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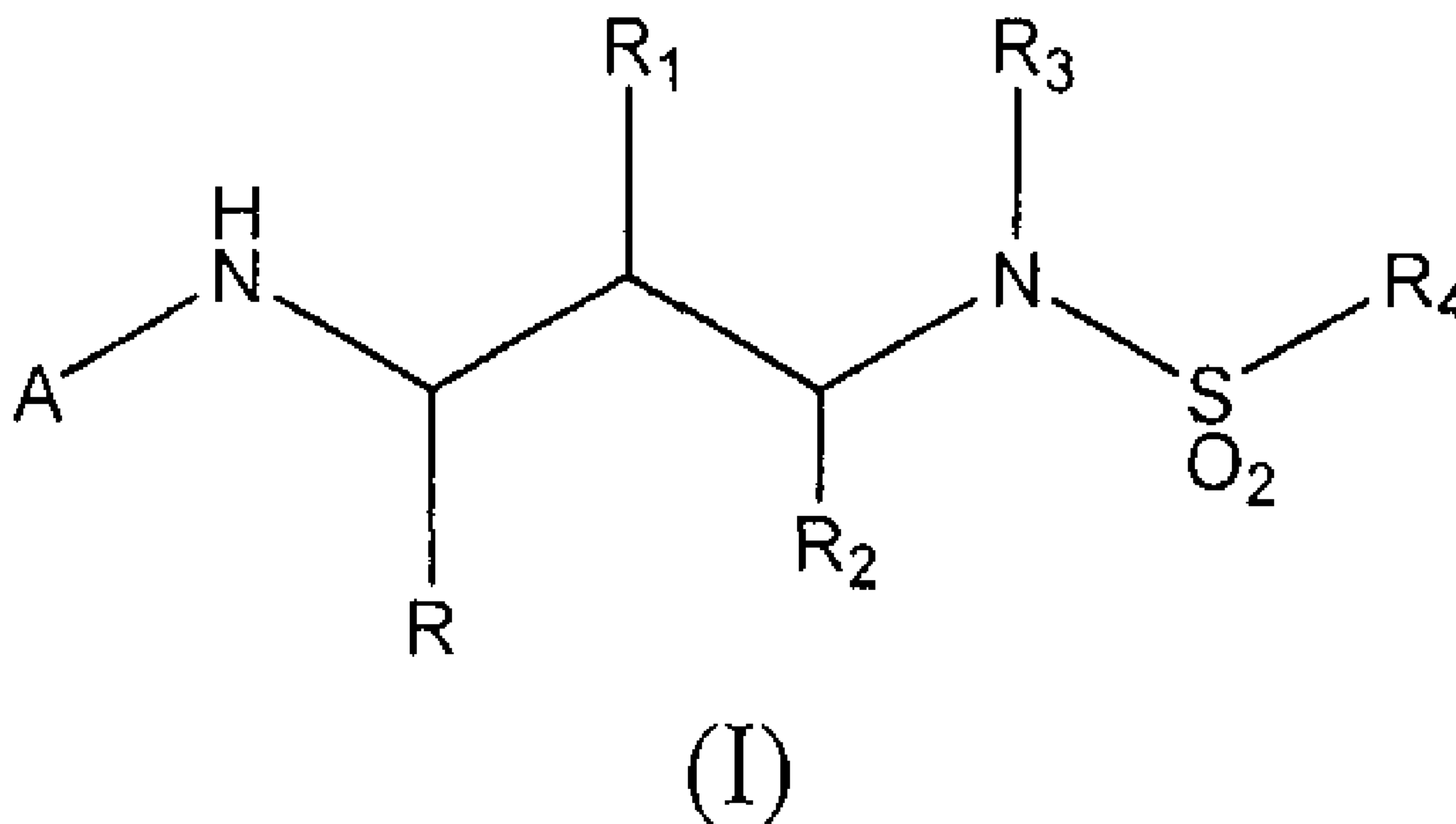
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(54) Titre : COMPOSES INHIBANT LA PROTEASE DU VIH

(54) Title: HIV PROTEASE INHIBITING COMPOUNDS



(57) Abrégé/Abstract:

A compound of the formula (see formula I) is disclosed as an HIV protease inhibitor. Methods and compositions for inhibiting an HIV infection are also disclosed.

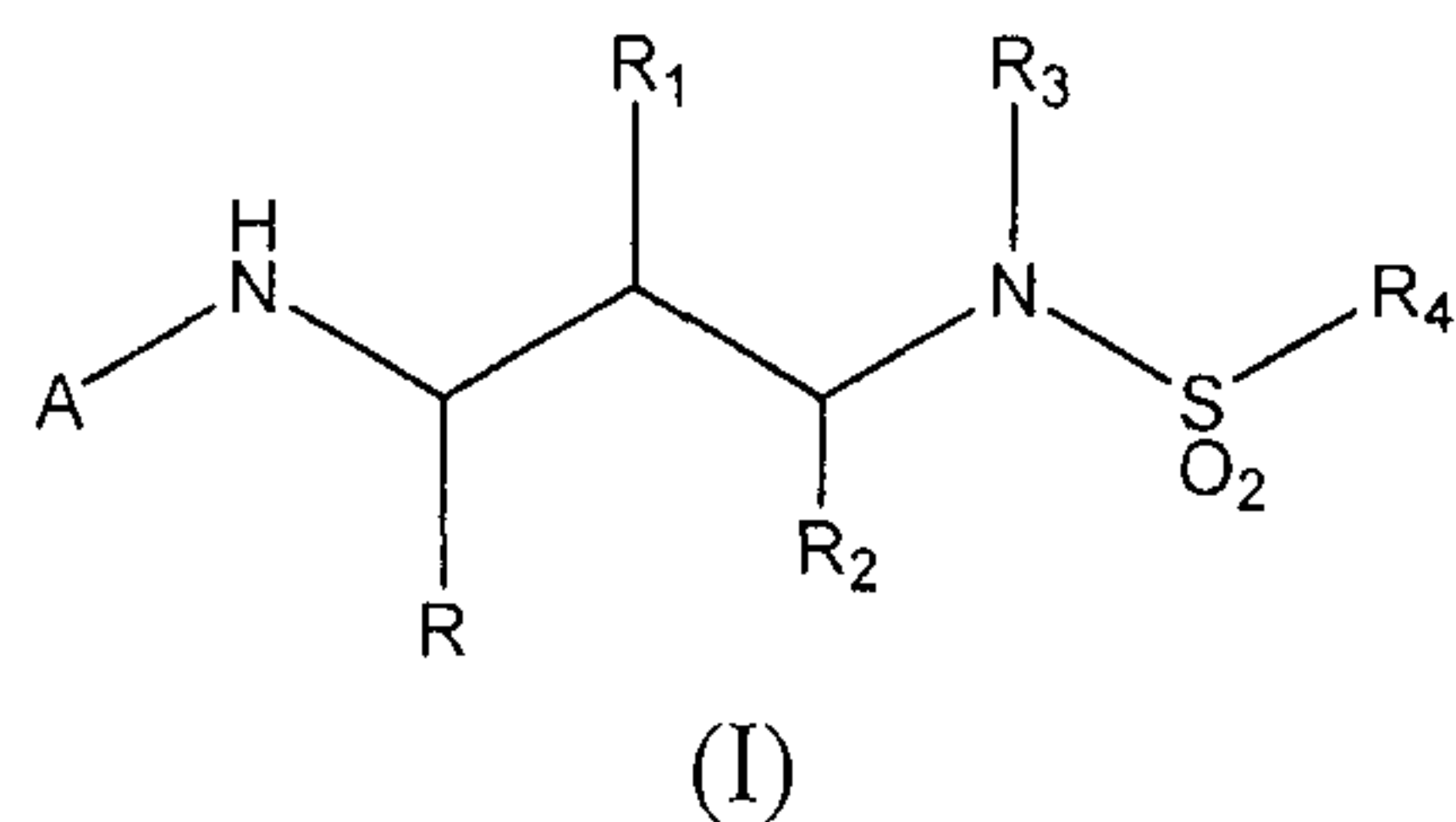


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Abstract

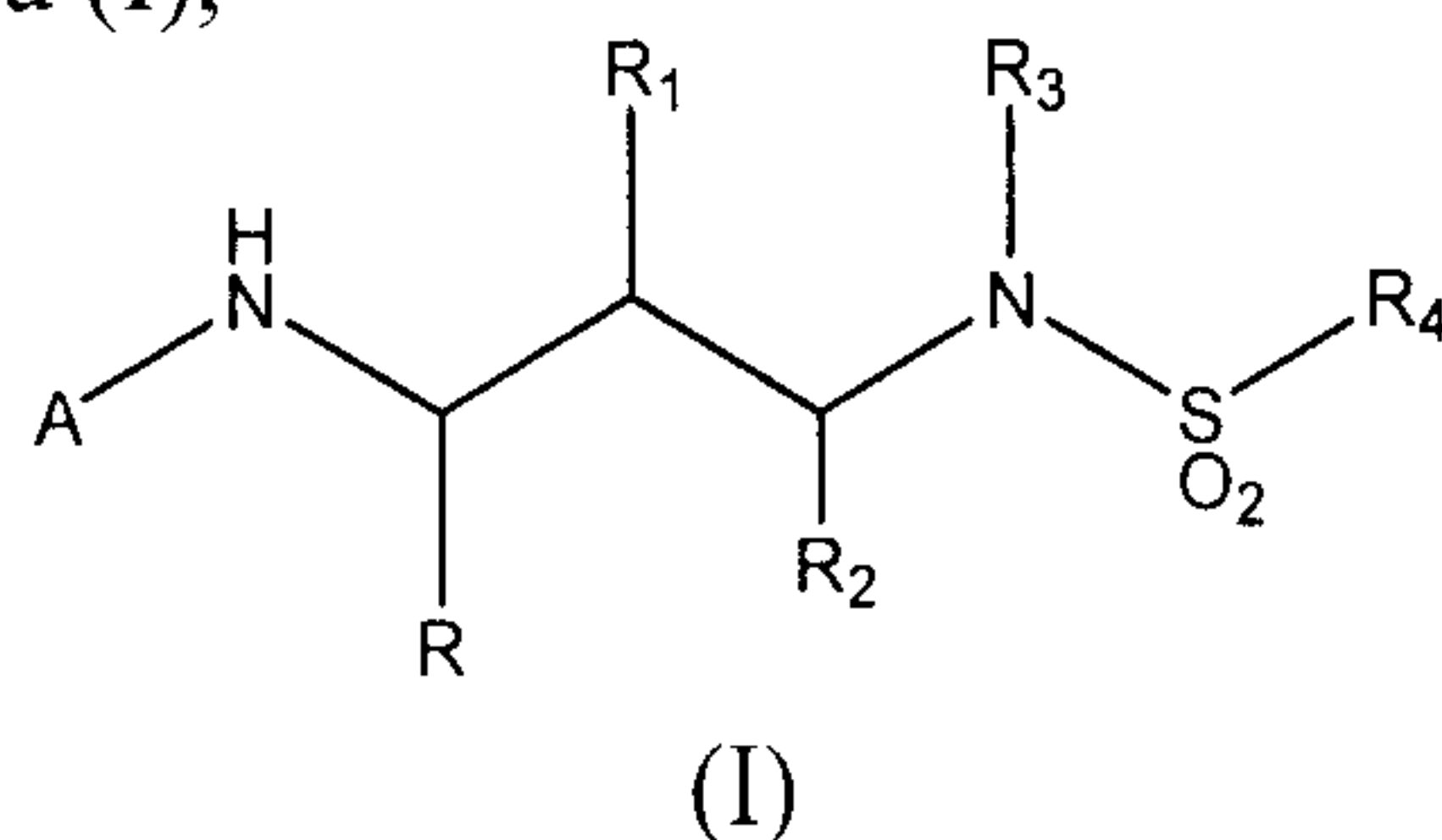
A compound of the formula



is disclosed as an HIV protease inhibitor. Methods and compositions for inhibiting an HIV infection are also disclosed.

