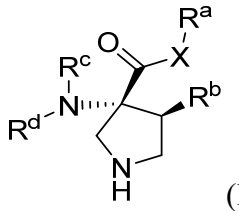
CLAIMS

1. An amine compound represented by formula I:



(I)

wherein:

X is O, S, or NR^e;

R^a is H, lower alkyl, or lower cycloalkyl;

R^b is $–CH_2CH=CH_2$, $–CH_2CH_2CH_2Z^1$, $–(CH_2)_nC(O)H$, or $–(CH_2)_nCO_2Z^2$;

R^c and R^d are independently H, lower alkyl, lower cycloalkyl, silyl, acyl, acyloxy; or R^c and R^d, together with the N that links them, form an optionally substituted 3- to 6-membered heteroaryl or heterocyclic ring;

R^e is H or lower alkyl;

n is 1 or 2;

Z^1 is halogen, alkyl sulfonate, aryl sulfonate, or an alkyl sulfonate optionally substituted with one or more halogen;

Z^2 is H, lower alkyl, or lower cycloalkyl; and

wherein the amine compound has an enantiomeric excess of greater than 75% ee.

2. The amine compound of claim 1, wherein R^a is *tert*-butyl.

3. The amine compound of either claim 1 or 2, wherein R^b is $–CH_2CH=CH_2$.

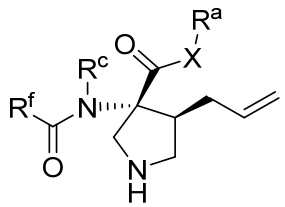
4. The amine compound of any of claims 1-3, wherein R^c is H.

5. The amine compound of any of claims 1-4, wherein R^d is acetyl or trifluoroacetyl.

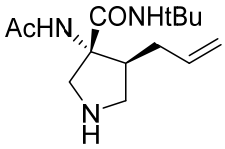
6. The amine compound of any of claims 1-5, wherein X is NH.

7. The amine compound of any of claims 1-5, wherein X is O.

8. The amine compound of any of claims 1-7, wherein the amine compound is:



9. The amine compound of any of claims 1-6, wherein the amine compound is:



.

10. The amine compound of any one of claims 1-8, wherein the amine compound has an enantiomeric excess of greater than 80% ee.

11. The amine compound of any one of claims 1-8, wherein the amine compound has an enantiomeric excess of greater than 90% ee.

12. The amine compound of any one of claims 1-8, wherein the amine compound has an enantiomeric excess of greater than 95% ee.

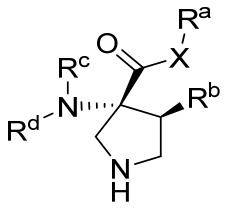
13. The amine compound of any one of claims 1-8, wherein the amine compound has an enantiomeric excess of greater than 97% ee.

14. The amine compound of any one of claims 1-8, wherein the amine compound has an enantiomeric excess of greater than 99% ee.

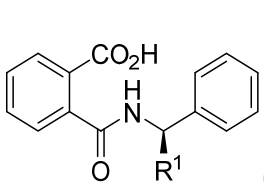
15. The amine compound of any one of claims 1-8, wherein the amine compound has an enantiomeric excess of between 80% and 99.5% ee.

16. The amine compound of any one of claims 1-8, wherein the amine compound has an enantiomeric excess of between 90% and 99.5% ee.

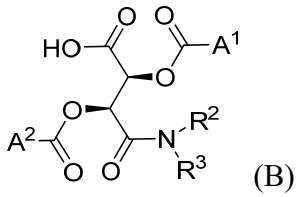
17. A salt of an amine compound represented by formula I and a carboxylic acid compound represented by formula A or B:



(I)



(A)



(B)

wherein:

X is O, S, or NR^e;

R^a is H, lower alkyl, or lower cycloalkyl;

R^b is $–CH_2CH=CH_2$, $–(CH_2)_nCH_2Z^1$, $–(CH_2)_nC(O)H$, or $–(CH_2)_nCO_2Z^2$;

R^c and R^d are independently H, lower alkyl, lower cycloalkyl, silyl, acyl, acyloxy; or R^c and R^d, together with the N that links them, form an optionally substituted 3- to 6-membered heteroaryl or heterocyclic ring;

R^e is H or lower alkyl;

n is 1 or 2;

Z^1 is halogen, alkyl sulfonate, aryl sulfonate, or an alkyl sulfonate optionally substituted with one or more halogen;

Z^2 is H, lower alkyl, or lower cycloalkyl;

