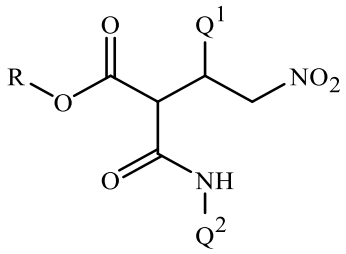
CLAIMS

What is claimed is:

1. A compound selected from Formula **I** and salts thereof,



I

wherein

Q^1 is a phenyl ring or a naphthalenyl ring system, each ring or ring system optionally substituted with up to 5 substituents independently selected from R^1; or a 5- to 6-membered fully unsaturated heterocyclic ring or an 8- to 10-membered heteroaromatic bicyclic ring system, each ring or ring system containing ring members selected from carbon atoms and 1 to 4 heteroatoms independently selected from up to 2 O, up to 2 S and up to 4 N atoms, wherein up to 3 carbon ring members are independently selected from C(=O) and C(=S), and the sulfur atom ring members are independently selected from $S(=O)_u(=NR^2)_v$, each ring or ring system optionally substituted with up to 5 substituents independently selected from R^1 on carbon atom ring members and selected from R^3 on nitrogen atom ring members;

Q^2 is a phenyl ring or a naphthalenyl ring system, each ring or ring system optionally substituted with up to 5 substituents independently selected from R^4; or a 5- to 6-membered fully unsaturated heterocyclic ring or an 8- to 10-membered heteroaromatic bicyclic ring system, each ring or ring system containing ring members selected from carbon atoms and 1 to 4 heteroatoms independently selected from up to 2 O, up to 2 S and up to 4 N atoms, wherein up to 3 carbon ring members are independently selected from C(=O) and C(=S), and the sulfur atom ring members are independently selected from $S(=O)_u(=NR^2)_v$, each ring or ring system optionally substituted with up to 5 substituents independently selected from R^4 on carbon atom ring members and selected from R^5 on nitrogen atom ring members;

R is C_1-C_8 alkyl or phenyl;

each R^1 and R^4 is independently halogen, cyano, nitro, C_1–C_8 alkyl, C_1–C_8 haloalkyl, C_1-C_8 nitroalkyl, C_2–C_8 alkenyl, C_2–C_8 haloalkenyl, C_2–C_8 haloalkoxyalkoxy, C_2-C_8 nitroalkenyl, C_2–C_8 alkynyl, C_2–C_8 haloalkynyl, C_4–C_{10} cycloalkylalkyl, C_4–C_{10} halocycloalkylalkyl, C_5–C_{12} alkylcycloalkylalkyl, C_5–C_{12} cycloalkylalkenyl, C_5–C_{12} cycloalkylalkynyl, C_3–C_8 cycloalkyl, C_3–C_8 halocycloalkyl, C_4–C_{10} alkylcycloalkyl, C_6–C_{12} cycloalkylcycloalkyl, C_3–C_8 cycloalkenyl, C_3–C_8 halocycloalkenyl, C_2–C_8 alkoxyalkyl, C_2–C_8 haloalkoxyalkyl, C_4–C_{10} cycloalkoxyalkyl, C_3–C_{10} alkoxyalkoxyalkyl, C_2–C_8 alkylthioalkyl, C_2–C_8 alkylsulfinylalkyl, C_2–C_8 alkylsulfonylalkyl, C_2–C_8 alkylaminoalkyl, C_2–C_8 haloalkylaminoalkyl, C_4–C_{10} cycloalkylaminoalkyl, C_3–C_{10} dialkylaminoalkyl, -CHO, C_2–C_8 alkylcarbonyl, C_2–C_8 haloalkylcarbonyl, C_4–C_{10} cycloalkylcarbonyl, -C(=O)OH, C_2–C_8 alkoxycarbonyl, C_2–C_8 haloalkoxycarbonyl, C_4–C_{10} cycloalkoxycarbonyl, C_5–C_{12} cycloalkylalkoxycarbonyl, -C(=O)NH_2, C_2-C_8 alkylaminocarbonyl, C_4–C_{10} cycloalkylaminocarbonyl, C_3–C_{10} dialkylaminocarbonyl, C_1–C_8 alkoxy, C_1–C_8 haloalkoxy, C_2–C_8 alkoxyalkoxy, C_2-C_8 alkenyloxy, C_2–C_8 haloalkenyloxy, C_3–C_8 alkynyloxy, C_3–C_8 haloalkynyloxy, C_3–C_8 cycloalkoxy, C_3–C_8 halocycloalkoxy, C_4–C_{10} cycloalkylalkoxy, C_3–C_{10} alkylcarbonylalkoxy, C_2–C_8 alkylcarbonyloxy, C_2–C_8 haloalkylcarbonyloxy, C_4–C_{10} cycloalkylcarbonyloxy, C_1–C_8 alkylsulfonyloxy, C_1-C_8 haloalkylsulfonyloxy, C_1–C_8 alkylthio, C_1–C_8 haloalkylthio, C_3–C_8 cycloalkylthio, C_1–C_8 alkylsulfinyl, C_1–C_8 haloalkylsulfinyl, C_1–C_8 alkylsulfonyl, C_1–C_8 haloalkylsulfonyl, C_3–C_8 cycloalkylsulfonyl, formylamino, C_2–C_8 alkylcarbonylamino, C_2–C_8 haloalkylcarbonylamino, C_2–C_8 alkoxycarbonylamino, C_1–C_6 alkylsulfonylamino, C_1–C_6 haloalkylsulfonylamino, -SF_5, -SCN, C_3–C_{12} trialkylsilyl, C_4–C_{12} trialkylsilylalkyl or C_4–C_{12} trialkylsilylalkoxy;