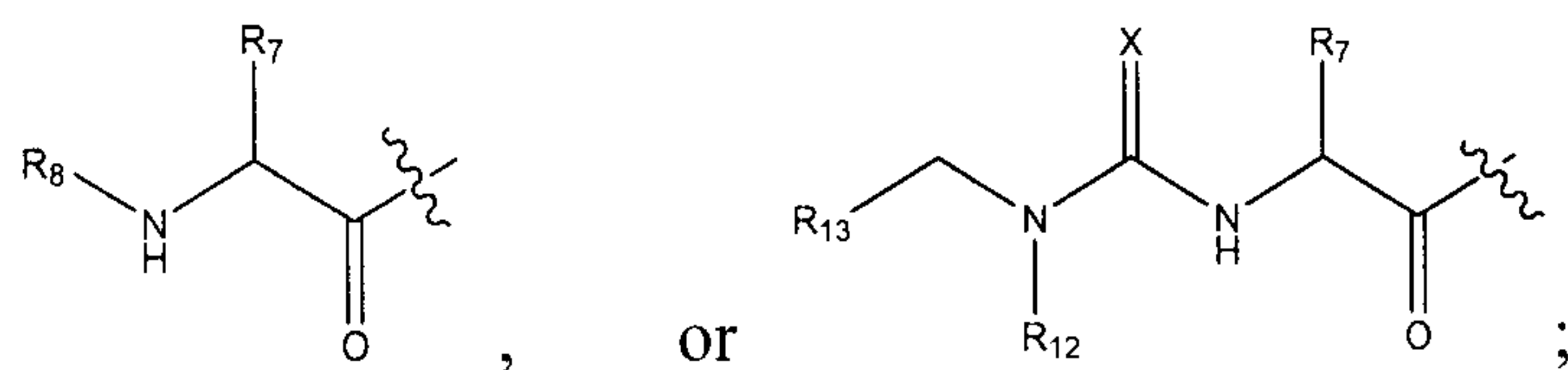
WHAT IS CLAIMED IS

1. A compound of formula (I),



or a pharmaceutically acceptable salt form, stereoisomer, ester, salt of an ester, or combination thereof, wherein:

A is $R_5C(O)-$, R_6SO_2- ,



X is O, S or NH;

Y is O, S or NH;

R is alkyl, alkenyl, cycloalkyl, cycloalkenyl, cycloalkylalkyl, cycloalkenylalkyl, arylalkyl or heteroarylalkyl; wherein each R is substituted with 0, 1, or 2 substituents that are alkyl, alkenyl, alkynyl, cyano, halo, formyl, nitro, hydroxy, alkoxy, $-NH_2$, $-N(H)alkyl$, $-N(alkyl)_2$, $-C(=O)OH$, $-C(=O)Oalkyl$, haloalkyl, hydroxyalkyl or alkoxyalkyl;

R_1 is OR_a , $-OSO_2R_a$, $-OSO_3R_a$, $-OPO_3R_a$, $-OC(=O)C(H)(R_{1a})NR_aR_b$ or $-OC(=O)C(H)(R_{1a})N(H)C(O)OR_a$;

R_{1a} is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, aryl, arylalkyl, heteroaryl or heteroarylalkyl; wherein each R_{1a} is substituted with 0, 1 or 2 substituents each independently halo, alkyl, alkenyl, alkynyl, $-OR_a$, $-SR_a$, $-SOR_a$, $-SO_2R_a$, $-SO_2NR_aR_b$, $-C(=O)R_a$, $-NR_aR_b$, $-N(R_b)C(=O)R_a$, $-N(R_b)C(=O)OR_a$, $-N(R_b)SO_2R_a$, $-N(R_a)SO_2NR_aR_b$, $-N(R_b)C(=NH)NR_aR_b$, $-N(R_b)C(=O)NR_aR_b$, $-C(=O)NR_aR_b$ or $-C(=O)OR_a$;

R_2 is H;

R_3 is alkyl, haloalkyl, alkenyl, haloalkenyl, alkynyl, haloalkynyl, cycloalkyl, cycloalkenyl, cycloalkenylalkyl, cycloalkylalkyl, heterocycle, heterocyclealkyl, heteroaryl, heteroarylalkyl, aryl, arylalkyl, hydroxyalkyl, alkoxyalkyl, haloalkoxyalkyl, -alkylSR_a, -alkylSOR_a, -alkylSO₂R_a, -alkylNR_aR_b, -alkylN(R_b)C(=O)OR_a, -alkylN(R_b)C(=O)R_a, -alkylN(R_b)SO₂R_a or -alkylN(R_b)SO₂NR_aR_b; wherein each of the cycloalkyl, cycloalkenyl, aryl, heteroaryl, heterocycle, cycloalkyl moiety of the cycloalkylalkyl, cycloalkenyl moiety of the cycloalkenylalkyl, heterocycle moiety of the heterocyclealkyl, heteroaryl moiety of the heteroarylalkyl, aryl moiety of the arylalkyl is independently substituted with 0, 1, 2 or 3 substituents each independently halo, nitro, cyano, formyl, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, -SH, -S(alkyl), -SO₂(alkyl), -NH₂, -N(H)(alkyl), -N(alkyl)₂, -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -C(=O)OH, -C(=O)O(alkyl), -C(=O)NH₂, -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, -C(=O)alkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, cyanoalkyl, formylalkyl, nitroalkyl, -alkylSH, -alkylS(alkyl), -alkylSO₂(alkyl), -alkylNH₂, -alkylN(H)(alkyl), -alkylN(alkyl)₂, -alkylN(H)C(=O)alkyl, -alkylN(alkyl)C(=O)alkyl, -alkylC(=O)OH, -alkylC(=O)O(alkyl), -alkylC(=O)NH₂, -alkylC(=O)N(H)(alkyl), -alkylC(=O)N(alkyl)₂, -alkylC(=O)alkyl or R_{3a};

R_{3a} is cycloalkyl, cycloalkenyl, aryl, heteroaryl or heterocycle, wherein each R_{3a} is independently substituted with 0, 1, 2 or 3 substituents each independently halo, nitro, cyano, formyl, alkyl, alkenyl, alkynyl, hydroxyl, alkoxy, -SH, -S(alkyl), -SO₂(alkyl), -NH₂, -N(H)(alkyl), -N(alkyl)₂, -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -C(=O)OH, -C(=O)O(alkyl), -C(=O)NH₂, -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, -C(=O)alkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, cyanoalkyl, formylalkyl, nitroalkyl, -alkylSH, -alkylS(alkyl), -alkylSO₂(alkyl), -alkylNH₂, -alkylN(H)(alkyl), -alkylN(alkyl)₂, -alkylN(H)C(=O)alkyl, -alkylN(alkyl)C(=O)alkyl, -alkylC(=O)OH, -alkylC(=O)O(alkyl), -alkylC(=O)NH₂, -alkylC(=O)N(H)(alkyl), -alkylC(=O)N(alkyl)₂ or -alkylC(=O)alkyl;

R_4 is cycloalkyl, cycloalkenyl, heterocycle, aryl or heteroaryl wherein each R_4 is substituted with 0, 1, 2, 3 or 4 substituents each independently halo, alkyl, oxo, alkenyl, alkynyl, nitro, cyano, haloalkyl, cyanoalkyl, hydroxyalkyl, alkoxyalkyl, nitroalkyl, -OR_{4a}, -SR_{4a}, -SOR_{4a}, -SO₂R_{4a}, -NR_{4a}R_{4b}, -OC(=O)R_{4a}, -C(=O)R_{4a}, -C(=O)OR_{4a}, -C(=O)NR_{4a}R_{4b}, -N(R_{4b})C(=O)R_{4a}, -N(R_{4b})C(=O)OR_{4a}, -N(R_{4b})SO₂R_{4a}, -N(R_{4b})C(=O)NR_{4a}R_{4b}, -N(R_{4b})SO₂NR_{4a}R_{4b}, -alkylSR_{4a}, -alkylSOR_{4a}, -alkylSO₂R_{4a}, -alkylNR_{4a}R_{4b}, -alkylOC(=O)R_{4a}, -alkylC(=O)R_{4a}, -alkylC(=O)OR_{4a}, -alkylC(=O)NR_{4a}R_{4b}, -alkylN(R_{4b})C(=O)R_{4a}, -alkylN(R_{4b})C(=O)OR_{4a}, -alkylN(R_{4b})SO₂R_{4a}, -alkylN(R_{4b})C(=O)NR_{4a}R_{4b}, -alkylN(R_{4b})SO₂NR_{4a}R_{4b}, -N(H)C(=O)alkylN(H)C(=O)OR_{4a},

-N(H)C(=O)alkylNR_{4a}R_{4b}, -C(R_{4b})=NOR_{4a}, -C(NR_{4a}R_{4b})=NOR_{4a} or
-C(R_{4b})=NOC(=O)alkylNR_{4a}R_{4b};

R_{4a} and R_{4b}, at each occurrence, are independently hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, heterocycle, heterocyclealkyl, heteroaryl or heteroalkyl; wherein each R_{4a} and R_{4b}, at each occurrence, is independently substituted with 0, 1 or 2 substituents each independently alkyl, alkenyl, hydroxy, alkoxy, halo, nitro, cyano, formyl, oxo, -NH₂, -N(H)alkyl, -N(alkyl)₂, -C(=O)alkyl, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂, -C(=O)N(H)alkyl, -C(=O)N(alkyl)₂, haloalkyl, hydroxyalkyl, cyanoalkyl, nitroalkyl, formylalkyl or alkoxyalkyl;

R₅ is alkyl, haloalkyl, cyanoalkyl, hydroxyalkyl, alkoxyalkyl, haloalkoxyalkyl, -OalkylSO₂alkyl, -O-heterocycle, -alkyl-O-aryl or -O-alkyl-heteroaryl; wherein the heterocycle, aryl or heteroaryl moiety of -O-heterocycle, -alkyl-O-aryl and -O-alkyl-heteroaryl is independently substituted with 0, 1, 2 or 3 substituents each independently cyano, halo, nitro, oxo, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, -NH₂, -N(H)(alkyl), -N(alkyl)₂, -SH, -S(alkyl), -SO₂(alkyl), -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -N(H)C(=O)NH₂, -N(H)C(=O)N(H)(alkyl), -N(H)C(=O)N(alkyl)₂, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂, -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, cyanoalkyl, formylalkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, -alkylNH₂, -alkylN(H)(alkyl), -alkylN(alkyl)₂, -alkylN(H)C(=O)NH₂, -alkylN(H)C(=O)N(H)(alkyl), -alkylN(H)C(=O)N(alkyl)₂, -alkylC(=O)OH, -alkylC(=O)Oalkyl, -alkylC(=O)NH₂, -alkylC(=O)N(H)(alkyl) or -alkylC(=O)N(alkyl)₂;

R₆ is aryl or heteroaryl; wherein each R₆ is substituted with 0 or 1 substituent that is -C(H)=NOH, -C(alkyl)=NOH, -C(H)=NO(alkyl), -C(alkyl)=NO(alkyl), -C(H)=NO(arylalkyl) or -C(alkyl)=NO(arylalkyl);

R₇ is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, aryl or heteroaryl; wherein each R₇ is substituted with 0, 1 or 2 substituents each independently halo, -OR_a, -OalkylC(=O)NR_aR_b, -SR_a, -SOR_a, -SO₂R_a, -SO₂NR_aR_b, -C(=O)R_a, -NR_aR_b, -N(R_b)C(=O)R_a, -N(R_b)C(=O)OR_a, -N(R_b)SO₂R_a, -N(R_b)SO₂NR_aR_b, -N(R_b)C(=NH)NR_aR_b, -N(R_b)C(=O)NR_aR_b, -C(=O)NR_aR_b, -C(=O)OR_a or R_{7a};

R_{7a} is cycloalkyl, cycloalkenyl, heterocycle, aryl or heteroaryl; wherein each R_{7a} is substituted with 0, 1, 2, 3 or 4 substituents each independently cyano, halo, nitro, oxo, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, -NH₂, -N(H)(alkyl), -N(alkyl)₂, -SH, -S(alkyl),

-SO₂(alkyl), -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -N(H)C(=O)NH₂,
 -N(H)C(=O)N(H)(alkyl), -N(H)C(=O)N(alkyl)₂, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂,
 -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, haloalkyl, hydroxyalkyl, alkoxyalkyl, -alkylNH₂,
 -alkylN(H)(alkyl), -alkylN(alkyl)₂, -alkylN(H)C(=O)NH₂, -alkylN(H)C(=O)N(H)(alkyl),
 -alkylN(H)C(=O)N(alkyl)₂, -alkylC(=O)OH, -alkylC(=O)Oalkyl, -alkylC(=O)NH₂,
 -alkylC(=O)N(H)(alkyl) or -alkyl-C(=O)N(alkyl)₂;