A^1 is phenyl or 5-6 membered heteroaryl, and is optionally substituted by up to 4 R^4;

A^2 is phenyl or 5-6 membered heteroaryl, and is optionally substituted by up to 4 R^5;

R^1 is lower alkyl or lower cycloalkyl;

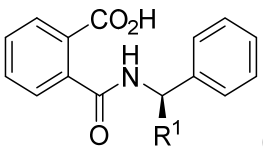
R^2 and R^3 are independently H, lower alkyl, or lower cycloalkyl; or R^2 and R^3, together with the N that links them, form an optionally substituted 3- to 6-membered saturated heterocyclic ring optionally containing 1 or 2 additional heteroatoms selected from S or O; and

R^4 and R^5 are independently halogen, hydroxyl, nitro, lower alkyl, or lower cycloalkyl.

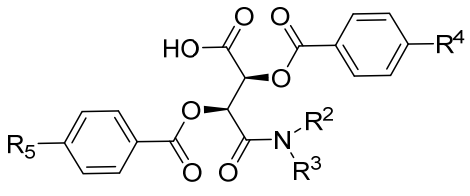
18. The salt of claim 16, wherein A^1 and A^2 are phenyl.

19. The salt of claim 16 or 17, wherein A^1 is substituted by one R^4 and A^2 is substituted by one R^5.

20. The salt of any one of claims 16-18, wherein the carboxylic acid compound is represented by formula A or B-I:



(A)



(B-I).

21. The salt of any one of claims 16-19, wherein the amine compound in the salt has an enantiomeric excess of at least 75% ee.

22. The salt of claim 20, wherein the carboxylic acid compound in the salt is essentially a single enantiomer.

23. The salt of any one of claims 16-21, wherein R^a is *tert*-butyl.

24. The salt of any one of claims 16-22, wherein R^b is $–CH_2CH=CH_2$.

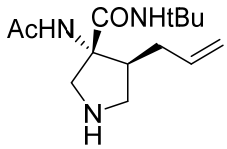
25. The salt of any one of claims 16-23, wherein R^c is H.

26. The salt of any one of claims 16-24, wherein R^d is acetyl or trifluoroacetyl.

27. The salt of any one of claims 16-25, wherein X is NH.

28. The salt of any one of claims 16-25, wherein X is O.

29. The salt of any one of claims 16-25, wherein the amine compound is:



.

30. The salt of any one of claims 16-28, wherein the carboxylic acid compound is represented by formula A.

31. The salt of any one of claims 16-29, wherein R^1 is methyl.

32. The salt of any one of claims 16-28, wherein the carboxylic acid compound is represented by formula B.

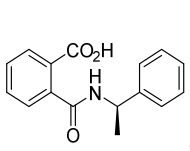
33. The salt of any one of claims 16-28, wherein the carboxylic acid compound is represented by formula B-I.

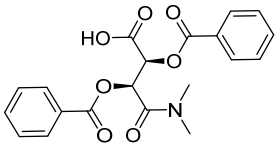
34. The salt of any one of claims 16-28, 31 and 32, wherein R^2 and R^3 are independently methyl, ethyl, or isopropyl; or R^2 and R^3, together with the N that links them, form a pyrrolidinyl.

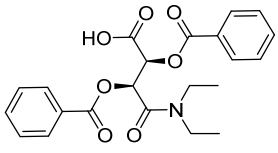
35. The salt of any one of claims 16-28 and 31-33, wherein R^4 is methyl.

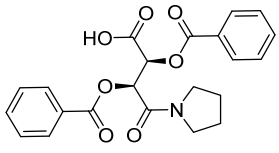
36. The salt of any one of claims 16-28 and 31-34, wherein R^5 is methyl.

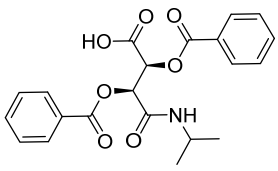
37. The salt of any one of claims 16-28, wherein the carboxylic acid compound is:

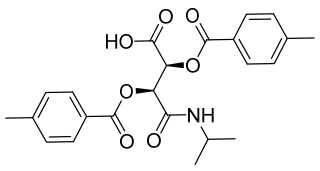


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, or


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38. A method of preparing the salt of any one of claims 16-36 by fractional crystallization, comprising:

preparing a crystallization solution comprising the amine compound, essentially a single enantiomer of the carboxylic acid compound, and a solvent; and

crystallizing from the crystallization solution the salt of the amine compound and the carboxylic acid compound.

39. The method of claim 37, wherein the solvent comprises water, methanol, ethanol, isopropanol, ethyl acetate, or acetonitrile or a mixture of any of these.

