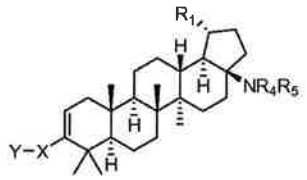
CLAIMS

What is claimed is:

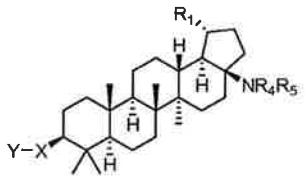
1. A compound, including pharmaceutically acceptable salts thereof, which is selected from the group consisting of:

a compound of formula I



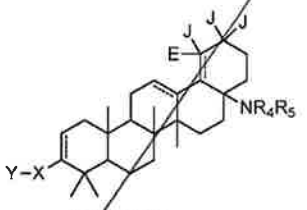
Formula I ;

a compound of formula II



Formula II ; and

a compound of formula III



Formula III ;

wherein R_1 is isopropenyl or isopropyl;

J and E are –H or $–CH_3$, and E is absent when the double bond is present;

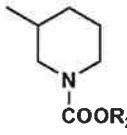
X is a phenyl or heteroaryl ring substituted with A, wherein A is at least one member selected from the group of -H, -halo, -hydroxyl, -C_{1-6} alkyl, -C_{1-6} alkoxy, and -$COOR_2$;

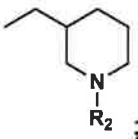
R_2 is -H, -C_{1-6} alkyl, -alkylsubstituted C_{1-6} alkyl or-arylsubstituted C_{1-6} alkyl;

Y is selected from the group of –$COOR_2$, -$C(O)NR_2SO_2R_3$, - $C(O)NHSO_2NR_2R_2$, -$NR_2SO_2R_2$, -$SO_2NR_2R_2$, -C_{3-6} cycloalkyl-$COOR_2$, -C_{2-6} alkenyl-$COOR_2$, -C_{2-6} alkynyl-$COOR_2$, -C_{1-6} alkyl-$COOR_2$, -$NHC(O)(CH_2)_n$-$COOR_2$, -$SO_2NR_2C(O)R_2$, -tetrazole, and –CONHOH,
wherein n=1-6;

R_3 is -C_{1-6} alkyl or -alkylsubstituted C_{1-6} alkyl;

R_4 is selected from the group of -H, -C_{1-6} alkyl, -C_{1-6} alkyl-$C(OR_3)_2$-C_{3-6} cycloalkyl, -C_{1-6} substituted alkyl, -C_{1-6} alkyl-C_{3-6} cycloalkyl, -C_{1-6} alkyl-Q_1, -C_{1-6} alkyl-C_{3-6} cycloalkyl-Q_1, aryl, heteroaryl, substituted heteroaryl, -COR_6, -$COCOR_6$, -SO_2R_7, -$SO_2NR_2R_2$,



, and


;

wherein Q_1 is selected from the group of heteroaryl, substituted heteroaryl, halogen, -CF_3, -OR_2, -$COOR_2$, -NR_8R_9, -$CONR_{10}R_{11}$ and -SO_2R_7;

R_5 is selected from the group of -H, -C_{1-6} alkyl, -C_{3-6} cycloalkyl, -C_{1-6} alkylsubstituted alkyl, -C_{1-6} alkyl-NR_8R_9, -COR_{10}, -COR_6, -$COCOR_6$, -SO_2R_7 and -$SO_2NR_2R_2$;

with the proviso that only one of R_4 or R_5 can be selected from the group of -COR_6, -$COCOR_6$,-SO_2R_7 and -$SO_2NR_2R_2$;
or R_4 and R_5 are taken together with the adjacent N to form



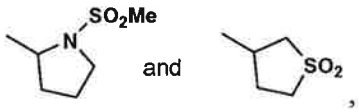
;

R_6 is selected from the group of -H, -C_{1-6} alkyl, -C_{1-6} alkyl-substitutedalkyl, -C_{3-6} cycloalkyl, -C_{3-6} substitutedcycloalkyl-Q_2, -C_{1-6} alkyl-Q_2, -C_{1-6} alkyl-substitutedalkyl-Q_2,-C_{3-6} cycloalkyl-Q_2, aryl-Q_2, -$NR_{13}R_{14}$, and -OR_{15};

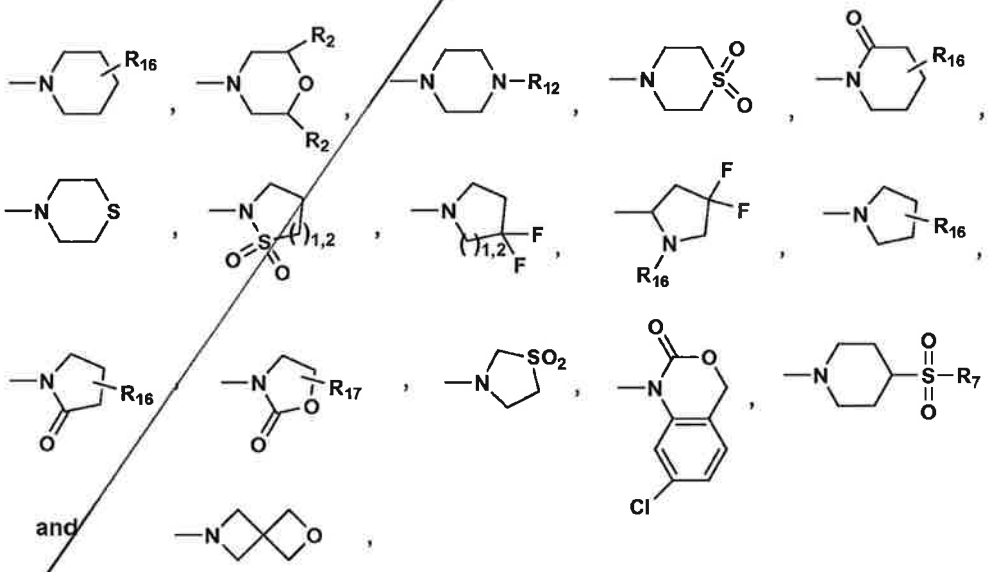
wherein Q_2 is selected from the group of aryl, heteroaryl, substituted heteroaryl, -OR_2, -$COOR_2$, -NR_8R_9, SO_2R_7, -$CONHSO_2R_3$, and -$CONHSO_2NR_2R_2$;

R_7 is selected from the group of -C_{1-6} alkyl, -C_{1-6} substituted alkyl, -C_{3-6} cycloalkyl, aryl, and heteroaryl;

R_8 and R_9 are independently selected from the group of -H, -C_{1-6} alkyl, -C_{1-6} substituted alkyl, aryl, heteroaryl, substituted aryl, substituted heteroaryl, -C_{1-6} alkyl-Q_2, and -$COOR_3$,
and R_8 and R_9 can also be independently selected from the group of

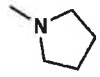


or R_8 and R_9 are taken together with the adjacent N to form a cycle selected from the group of:



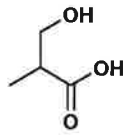
with the proviso that only one of R_8 or R_9 can be -$COOR_3$;

R_{10} and R_{11} are independently selected from the group of -H, -C_{1-6} alkyl, -C_{1-6} substituted alkyl and -C_{3-6} cycloalkyl,
or R_{10} and R_{11} are taken together with the adjacent N to form a cycle such as