R₈ is -C(=O)OR_{8a} or -C(=O)alkylNR_{8a}R_{8b},

R_{8a} and R_{8b} are, at each occurrence, independently alkyl, arylalkyl or heteroarylalkyl; wherein each R_{8a} and R_{8b} is independently substituted with 0, 1, 2, 3 or 4 substituents each independently alkyl, nitro, hydroxy, alkoxy, amino, formyl, halo, haloalkyl, hydroxyalkyl, alkoxyalkyl aminoalkyl or formylalkyl;

R₁₂ is alkyl, alkenyl, cycloalkyl, cycloalkenyl, cycloalkylalkyl or cycloalkenylalkyl; wherein each R₁₂ is substituted with 0, 1 or 2 substituents each independently hydroxy, alkoxy cyano, nitro or halo;

R₁₃ is alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, aryl, heteroaryl or heterocycle; wherein each R₁₃ is substituted with 0, 1, 2 or 3 substituents each independently alkyl, alkenyl, alkynyl, cyano, halo, nitro, oxo, -OR_a, -OC(=O)R_a, -SR_a, -SOR_a, -SO₂R_a, -SO₂NR_a, -SO₂OR_a, -NR_aR_b, -N(R_b)NR_aR_b, -N(R_b)C(=O)R_a, -N(R_b)SO₂R_a, -N(R_b)C(=O)OR_a, -N(R_b)C(=O)NR_aR_b, -N(R_b)SO₂NR_aR_b, -C(=O)R_a, -C(=O)NR_aR_b, -C(=O)OR_a, azidoalkyl, haloalkyl, nitroalkyl, cyanoalkyl, -alkylOR_a, -alkylOC(=O)R_a, -alkylSR_a, -alkylSOR_a, -alkylSO₂R_a, -alkylSO₂NR_a, -alkylSO₂OR_a, -alkylNR_aR_b, -C(H)=N(OR_a), -C(alkyl)=N(OR_a), -C(H)=NNR_aR_b, -C(alkyl)=NNR_aR_b, -C(H)=(=NOR_a)NR_aR_b, -C(alkyl)=(=NOR_a)NR_aR_b, -alkylN(R_b)NR_aR_b, -alkylN(R_b)C(=O)R_a, -alkylN(R_b)C(=O)OR_a, -alkylN(R_b)C(=O)NR_aR_b, -alkylN(R_b)SO₂NR_aR_b, -alkylN(R_b)SO₂R_a, -alkylC(=O)R_a, -alkylC(=O)OR_a, -alkylC(=O)NR_aR_b or R_{13a};

R_{13a} is cycloalkyl, cycloalkenyl, heterocycle, aryl or heteroaryl; wherein each R_{13a} is substituted with 0, 1, 2, 3 or 4 substituents each independently cyano, halo, nitro, oxo, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, -NH₂, -N(H)(alkyl), -N(alkyl)₂, -SH, -S(alkyl), -SO₂(alkyl), -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -N(H)C(=O)NH₂, -N(H)C(=O)N(H)(alkyl), -N(H)C(=O)N(alkyl)₂, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂, -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, cyanoalkyl, formylalkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, -alkylNH₂, -alkylN(H)(alkyl), -alkylN(alkyl)₂, -alkylN(H)C(=O)NH₂,

-alkylN(H)C(=O)N(H)(alkyl), -alkylN(H)C(=O)N(alkyl)₂, -alkylC(=O)OH,
-alkylC(=O)Oalkyl, -alkylC(=O)NH₂, -alkylC(=O)N(H)(alkyl) or -alkylC(=O)N(alkyl)₂;

R_a and R_b at each occurrence are independently hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heteroaryl or heterocycle; wherein each R_a and R_b, at each occurrence, is independently substituted with 0, 1, 2 or 3 substituents each independently alkyl, alkenyl, alkynyl, cyano, formyl, nitro, halo, oxo, hydroxy, alkoxy, -NH₂, -N(H)(alkyl), -N(alkyl)₂, -SH, -S(alkyl), -SO₂(alkyl), -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -N(H)C(=O)NH₂, -N(H)C(=O)N(H)(alkyl), -N(H)C(=O)N(alkyl)₂, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂, -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, cyanoalkyl, formylalkyl, nitroalkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, -alkylNH₂, -alkylN(H)(alkyl), -alkylN(alkyl)₂, -alkylN(H)C(=O)NH₂, -alkylN(H)C(=O)N(H)(alkyl), -alkylN(H)C(=O)N(alkyl)₂, -alkylC(=O)OH, -alkylC(=O)Oalkyl, -alkylC(=O)NH₂, -alkylC(=O)N(H)(alkyl) -alkylC(=O)N(alkyl)₂ or R_c;

alternatively, R_a and R_b, together with the nitrogen atom they are attached, form a heterocycle ring substituted with 0, 1, 2 or 3 substituents each independently alkyl, alkenyl, alkynyl, cyano, formyl, nitro, halo, oxo, hydroxy, alkoxy, -NH₂, -N(H)(alkyl), -N(alkyl)₂, -SH, -S(alkyl), -SO₂(alkyl), -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -N(H)C(=O)NH₂, -N(H)C(=O)N(H)(alkyl), -N(H)C(=O)N(alkyl)₂, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂, -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, cyanoalkyl, formylalkyl, nitroalkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, -alkylNH₂, -alkylN(H)(alkyl), -alkylN(alkyl)₂, -alkylN(H)C(=O)NH₂, -alkylN(H)C(=O)N(H)(alkyl), -alkylN(H)C(=O)N(alkyl)₂, -alkylC(=O)OH, -alkylC(=O)Oalkyl, -alkylC(=O)NH₂, -alkylC(=O)N(H)(alkyl) -alkylC(=O)N(alkyl)₂ or R_c;

R_c is aryl, heteroaryl or heterocycle; wherein each R_c is independently substituted with 0, 1, 2, 3 or 4 substituents each independently halo, nitro, oxo, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, -NH₂, -N(H)(alkyl), -N(alkyl)₂, -SH, -S(alkyl), -SO₂(alkyl), -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -N(H)C(=O)NH₂, -N(H)C(=O)N(H)(alkyl), -N(H)C(=O)N(alkyl)₂, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂, -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, haloalkyl, hydroxyalkyl, alkoxyalkyl, -alkylNH₂, -alkyl-N(H)(alkyl), -alkyl-N(alkyl)₂, -alkyl-N(H)C(=O)NH₂, -alkyl-N(H)C(=O)N(H)(alkyl), -alkyl-N(H)C(=O)N(alkyl)₂, -alkyl-C(=O)OH, -alkyl-C(=O)Oalkyl, -alkyl-C(=O)NH₂, -alkyl-C(=O)N(H)(alkyl) or -alkyl-C(=O)N(alkyl)₂; and

n is 1 or 2.

2. The compound of claim 1 wherein R₁ is OH and R₂ is H.
3. The compound of claim 1 wherein R₁ is OH, R₂ is H, X is O, Y is O, and R₃ is alkyl, cycloalkenylalkyl, cycloalkylalkyl, heterocyclealkyl, heteroarylalkyl, arylalkyl, hydroxyalkyl, alkoxyalkyl, -alkylSR_a, -alkylSOR_a, -alkylSO₂R_a or -alkylNR_aR_b.
4. The compound of claim 1 wherein R₁ is OH, R₂ is H, X is O, Y is O, R₃ is alkyl or cycloalkylalkyl and R₄ is aryl or heteroaryl.
5. The compound of claim 1 wherein R₁ is OH, R₂ is H, R₃ is alkyl or cycloalkylalkyl, X is O, Y is O, and R₄ is phenyl substituted with 0, 1, 2, 3 or 4 substituents that are halo, -OR_{4a}, -NR_{4a}R_{4b} or -C(R_{4b})=NOR_{4a}; wherein R_{4a} and R_{4b} are independently hydrogen or alkyl.
6. The compound of claim 1 or a pharmaceutically acceptable salt form, stereoisomer, ester, salt of an ester, or combination thereof, that is

hexahydrofuro[2,3-*b*]furan-3-yl (1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propylcarbamate;

tetrahydro-3-furanyl (1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propylcarbamate;

N-{(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}acetamide;

N-{(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}-2-(2,6-dimethylphenoxy)acetamide;

(3*aS*,7*aR*)-hexahydro-4*H*-furo[2,3-*b*]pyran-3-yl (1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propylcarbamate and

(3*aR*,7*aS*)-hexahydro-4*H*-furo[2,3-*b*]pyran-3-yl (1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propylcarbamate;

3-furylmethyl (1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propylcarbamate;

2-pyridinylmethyl 2-[(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}amino)-2-oxoethylcarbamate;

2-(methylsulfonyl)ethyl (1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propylcarbamate;

(3a*S*,7a*R*)-hexahydro-4*H*-furo[2,3-*b*]pyran-3-yl (1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propylcarbamate;

(3a*R*,7a*S*)-hexahydro-4*H*-furo[2,3-*b*]pyran-3-yl (1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propylcarbamate;

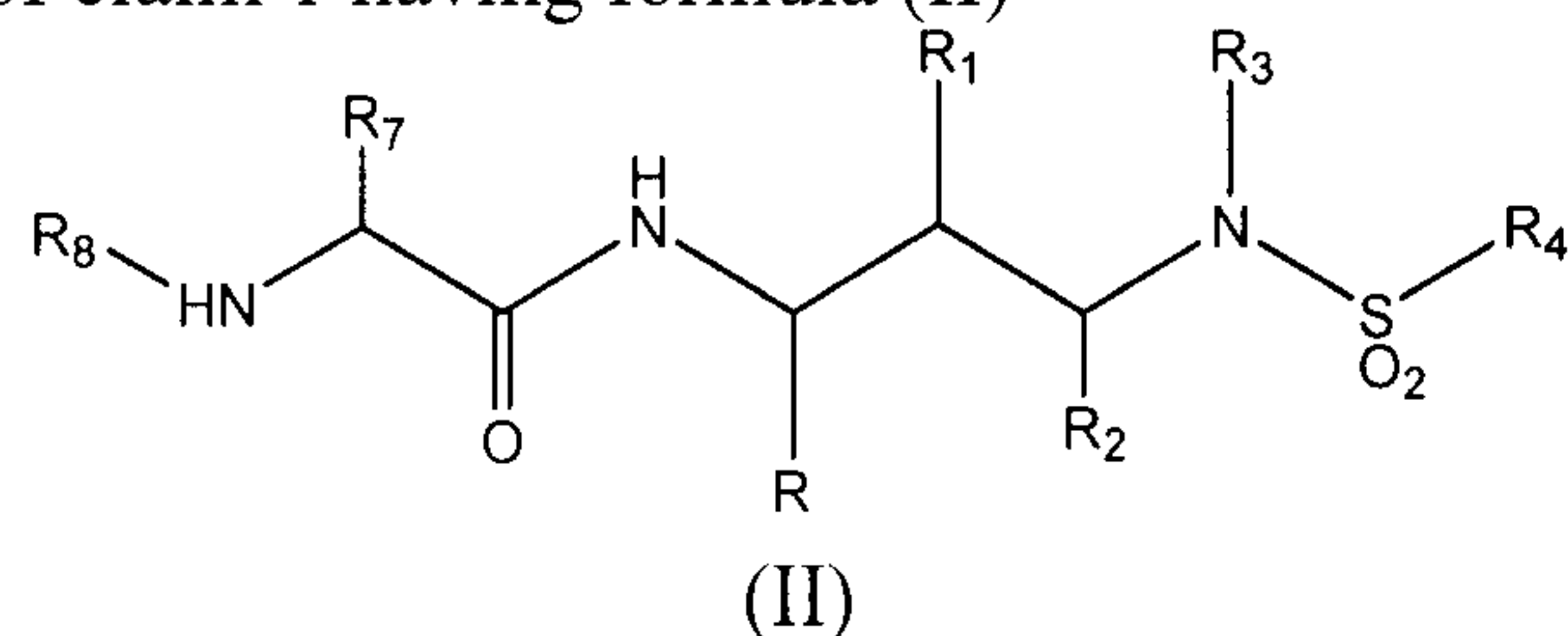
3-pyridinylmethyl (1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propylcarbamate;

4-pyridinylmethyl (1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propylcarbamate;

1,3-thiazol-5-ylmethyl (1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propylcarbamate; or

N-{(2*R*,3*S*)-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl]amino}-4-phenylbutyl}-4-[(*E*)-(hydroxyimino)methyl]-*N*-isobutylbenzenesulfonamide.

