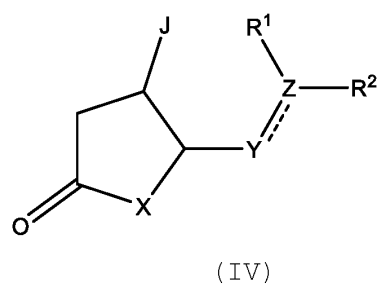
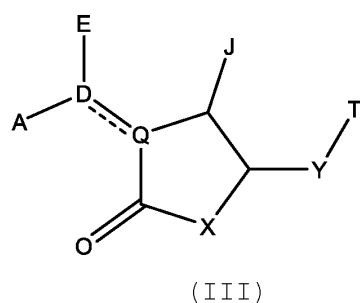
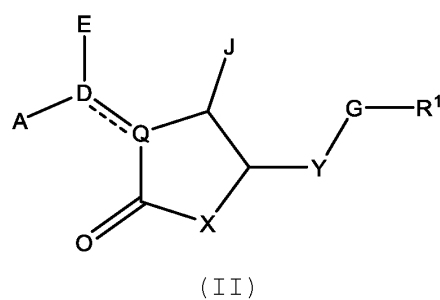
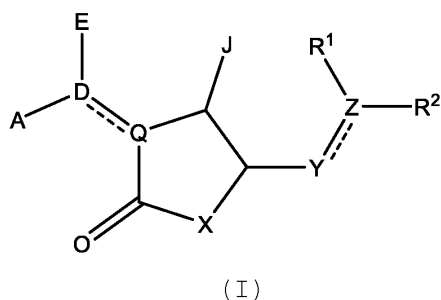


CLAIMS

1. Compounds of formula I, II, III and IV, pharmaceutically acceptable salts or prodrug thereof,



wherein

----- represents a carbon-carbon single bond or a carbon-carbon double bond;

X is selected from O, S, NH, CH₂;

Y is selected from CH, CH₂;

Z is selected from C, N;

G is selected from O, S;

T is selected from OH, SH, NH₂, halogen;

R¹ and R² are independently selected from H, alkyl, alkenyl, cycloalkyl, aryl or -CH₂-R³; wherein R³ is selected from aryl, cycloalkyl, heteroaryl, -R⁴-R⁵; wherein R⁴ is selected from alkyl, alkenyl; wherein R⁵ is selected from aryl, substituted

or unsubstituted heteroaryl, substituted or unsubstituted gamma-lactone;

Q is selected from C, CH;

D is selected from C, CH, CH₂;

One of A and E is H and the other is selected from H, OH, SH, aryl, alkyl, alkenyl, R⁶-R⁷, wherein R⁶ is selected from alkyl, alkenyl, and R⁷ is selected from alkyl, alkenyl, substituted or unsubstituted aryl, substituted or unsubstituted heteroaryl, substituted or unsubstituted gamma-lactone;

J is selected from H, OH, SH, NH₂, halogen;

wherein the compound is not nitenin, dihydronitenin nor their respective isomers, enantiomers and stereoisomers.

2. The compounds of formula IV according to claim 1, wherein

X is O;

Y is CH;

Z is C;

R¹ is H;

R² is H; and

J is OH.

3. The compounds of formula IV according to claim 1, wherein

X is O;

Y is CH;

Z is C;

R¹ is alkyl;

R² is -CH₂-R₃; wherein R³ is -R⁴-R⁵; wherein R⁴ is alkyl and R⁵ is heteroaryl J is OH.

4. The compounds of formula II according to claim 1, wherein

X is O;

Y is CH₂;

G is O;

R¹ is H;

J is H;

Q is C;

D is C;

E is H;

A is -R⁶-R⁷; wherein R⁶ is alkyl and R⁷ is heteroaryl.

5. The compounds of formula II according to claim 1, wherein

X is O;

Y is CH₂;

G is O;

R¹ is H;

J is H;

Q is C;