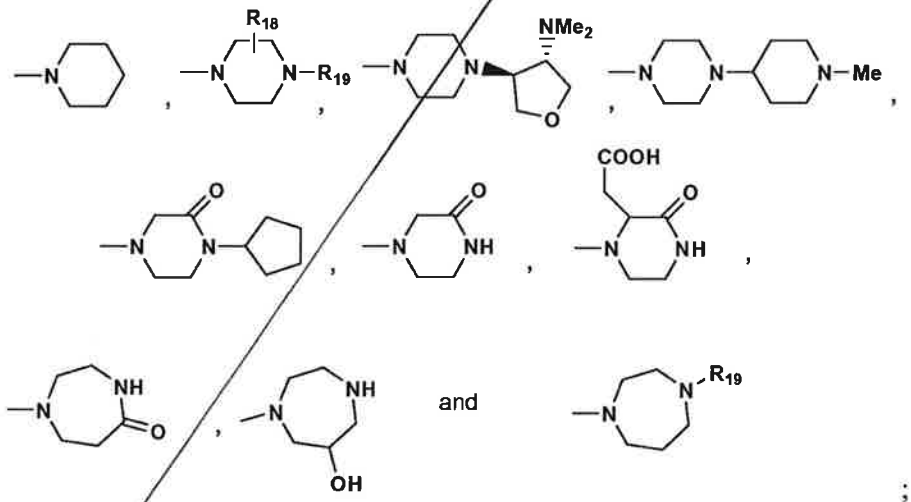

;

R_{12} is selected from the group of -C_{1-6} alkyl, -NR_2R_2, -C_{1-6} alkyl-OH, -C_{1-6} alkyl, -C_{1-6} substituted alkyl,-C_{3-6} cycloalkyl, -COR_7, -$COONR_{22}R_{23}$, -SOR_7, and -$SONR_{24}R_{25}$;

R_{13} and R_{14} are independently selected from the group of -H, -C_{1-6} alkyl, -C_{3-6} cycloalkyl, -C_{1-6} substituted alkyl, -C_{1-6} alkyl-Q_3, -C_{1-6} alkyl-C_{3-6} cycloalkyl-Q_3, C_{1-6} substituted alkyl-Q_3 and


,

or R_{13} and R_{14} are taken together with the adjacent N to form a cycle selected from the group of:



;

Q_3 is selected from the group of heteroaryl, substituted heteroaryl, -$NR_{20}R_{21}$, -$CONR_2R_2$, -$COOR_2$, -OR_2, and -SO_2R_3;

R_{15} is selected from the group of -C_{1-6} alkyl, -C_{3-6} cycloalkyl, -C_{1-6} substituted alkyl, -C_{1-6} alkyl-Q_3, -C_{1-6} alkyl-C_{3-6} cycloalkyl-Q_3 and -C_{1-6} substituted alkyl-Q_3;

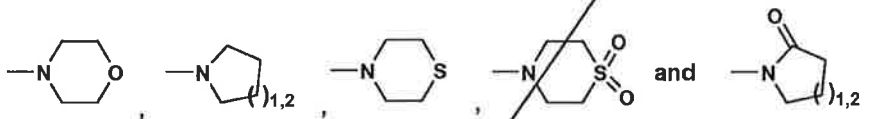
R_{16} is selected from the group of -H, -C_{1-6} alkyl, -NR_2R_2, and -$COOR_3$;

R_{17} is selected from the group of -H, -C_{1-6} alkyl, -$COOR_3$, and aryl;

R_{18} is selected from the group of -$COOR_2$ and -C_{1-6} alkyl-$COOR_2$;

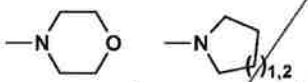
R_{19} is selected from the group of -H, -C_{1-6} alkyl, -C_{1-6} alkyl-Q_4, -COR_3, -$COOR_3$, wherein Q_4 is selected from the group of -NR_2R_2 and -OR_2;

R_{20} and R_{21} are independently selected from the group of -H, -C_{1-6} alkyl, -C_{1-6} substituted alkyl, -C_{1-6} substituted alkyl-OR_2, and -COR_3,
or R_{20} and R_{21} are taken together with the adjacent N to form a cycle selected from the group of



with the proviso that only one of R_{20} or R_{21} can be -COR_3;

R_{22} and R_{23} are independently selected from the group of H, -C_{1-6} alkyl, -C_{1-6} substituted alkyl, and -C_{1-6} cycloalkyl,
or R_{22} and R_{23} are taken together with the adjacent N to form a cycle selected from the group of



R_{24} and R_{25} are independently from the group of H, -C_{1-6} alkyl, -C_{1-6} substituted alkyl, -C_{1-6} alkyl-Q_5, -C_{1-6} cycloalkyl, aryl, substituted aryl, heteroaryl, and substituted heteroaryl,
and Q_5 is selected from the group of halogen and SO_2R_3.

2. The compound as claimed in claim 1, wherein said compound has the Formula I.

3. The compound as claimed in claim 1, wherein said compound has the Formula II.

4. The compound as claimed in claim 1, wherein said compound has the Formula III.

5. The compound as claimed in claim 2, wherein R_1 is isopropenyl.

6. The compound as claimed in claim 5, wherein X is phenyl.

7. The compound as claimed in claim 6, wherein Y is $-COOR_2$.

8. The compound as claimed in claim 7, wherein Y is –COOH.

9. The compound as claimed in claim 6, wherein A is –H.

10. The compound as claimed in claim 6, wherein R_4 is selected from the group of –H, $-C_{1-6}$ alkyl, $-C_{1-6}$ alkyl-Q_1, and $-COR_6$.

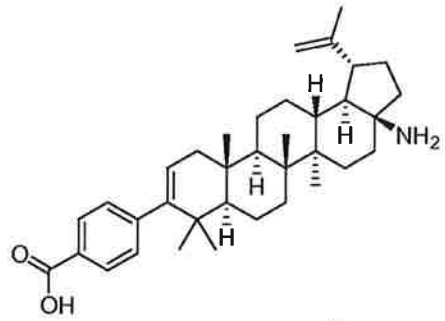
11. The compound as claimed in claim 10, wherein R_5 is –H.

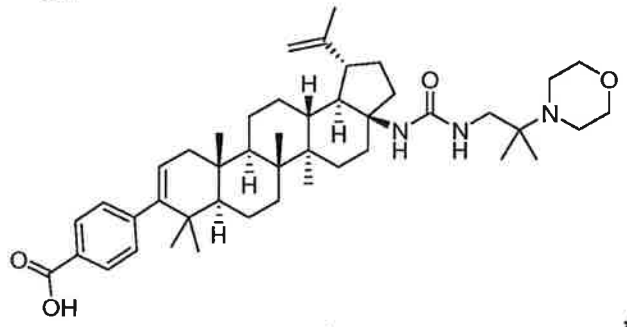
12. The compound as claimed in claim 10, wherein R_4 is $-C_{1-6}$ alkyl-Q_1.

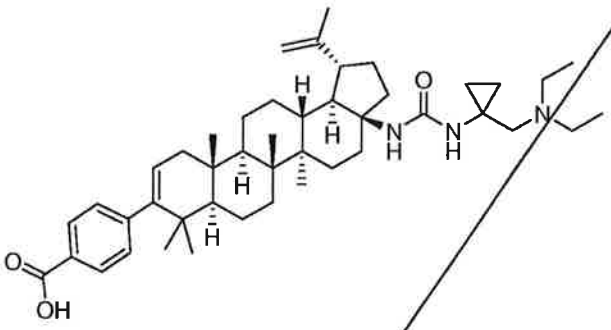
13. The compound as claimed in claim 12, wherein Q_1 is $-NR_8R_9$.