7. The compound of claim 1 having formula (II)



or a pharmaceutically acceptable salt form, stereoisomer, ester, salt of an ester, or combination thereof, wherein

R is alkyl, alkenyl, cycloalkyl, cycloalkenyl, cycloalkylalkyl, cycloalkenylalkyl, arylalkyl or heteroarylalkyl; wherein each *R* is substituted with 0, 1, or 2 substituents that are alkyl, alkenyl, alkynyl, cyano, halo, formyl, nitro, hydroxy, alkoxy, -NH₂, -N(H)alkyl, -N(alkyl)₂, -C(=O)OH, -C(=O)Oalkyl, haloalkyl, hydroxyalkyl or alkoxyalkyl;

*R*₁ is OR_a, -OSO₂R_a, -OSO₃R_a, -OPO₃R_a, -OC(=O)C(H)(R_{1a})NR_aR_b or -OC(=O)C(H)(R_{1a})N(H)C(O)OR_a;

*R*_{1a} is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, aryl, arylalkyl, heteroaryl or heteroarylalkyl; wherein each *R*_{1a} is substituted with 0, 1 or 2 substituents each independently halo, alkyl, alkenyl, alkynyl, -OR_a, -SR_a, -SOR_a, -SO₂R_a, -SO₂NR_aR_b, -C(=O)R_a, -NR_aR_b, -N(R_b)C(=O)R_a, -N(R_b)C(=O)OR_a, -N(R_b)SO₂R_a, -N(R_a)SO₂NR_aR_b, -N(R_b)C(=NH)NR_aR_b, -N(R_b)C(=O)NR_aR_b, -C(=O)NR_aR_b or -C(=O)OR_a;

*R*₂ is H;

R_3 is alkyl, haloalkyl, alkenyl, haloalkenyl, alkynyl, haloalkynyl, cycloalkyl, cycloalkenyl, cycloalkenylalkyl, cycloalkylalkyl, heterocycle, heterocyclealkyl, heteroaryl, heteroarylalkyl, aryl, arylalkyl, hydroxyalkyl, alkoxyalkyl, haloalkoxyalkyl, -alkylSR_a, -alkylSOR_a, -alkylSO₂R_a, -alkylNR_aR_b, -alkylN(R_b)C(=O)OR_a, -alkylN(R_b)C(=O)R_a, -alkylN(R_b)SO₂R_a or -alkylN(R_b)SO₂NR_aR_b; wherein each of the cycloalkyl, cycloalkenyl, aryl, heteroaryl, heterocycle, cycloalkyl moiety of the cycloalkylalkyl, cycloalkenyl moiety of the cycloalkenylalkyl, heterocycle moiety of the heterocyclealkyl, heteroaryl moiety of the heteroarylalkyl, aryl moiety of the arylalkyl is independently substituted with 0, 1, 2 or 3 substituents each independently halo, nitro, cyano, formyl, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, -SH, -S(alkyl), -SO₂(alkyl), -NH₂, -N(H)(alkyl), -N(alkyl)₂, -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -C(=O)OH, -C(=O)O(alkyl), -C(=O)NH₂, -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, -C(=O)alkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, cyanoalkyl, formylalkyl, nitroalkyl, -alkylSH, -alkylS(alkyl), -alkylSO₂(alkyl), -alkylNH₂, -alkylN(H)(alkyl), -alkylN(alkyl)₂, -alkylN(H)C(=O)alkyl, -alkylN(alkyl)C(=O)alkyl, -alkylC(=O)OH, -alkylC(=O)O(alkyl), -alkylC(=O)NH₂, -alkylC(=O)N(H)(alkyl), -alkylC(=O)N(alkyl)₂, -alkylC(=O)alkyl or R_{3a};

R_{3a} is cycloalkyl, cycloalkenyl, aryl, heteroaryl or heterocycle, wherein each R_{3a} is independently substituted with 0, 1, 2 or 3 substituents each independently halo, nitro, cyano, formyl, alkyl, alkenyl, alkynyl, hydroxyl, alkoxy, -SH, -S(alkyl), -SO₂(alkyl), -NH₂, -N(H)(alkyl), -N(alkyl)₂, -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -C(=O)OH, -C(=O)O(alkyl), -C(=O)NH₂, -C(=O)N(H)(alkyl), -C(O)N(alkyl)₂, -C(=O)alkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, cyanoalkyl, formylalkyl, nitroalkyl, -alkylSH, -alkylS(alkyl), -alkylSO₂(alkyl), -alkylNH₂, -alkylN(H)(alkyl), -alkylN(alkyl)₂, -alkylN(H)C(=O)alkyl, -alkylN(alkyl)C(=O)alkyl, -alkylC(=O)OH, -alkylC(=O)O(alkyl), -alkylC(=O)NH₂, -alkylC(=O)N(H)(alkyl), -alkylC(=O)N(alkyl)₂ or -alkylC(=O)alkyl;

R_4 is cycloalkyl, cycloalkenyl, heterocycle, aryl or heteroaryl wherein each R_4 is substituted with 0, 1, 2, 3 or 4 substituents each independently halo, alkyl, oxo, alkenyl, alkynyl, nitro, cyano, haloalkyl, cyanoalkyl, hydroxyalkyl, alkoxyalkyl, nitroalkyl, -OR_{4a}, -SR_{4a}, -SOR_{4a}, -SO₂R_{4a}, -NR_{4a}R_{4b}, -OC(=O)R_{4a}, -C(=O)R_{4a}, -C(=O)OR_{4a}, -C(=O)NR_{4a}R_{4b}, -N(R_{4b})C(=O)R_{4a}, -N(R_{4b})C(=O)OR_{4a}, -N(R_{4b})SO₂R_{4a}, -N(R_{4b})C(=O)NR_{4a}R_{4b}, -N(R_{4b})SO₂NR_{4a}R_{4b}, -alkylSR_{4a}, -alkylSOR_{4a}, -alkylSO₂R_{4a}, -alkylNR_{4a}R_{4b}, -alkylOC(=O)R_{4a}, -alkylC(=O)R_{4a}, -alkylC(=O)OR_{4a}, -alkylC(=O)NR_{4a}R_{4b}, -alkylN(R_{4b})C(=O)R_{4a}, -alkylN(R_{4b})C(=O)OR_{4a}, -alkylN(R_{4b})SO₂R_{4a}, -alkylN(R_{4b})C(=O)NR_{4a}R_{4b}, -alkylN(R_{4b})SO₂NR_{4a}R_{4b}, -N(H)C(=O)alkylN(H)C(=O)OR_{4a},

-N(H)C(=O)alkylNR_{4a}R_{4b}, -C(R_{4b})=NOR_{4a}, -C(NR_{4a}R_{4b})=NOR_{4a} or
-C(R_{4b})=NOC(=O)alkylNR_{4a}R_{4b};

R_{4a} and R_{4b}, at each occurrence, are independently hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, heterocycle, heterocyclealkyl, heteroaryl or heteroalkyl; wherein each R_{4a} and R_{4b}, at each occurrence, is independently substituted with 0, 1 or 2 substituents each independently alkyl, alkenyl, hydroxy, alkoxy, halo, nitro, cyano, formyl, oxo, -NH₂, -N(H)alkyl, -N(alkyl)₂, -C(=O)alkyl, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂, -C(=O)N(H)alkyl, -C(=O)N(alkyl)₂, haloalkyl, hydroxyalkyl, cyanoalkyl, nitroalkyl, formylalkyl or alkoxyalkyl;

R₇ is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, aryl or heteroaryl; wherein each R₇ is substituted with 0, 1 or 2 substituents each independently halo, -OR_a, -OalkylC(=O)NR_aR_b, -SR_a, -SOR_a, -SO₂R_a, -SO₂NR_aR_b, -C(=O)R_a, -NR_aR_b, -N(R_b)C(=O)R_a, -N(R_b)C(=O)OR_a, -N(R_b)SO₂R_a, -N(R_b)SO₂NR_aR_b, -N(R_b)C(=NH)NR_aR_b, -N(R_b)C(=O)NR_aR_b, -C(=O)NR_aR_b, -C(=O)OR_a or R_{7a};

R_{7a} is cycloalkyl, cycloalkenyl, heterocycle, aryl or heteroaryl; wherein each R_{7a} is substituted with 0, 1, 2, 3 or 4 substituents each independently cyano, halo, nitro, oxo, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, -NH₂, -N(H)(alkyl), -N(alkyl)₂, -SH, -S(alkyl), -SO₂(alkyl), -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -N(H)C(=O)NH₂, -N(H)C(=O)N(H)(alkyl), -N(H)C(=O)N(alkyl)₂, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂, -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, haloalkyl, hydroxyalkyl, alkoxyalkyl, -alkylNH₂, -alkylN(H)(alkyl), -alkylN(alkyl)₂, -alkylN(H)C(=O)NH₂, -alkylN(H)C(=O)N(H)(alkyl), -alkylN(H)C(=O)N(alkyl)₂, -alkylC(=O)OH, -alkylC(=O)Oalkyl, -alkylC(=O)NH₂, -alkylC(=O)N(H)(alkyl) or -alkyl-C(=O)N(alkyl)₂;

R₈ is -C(=O)OR_{8a} or -C(=O)alkylNR_{8a}R_{8b},

R_{8a} and R_{8b} are, at each occurrence, independently alkyl, arylalkyl or heteroarylalkyl; wherein each R_{8a} and R_{8b} is independently substituted with 0, 1, 2, 3 or 4 substituents each independently alkyl, nitro, hydroxy, alkoxy, amino, formyl, halo, haloalkyl, hydroxyalkyl, alkoxyalkyl aminoalkyl or formylalkyl;

R_a and R_b at each occurrence are independently hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heteroaryl or heterocycle; wherein each R_a and R_b, at each occurrence, is independently substituted with 0, 1, 2 or 3 substituents each independently alkyl, alkenyl, alkynyl, cyano,

formyl, nitro, halo, oxo, hydroxy, alkoxy, -NH_2 , -N(H)(alkyl) , -N(alkyl)_2 , -SH , -S(alkyl) , $\text{-SO}_2(\text{alkyl})$, -N(H)C(=O)alkyl , $\text{-N(alkyl)C(=O)alkyl}$, -N(H)C(=O)NH_2 , $\text{-N(H)C(=O)N(H)(alkyl)}$, $\text{-N(H)C(=O)N(alkyl)}_2$, -C(=O)OH , -C(=O)Oalkyl , -C(=O)NH_2 , -C(=O)N(H)(alkyl) , -C(=O)N(alkyl)_2 , cyanoalkyl, formylalkyl, nitroalkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, -alkylNH_2 , -alkylN(H)(alkyl) , -alkylN(alkyl)_2 , $\text{-alkylN(H)C(=O)NH}_2$, $\text{-alkylN(H)C(=O)N(H)(alkyl)}$, $\text{-alkylN(H)C(=O)N(alkyl)}_2$, -alkylC(=O)OH , -alkylC(=O)Oalkyl , -alkylC(=O)NH_2 , $\text{-alkylC(=O)N(H)(alkyl)}$, $\text{-alkylC(=O)N(alkyl)}_2$ or R_c ;

alternatively, R_a and R_b , together with the nitrogen atom they are attached, form a heterocycle ring substituted with 0, 1, 2 or 3 substituents each independently alkyl, alkenyl, alkynyl, cyano, formyl, nitro, halo, oxo, hydroxy, alkoxy, -NH_2 , -N(H)(alkyl) , -N(alkyl)_2 , -SH , -S(alkyl) , $\text{-SO}_2(\text{alkyl})$, -N(H)C(=O)alkyl , $\text{-N(alkyl)C(=O)alkyl}$, -N(H)C(=O)NH_2 , $\text{-N(H)C(=O)N(H)(alkyl)}$, $\text{-N(H)C(=O)N(alkyl)}_2$, -C(=O)OH , -C(=O)Oalkyl , -C(=O)NH_2 , -C(=O)N(H)(alkyl) , -C(=O)N(alkyl)_2 , cyanoalkyl, formylalkyl, nitroalkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, -alkylNH_2 , -alkylN(H)(alkyl) , -alkylN(alkyl)_2 , $\text{-alkylN(H)C(=O)NH}_2$, $\text{-alkylN(H)C(=O)N(H)(alkyl)}$, $\text{-alkylN(H)C(=O)N(alkyl)}_2$, -alkylC(=O)OH , -alkylC(=O)Oalkyl , -alkylC(=O)NH_2 , $\text{-alkylC(=O)N(H)(alkyl)}$, $\text{-alkylC(=O)N(alkyl)}_2$ or R_c ; and