40. The method of any one of claims 37-38, wherein the amine compound in the salt crystallized from the crystallization solution is enantiomerically enriched relative to the amine compound present in the crystallization solution prior to crystallization.

41. The method of any one of claims 36-38, wherein the amine compound in the crystallization solution is racemic.

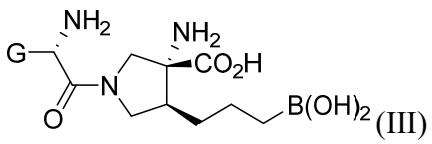
42. The method of any one of claims 36-38, wherein the amine compound in the crystallization solution is enantiomerically enriched.

43. The method of any one of claims 36-40, wherein preparing the crystallization solution comprises:

preparing a precursor solution comprising the amine compound, a second enantiomer of the amine compound, and a second enantiomer of the carboxylic acid compound;

crystallizing from the precursor solution the salt of the second enantiomer of the amine compound with the second enantiomer of the carboxylic acid compound, thereby forming the crystallization solution as the supernatant.

44. A process to prepare an arginase inhibitor of formula III:

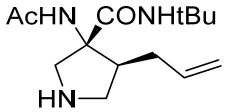


(III)

wherein G is H, methyl, isopropyl, *sec*-butyl, -$CH_2CH(CH_3)_2$, benzyl, p-hydroxybenzyl, -CH_2OH, -$CH(OH)CH_3$, -CH_2-3-indoyl, -CH_2COOH, -CH_2CH_2COOH, -$CH_2C(O)NH_2$, -$CH_2CH_2C(O)NH_2$, -CH_2SH, -$CH_2CH_2SCH_3$, -$(CH_2)_4NH_2$, -$(CH_2)_3NHC(=NH)NH_2$, or -CH_2-3-imidazoyl;

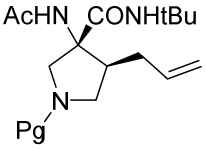
said process comprising:

(a) providing a compound of formula IIa:



wherein the enantiomeric excess of the compound of formula IIa is greater than 80% ee;

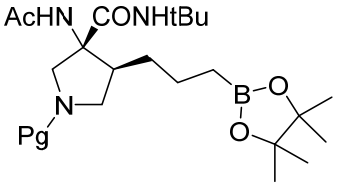
(b) adding a protecting group to the secondary amine of the compound of formula IIa to form the following compound:



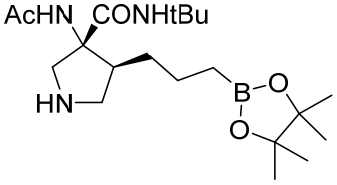
,

wherein the protecting group (Pg) is formyl, acetyl, trifluoroacetyl, benzyl, benzyloxycarbonyl, *tert*-butoxycarbonyl, trimethylsilyl, 2-trimethylsilyl-ethanesulfonyl, methoxymethyl, triethylsilyl, triisopropylsilyl, *tert*-butyldimethylsilyltrityl, trityl, allyloxycarbonyl, 9-fluorenylmethyloxycarbonyl, or nitro-veratryloxycarbonyl;

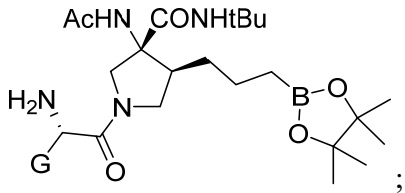
(c) subjecting the compound of step (b) to hydroboration conditions to form the following compound:



(d) removing the protecting group from the compound of step (c) to form the following compound:



(e) subjecting the secondary amine of the amine compound of step (d) to an amidation reaction to form the following compound



; and

(f) subjecting the compound of step (e) to conditions sufficient to form the compound of formula III;

wherein the compound of formula III obtained in step (e) has an enantiomeric excess of greater than 80% ee.

45. The process of claim 43, wherein G is H.

46. The process of claim 43, wherein G is methyl.

47. The process of claim 43, wherein G is -CH_2OH.

48. The process of any of claims 43-46, wherein the compound of formula III obtained in step (e) has an enantiomeric excess of greater than 90% ee.

49. The process of any of claims 43-47, wherein the compound of formula III obtained in step (e) has an enantiomeric excess of greater than 95% ee.

50. The process of any of claims 43-48, wherein the enantiomeric excess of the compound of formula IIa is greater than 90% ee.

51. The process of any of claims 43-47, wherein the enantiomeric excess of the compound of formula IIa is greater than 95% ee.