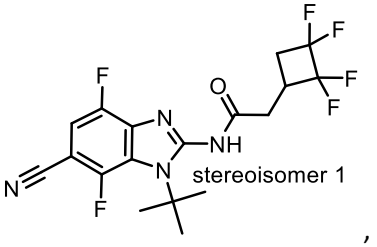
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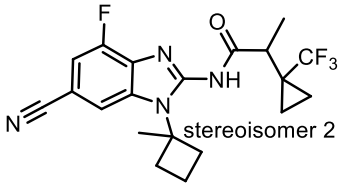

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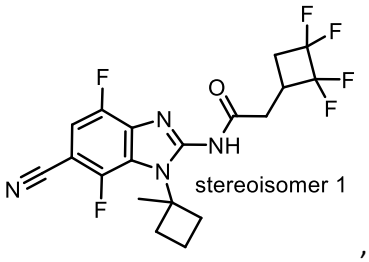
, or a pharmaceutically acceptable salt thereof.

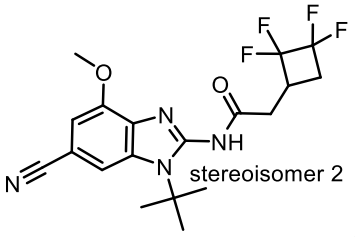
6. The use according to any one of Claims 1 to 4, wherein the Kv7 channel activator has the following chemical formula:

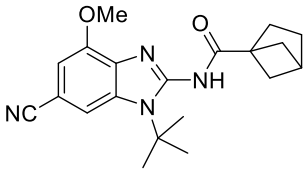
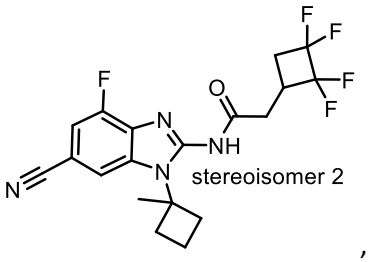

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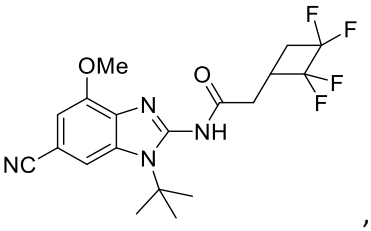
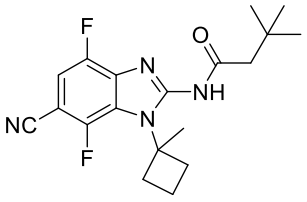
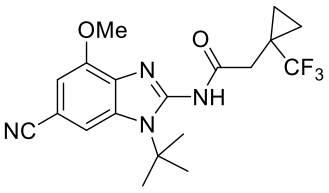
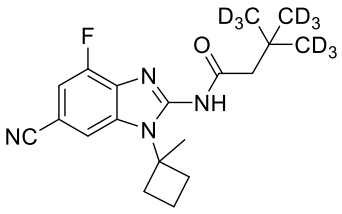
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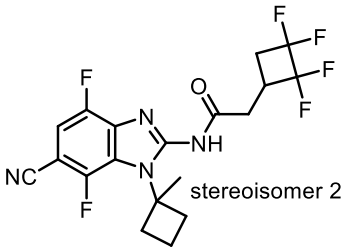
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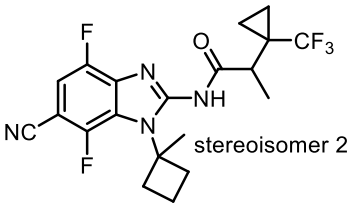
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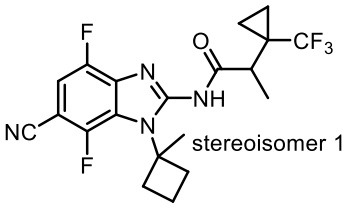
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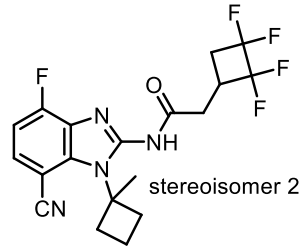
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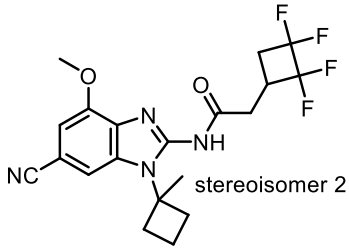
7. The use according to any one of Claims 1 to 4, wherein the Kv7 channel activator has the following chemical formula:

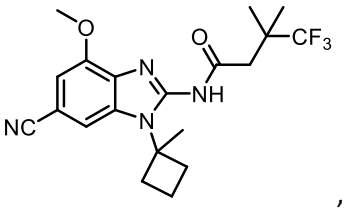
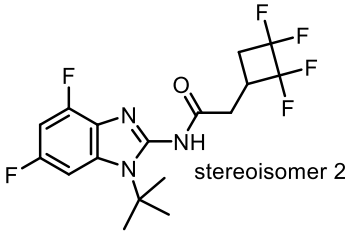


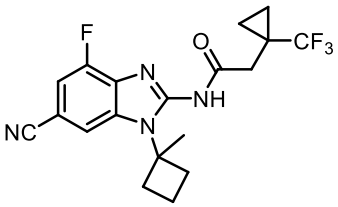
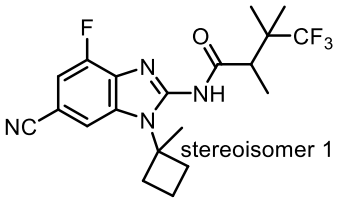
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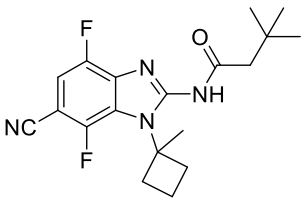
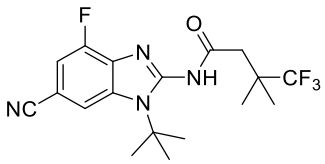
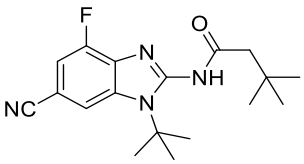
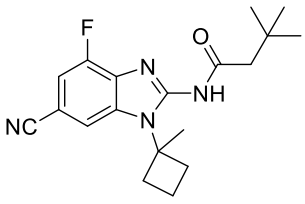
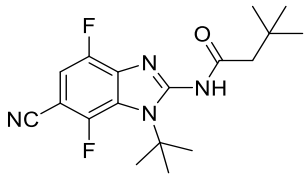
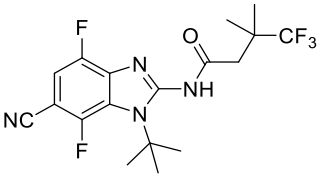
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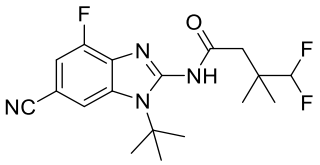
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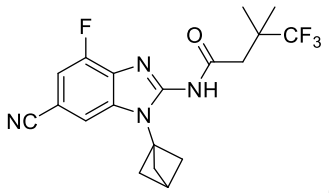
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, and


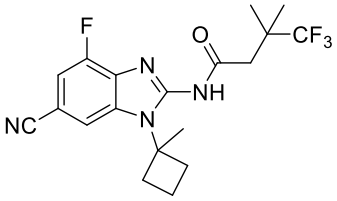
, or a pharmaceutically acceptable salt thereof.

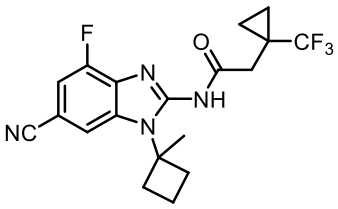
8. The use according to any one of Claims 1 to 4, wherein the Kv7 channel activator has the following chemical formula:


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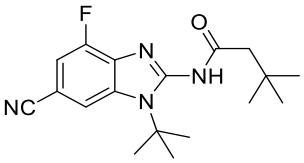
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, and


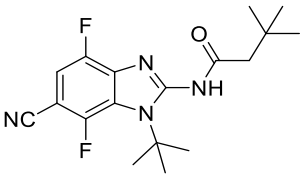
, or a pharmaceutically acceptable salt thereof.