R_c is aryl, heteroaryl or heterocycle; wherein each R_c is independently substituted with 0, 1, 2, 3 or 4 substituents each independently halo, nitro, oxo, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, -NH_2 , -N(H)(alkyl) , -N(alkyl)_2 , -SH , -S(alkyl) , $\text{-SO}_2(\text{alkyl})$, -N(H)C(=O)alkyl , $\text{-N(alkyl)C(=O)alkyl}$, -N(H)C(=O)NH_2 , $\text{-N(H)C(=O)N(H)(alkyl)}$, $\text{-N(H)C(=O)N(alkyl)}_2$, -C(=O)OH , -C(=O)Oalkyl , -C(=O)NH_2 , -C(=O)N(H)(alkyl) , -C(=O)N(alkyl)_2 , haloalkyl, hydroxyalkyl, alkoxyalkyl, -alkylNH_2 , $\text{-alkyl-N(H)(alkyl)}$, -alkyl-N(alkyl)_2 , $\text{-alkyl-N(H)C(=O)NH}_2$, $\text{-alkyl-N(H)C(=O)N(H)(alkyl)}$, $\text{-alkyl-N(H)C(=O)N(alkyl)}_2$, -alkyl-C(=O)OH , $\text{-alkyl-C(=O)Oalkyl}$, -alkyl-C(=O)NH_2 , $\text{-alkyl-C(=O)N(H)(alkyl)}$ or $\text{-alkyl-C(=O)N(alkyl)}_2$.

8. The compound of claim 7 wherein R_1 is OH and R_2 is H.

9. The compound of claim 7 wherein R_1 is OH, R_2 is H and R_3 is alkyl, cycloalkenylalkyl, cycloalkylalkyl, heterocyclealkyl, heteroarylalkyl, arylalkyl, hydroxyalkyl, alkoxyalkyl, -alkylSR_a , -alkylSOR_a , $\text{-alkylSO}_2\text{R}_a$ or $\text{-alkylNR}_a\text{R}_b$.

10. The compound of claim 7 wherein R₁ is OH, R₂ is H, R₃ is alkyl or cycloalkyl and R₄ is aryl or heteroaryl.

11. The compound of claim 7 wherein R₁ is OH, R₂ is H, R₃ is alkyl or cycloalkylalkyl and R₄ is phenyl substituted with 0, 1, 2, 3 or 4 substituents that are halo, -OR_{4a}, -NR_{4a}R_{4b} or -C(R_{4b})=NOR_{4a}; wherein R_{4a} and R_{4b} are independently hydrogen and alkyl.

12. The compound of claim 7 wherein R₁ is OH, R₂ is H, R₃ is alkyl or cycloalkylalkyl, R₄ is phenyl substituted with 0, 1, 2, 3 or 4 substituents that are halo, -OR_{4a}, -NR_{4a}R_{4b} or -C(R_{4b})=NOR_{4a}, and R₇ is alkyl; wherein R_{4a} and R_{4b} are independently hydrogen and alkyl.

13. The compound of claim 7 or a pharmaceutically acceptable salt form, stereoisomer, ester, salt of an ester, or combination thereof, that is

tert-butyl (1*S*)-1-[({(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}amino)carbonyl]-2,2-dimethylpropylcarbamate;

benzyl (1*S*)-3-amino-1-[({(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}amino)carbonyl]-3-oxopropylcarbamate;

methyl (1*S*)-1-[({(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}amino)carbonyl]-2,2-dimethylpropylcarbamate;

2-pyridinylmethyl (1*R*)-1-[({(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}amino)carbonyl]-2-methylpropylcarbamate;

2-pyridinylmethyl (1*S*)-1-[({(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}amino)carbonyl]-2-methylpropylcarbamate;

benzyl (1*S*)-1-[({(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}amino)carbonyl]-2-methylpropylcarbamate;

benzyl (1*S*,2*R*)-1-[({(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}amino)carbonyl]-2-hydroxypropylcarbamate;

tert-butyl (1*S*,2*S*)-1-[({(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}amino)carbonyl]-2-methylbutylcarbamate;

benzyl (1*S*,2*S*)-1-[(*{*(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(*{*4-[(*E*)-(hydroxyimino)methyl]phenyl} sulfonyl)(isobutyl)amino]propyl} amino)carbonyl]-2-methylbutylcarbamate;

tert-butyl (1*S*)-1-[(*{*(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(*{*4-[(*E*)-(hydroxyimino)methyl]phenyl} sulfonyl)(isobutyl)amino]propyl} amino)carbonyl]-3-(methylsulfonyl)propylcarbamate;

benzyl (1*R*)-1-[(aminosulfonyl)methyl]-2-[(*{*(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(*{*4-[(*E*)-(hydroxyimino)methyl]phenyl} sulfonyl)(isobutyl)amino]propyl} amino)-2-oxoethylcarbamate;

benzyl (1*S*)-1-[(*{*(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(*{*4-[(*E*)-(hydroxyimino)methyl]phenyl} sulfonyl)(isobutyl)amino]propyl} amino)carbonyl]-3-(methylsulfonyl)propylcarbamate;

benzyl (1*S*)-1-[(*{*(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(*{*4-[(*E*)-(hydroxyimino)methyl]phenyl} sulfonyl)(isobutyl)amino]propyl} amino)carbonyl]-3-methylbutylcarbamate;

benzyl (1*S*)-1-[(*{*(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(*{*4-[(*E*)-(hydroxyimino)methyl]phenyl} sulfonyl)(isobutyl)amino]propyl} amino)carbonyl]-2,2-dimethylpropylcarbamate;

benzyl (1*S*)-4-amino-1-[(*{*(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(*{*4-[(*E*)-(hydroxyimino)methyl]phenyl} sulfonyl)(isobutyl)amino]propyl} amino)carbonyl]butylcarbamate;

benzyl (1*S*)-2-[(*{*(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(*{*4-[(*E*)-(hydroxyimino)methyl]phenyl} sulfonyl)(isobutyl)amino]propyl} amino)-1-(1*H*-imidazol-4-ylmethyl)-2-oxoethylcarbamate;

benzyl (1*S*)-2-[(*{*(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(*{*4-[(*E*)-(hydroxyimino)methyl]phenyl} sulfonyl)(isobutyl)amino]propyl} amino)-1-(1*H*-indol-3-ylmethyl)-2-oxoethylcarbamate;

benzyl (1*S*,2*R*)-2-(2-amino-2-oxoethoxy)-1-[(*{*(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(*{*4-[(*E*)-(hydroxyimino)methyl]phenyl} sulfonyl)(isobutyl)amino]propyl} amino)carbonyl]propylcarbamate;

methyl (3*S*)-4-[(*{*(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(*{*4-[(*E*)-(hydroxyimino)methyl]phenyl} sulfonyl)(isobutyl)amino]propyl} amino)-3-[(benzyloxy)carbonyl]amino}-4-oxobutanoate;

2-pyridinylmethyl (1*S*,2*S*)-1-[(*{*(1*S*,2*R*)-1-benzyl-3-[(cyclopentylmethyl)(*{*4-[(*E*)-(hydroxyimino)methyl]phenyl} sulfonyl)amino]-2-hydroxypropyl} amino)carbonyl]-2-methylbutylcarbamate;

[6-(methoxymethyl)-2-pyridinyl]methyl (1*S*,2*S*)-1-[(*(1S,2R)*-1-benzyl-3-[(cyclopentylmethyl)(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino]-2-hydroxypropyl)amino)carbonyl]-2-methylbutylcarbamate;

[6-(methoxymethyl)-2-pyridinyl]methyl (1*S*)-1-[(*(1S,2R)*-1-benzyl-3-[(cyclopentylmethyl)(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino]-2-hydroxypropyl)amino)carbonyl]-2,2-dimethylpropylcarbamate;

(2*S*)-*N*-{(*(1S,2R)*-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino)propyl}-2-([(3-fluorobenzyl)amino]acetyl)amino)-3,3-dimethylbutanamide;

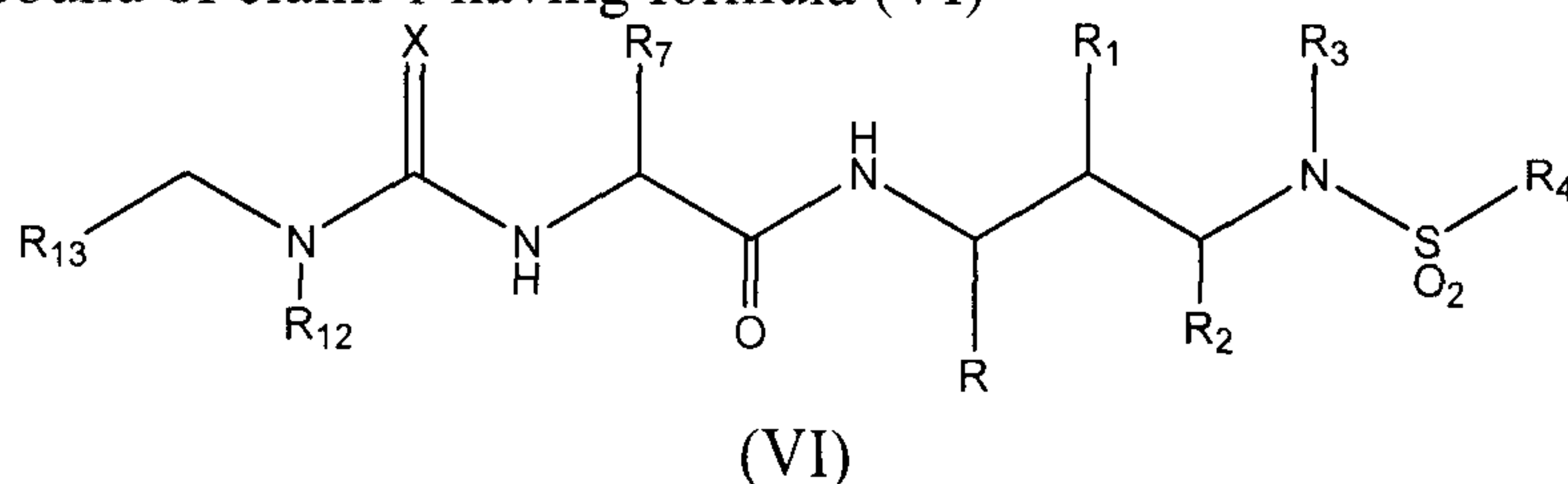
(2*R*)-*N*-{(*(1S,2R)*-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino)propyl}-2-([(3-fluorobenzyl)amino]acetyl)amino)-3,3-dimethylbutanamide;

(2*S*,3*S*)-*N*-{(*(1S,2R)*-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino)propyl}-2-([(3-fluorobenzyl)amino]acetyl)amino)-3-methylpentanamide;

(2*S*,3*S*)-*N*-{(*(1S,2R)*-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino)propyl}-3-methyl-2-([(5-nitro-3-thienyl)methyl]amino)acetyl)amino]pentanamide; or

benzyl (1*S*)-4-{[amino(imino)methyl]amino}-1-[(*(1S,2R)*-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino)propyl)amino)carbonyl]butylcarbamate.