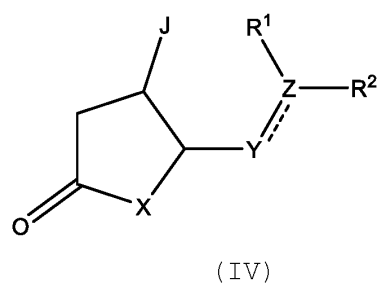
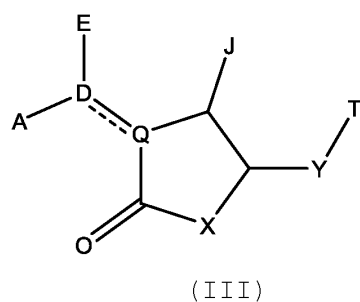
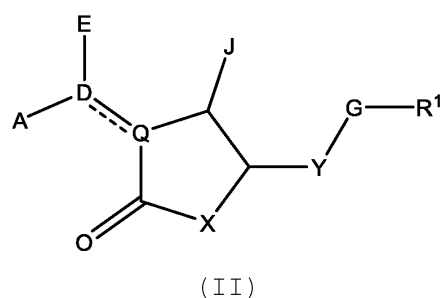
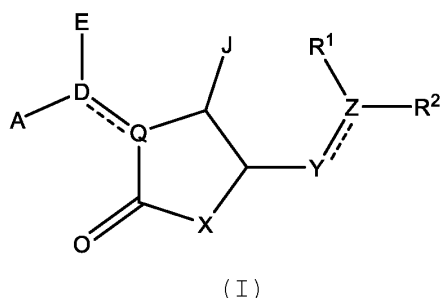
D is C;

E is -R⁶-R⁷; wherein R⁶ is alkyl and R⁷ is heteroaryl;

A is H.

6. The compounds of formula I, II, III and IV, according to claim 1, wherein R⁷ is not furan-3-yl.

7. The compounds of formula I, II, III and IV, pharmaceutically acceptable salts or prodrug thereof,



wherein

----- represents a carbon-carbon single bond or a carbon-carbon double bond;

X is selected from O, S, NH, CH₂;

Y is selected from CH, CH₂;

Z is selected from C, N;

G is selected from O, S;

T is selected from OH, SH, NH₂, halogen;

R¹ and R² are independently selected from H, alkyl, alkenyl, cycloalkyl, aryl or -CH₂-R³; wherein R³ is selected from aryl, cycloalkyl, heteroaryl, -R⁴-R⁵; wherein R⁴ is selected from alkyl, alkenyl; wherein R⁵ is selected from aryl, substituted or unsubstituted heteroaryl, substituted or unsubstituted gamma-lactone;

Q is selected from C, CH;

D is selected from C, CH, CH₂;

One of A and E is H and the other is selected from H, OH, SH, aryl, alkyl, alkenyl, R⁶-R⁷, wherein R⁶ is selected from

alkyl, alkenyl, and R^7 is selected from alkyl, alkenyl, substituted or unsubstituted aryl, substituted or unsubstituted heteroaryl, substituted or unsubstituted gamma-lactone;

J is selected from H, OH, SH, NH_2 , halogen;
for use as a pharmaceutical ingredient.

8. The compounds of formula I for use as pharmaceutical ingredient according to claim 7, wherein;

X is O;

Y is CH;

Z is C;

R₁ is alkyl;

R₂ is $-CH_2-R^3$; wherein R^3 is $-R^4-R^5$; wherein R^4 is alkyl and R^5 is heteroaryl;

Q is C;

D is C;

A is $-R^6-R^7$; wherein R^6 is alkyl and R^7 is heteroaryl;

E is H; and

J is H.

9. The compounds of formula IV for use as pharmaceutical ingredient according to claim 7, wherein;

X is O;

Y is CH;

Z is C;

R¹ is H;

R² is H; and

J is OH.

10. The compounds of formula IV for use as pharmaceutical ingredient according to claim 7, wherein;

X is O;

Y is CH;

Z is C;

R¹ is alkyl;

R² is -CH₂-R³; wherein R³ is -R⁴-R⁵; wherein R⁴ is alkyl and R⁵ is heteroaryl J is OH.

11. The compounds of formula II for use as pharmaceutical ingredient according to claim 7, wherein;

X is O;

Y is CH₂;

G is O;

R¹ is H;

J is H;

Q is C;

D is C;

E is H;

A is -R⁶-R⁷; wherein R⁶ is alkyl and R⁷ is heteroaryl.

12. The compounds of formula II for use as pharmaceutical ingredient according to claim 7, wherein;

X is O;

Y is CH₂;

G is O;

R¹ is H;

J is H;

Q is C;

D is C;

E is -R⁶-R⁷; wherein R⁶ is alkyl and R⁷ is heteroaryl;

A is H.

13. The compound of formula I, II, III and IV according to any of claims 7 through 12, for use in the treatment,

prevention or reduction of pain in an individual in need thereof.

