acute phase and/or at onset and duration of an acute flare) and for a limited amount of time so as to maximixe short term relief, minimize long term progression of the disease, and minimize long term toxicological and other adverse effects.

In one aspect, there is provided a use of a pharmaceutical composition comprising a compound selected from (E) isomer, (Z) isomer, and a mixture of (E) and (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile, or a pharmaceutically acceptable salt of any of the foregoing compounds, in the manufacture of a medicament for treating pemphigus vulgaris in a mammal.

In another aspect, there is provided a use of a compound selected from (E) isomer, (Z) isomer, and a mixture of (E) and (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile, or a pharmaceutically acceptable salt of any of the foregoing compounds, in the manufacture of a medicament for treating pemphigus vulgaris or pemphigus foliaceus in a mammal in need thereof where corticosteroid therapy is used as the first or second line therapy ; wherein said compound is to be used in place of or in combination with said corticosteroid therapy; and optionally administering said (E) isomer, (Z) isomer, or a mixture of (E) and (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile, or a pharmaceutically acceptable salt of any of the foregoing compounds in combination with a noncorticosteroidal immunosuppressive and/or antiinflammatory agent.

In yet another aspect, there is provided a use of a compound selected from (E) isomer, (Z) isomer, and a mixture of (E) and (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile, or a pharmaceutically acceptable salt of any of the foregoing compounds, in the manufacture of a medicament for treating pemphigus vulgaris or pemphigus foliaceus in a mammal in need thereof, where corticosteroid therapy is used as the first or second line maintenance therapy; and optionally administering said (E) isomer, (Z) isomer, or a mixture of (E) and (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile, or a pharmaceutically acceptable salt of any of the foregoing compounds in combination with a noncorticosteroidal immunosuppressive and/or antiinflammatory agent.

In another aspect, there is provided a sulfonic acid or carboxylic acid salt of a compound selected from (E) isomer, (Z) isomer, and a mixture of (E) and (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]-pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile, preferably wherein the sulfonic acid or carboxylic acid salt is mono- or di-methanesulfonic acid salt.

In yet another aspect, there is provided an amorphous form of a pharmaceutically acceptable salt of a compound selected from (E) isomer, (Z) isomer, and a mixture of (E) and (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]-pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile.

In a further aspect, there is provided a pharmaceutical composition comprising the sulfonic acid or carboxylic acid salt described herein or the amorphous form of a pharmaceutically acceptable salt described herein.

In another aspect, there is provided a use of the pharmaceutical composition described herein in the manufacture of a medicament for treating pemphigus vulgaris in a mammal in need of such treatment.

In yet another aspect, there is provided a use of a pharmaceutical composition comprising a compound selected from (E) isomer, (Z) isomer, and a mixture of (E) and (Z) isomers of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile; or a pharmaceutically acceptable salt of any of the foregoing compounds in the manufacture of a medicament for treating lupus nephritis in a mammal.

Accordingly, in a first aspect disclosed herein is a sulfonic acid or a carboxylic acid salt of compound (I).

Embodiment (1a)

In one embodiment (embodiment (Ia)) of the first aspect, the salt is a sulfonic acid salt of compound (I).

Within embodiment (1a), in one embodiment the sufonic acid salt of compound (I) is mono- or di-methanesulfonic acid, mono or di-benezenesulfonic acid, mono- or di-toluenesulfonic acid, or ethane-1,2-disulfonic acid salt of compound (I). Within embodiment (1a), in another embodiment the sufonic acid salt of compound (I) is mono- or di-methanesulfonic acid salt of compound (I). Within embodiment (1a), in yet another embodiment the sufonic acid salt of compound (I) is di- methanesulfonic acid salt of compound (I). Within embodiment (1a), in another embodiment the sufonic acid salt of compound (I) is mono methanesulfonic acid salt of compound (I).

Embodiment (1b)

In another embodiment (embodiment (1b)) of the first aspect, the salt is a carboxylic acid salt of compound (I).