14. The compound of claim 1 having formula (VI)



or a pharmaceutically acceptable salt form, stereoisomer, ester, salt of an ester, or combination thereof, wherein

X is O, S or NH;

R is alkyl, alkenyl, cycloalkyl, cycloalkenyl, cycloalkylalkyl, cycloalkenylalkyl, arylalkyl or heteroarylalkyl; wherein each R is substituted with 0, 1, or 2 substituents that are alkyl,

alkenyl, alkynyl, cyano, halo, formyl, nitro, hydroxy, alkoxy, $-\text{NH}_2$, $-\text{N}(\text{H})\text{alkyl}$, $-\text{N}(\text{alkyl})_2$, $-\text{C}(=\text{O})\text{OH}$, $-\text{C}(=\text{O})\text{Oalkyl}$, haloalkyl, hydroxyalkyl or alkoxyalkyl;

R_1 is H and R_2 is OR_a , $-\text{OSO}_2\text{R}_a$, $-\text{OSO}_3\text{R}_a$, $-\text{OPO}_3\text{R}_a$, $-\text{OC}(=\text{O})\text{C}(\text{H})(\text{R}_{1a})\text{NR}_a\text{R}_b$ or $-\text{OC}(=\text{O})\text{C}(\text{H})(\text{R}_{1a})\text{N}(\text{H})\text{C}(\text{O})\text{OR}_a$; or

R_1 is OR_a , $-\text{OSO}_2\text{R}_a$, $-\text{OSO}_3\text{R}_a$, $-\text{OPO}_3\text{R}_a$, $-\text{OC}(=\text{O})\text{C}(\text{H})(\text{R}_{1a})\text{NR}_a\text{R}_b$ or $-\text{OC}(=\text{O})\text{C}(\text{H})(\text{R}_{1a})\text{N}(\text{H})\text{C}(\text{O})\text{OR}_a$;

R_{1a} is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, aryl, arylalkyl, heteroaryl or heteroarylalkyl; wherein each R_{1a} is substituted with 0, 1 or 2 substituents each independently halo, alkyl, alkenyl, alkynyl, $-\text{OR}_a$, $-\text{SR}_a$, $-\text{SOR}_a$, $-\text{SO}_2\text{R}_a$, $-\text{SO}_2\text{NR}_a\text{R}_b$, $-\text{C}(=\text{O})\text{R}_a$, $-\text{NR}_a\text{R}_b$, $-\text{N}(\text{R}_b)\text{C}(=\text{O})\text{R}_a$, $-\text{N}(\text{R}_b)\text{C}(=\text{O})\text{OR}_a$, $-\text{N}(\text{R}_b)\text{SO}_2\text{R}_a$, $-\text{N}(\text{R}_a)\text{SO}_2\text{NR}_a\text{R}_b$, $-\text{N}(\text{R}_b)\text{C}(=\text{NH})\text{NR}_a\text{R}_b$, $-\text{N}(\text{R}_b)\text{C}(=\text{O})\text{NR}_a\text{R}_b$, $-\text{C}(=\text{O})\text{NR}_a\text{R}_b$ or $-\text{C}(=\text{O})\text{OR}_a$;

R_2 is H;

R_3 is alkyl, haloalkyl, alkenyl, haloalkenyl, alkynyl, haloalkynyl, cycloalkyl, cycloalkenyl, cycloalkenylalkyl, cycloalkylalkyl, heterocycle, heterocyclealkyl, heteroaryl, heteroarylalkyl, aryl, arylalkyl, hydroxyalkyl, alkoxyalkyl, haloalkoxyalkyl, $-\text{alkylSR}_a$, $-\text{alkylSOR}_a$, $-\text{alkylSO}_2\text{R}_a$, $-\text{alkylNR}_a\text{R}_b$, $-\text{alkylN}(\text{R}_b)\text{C}(=\text{O})\text{OR}_a$, $-\text{alkylN}(\text{R}_b)\text{C}(=\text{O})\text{R}_a$, $-\text{alkylN}(\text{R}_b)\text{SO}_2\text{R}_a$ or $-\text{alkylN}(\text{R}_b)\text{SO}_2\text{NR}_a\text{R}_b$; wherein each of the cycloalkyl, cycloalkenyl, aryl, heteroaryl, heterocycle, cycloalkyl moiety of the cycloalkylalkyl, cycloalkenyl moiety of the cycloalkenylalkyl, heterocycle moiety of the heterocyclealkyl, heteroaryl moiety of the heteroarylalkyl, aryl moiety of the arylalkyl is independently substituted with 0, 1, 2 or 3 substituents each independently halo, nitro, cyano, formyl, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, $-\text{SH}$, $-\text{S}(\text{alkyl})$, $-\text{SO}_2(\text{alkyl})$, $-\text{NH}_2$, $-\text{N}(\text{H})(\text{alkyl})$, $-\text{N}(\text{alkyl})_2$, $-\text{N}(\text{H})\text{C}(=\text{O})\text{alkyl}$, $-\text{N}(\text{alkyl})\text{C}(=\text{O})\text{alkyl}$, $-\text{C}(=\text{O})\text{OH}$, $-\text{C}(=\text{O})\text{O}(\text{alkyl})$, $-\text{C}(=\text{O})\text{NH}_2$, $-\text{C}(=\text{O})\text{N}(\text{H})(\text{alkyl})$, $-\text{C}(=\text{O})\text{N}(\text{alkyl})_2$, $-\text{C}(=\text{O})\text{alkyl}$, haloalkyl, hydroxyalkyl, alkoxyalkyl, cyanoalkyl, formylalkyl, nitroalkyl, $-\text{alkylSH}$, $-\text{alkylS}(\text{alkyl})$, $-\text{alkylSO}_2(\text{alkyl})$, $-\text{alkylNH}_2$, $-\text{alkylN}(\text{H})(\text{alkyl})$, $-\text{alkylN}(\text{alkyl})_2$, $-\text{alkylN}(\text{H})\text{C}(=\text{O})\text{alkyl}$, $-\text{alkylN}(\text{alkyl})\text{C}(=\text{O})\text{alkyl}$, $-\text{alkylC}(=\text{O})\text{OH}$, $-\text{alkylC}(=\text{O})\text{O}(\text{alkyl})$, $-\text{alkylC}(=\text{O})\text{NH}_2$, $-\text{alkylC}(=\text{O})\text{N}(\text{H})(\text{alkyl})$, $-\text{alkylC}(=\text{O})\text{N}(\text{alkyl})_2$, $-\text{alkylC}(=\text{O})\text{alkyl}$ or R_{3a} ;

R_{3a} is cycloalkyl, cycloalkenyl, aryl, heteroaryl or heterocycle, wherein each R_{3a} is independently substituted with 0, 1, 2 or 3 substituents each independently halo, nitro, cyano, formyl, alkyl, alkenyl, alkynyl, hydroxyl, alkoxy, $-\text{SH}$, $-\text{S}(\text{alkyl})$, $-\text{SO}_2(\text{alkyl})$, $-\text{NH}_2$,

-N(H)(alkyl), -N(alkyl)₂, -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -C(=O)OH, -C(=O)O(alkyl), -C(=O)NH₂, -C(=O)N(H)(alkyl), -C(O)N(alkyl)₂, -C(=O)alkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, cyanoalkyl, formylalkyl, nitroalkyl, -alkylSH, -alkylS(alkyl), -alkylSO₂(alkyl), -alkylNH₂, -alkylN(H)(alkyl), -alkylN(alkyl)₂, -alkylN(H)C(=O)alkyl, -alkylN(alkyl)C(=O)alkyl, -alkylC(=O)OH, -alkylC(=O)O(alkyl), -alkylC(=O)NH₂, -alkylC(=O)N(H)(alkyl), -alkylC(=O)N(alkyl)₂ or -alkylC(=O)alkyl;

R₄ is cycloalkyl, cycloalkenyl, heterocycle, aryl or heteroaryl wherein each R₄ is substituted with 0, 1, 2, 3 or 4 substituents each independently halo, alkyl, oxo, alkenyl, alkynyl, nitro, cyano, haloalkyl, cyanoalkyl, hydroxyalkyl, alkoxyalkyl, nitroalkyl, -OR_{4a}, -SR_{4a}, -SOR_{4a}, -SO₂R_{4a}, -NR_{4a}R_{4b}, -OC(=O)R_{4a}, -C(=O)R_{4a}, -C(=O)OR_{4a}, -C(=O)NR_{4a}R_{4b}, -N(R_{4b})C(=O)R_{4a}, -N(R_{4b})C(=O)OR_{4a}, -N(R_{4b})SO₂R_{4a}, -N(R_{4b})C(=O)NR_{4a}R_{4b}, -N(R_{4b})SO₂NR_{4a}R_{4b}, -alkylSR_{4a}, -alkylSOR_{4a}, -alkylSO₂R_{4a}, -alkylNR_{4a}R_{4b}, -alkylOC(=O)R_{4a}, -alkylC(=O)R_{4a}, -alkylC(=O)OR_{4a}, -alkylC(=O)NR_{4a}R_{4b}, -alkylN(R_{4b})C(=O)R_{4a}, -alkylN(R_{4b})C(=O)OR_{4a}, -alkylN(R_{4b})SO₂R_{4a}, -alkylN(R_{4b})C(=O)NR_{4a}R_{4b}, -alkylN(R_{4b})SO₂NR_{4a}R_{4b}, -N(H)C(=O)alkylN(H)C(=O)OR_{4a}, -N(H)C(=O)alkylNR_{4a}R_{4b}, -C(R_{4b})=NOR_{4a}, -C(NR_{4a}R_{4b})=NOR_{4a} or -C(R_{4b})=NOC(=O)alkylNR_{4a}R_{4b};

R_{4a} and R_{4b}, at each occurrence, are independently hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, heterocycle, heterocyclealkyl, heteroaryl or heteroalkyl; wherein each R_{4a} and R_{4b}, at each occurrence, is independently substituted with 0, 1 or 2 substituents each independently alkyl, alkenyl, hydroxy, alkoxy, halo, nitro, cyano, formyl, oxo, -NH₂, -N(H)alkyl, -N(alkyl)₂, -C(=O)alkyl, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂, -C(=O)N(H)alkyl, -C(=O)N(alkyl)₂, haloalkyl, hydroxyalkyl, cyanoalkyl, nitroalkyl, formylalkyl or alkoxyalkyl;

R₇ is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, aryl or heteroaryl; wherein each R₇ is substituted with 0, 1 or 2 substituents each independently halo, -OR_a, -OalkylC(=O)NR_aR_b, -SR_a, -SOR_a, -SO₂R_a, -SO₂NR_aR_b, -C(=O)R_a, -NR_aR_b, -N(R_b)C(=O)R_a, -N(R_b)C(=O)OR_a, -N(R_b)SO₂R_a, -N(R_b)SO₂NR_aR_b, -N(R_b)C(=NH)NR_aR_b, -N(R_b)C(=O)NR_aR_b, -C(=O)NR_aR_b, -C(=O)OR_a or R_{7a};

R_{7a} is cycloalkyl, cycloalkenyl, heterocycle, aryl or heteroaryl; wherein each R_{7a} is substituted with 0, 1, 2, 3 or 4 substituents each independently cyano, halo, nitro, oxo, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, -NH₂, -N(H)(alkyl), -N(alkyl)₂, -SH, -S(alkyl), -SO₂(alkyl), -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -N(H)C(=O)NH₂,

-N(H)C(=O)N(H)(alkyl), -N(H)C(=O)N(alkyl)₂, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂,
 -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, haloalkyl, hydroxyalkyl, alkoxyalkyl, -alkylNH₂,
 -alkylN(H)(alkyl), -alkylN(alkyl)₂, -alkylN(H)C(=O)NH₂, -alkylN(H)C(=O)N(H)(alkyl),
 -alkylN(H)C(=O)N(alkyl)₂, -alkylC(=O)OH, -alkylC(=O)Oalkyl, -alkylC(=O)NH₂,
 -alkylC(=O)N(H)(alkyl) or -alkyl-C(=O)N(alkyl)₂;

R₁₂ is alkyl, alkenyl, cycloalkyl, cycloalkenyl, cycloalkylalkyl or cycloalkenylalkyl; wherein each R₁₂ is substituted with 0, 1 or 2 substituents each independently hydroxy, alkoxy cyano, nitro or halo;

R₁₃ is alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, aryl, heteroaryl or heterocycle; wherein each R₁₃ is substituted with 0, 1, 2 or 3 substituents each independently alkyl, alkenyl, alkynyl, cyano, halo, nitro, oxo, -OR_a, -OC(=O)R_a, -SR_a, -SOR_a, -SO₂R_a, -SO₂NR_a, -SO₂OR_a, -NR_aR_b, -N(R_b)NR_aR_b, -N(R_b)C(=O)R_a, -N(R_b)SO₂R_a, -N(R_b)C(=O)OR_a, -N(R_b)C(=O)NR_aR_b, -N(R_b)SO₂NR_aR_b, -C(=O)R_a, -C(=O)NR_aR_b, -C(=O)OR_a, azidoalkyl, haloalkyl, nitroalkyl, cyanoalkyl, -alkylOR_a, -alkylOC(=O)R_a, -alkylSR_a, -alkylSOR_a, -alkylSO₂R_a, -alkylSO₂NR_a, -alkylSO₂OR_a, -alkylNR_aR_b, -C(H)=N(OR_a), -C(alkyl)=N(OR_a), -C(H)=NNR_aR_b, -C(alkyl)=NNR_aR_b, -C(H)=(NOR_a)NR_aR_b, -C(alkyl)=(NOR_a)NR_aR_b, -alkylN(R_b)NR_aR_b, -alkylN(R_b)C(=O)R_a, -alkylN(R_b)C(=O)OR_a, -alkylN(R_b)C(=O)NR_aR_b, -alkylN(R_b)SO₂NR_aR_b, -alkylN(R_b)SO₂R_a, -alkylC(=O)R_a, -alkylC(=O)OR_a, -alkylC(=O)NR_aR_b or R_{13a};