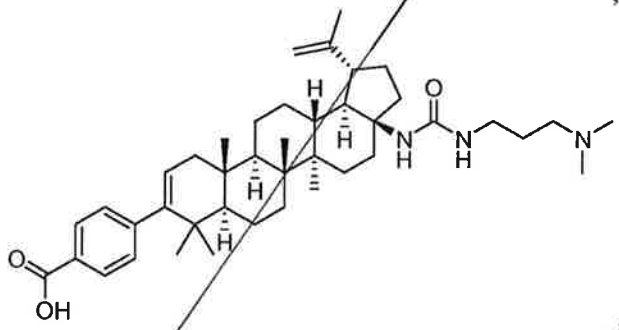
14. The compound as claimed in claim 10, wherein R_4 is $-COR_6$.

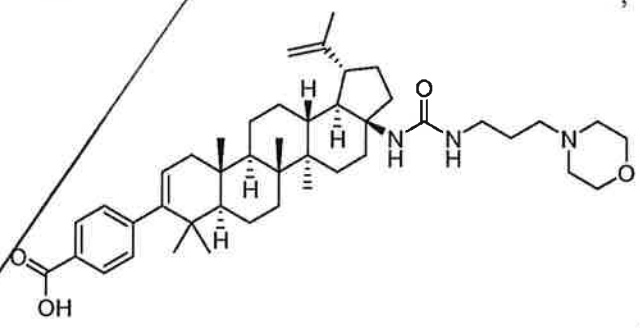
15. A compound, including pharmaceutically acceptable salts thereof, which is selected from the group consisting of:

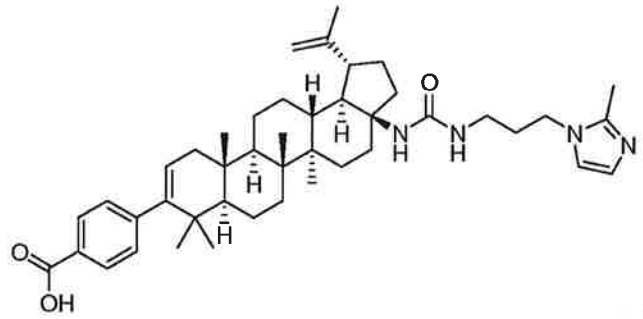




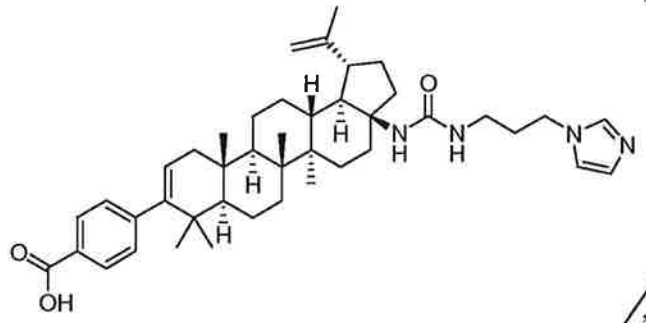




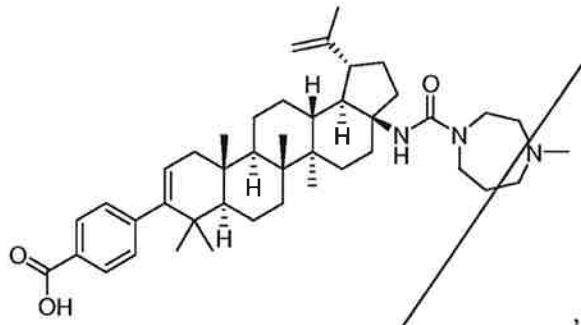




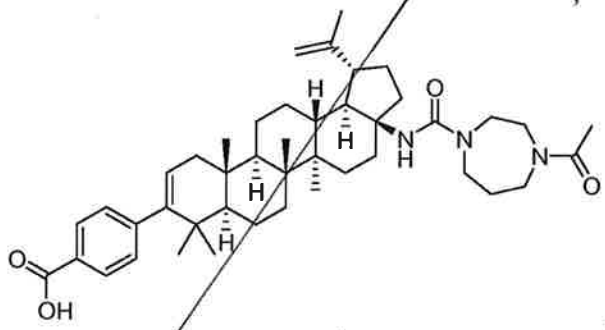
,



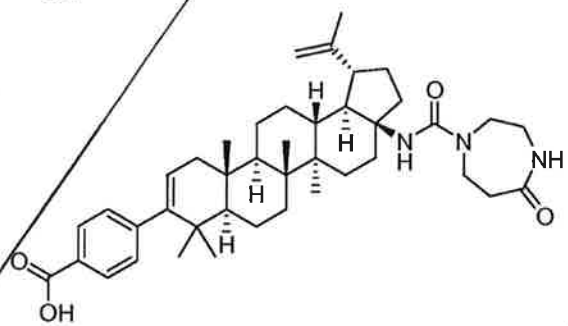
,



,

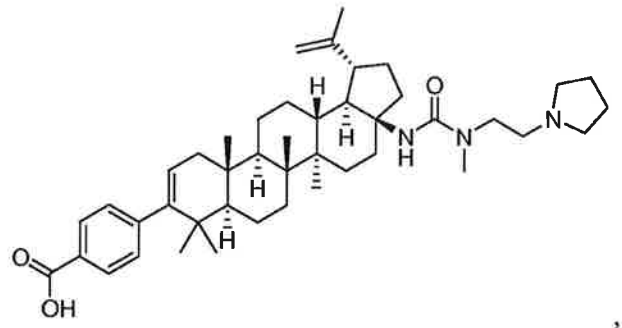


,

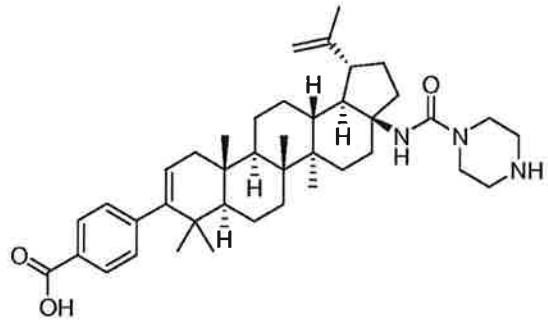


,

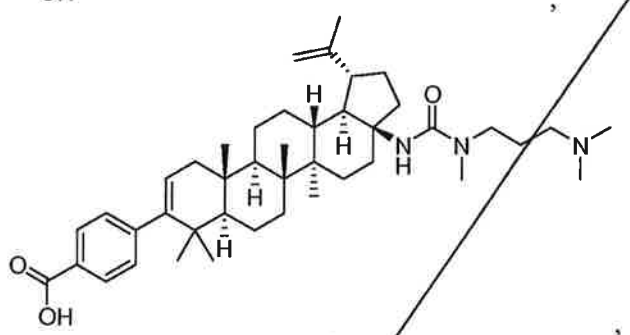
5



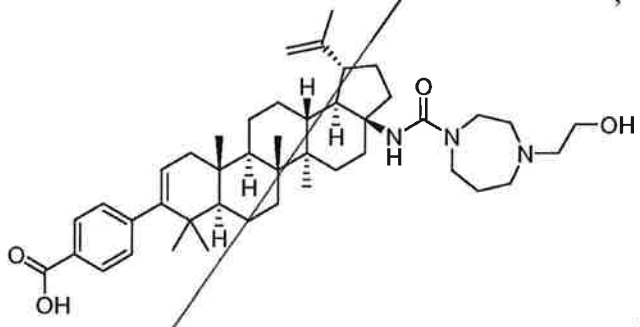
,



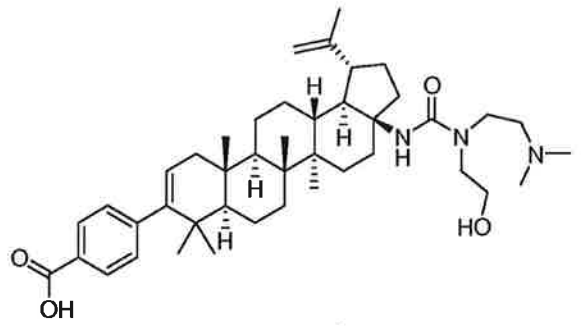
,

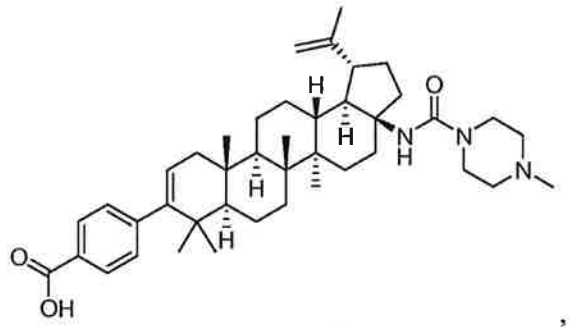


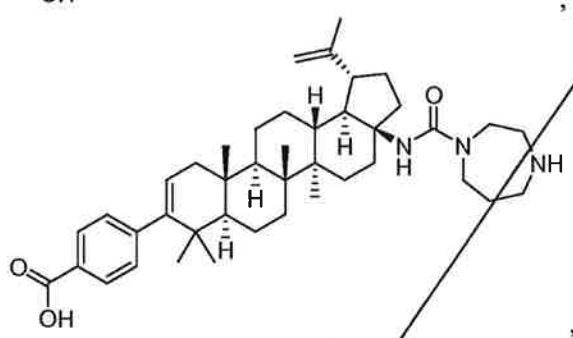
,

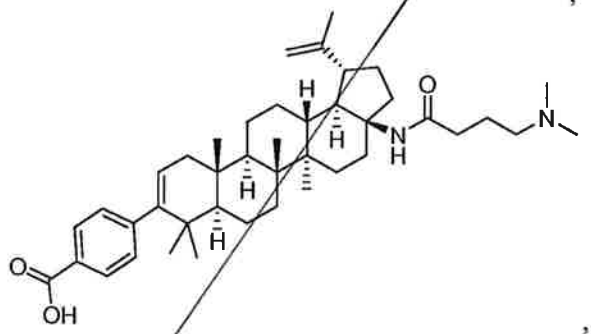


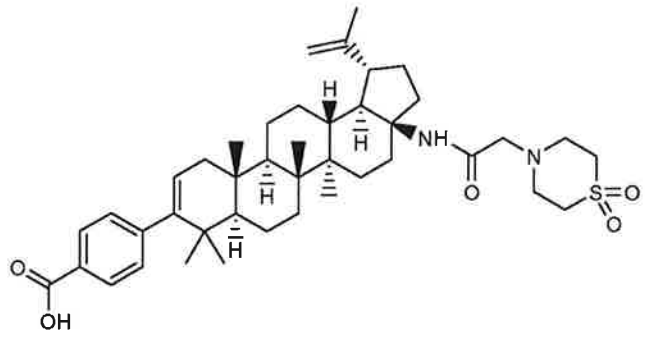
,

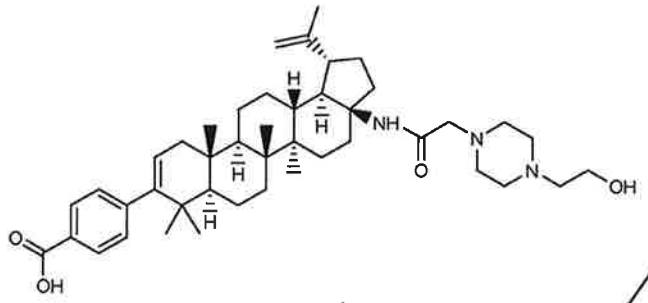


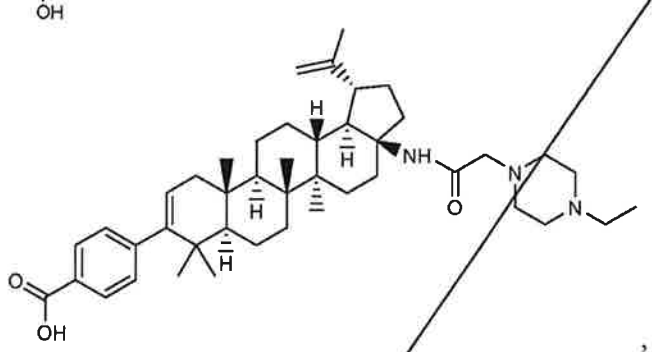






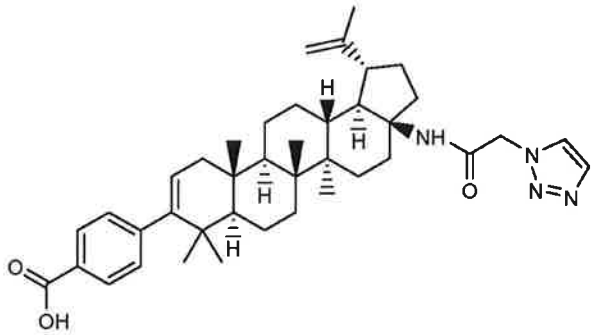


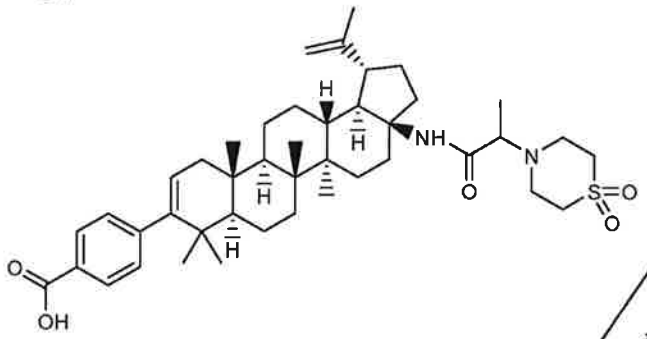