each R^2 is independently H, cyano, C_2–C_3 alkylcarbonyl or C_2–C_3 haloalkylcarbonyl;

each R^3 and R^5 is independently cyano, C_1–C_3 alkyl, C_2–C_3 alkenyl, C_2–C_3 alkynyl, C_3-C_6 cycloalkyl, C_2–C_3 alkoxyalkyl, C_1–C_3 alkoxy, C_2–C_3 alkylcarbonyl, C_2–C_3 alkoxycarbonyl, C_2–C_3 alkylaminoalkyl, C_3–C_4 dialkylaminoalkyl or C_2–C_3 haloalkyl; and

each u and v are independently 0, 1 or 2 in each instance of $S(=O)_u(=NR^2)_v$, provided that the sum of u and v is 0, 1 or 2.

2. The compound of Claim 1 wherein

Q^1 is a phenyl ring substituted with 1 to 3 substituents independently selected from R^1;

Q^2 is a phenyl ring substituted with 1 to 3 substituents independently selected from R^4;

R is C_1-C_4 alkyl;

R^1 is independently halogen, cyano, nitro, C_1–C_8 alkyl, C_1–C_8 haloalkyl or C_2–C_8 haloalkoxyalkoxy; and

R^4 is independently halogen, C_1–C_3 alkyl or C_1–C_3 haloalkyl.

3. The compound of Claim 2 wherein

Q^1 is a phenyl ring having a substituent selected from R^1 at the meta (3-) position and optionally up to 2 additional R^1 substituents;

Q^2 is a phenyl ring having a substituent selected from R^4 at the ortho (2-) position and optionally up to 2 additional R^4 substituents;

R is methyl or ethyl;

R^1 is independently halogen, C_1–C_3 alkyl or C_1–C_3 haloalkyl; and

R^4 is independently halogen or C_1–C_3 haloalkyl.

4. The compound of Claim 2 wherein

Q^1 is a phenyl ring having a substituent selected from R^1 at the para (4-) position and optionally up to 2 additional R^1 substituents;

Q^2 is a phenyl ring having a substituent selected from R^4 at the ortho (2-) position and optionally up to 2 additional R^4 substituents;

R is methyl or ethyl;

R^1 is independently halogen, C_1–C_3 alkyl or C_1–C_3 haloalkyl; and

R^4 is independently halogen or C_1–C_3 haloalkyl.

5. The compound of Claim 1 wherein

Q^1 is a 5- to 6-membered fully unsaturated heterocyclic ring optionally substituted with up to 5 substituents independently selected from R^1 on carbon atom ring members and selected from R^3 on nitrogen atom ring members;

Q^2 is a phenyl ring substituted with 1 to 3 substituents independently selected from R^4;

R is C_1-C_4 alkyl;

R^1 is independently halogen, cyano, nitro, C_1–C_8 alkyl, C_1–C_8 haloalkyl or C_2–C_8 haloalkoxyalkoxy;

R^3 is independently C_1–C_3 alkyl, C_2–C_3 alkenyl, C_2–C_3 alkynyl, C_3–C_6 cycloalkyl or C_1–C_3 alkoxy; and

R^4 is independently halogen, C_1–C_3 alkyl or C_1–C_3 haloalkyl.