R_{13a} is cycloalkyl, cycloalkenyl, heterocycle, aryl or heteroaryl; wherein each R_{13a} is substituted with 0, 1, 2, 3 or 4 substituents each independently cyano, halo, nitro, oxo, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, -NH₂, -N(H)(alkyl), -N(alkyl)₂, -SH, -S(alkyl), -SO₂(alkyl), -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -N(H)C(=O)NH₂, -N(H)C(=O)N(H)(alkyl), -N(H)C(=O)N(alkyl)₂, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂, -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, cyanoalkyl, formylalkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, -alkylNH₂, -alkylN(H)(alkyl), -alkylN(alkyl)₂, -alkylN(H)C(=O)NH₂, -alkylN(H)C(=O)N(H)(alkyl), -alkylN(H)C(=O)N(alkyl)₂, -alkylC(=O)OH, -alkylC(=O)Oalkyl, -alkylC(=O)NH₂, -alkylC(=O)N(H)(alkyl) or -alkylC(=O)N(alkyl)₂;

R_a and R_b at each occurrence are independently hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heteroaryl or heterocycle; wherein each R_a and R_b, at each occurrence, is independently substituted with 0, 1, 2 or 3 substituents each independently alkyl, alkenyl, alkynyl, cyano, formyl, nitro, halo, oxo, hydroxy, alkoxy, -NH₂, -N(H)(alkyl), -N(alkyl)₂, -SH, -S(alkyl), -SO₂(alkyl), -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -N(H)C(=O)NH₂,

-N(H)C(=O)N(H)(alkyl), -N(H)C(=O)N(alkyl)₂, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂,
 -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, cyanoalkyl, formylalkyl, nitroalkyl, haloalkyl,
 hydroxyalkyl, alkoxyalkyl, -alkylNH₂, -alkylN(H)(alkyl), -alkylN(alkyl)₂,
 -alkylN(H)C(=O)NH₂, -alkylN(H)C(=O)N(H)(alkyl), -alkylN(H)C(=O)N(alkyl)₂,
 -alkylC(=O)OH, -alkylC(=O)Oalkyl, -alkylC(=O)NH₂, -alkylC(=O)N(H)(alkyl)
 -alkylC(=O)N(alkyl)₂ or R_c;

alternatively, R_a and R_b, together with the nitrogen atom they are attached, form a heterocycle ring substituted with 0, 1, 2 or 3 substituents each independently alkyl, alkenyl, alkynyl, cyano, formyl, nitro, halo, oxo, hydroxy, alkoxy, -NH₂, -N(H)(alkyl), -N(alkyl)₂, -SH, -S(alkyl), -SO₂(alkyl), -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -N(H)C(=O)NH₂, -N(H)C(=O)N(H)(alkyl), -N(H)C(=O)N(alkyl)₂, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂, -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, cyanoalkyl, formylalkyl, nitroalkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, -alkylNH₂, -alkylN(H)(alkyl), -alkylN(alkyl)₂, -alkylN(H)C(=O)NH₂, -alkylN(H)C(=O)N(H)(alkyl), -alkylN(H)C(=O)N(alkyl)₂, -alkylC(=O)OH, -alkylC(=O)Oalkyl, -alkylC(=O)NH₂, -alkylC(=O)N(H)(alkyl) -alkylC(=O)N(alkyl)₂ or R_c; and

R_c is aryl, heteroaryl or heterocycle; wherein each R_c is independently substituted with 0, 1, 2, 3 or 4 substituents each independently halo, nitro, oxo, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, -NH₂, -N(H)(alkyl), -N(alkyl)₂, -SH, -S(alkyl), -SO₂(alkyl), -N(H)C(=O)alkyl, -N(alkyl)C(=O)alkyl, -N(H)C(=O)NH₂, -N(H)C(=O)N(H)(alkyl), -N(H)C(=O)N(alkyl)₂, -C(=O)OH, -C(=O)Oalkyl, -C(=O)NH₂, -C(=O)N(H)(alkyl), -C(=O)N(alkyl)₂, haloalkyl, hydroxyalkyl, alkoxyalkyl, -alkylNH₂, -alkyl-N(H)(alkyl), -alkyl-N(alkyl)₂, -alkyl-N(H)C(=O)NH₂, -alkyl-N(H)C(=O)N(H)(alkyl), -alkyl-N(H)C(=O)N(alkyl)₂, -alkyl-C(=O)OH, -alkyl-C(=O)Oalkyl, -alkyl-C(=O)NH₂, -alkyl-C(=O)N(H)(alkyl) or -alkyl-C(=O)N(alkyl)₂.

15. The compound of claim 14 wherein R₁ is OH and R₂ is H.

16. The compound of claim 14 wherein R₁ is OH, R₂ is H, X is O and R₃ is alkyl, cycloalkenylalkyl, cycloalkylalkyl, heterocyclealkyl, heteroarylalkyl, arylalkyl, hydroxyalkyl, alkoxyalkyl, -alkylSR_a, -alkylSOR_a, -alkylSO₂R_a or -alkylNR_aR_b.

17. The compound of claim 14 wherein R₁ is OH, R₂ is H, X is O, R₃ is alkyl or cycloalkyl and R₄ is aryl or heteroaryl.

18. The compound of claim 14 wherein R₁ is OH, R₂ is H, X is O, R₃ is alkyl or cycloalkylalkyl and R₄ is phenyl.

19. The compound of claim 14 wherein R₁ is OH, R₂ is H, X is O, R₃ is alkyl or cycloalkylalkyl, R₄ is phenyl substituted with 0, 1, 2, 3 or 4 substituents that are halo, -OR_{4a}, -NR_{4a}R_{4b} and -C(R_{4b})=NOR_{4a}, or R₇ is alkyl; wherein R_{4a} and R_{4b} are independently hydrogen or alkyl.

20. The compound of claim 14 or a pharmaceutically acceptable salt form, stereoisomer, ester, salt of an ester, or combination thereof, that is

(2*S*,3*S*)-*N*-{(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}-3-methyl-2-({[methyl(2-pyridinylmethyl)amino]carbonyl}amino)pentanamide;

(2*S*)-*N*-{(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}-2-({[(2-isopropyl-1,3-thiazol-4-yl)methyl](methyl)amino]carbonyl}amino)-3-methylbutanamide;

(2*S*)-*N*-{(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}-3-methyl-2-({[methyl(2-pyridinylmethyl)amino]carbonyl}amino)butanamide;

(2*S*)-*N*-{(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}-3-methyl-2-({[methyl[(2-methyl-1,3-thiazol-4-yl)methyl]amino]carbonyl}amino)butanamide;

(2*S*)-*N*-{(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}-2-({[2-(methoxymethyl)-1,3-thiazol-4-yl]methyl}(methyl)amino]carbonyl}amino)-3-methylbutanamide;

(2*S*)-*N*-{(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl](isobutyl)amino]propyl}-2-({[ethyl[(2-isopropyl-1,3-thiazol-4-yl)methyl]amino]carbonyl}amino)propanamide;

(2*S*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclopentylmethyl)(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl]amino]-2-hydroxypropyl}-2-({[(2-isopropyl-1,3-thiazol-4-yl)methyl](methyl)amino]carbonyl}amino)-3-methylbutanamide;

(2*S*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclobutylmethyl)(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl]amino]-2-hydroxypropyl}-2-({[(2-isopropyl-1,3-thiazol-4-yl)methyl](methyl)amino]carbonyl}amino)-3-methylbutanamide;

(2*S*,3*S*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclopentylmethyl)(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl]amino]-2-hydroxypropyl}-3-methyl-2-({[methyl(2-pyridinylmethyl)amino]carbonyl}amino)pentanamide;

(2*S*,3*S*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclobutylmethyl)(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino]-2-hydroxypropyl}-3-methyl-2-([methyl(2-pyridinylmethyl)amino]carbonyl)amino)pentanamide;

(2*S*,3*R*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclobutylmethyl)(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino]-2-hydroxypropyl}-3-*tert*-butoxy-2-([2-(methoxymethyl)-1,3-thiazol-4-yl]methyl)(methyl)amino]carbonyl)amino)butanamide;

(2*S*,3*R*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclopentylmethyl)(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino]-2-hydroxypropyl}-3-*tert*-butoxy-2-([2-(methoxymethyl)-1,3-thiazol-4-yl]methyl)(methyl)amino]carbonyl)amino)butanamide;

(2*S*,3*S*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclobutylmethyl)(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino]-2-hydroxypropyl}-2-([2-(methoxymethyl)-1,3-thiazol-4-yl]methyl)(methyl)amino]carbonyl)amino)-3-methylpentanamide;

(2*S*,3*S*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclopentylmethyl)(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino]-2-hydroxypropyl}-2-([2-(methoxymethyl)-1,3-thiazol-4-yl]methyl)(methyl)amino]carbonyl)amino)-3-methylpentanamide;

(2*S*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclobutylmethyl)(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino]-2-hydroxypropyl}-3-methyl-2-([methyl(2-methyl-1,3-thiazol-4-yl)methyl]amino)carbonyl)amino]butanamide;

(2*S*,3*S*)-*N*-{(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl(isobutyl)amino]propyl}-3-methyl-2-([methyl(2-methyl-1,3-thiazol-4-yl)methyl]amino)carbonyl)amino]pentanamide;

(2*S*,3*S*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclobutylmethyl)(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino]-2-hydroxypropyl}-3-methyl-2-([methyl(2-methyl-1,3-thiazol-4-yl)methyl]amino)carbonyl)amino]pentanamide;

(2*S*,3*S*)-*N*-{(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl(isobutyl)amino]propyl}-3-*tert*-butoxy-2-([methyl(2-methyl-1,3-thiazol-4-yl)methyl]amino)carbonyl)amino]butanamide;

(2*S*,3*S*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclobutylmethyl)(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino]-2-hydroxypropyl}-3-*tert*-butoxy-2-([methyl(2-methyl-1,3-thiazol-4-yl)methyl]amino)carbonyl)amino]butanamide;

(2*S*,3*S*)-*N*-{(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[(4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl(isobutyl)amino]propyl}-3-methyl-2-([methyl(3-nitrobenzyl)amino]carbonyl)amino)pentanamide;

methyl 4-((5*S*,8*S*,9*R*)-8-benzyl-9-hydroxy-11-((4-((*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)-2,13-dimethyl-5-((1*S*)-1-methylpropyl)-3,6-dioxo-2,4,7,11-tetraazatetradec-1-yl)-1,3-thiazol-2-yl)carbamate;

(2*S*)-*N*-((1*S*,2*R*)-1-benzyl-3-((cyclobutylmethyl)((4-((*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino)-2-hydroxypropyl)-2-(((2-(methoxymethyl)-1,3-thiazol-4-yl)methyl)(methyl)amino)carbonyl)amino)-3-methylbutanamide;

(2*S*,3*S*)-2-(((2-(acetylamino)-1,3-thiazol-4-yl)methyl)(methyl)amino)carbonyl)amino)-*N*-((1*S*,2*R*)-1-benzyl-3-((cyclobutylmethyl)((4-((*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino)-2-hydroxypropyl)-3-methylpentanamide;

(2*S*,3*S*)-*N*-((1*S*,2*R*)-1-benzyl-2-hydroxy-3-(((4-((*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)(isobutyl)amino)propyl)-3-methyl-2-(((methyl(3-pyridinylmethyl)amino)carbonyl)amino)pentanamide;