14. The compound of formula I, II, III and IV according to any of claims 7 through 12, for use in the treatment of at least one of the following acute and chronic pain types: neuropathic pain, nociceptive pain, psychogenic or somatogenic pain, diabetic neuropathic pain, post-herpetic pain, low-back pain, radiculopathy pain, musculoskeletal pain, post-operative and post-traumatic pain, phantom pain, surgical pain, wound associated pain, chemotherapy-induced peripheral neuropathic pain, short-term/acute or long-term/chronic inflammatory pain, rheumatic pain, arthritic pain, pain associated with osteoarthritis, myofascial pain, migraine, orofacial chronic pain, trigeminal neuralgia, pain associated with cancer, pain associated with fibromyalgia, hyperalgesia syndromes, pain associated with infections, HIV related pain, sprains and strains, hyperalgesia, somatogenic pain, psychogenic pain, heat induced pain, physical pain, nociceptive pain, rheumatic pain, headache, pelvic pain, bladder pain, myofascial, vascular pain, migraine wound, wound associated pain, arthritic pain, somatic visceral pain, phantom pain, radiculopathy, lumbar pain, visceral pain, bowel pain, and pain associated with osteoarthritis.

15. The compound of formula I, II, III and IV according to any of claims 7 through 12, for use in the treatment or prophylaxis of a disease in which Kv1.3 channels are involved.

16. The compound of formula I, II, III and IV according to any of claims 7 through 12, for use in the treatment of autoimmune disorders.

17. The compound of formula I, II, III and IV according any of claims 7 through 12, for use in the treatment of diabetes and insulin resistance syndromes.

18. The compounds of formula I, II, III and IV, pharmaceutical salts or prodrug thereof are used as antiepileptic and antiseizures agents.

19. The compound of formula I, II, III and IV according to any of claims 7 through 12, wherein the compound is administered in a therapeutically effective dose between 0.0018 and 1.8mg/kg.

20. Pharmaceutical composition comprising a pharmacologically acceptable diluent or carrier and a combination of active ingredients, wherein said active ingredients comprise at least one compound as described in formula I, II, III and IV in anyone of claims 7-12 or a pharmacologically acceptable salt or prodrug thereof.

21. A method of treating pain in a subject in need thereof, comprising administering to the subject having pain a therapeutically effective amount of a compound of formula I, II, III and IV of any one of claims 7 through 12.

22. The method according to claim 21, wherein the pain is of an acute or chronic pain type selected from neuropathic pain, nociceptive pain , psychogenic or somatogenic pain, diabetic neuropathic pain, post-herpetic pain, low-back pain, radiculopathy pain, musculoskeletal pain, post-operative and post-traumatic pain, phantom pain, surgical pain, wound associated pain, chemotherapy-induced peripheral

neuropathic pain, short-term/acute or long-term/chronic inflammatory pain, rheumatic pain, arthritic pain, pain associated with osteoarthritis, myofascial pain, migraine, orofacial chronic pain, trigeminal neuralgia, pain associated with cancer, pain associated with fibromyalgia, hyperalgesia syndromes, pain associated with infections, HIV related pain, sprains and strains, hyperalgesia, somatogenic pain, psychogenic pain, heat induced pain, physical pain, nociceptive pain, rheumatic pain, headache, pelvic pain, bladder pain, myofascial, vascular pain, migraine wound, wound associated pain, arthritic pain, somatic visceral pain, phantom pain, radiculopathy, lumbar pain, visceral pain, bowel pain, and pain associated with osteoarthritis.

23. A method of treatment or prophylaxis of a disease in which Kv1.3 channels are involved in a subject in need thereof, comprising administering a therapeutically effective amount of a compound of formula I, II, III and IV of anyone of claims 7 through 12 to a subject in need of treatment or prophylaxis of a disease in which Kv1.3 channels are involved.

24. A method of treatment of an autoimmune disease in a subject in need thereof, comprising administering a therapeutically effective amount of a compound of anyone of claims 7 through 12 to a subject having an autoimmune disease.

25. A method of treatment of diabetes or insulin resistance syndromes in a subject in need thereof, comprising administering a therapeutically effective amount of a compound of anyone of claims 7 through 12 to a subject having diabetes or an insulin resistance syndrome.

26. A method of treatment of epilepsy or seizures in a subject in need thereof, comprising administering a therapeutically effective amount of a compound of anyone of claims 7 through 12 to a subject having epilepsy or seizures.

27. The method according to anyone of claims 21 through 25, wherein the compound is administered in a therapeutically effective amount between 0.018 and 1.8 mg/kg.

28. The compound, composition, use, or method of anyone of claims 1 through 27, wherein the compound is a compound of formula I, wherein

X is O;

Y is CH;

Z is C;

R¹ is alkyl;

R² is -CH₂-R³; wherein R³ is -R⁴-R⁵; wherein R⁴ is alkyl and R⁵ is heteroaryl;

Q is C;

D is C;

A is -R⁶-R⁷; wherein R⁶ is alkyl and R⁷ is heteroaryl;

E is H; and

J is H.

29. The compound of anyone of claims 1 through 6, wherein the compound is isolated or synthetically produced.

30. The compound of anyone of claims 7 through 28, wherein the compound is nitenin or dihydronitenin.