6. The compound of Claim 5 wherein

Q^1 is a pyridyl ring optionally substituted with up to 2 R^1;

Q^2 is a phenyl ring substituted with 1 to 2 substituents independently selected from R^4;

R is methyl or ethyl;

R^1 is independently halogen or C_1–C_3 haloalkyl; and

R^4 is independently halogen or C_1–C_3 haloalkyl.

7. The compound of Claim 5 wherein

Q^1 is a 3-pyridyl ring substituted with R^1 at the position para to the bond connecting Q^1 to the remainder of the compound of Formula **I**; or Q^1 is a thiophene or furan ring optionally substituted with up to 2 R^1;

Q^2 is a phenyl ring substituted with 1 to 2 substituents independently selected from R^4;

R is methyl or ethyl;

R^1 is independently halogen or C_1–C_3 haloalkyl; and

R^4 is independently halogen or C_1–C_3 haloalkyl.

8. The compound of Claim 1 wherein

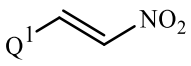
Q^2 is a 2-pyridyl or 3-pyridyl ring optionally substituted with up to 2 R^4;

R is methyl or ethyl;

R^1 is independently halogen or C_1–C_3 haloalkyl; and

R^4 is independently halogen or C_1–C_3 haloalkyl.

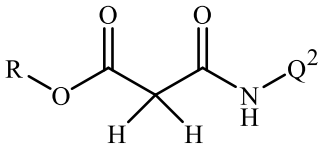
9. A method for preparing a compound of Formula **I** as defined in Claim 1, comprising contacting a compound of Formula **II**



II

wherein Q^1 is as defined in Claim 1,

with a compound of Formula **III**



III

wherein R and Q^2 are as defined in Claim 1,

optionally in the presence of a catalyst or a base to form a compound of Formula **I**.

10. The method of Claim 9 wherein

Q^1 is a phenyl ring substituted with 1 to 3 substituents independently selected from R^1;

Q^2 is a phenyl ring substituted with 1 to 3 substituents independently selected from R^4;

R is C_1-C_4 alkyl;

R^1 is independently halogen, cyano, nitro, C_1–C_8 alkyl, C_1–C_8 haloalkyl or C_2–C_8 haloalkoxyalkoxy; and

R^4 is independently halogen, C_1–C_3 alkyl or C_1–C_3 haloalkyl.

11. The method of Claim 10 wherein

Q^1 is a phenyl ring having a substituent selected from R^1 at the meta (3-) position and optionally up to 2 additional R^1 substituents;

Q^2 is a phenyl ring having a substituent selected from R^4 at the ortho (2-) position and optionally up to 2 additional R^4 substituents;

R is methyl or ethyl;

R^1 is independently halogen, C_1–C_3 alkyl or C_1–C_3 haloalkyl; and

R^4 is independently halogen or C_1–C_3 haloalkyl.

12. The method of Claim 10 wherein

the catalyst is a nickel complex; and

the base is an organic base.

13. The method of Claim 12 wherein

the nickel complex is Ni(II) with chiral vicinal diamine ligands.

14. The method of Claim 13 wherein

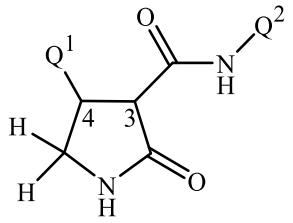
the ligands are N substituted cyclohexane-1,2 diamines or 1,1'-Bi(tetrahydroisoquinoline)-diamines; and

the base is triethylamine, morpholine or piperidine.

15. The method of Claim 10 wherein

the stereochemistry of the carbon center connecting Q^1 to the remainder of Formula **I** is *S* or *R*.

16. A method for preparing a compound of Formula **IV**



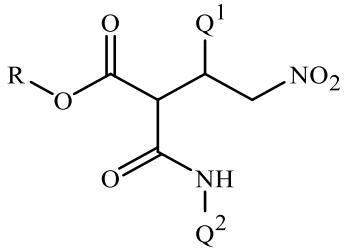
IV

wherein

Q^1 is a phenyl ring or a naphthalenyl ring system, each ring or ring system optionally substituted with up to 5 substituents independently selected from R^1; or a 5- to 6-membered fully unsaturated heterocyclic ring or an 8- to 10-membered heteroaromatic bicyclic ring system, each ring or ring system containing ring members selected from carbon atoms and 1 to 4 heteroatoms independently selected from up to 2 O, up to 2 S and up to 4 N atoms, wherein up to 3 carbon ring members are independently selected from C(=O) and C(=S), and the sulfur atom ring members are independently selected from $S(=O)_u(=NR^2)_v$, each ring or ring system optionally substituted with up to 5 substituents independently selected from R^1 on carbon atom ring members and selected from R^3 on nitrogen atom ring members; and