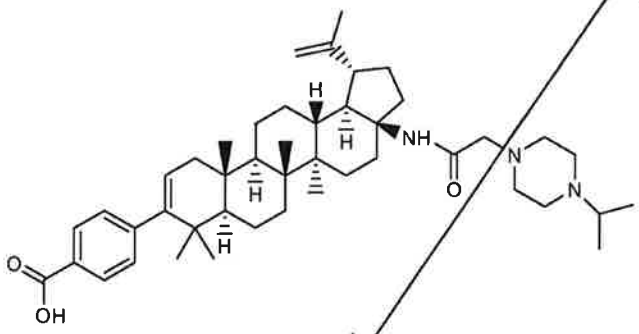


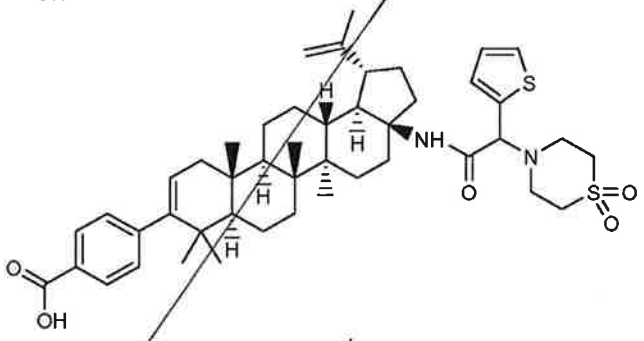
,

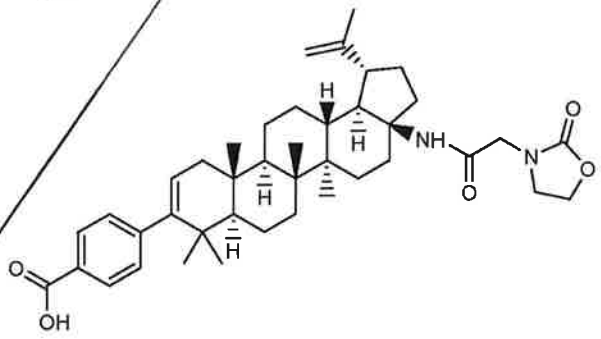
5



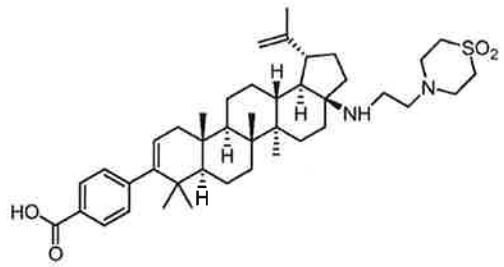


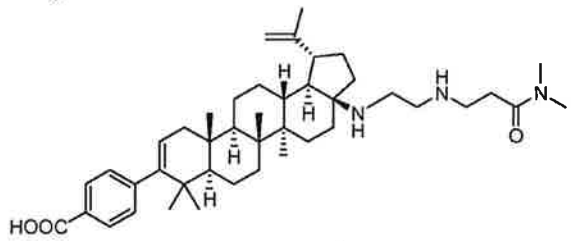


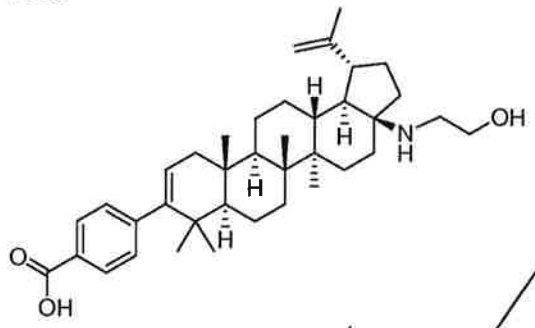


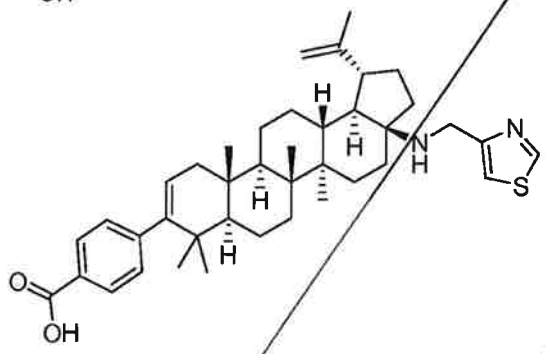


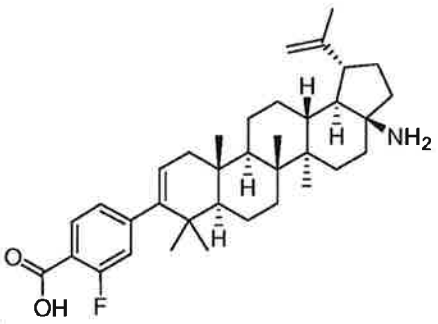
5



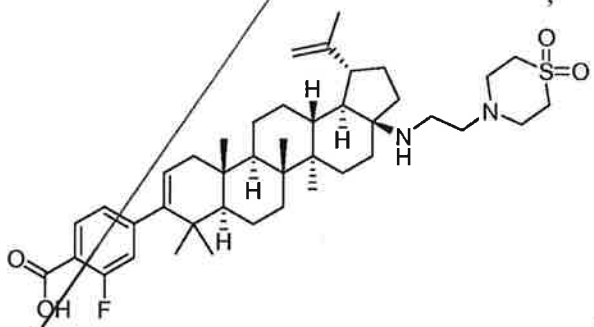




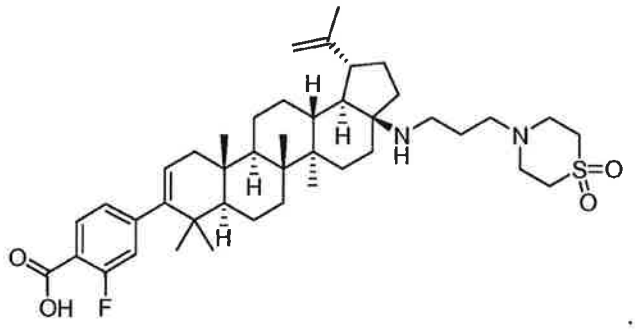




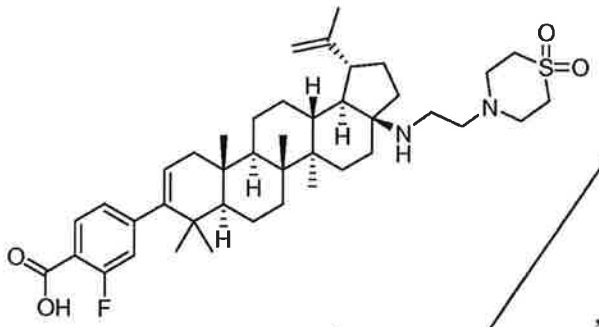
,

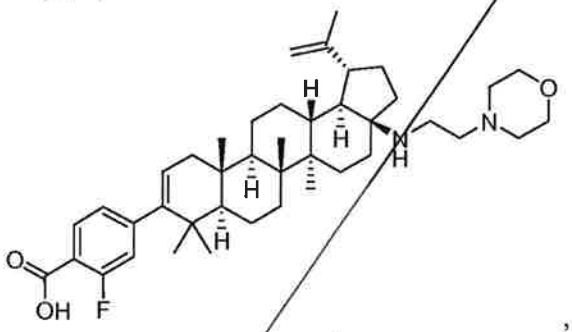


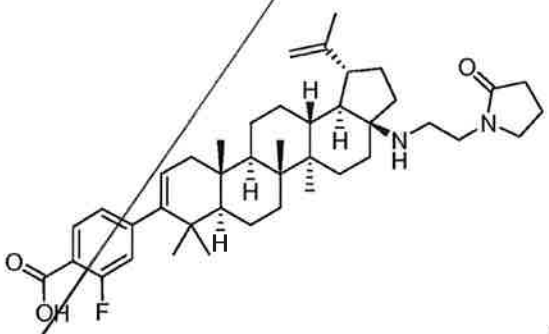
, and

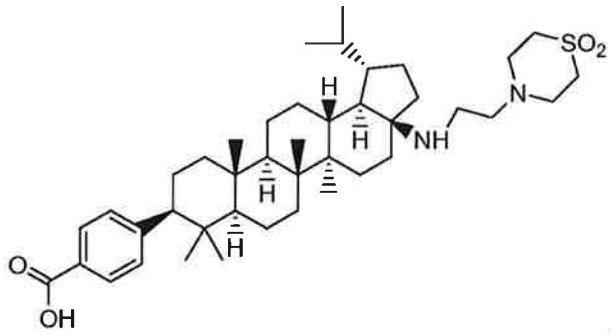


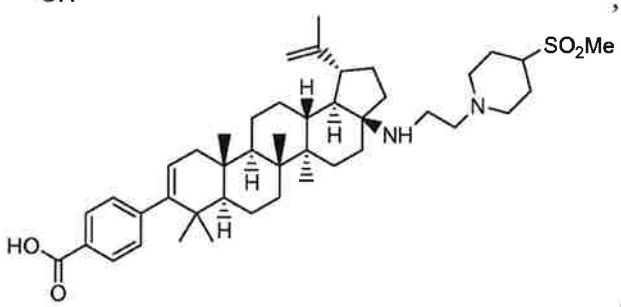
16. A compound, including pharmaceutically acceptable salts thereof, which is selected from the group consisting of:

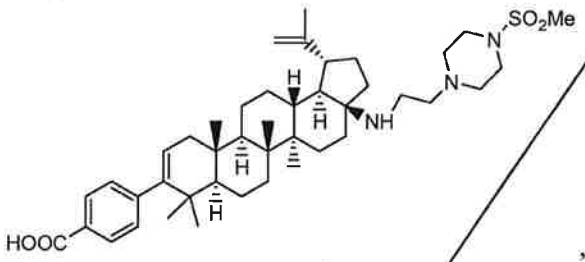


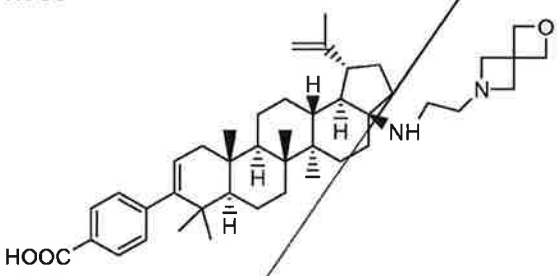


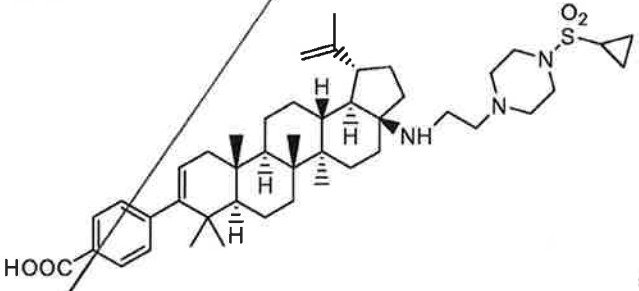


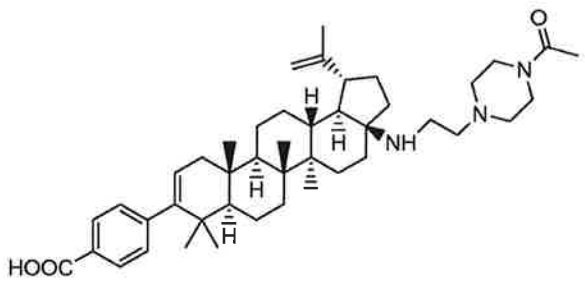




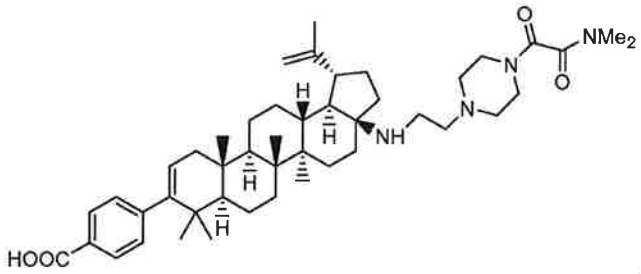








and

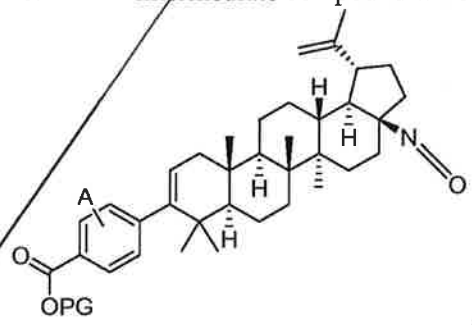


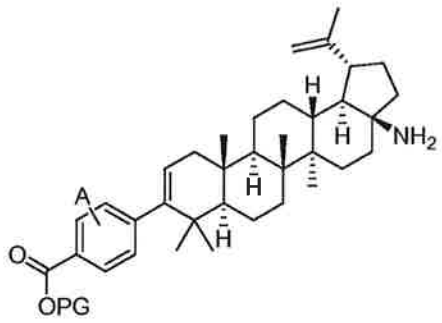
17. A pharmaceutical composition which comprises an antiviral effective amount of one or more of the compounds as claimed in claim 1, together with one or more pharmaceutically acceptable carriers, excipients or diluents.

18. The pharmaceutical composition of claim 17, useful for treating infection by HIV, which additionally comprises an antiviral effective amount of an AIDS treatment agent selected from the group consisting of: (a) an AIDS antiviral agent; (b) an anti-infective agent; (c) an immunomodulator; and (d) another HIV entry inhibitor.

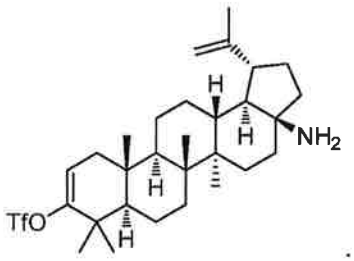
19. A method for treating a mammal infected with the HIV virus comprising administering to said mammal an antiviral effective amount of a compound as claimed in claim 1, and one or more pharmaceutically acceptable carriers, excipients or diluents.

20. An intermediate compound which is selected from the group of





, and



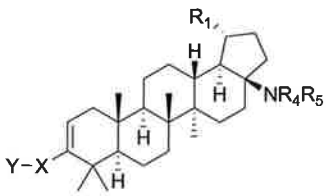
.

5

What is claimed is:

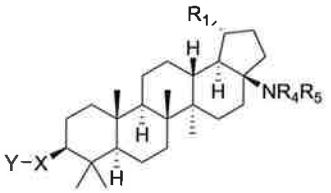
1. A compound-which is selected from the group consisting of:

a compound of formula I



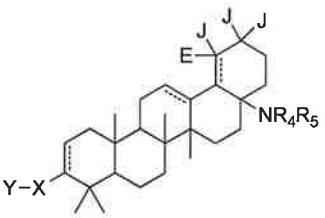
Formula I ;

a compound of formula II



Formula II ; and

a compound of formula III



Formula III ;

wherein R_1 is isopropenyl or isopropyl;

J and E are independently –H or $-CH_3$, and E is absent when the double bond is present;

X is a phenyl or heteroaryl ring substituted with A, wherein A is at least one member selected from the group of -H, -halo, -hydroxyl, -C_{1-6} alkyl, -C_{1-6} alkoxy, and -$COOR_2$;

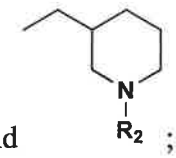
R_2 is -H, -C_{1-6} alkyl, -alkylsubstituted C_{1-6} alkyl or-arylsubstituted C_{1-6} alkyl;

Y is selected from the group of –$COOR_2$, -$C(O)NR_2SO_2R_3$, - $C(O)NHSO_2NR_2R_2$, -$NR_2SO_2R_2$, -$SO_2NR_2R_2$, -C_{3-6} cycloalkyl-$COOR_2$, -C_{2-6} alkenyl-$COOR_2$, -C_{2-6} alkynyl-$COOR_2$, -C_{1-6} alkyl-$COOR_2$, -$NHC(O)(CH_2)_n$-$COOR_2$, -$SO_2NR_2C(O)R_2$, -tetrazole, and –CONHOH,
wherein n=1-6;