Within embodiment (1b), in one embodiment the carboxylic acid salt of compound (I) is fumaric acid, oxalic acid, tartaric acid, maleic acid, citric acid, or malonic acid salt of compound (I).

In a second aspect, disclosed herein is an amorphous form of a pharmaceutically acceptable salt of compound (I).

Embodiment (2a)

In one embodiment (embodiment (2a)) of the second aspect, the amorphous form is of a sulfonic acid salt of compound (I).

Within embodiment (2a), in one embodiment the amorphous form is of mono- or di-methanesulfonic acid, mono or di-benezenesulfonic acid, mono- or di-toluenesulfonic acid, or ethane-1,2-disulfonic acid salt of compound (I). Within embodiment (2a), in another embodiment, the amorphous form is of mono- or di-methanesulfonic acid salt of compound (I). Within embodiment (2a), in another embodiment the sufonic acid salt is the dimethanesulfonic acid salt of compound (I). Within embodiment (2a), in another embodiment the sufonic acid salt is the mono methanesulfonic acid salt of compound (I).

What is Claimed

1. Use of a pharmaceutical composition comprising a compound selected from (E) isomer, (Z) isomer, and a mixture of (E) and (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile, or a pharmaceutically acceptable salt of any of the foregoing compounds, in the manufacture of a medicament for treating pemphigus vulgaris in a mammal.

2. Use of a compound selected from (E) isomer, (Z) isomer, and a mixture of (E) and (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile, or a pharmaceutically acceptable salt of any of the foregoing compounds, in the manufacture of a medicament for treating pemphigus vulgaris or pemphigus foliaceus in a mammal in need thereof where corticosteroid therapy is used as the first or second line therapy; wherein said compound is to be used in place of or in combination with said corticosteroid therapy; and

optionally administering

said (E) isomer, (Z) isomer, or a mixture of (E) and (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile, or a pharmaceutically acceptable salt of any of the foregoing compounds in combination with a noncorticosteroidal immunosuppressive and/or antiinflammatory agent.

3. Use of a compound selected from (E) isomer, (Z) isomer, and a mixture of (E) and (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile, or a pharmaceutically acceptable salt of any of the foregoing compounds, in the manufacture of a medicament for treating pemphigus vulgaris or pemphigus foliaceus in a mammal in need thereof, where corticosteroid therapy is used as the first or second line maintenance therapy; and

optionally administering

said (E) isomer, (Z) isomer, or a mixture of (E) and (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile, or a pharmaceutically acceptable

salt of any of the foregoing compounds in combination with a noncorticosteroidal immunosuppressive and/or antiinflammatory agent.

4. The use according to claims 1 to 3, wherein the compound is a substantially pure (E) or (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile; or a pharmaceutically acceptable salt of the compound, and wherein the mammal is a human.

5. The use according to Claim 4, wherein at least 85% w/w of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile or at least 85% w/w of a pharmaceutically acceptable salt of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile is the (E) isomer, preferably wherein at least 90% w/w of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile or at least 90% w/w of a pharmaceutically acceptable salt of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile is the (E) isomer.

6. The use according to any of Claims 1 to 5, wherein the compound is 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile.

7. A sulfonic acid or carboxylic acid salt of a compound selected from (E) isomer, (Z) isomer, and a mixture of (E) and (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]-pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile, preferably wherein the sulfonic acid or carboxylic acid salt is mono- or di-methanesulfonic acid salt.

8. An amorphous form of a pharmaceutically acceptable salt of a compound selected from (E) isomer, (Z) isomer, and a mixture of (E) and (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-

fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]-pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile.

9. The amorphous form of the pharmaceutically acceptable salt of the compound of Claim 8, wherein the pharmaceutically acceptable salt is a sulfonic acid or a carboxylic acid salt, preferably wherein the pharmaceutically acceptable salt is mono- or di-methanesulfonic acid salt.

10. The amorphous form of the pharmaceutically acceptable salt of the compound of Claim 8 or 9, wherein the amorphous form is substantially free of any crystalline form(s) of the pharmaceutically acceptable salt of said compound.