(2*S*,3*S*)-*N*-((1*S*,2*R*)-1-benzyl-3-((cyclobutylmethyl)((4-((*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino)-2-hydroxypropyl)-3-methyl-2-(((methyl(4-pyridinylmethyl)amino)carbonyl)amino)pentanamide;

(2*S*,3*S*)-*N*-((1*S*,2*R*)-1-benzyl-2-hydroxy-3-(((4-((*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)(isobutyl)amino)propyl)-2-(((2-(methoxymethyl)-1,3-thiazol-4-yl)methyl)(methyl)amino)carbonyl)amino)-3-methylpentanamide;

(2*S*,3*S*)-*N*-((1*S*,2*R*)-1-benzyl-3-((cyclopentylmethyl)((4-((*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino)-2-hydroxypropyl)-2-(((6-(methoxymethyl)-2-pyridinyl)methyl)(methyl)amino)carbonyl)amino)-3-methylpentanamide;

(2*S*,3*S*)-*N*-((1*S*,2*R*)-1-benzyl-2-hydroxy-3-(((4-((*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)(isobutyl)amino)propyl)-2-(((2-isopropyl-1,3-thiazol-4-yl)methyl)(methyl)amino)carbonyl)amino)-3-methylpentanamide;

(2*S*,3*S*)-*N*-((1*S*,2*R*)-1-benzyl-3-((cyclopentylmethyl)((4-((*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino)-2-hydroxypropyl)-2-(((2-isopropyl-1,3-thiazol-4-yl)methyl)(methyl)amino)carbonyl)amino)-3-methylpentanamide;

(2*S*,3*S*)-2-(((6-((*Z*)-amino(hydroxyimino)methyl)-2-pyridinyl)methyl)(methyl)amino)carbonyl)amino)-*N*-((1*S*,2*R*)-1-benzyl-3-((cyclopentylmethyl)((4-((*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino)-2-hydroxypropyl)-3-methylpentanamide;

(2*S*)-*N*-((1*S*,2*R*)-1-benzyl-3-((cyclopentylmethyl)((4-((*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino)-2-hydroxypropyl)-2-(((6-

(methoxymethyl)-2-pyridinyl]methyl}(methyl)amino]carbonyl}amino)-3,3-dimethylbutanamide;

(2*S*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclopentylmethyl)({4-[(*E*)-(hydroxyimino)methyl]phenyl}sulfonyl)amino]-2-hydroxypropyl}-2-({[6-(*tert*-butoxymethyl)-2-pyridinyl]methyl}(methyl)amino]carbonyl}amino)-3,3-dimethylbutanamide;

(2*S*,3*R*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclobutylmethyl)({4-[(*E*)-(hydroxyimino)methyl]phenyl}sulfonyl)amino]-2-hydroxypropyl}-3-hydroxy-2-({[2-(methoxymethyl)-1,3-thiazol-4-yl]methyl}(methyl)amino]carbonyl}amino)butanamide;

(2*S*,3*R*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclopentylmethyl)({4-[(*E*)-(hydroxyimino)methyl]phenyl}sulfonyl)amino]-2-hydroxypropyl}-3-hydroxy-2-({[2-(methoxymethyl)-1,3-thiazol-4-yl]methyl}(methyl)amino]carbonyl}amino)butanamide;

(2*S*,3*S*)-2-({[(3-aminobenzyl)(methyl)amino]carbonyl}amino)-*N*-{(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[({4-[(*E*)-(hydroxyimino)methyl]phenyl}sulfonyl)(isobutyl)amino]propyl}-3-methylpentanamide;

(2*S*,3*R*)-*N*-{(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[({4-[(*E*)-(hydroxyimino)methyl]phenyl}sulfonyl)(isobutyl)amino]propyl}-3-hydroxy-2-[({methyl[(2-methyl-1,3-thiazol-4-yl)methyl]amino}carbonyl)amino]butanamide;

(2*S*,3*R*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclobutylmethyl)({4-[(*E*)-(hydroxyimino)methyl]phenyl}sulfonyl)amino]-2-hydroxypropyl}-3-hydroxy-2-[({methyl[(2-methyl-1,3-thiazol-4-yl)methyl]amino}carbonyl)amino]butanamide;

(2*S*,3*S*)-2-({[2-(aminomethyl)-1,3-thiazol-4-yl]methyl}(methyl)amino]carbonyl}amino)-*N*-{(1*S*,2*R*)-1-benzyl-2-hydroxy-3-[({4-[(*E*)-(hydroxyimino)methyl]phenyl}sulfonyl)(isobutyl)amino]propyl}-3-methylpentanamide;

(2*S*,3*S*)-2-({[2-(aminomethyl)-1,3-thiazol-4-yl]methyl}(methyl)amino]carbonyl}amino)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclobutylmethyl)({4-[(*E*)-(hydroxyimino)methyl]phenyl}sulfonyl)amino]-2-hydroxypropyl}-3-methylpentanamide;

(2*S*,3*S*)-2-({[2-(aminomethyl)-1,3-thiazol-4-yl]methyl}(methyl)amino]carbonyl}amino)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclopentylmethyl)({4-[(*E*)-(hydroxyimino)methyl]phenyl}sulfonyl)amino]-2-hydroxypropyl}-3-methylpentanamide;

(2*S*,3*S*)-2-({[(2-[(1*S*)-1-aminoethyl]-1,3-thiazol-4-yl]methyl)(methyl)amino]carbonyl}amino)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclopentylmethyl)({4-[(*E*)-(hydroxyimino)methyl]phenyl}sulfonyl)amino]-2-hydroxypropyl}-3-methylpentanamide;

(2*S*,3*S*)-2-({[(2-[(1*R*)-1-aminoethyl]-1,3-thiazol-4-yl)methyl](methyl)amino]carbonyl}amino)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclopentylmethyl)({4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino]-2-hydroxypropyl}-3-methylpentanamide;

(2*S*,3*S*)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclopentylmethyl)({4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino]-2-hydroxypropyl}-2-({[(6-[*N*-hydroxyethanimidoyl]-2-pyridinyl)methyl](methyl)amino]carbonyl}amino)-3-methylpentanamide; or

(2*S*,3*S*)-2-({[(2-[(1*S*)-1-(acetylamino)ethyl]-1,3-thiazol-4-yl)methyl](methyl)amino]carbonyl}amino)-*N*-{(1*S*,2*R*)-1-benzyl-3-[(cyclopentylmethyl)({4-[(*E*)-(hydroxyimino)methyl]phenyl)sulfonyl)amino]-2-hydroxypropyl}-3-methylpentanamide.

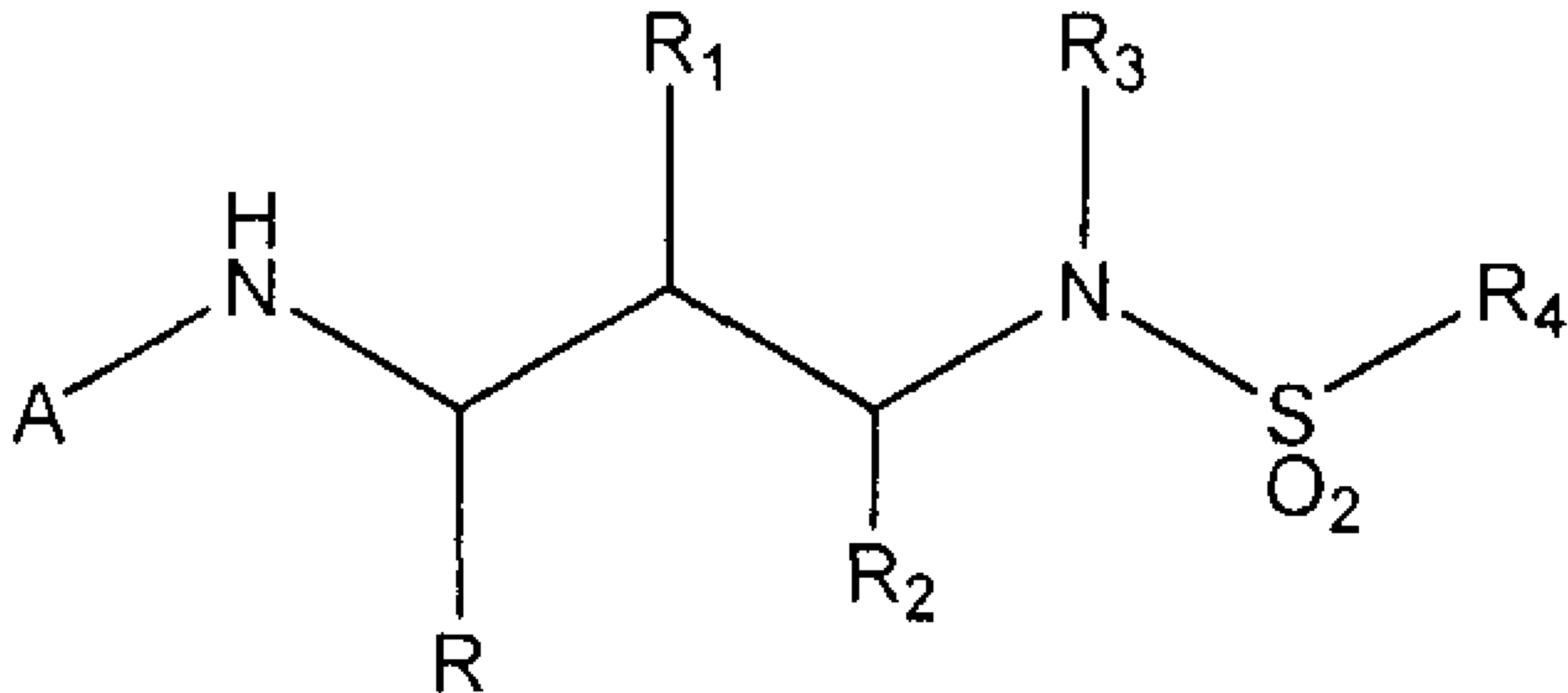
21. A pharmaceutical composition comprising a therapeutically effective amount of a compound or combination of compounds of claim 1, and a pharmaceutically acceptable carrier.

22. A pharmaceutical composition comprising a therapeutically effective amount of a compound or combination of compounds of claim 1, one, two, three, four, five or six agents a second HIV protease inhibitor, a HIV reverse transcriptase inhibitor, an HIV entry/fusion inhibitor, an HIV integrase inhibitor or an HIV budding/maturation inhibitor, or combination thereof, and a pharmaceutically acceptable carrier.

23. The pharmaceutical composition of claim 22 wherein the second HIV protease inhibitor is ritonavir, lopinavir, saquinavir, amprenavir, fosamprenavir, nelfinavir, tipranavir, indinavir, atazanavir, TMC-126, TMC-114, mozenavir (DMP-450), JE-2147 (AG1776), L-756423, RO0334649, KNI-272, DPC-681, DPC-684 or GW640385X.

24. The pharmaceutical composition of claim 22 wherein the HIV reverse transcriptase inhibitor is lamivudine, stavudine, zidovudine, abacavir, zalcitabine, didanosine, tenofovir, emtricitabine, amdoxovir, elvucitabine, alovudine, MIV-210, Racivir ($\pm$ -FTC), D-D4FC (Reverset, DPC-817), SPD754, nevirapine, delavirdine, efavirenz, capravirine, emivirine, calanolide A, GW5634, BMS-56190 (DPC-083), DPC-961, MIV-150, TMC-120 or TMC-125.

25. The pharmaceutical composition of claim 22 wherein the HIV entry/fusion inhibitor is enfuvirtide (T-20), T-1249, PRO 2000, PRO 542, PRO 140, AMD-3100, BMS-806, FP21399, GW873140, Schering C (SCH-C), Schering D (SCH-D), TNX-355 or UK-427857.
26. The pharmaceutical composition of claim 22 wherein the HIV integrase inhibitor is S-1360, zintevir (AR-177), L-870812 or L-870810.
27. The pharmaceutical composition of claim 22 wherein the HIV budding/maturation inhibitor is PA-457.
28. Use of a therapeutically effective amount of a compound or combination of compounds of claim 1 for inhibition of the replication of an HIV virus.
29. Use of a therapeutically effective amount of a compound or combination of compounds of claim 1 for treatment or prevention of HIV infection.
30. Use of a pharmaceutical composition of any one of claims 21 to 27 for treatment or prevention of HIV infection.
31. Use of a therapeutically effective amount of a compound or combination of compounds of claim 1 for inhibition of an HIV protease.



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