9. The use according to any one of Claims 1 to 4, wherein the Kv7 channel activator has the following chemical formula:



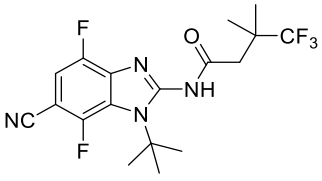
, or a pharmaceutically acceptable salt thereof.

10. The use according to any one of Claims 1 to 4, wherein the Kv7 channel activator has the following chemical formula:



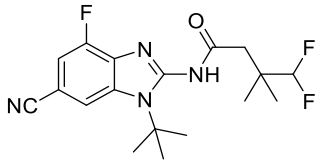
, or a pharmaceutically acceptable salt thereof.

11. The use according to any one of Claims 1 to 4, wherein the Kv7 channel activator has the following chemical formula:



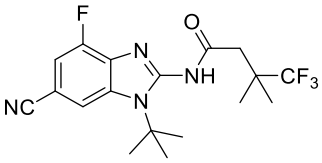
, or a pharmaceutically acceptable salt thereof.

12. The use according to any one of Claims 1 to 4, wherein the Kv7 channel activator has the following chemical formula:



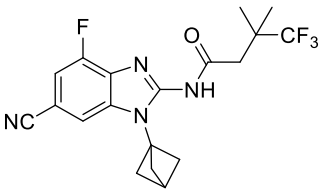
, or a pharmaceutically acceptable salt thereof.

13. The use according to any one of Claims 1 to 4, wherein the Kv7 channel activator has the following chemical formula:



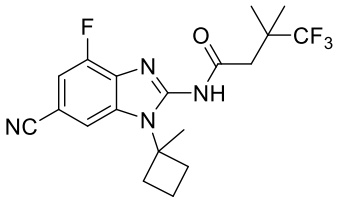
, or a pharmaceutically acceptable salt thereof.

14. The use according to any one of Claims 1 to 4, wherein the Kv7 channel activator has the following chemical formula:



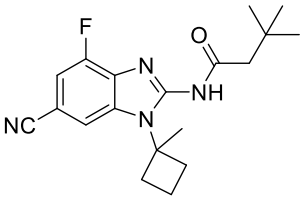
, or a pharmaceutically acceptable salt thereof.

15. The use according to any one of Claims 1 to 4, wherein the Kv7 channel activator has the following chemical formula:



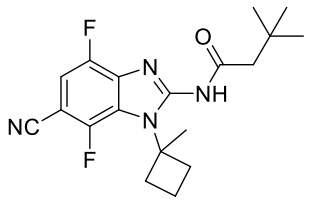
, or a pharmaceutically acceptable salt thereof.

16. The use according to any one of Claims 1 to 4, wherein the Kv7 channel activator has the following chemical formula:



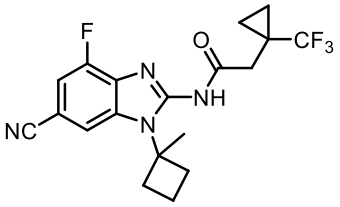
, or a pharmaceutically acceptable salt thereof.

17. The use according to any one of Claims 1 to 4, wherein the Kv7 channel activator has the following chemical formula:



, or a pharmaceutically acceptable salt thereof.

18. The use according to any one of Claims 1 to 4, wherein the Kv7 channel activator has the following chemical formula:



, or a pharmaceutically acceptable salt thereof.

19. The use according to any one of Claims 1-18, wherein the medical condition is an epilepsy-related disorder.

20. The use according to any of Claim 19, wherein the epilepsy-related disorder is focal epilepsy, pain, neuropathic pain, inflammatory pain, persistent pain, cancer pain, postoperative pain, tinnitus, epileptic encephalopathy, treatment-resistant epilepsy, congenital neurological disorder with intellectual disability or epileptic encephalopathy, severe epileptic encephalopathies, congenital neurodevelopmental disorder with phenotypes of non-syndromic intellectual disability or epileptic encephalopathy, epileptic spasms, epileptic encephalopathy, early infantile epileptic encephalopathy 7, early infantile epileptic encephalopathy with delayed psychomotor development, or a combination thereof.