R_3 is -C_{1-6} alkyl or -alkylsubstituted C_{1-6} alkyl;

R_4 is selected from the group of -H, -C_{1-6} alkyl, -C_{1-6} alkyl-$C(OR_3)_2$-C_{3-6} cycloalkyl, -C_{1-6} substituted alkyl, -C_{1-6} alkyl-C_{3-6} cycloalkyl, -C_{1-6} alkyl-Q_1, -C_{1-6} alkyl-C_{3-6} cycloalkyl-Q_1, aryl, heteroaryl, substituted heteroaryl, -COR_6, -$COCOR_6$, -SO_2R_7, -$SO_2NR_2R_2$,



, and


;

wherein Q_1 is selected from the group of heteroaryl, substituted heteroaryl, halogen, -CF_3, -OR_2, -$COOR_2$, -NR_8R_9, -$CONR_{10}R_{11}$ and -SO_2R_7;

R_5 is selected from the group of -H, -C_{1-6} alkyl, -C_{3-6} cycloalkyl, -C_{1-6} alkylsubstituted alkyl, -C_{1-6} alkyl-NR_8R_9, -COR_{10}, -COR_6, -$COCOR_6$, -SO_2R_7 and -$SO_2NR_2R_2$;

with the proviso that only one of R_4 or R_5 can be selected from the group of -COR_6, -$COCOR_6$, -SO_2R_7 and -$SO_2NR_2R_2$;
or R_4 and R_5 are taken together with the adjacent N to form



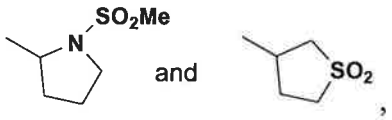
;

R_6 is selected from the group of -H, -C_{1-6} alkyl, -C_{1-6} alkyl-substitutedalkyl, -C_{3-6} cycloalkyl, -C_{3-6} substitutedcycloalkyl-Q_2, -C_{1-6} alkyl-Q_2, -C_{1-6} alkyl-substitutedalkyl-Q_2,-C_{3-6} cycloalkyl-Q_2, aryl-Q_2, -$NR_{13}R_{14}$, and -OR_{15};

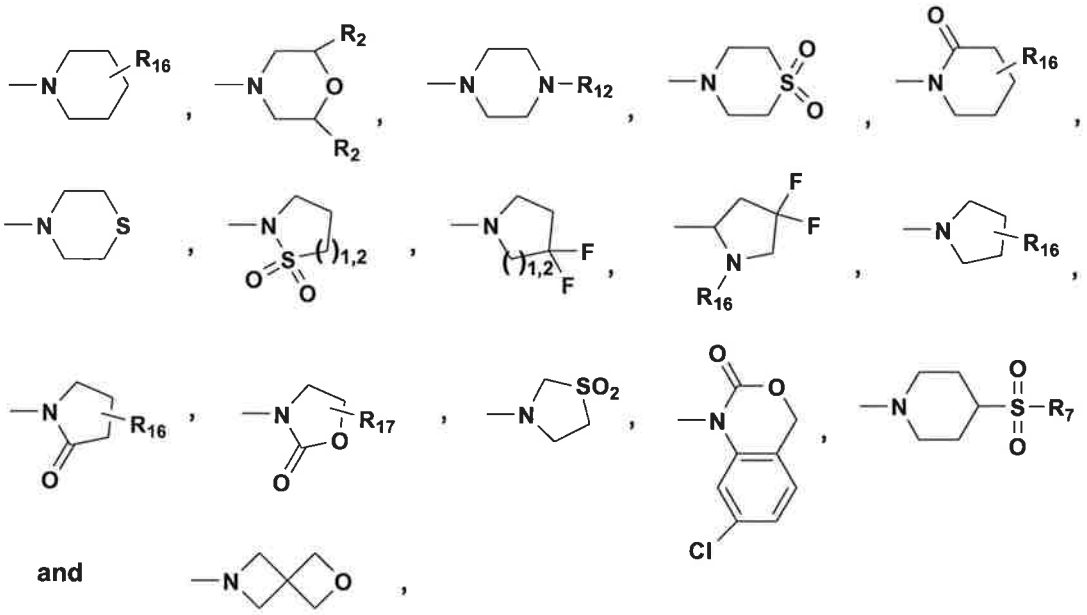
wherein Q_2 is selected from the group of aryl, heteroaryl, substituted heteroaryl, -OR_2, -$COOR_2$, -NR_8R_9, SO_2R_7, -$CONHSO_2R_3$, and -$CONHSO_2NR_2R_2$;

R_7 is selected from the group of -C_{1-6} alkyl, -C_{1-6} substituted alkyl, -C_{3-6} cycloalkyl, aryl, and heteroaryl;

R_8 and R_9 are independently selected from the group of -H, -C_{1-6} alkyl, -C_{1-6} substituted alkyl, aryl, heteroaryl, substituted aryl, substituted heteroaryl, -C_{1-6} alkyl-Q_2, and -$COOR_3$,
or R_8 and R_9 are independently selected from the group of



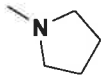
or R_8 and R_9 are taken together with the adjacent N to form a cycle selected from the group of:



with the proviso that only one of R_8 or R_9 is -$COOR_3$;

R_{10} and R_{11} are independently selected from the group of -H, -C_{1-6} alkyl, -C_{1-6} substituted alkyl and -C_{3-6} cycloalkyl,

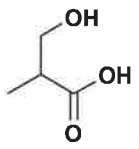
or R_{10} and R_{11} are taken together with the adjacent N to form the ~~a~~ cycle ~~such as~~



;

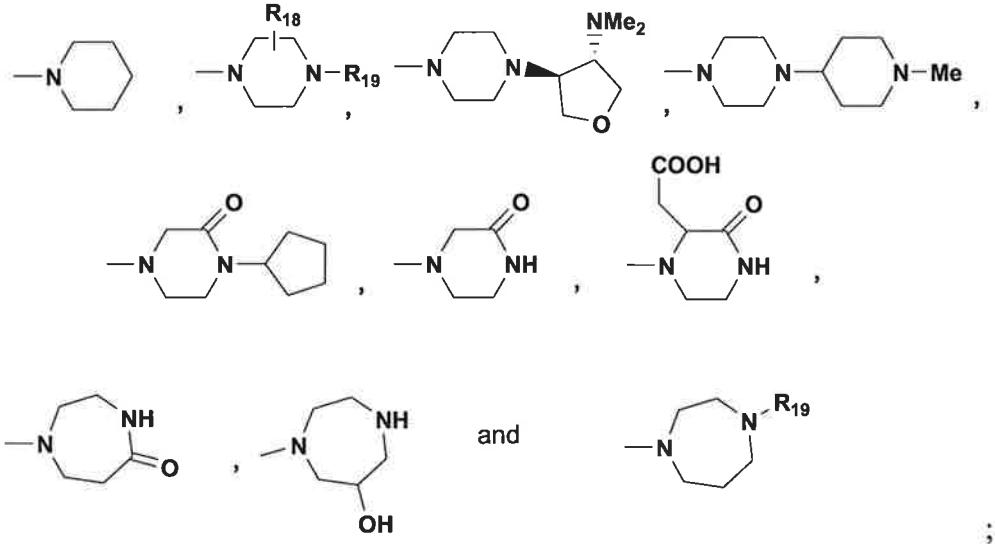
R_{12} is selected from the group of -C_{1-6} alkyl, -NR_2R_2, -C_{1-6} alkyl-OH, -C_{1-6} alkyl, -C_{1-6} substituted alkyl,-C_{3-6} cycloalkyl, -COR_7, -$COONR_{22}R_{23}$, -SOR_7, and -$SONR_{24}R_{25}$;