11. The amorphous form of the pharmaceutically acceptable salt of the compound of any of Claims 8-10, wherein at least about 90% w/w of the pharmaceutically acceptable salt of said compound is in amorphous form.

12. The sulfonic acid or carboxylic acid salt of the compound of Claim 7, wherein the pharmaceutically acceptable salt of said compound is a substantially pure (E) or (Z) isomer.

13. The amorphous form of the pharmaceutically acceptable salt of the compound of any of Claims 8-11, wherein the pharmaceutically acceptable salt of said compound is a substantially pure (E) or (Z) isomer.

14. The sulfonic acid or carboxylic acid salt of the compound of Claim 12, wherein at least about 80% w/w of the salt of the compound is the (E) isomer, preferably wherein at least about 90% w/w of the pharmaceutically acceptable salt of the compound is the (E) isomer.

15. The amorphous form of the pharmaceutically acceptable salt of the compound of Claim 13, wherein at least about 80% w/w of the pharmaceutically acceptable salt of the compound is the (E) isomer, preferably wherein at least about 90% w/w of the pharmaceutically acceptable salt of the compound is the (E) isomer.

16. A pharmaceutical composition comprising the sulfonic acid or carboxylic acid salt of any of Claims 7, 12 and 14 or the amorphous form of a pharmaceutically acceptable salt of any of Claims 8-11, 13 and 15.

17. Use of the pharmaceutical composition of Claim 16 in the manufacture of a medicament for treating pemphigus vulgaris in a mammal in need of such treatment.

18. The use according to Claim 17, wherein the mammal is a human.

19. Use of a pharmaceutical composition comprising a compound selected from (E) isomer, (Z) isomer, and a mixture of (E) and (Z) isomers of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile; or a pharmaceutically acceptable salt of any of the foregoing compounds in the manufacture of a medicament for treating lupus nephritis in a mammal.

20. The use according to claim 19, wherein the mammal is a human.

21. The use according to claim 20, wherein the compound is a substantially pure (E) or (Z) isomer of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile, or a pharmaceutically acceptable salt of the compound.

22. The use according to claim 21, wherein at least 85% w/w of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile or at least 85% w/w of a pharmaceutically acceptable salt of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile is the (E) isomer.

23. The use according to claim 22, wherein at least 90% w/w of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile or at least 90% w/w of a pharmaceutically acceptable salt of 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-

d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile is the (E) isomer.

24. The use according to any of claims 19 to 23, wherein the compound is 2-[(3R)-3-[4-amino-3-(2-fluoro-4-phenoxy-phenyl)pyrazolo[3,4-d]pyrimidin-1-yl]piperidine-1-carbonyl]-4-methyl-4-[4-(oxetan-3-yl)piperazin-1-yl]pent-2-enenitrile.

25. The use according to any of claims 19 to 23, wherein the pharmaceutically acceptable salt is a sulfonic acid or carboxylic acid salt.

26. The use according to claim 25, wherein the sulfonic acid or carboxylic acid salt is mono- or di-methanesulfonic acid salt.

27. The use according to any of claims 19 to 23, wherein the pharmaceutically acceptable salt is in an amorphous form.

28. The use according to claim 27, wherein the pharmaceutically acceptable salt is a sulfonic acid or a carboxylic acid salt, preferably wherein the pharmaceutically acceptable salt is mono- or di-methanesulfonic acid salt.

29. The use according to claim 27 or claim 28, wherein the amorphous form is substantially free of any crystalline form(s) of the pharmaceutically acceptable salt of said compound.

30. The use according to any of claims 27 to 29, wherein at least 90% w/w of the pharmaceutically acceptable salt of said compound is in an amorphous form.

31. The use according to any of claims 25 to 30, wherein the pharmaceutically acceptable salt is a substantially pure (E) or (Z) isomer.

32. The use according to claim 31, wherein at least 80% w/w of the pharmaceutically acceptable salt of the compound is the (E) isomer.

33. The use according to claim 32, wherein at least 90% w/w of the pharmaceutically acceptable salt of the compound is the (E) isomer.