Q^2 is a phenyl ring or a naphthalenyl ring system, each ring or ring system optionally substituted with up to 5 substituents independently selected from R^4; or a 5- to 6-membered fully unsaturated heterocyclic ring or an 8- to 10-membered heteroaromatic bicyclic ring system, each ring or ring system containing ring members selected from carbon atoms and 1 to 4 heteroatoms independently selected from up to 2 O, up to 2 S and up to 4 N atoms, wherein up to 3 carbon ring members are independently selected from C(=O) and C(=S), and the sulfur atom ring members are independently selected from $S(=O)_u(=NR^2)_v$, each ring or ring system optionally substituted with up to 5 substituents independently selected from R^4 on carbon atom ring members and selected from R^5 on nitrogen atom ring members

comprising reductively cyclizing a compound of Formula **I**



I

wherein

Q^1 is a phenyl ring or a naphthalenyl ring system, each ring or ring system optionally substituted with up to 5 substituents independently selected from R^1; or a 5- to 6-membered fully unsaturated heterocyclic ring or an 8- to 10-membered heteroaromatic bicyclic ring system, each ring or ring system containing ring members selected from carbon atoms and 1 to 4 heteroatoms independently selected from up to 2 O, up to 2 S and up to 4 N atoms, wherein up to 3 carbon ring members are independently selected from C(=O) and C(=S), and the sulfur atom ring members are independently selected from $S(=O)_u(=NR^2)_v$, each ring or ring system optionally substituted with up to 5 substituents independently selected from R^1 on carbon atom ring members and selected from R^3 on nitrogen atom ring members;

Q^2 is a phenyl ring or a naphthalenyl ring system, each ring or ring system optionally substituted with up to 5 substituents independently selected from R^4; or a 5- to 6-membered fully unsaturated heterocyclic ring or an 8- to 10-membered heteroaromatic bicyclic ring system, each ring or ring system containing ring members selected from carbon atoms and 1 to 4 heteroatoms independently selected from up to 2 O, up to 2 S and up to 4 N atoms, wherein up to 3 carbon ring members are independently selected from C(=O) and C(=S), and the sulfur

atom ring members are independently selected from $S(=O)_u(=NR^2)_v$, each ring or ring system optionally substituted with up to 5 substituents independently selected from R^4 on carbon atom ring members and selected from R^5 on nitrogen atom ring members; and

R is C_1-C_8 alkyl or phenyl;

in the presence of a reducing agent.

17. The method of Claim 16 wherein

Q^1 is a phenyl ring substituted with 1 to 3 substituents independently selected from R^1;

Q^2 is a phenyl ring substituted with 1 to 3 substituents independently selected from R^4;

R is C_1-C_4 alkyl;

R^1 is independently halogen, cyano, nitro, C_1–C_8 alkyl, C_1–C_8 haloalkyl or C_2–C_8 haloalkoxyalkoxy; and

R^4 is independently halogen, C_1–C_3 alkyl or C_1–C_3 haloalkyl.

18. The method of Claim 17 wherein

Q^1 is a phenyl ring having a substituent selected from R^1 at the meta (3-) position and optionally up to 2 additional R^1 substituents;

Q^2 is a phenyl ring having a substituent selected from R^4 at the ortho (2-) position and optionally up to 2 additional R^4 substituents;

R^1 is independently halogen, C_1–C_3 alkyl or C_1–C_3 haloalkyl;

R^4 is independently halogen or C_1–C_3 haloalkyl.

19. The method of Claim 16 wherein

Q^1 is a pyridyl ring optionally substituted with up to 2 R^1;

Q^2 is a phenyl ring substituted with 1 to 3 substituents independently selected from R^4;

R^1 is independently halogen or C_1–C_3 haloalkyl; and

R^4 is independently halogen or C_1–C_3 haloalkyl.

20. The method of Claim 16 wherein

the stereochemistry of a compound of Formula **IV** is (3*R*,4*S*) or (3*S*,4*R*).

21. The compound of Claim 1 that is ethyl a-[[(2-fluorophenyl)amino]carbonyl]-(nitromethyl)-3-(trifluoromethyl)benzenepropanoate.