21. The use according to any one of Claims 1-18, wherein the medical condition is a depressive disorder.

22. The use according to Claim 21, wherein the depressive disorder is major depressive disorder (MDD), disruptive mood dysregulation disorder, persistent depressive disorder, bipolar spectrum disorder, postpartum depression, premenstrual dysphoric disorder (PMDD), seasonal affective

disorder (SAD), atypical depression, treatment-resistant depression (TRD), depression associated with agitation or anxiety, adjustment disorder with depressed mood, prolonged depressive reaction, or a combination thereof.

23. The use according to any one of Claims 1-18, wherein the medical condition is a neurological or neurodegenerative disorder.

24. The use according to Claim 23, wherein the neurological or neurodegenerative disorder is amyotrophic lateral sclerosis, bipolar disorder, treatment resistant and major depression, general anxiety disorder, panic disorder, social anxiety, mood disorders, cognitive disorders, dementia, agitation, apathy, psychoses, post-traumatic stress disorders, irritability, disinhibition, learning disorders, memory loss, personality disorders, bipolar disorders, Rett syndrome, eating disorders, conduct disorder, neurodegenerative disorders, pain disorders, supranuclear palsy, frontotemporal dementia, frontotemporal lobar degeneration, delirium, Alzheimer's disease, mild cognitive impairment, mild cognitive impairment due to Alzheimer’s disease, drug addiction, tinnitus, mental retardation, obsessive-compulsive disorder, spinal muscular atrophy, radiation therapy, multiple sclerosis, chronic cerebellar ataxia, cervical spondylotic myelopathy, spinal cord injury, hereditary cerebellar ataxia, Tourette syndrome, autism spectrum disorder, schizophrenia, fragile X syndrome, Parkinson's Disease, Huntington’s disease, or a combination thereof.

25. The use according to any one of Claims 1-18, wherein the medical condition is a pain disorder.

26. The use according to Claim 25, wherein the pain disorder is acute pain, chronic pain, neuropathic pain, nociceptive pain, or radicular pain.

27. The use according to Claim 25, wherein the pain disorder is migraine, inflammatory pain, persistent pain, cancer pain, or postoperative pain.

28. The use according to any one of Claims 1-27, wherein the Kv7 channel activator or a pharmaceutically acceptable salt thereof is to be administered in an amount of 10 mg, 25 mg, or 50 mg.

29. The use according to any one of Claims 1-28, wherein the Kv7 channel activator or a pharmaceutically acceptable salt thereof is to be administered daily.

30. The use according to any one of Claims 1-29, wherein the Kv7 channel activator or a pharmaceutically acceptable salt thereof is to be administered on Day 1, Day 5, or Day 9 of the treatment.

31. The use according to any one of Claims 1-30, wherein

a change from baseline in spectral power of alpha, beta, or gamma frequency bands at the time of maximal response following a single dose of the Kv7 channel activator or a pharmaceutically acceptable salt thereof, as evidenced by electroencephalogram (EEG), is greater than change from baseline in spectral power of delta or theta frequency bands.

32. The use according to any one of Claims 1-31, wherein a change from baseline in spectral power of alpha, beta, and gamma frequency bands at the time of maximal response following a single dose of the Kv7 channel activator or a pharmaceutically acceptable salt thereof, as evidenced by electroencephalogram (EEG), is greater than change from baseline in spectral power of delta and theta frequency bands.

33. The use according to any one of Claims 1-32, wherein a change from baseline in spectral power of frequency bands at the time of maximal response following a single dose of the Kv7 channel activator or a pharmaceutically acceptable salt thereof, as evidenced by electroencephalogram (EEG), is substantially as shown in Figure 1.

34. The use according to any one of Claims 1-32, wherein the single dose of the Kv7 channel activator or a pharmaceutically acceptable salt thereof is 10 mg, 25 mg, or 50 mg.