R_{13} and R_{14} are independently selected from the group of -H, -C_{1-6} alkyl, -C_{3-6} cycloalkyl, -C_{1-6} substituted alkyl, -C_{1-6} alkyl-Q_3, -C_{1-6} alkyl-C_{3-6} cycloalkyl-Q_3, C_{1-6} substituted alkyl-Q_3 and



,

or R_{13} and R_{14} are taken together with the adjacent N to form a cycle selected from the group of:



;

Q_3 is selected from the group of heteroaryl, substituted heteroaryl, -$NR_{20}R_{21}$, -$CONR_2R_2$, -$COOR_2$, -OR_2, and -SO_2R_3;

R_{15} is selected from the group of -C_{1-6} alkyl, -C_{3-6} cycloalkyl, -C_{1-6} substituted alkyl, -C_{1-6} alkyl-Q_3, -C_{1-6} alkyl-C_{3-6} cycloalkyl-Q_3 and -C_{1-6} substituted alkyl-Q_3;

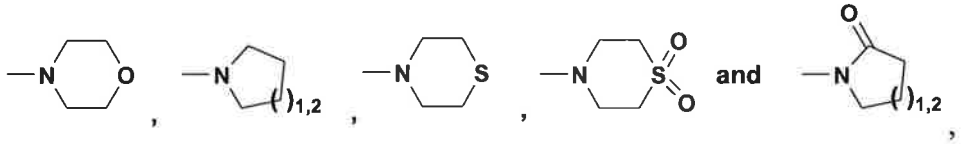
R_{16} is selected from the group of -H, -C_{1-6} alkyl, -NR_2R_2, and -$COOR_3$;

R_{17} is selected from the group of -H, -C_{1-6} alkyl, -$COOR_3$, and aryl;

R_{18} is selected from the group of -$COOR_2$ and -C_{1-6} alkyl-$COOR_2$;

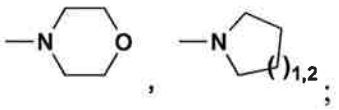
R_{19} is selected from the group of -H, -C_{1-6} alkyl, -C_{1-6} alkyl-Q_4, -COR_3, -$COOR_3$,
wherein Q_4 is selected from the group of -NR_2R_2 and -OR_2;

R_{20} and R_{21} are independently selected from the group of -H, -C_{1-6} alkyl, -C_{1-6} substituted alkyl, -C_{1-6} substituted alkyl-OR_2, and -COR_3,
or R_{20} and R_{21} are taken together with the adjacent N to form a cycle selected from the group of



with the proviso that only one of R_{20} or R_{21} is -COR_3;

R_{22} and R_{23} are independently selected from the group of H, -C_{1-6} alkyl, -C_{1-6} substituted alkyl, and -C_{1-6} cycloalkyl,
or R_{22} and R_{23} are taken together with the adjacent N to form a cycle selected from the group of



;

R_{24} and R_{25} are independently from the group of H, -C_{1-6} alkyl, -C_{1-6} substituted alkyl, -C_{1-6} alkyl-Q_5, -C_{1-6} cycloalkyl, aryl, substituted aryl, heteroaryl, and substituted heteroaryl,
and Q_5 is selected from the group of halogen and SO_2R_3; and pharmaceutically acceptable salts thereof.

2. The compound as claimed in claim 1, wherein said compound is a compound of Formula I.

3. The compound as claimed in claim 1, wherein said compound is a compound of Formula II.

4. The compound as claimed in claim 1, wherein said compound is a compound of Formula III.

5. The compound as claimed in claim 2, wherein R_1 is isopropenyl.

6. The compound as claimed in claim 5, wherein X is phenyl.

7. The compound as claimed in claim 6, wherein Y is $-COOR_2$.

8. The compound as claimed in claim 7, wherein Y is –COOH.

9. The compound as claimed in claim 6, wherein A is –H.

10. The compound as claimed in claim 6, wherein R_4 is selected from the group of –H, $-C_{1-6}$ alkyl, $-C_{1-6}$ alkyl-Q_1, and $-COR_6$.

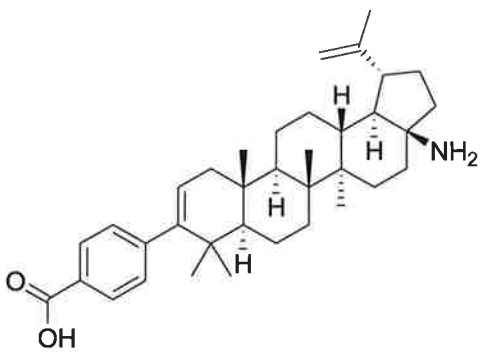
11. The compound as claimed in claim 10, wherein R_5 is –H.

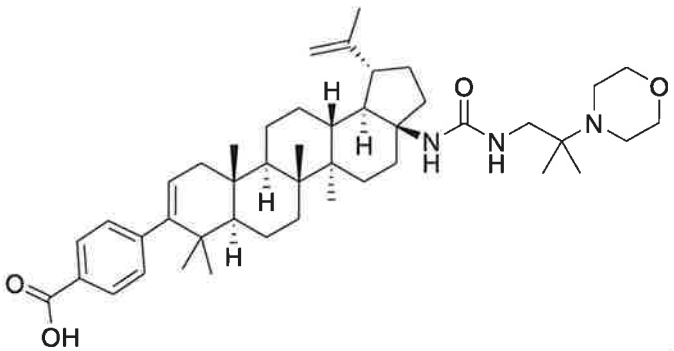
12. The compound as claimed in claim 10, wherein R_4 is $-C_{1-6}$ alkyl-Q_1.

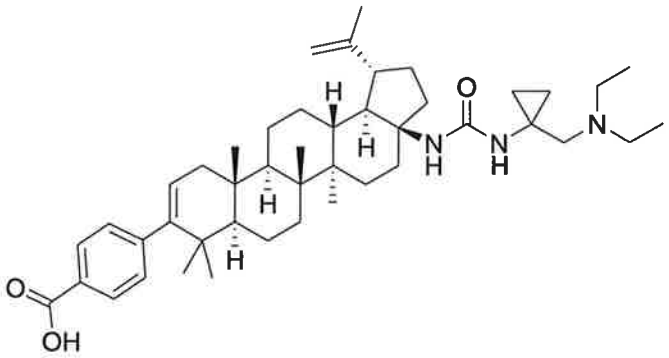
13. The compound as claimed in claim 12, wherein Q_1 is $-NR_8R_9$.

14. The compound as claimed in claim 10, wherein R_4 is $-COR_6$.

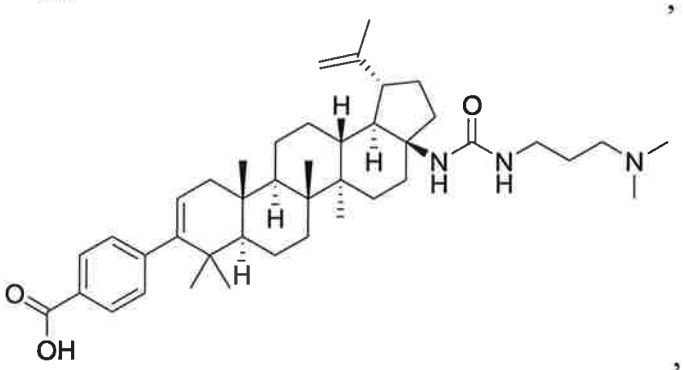
15. A compound which is selected from the group consisting of:



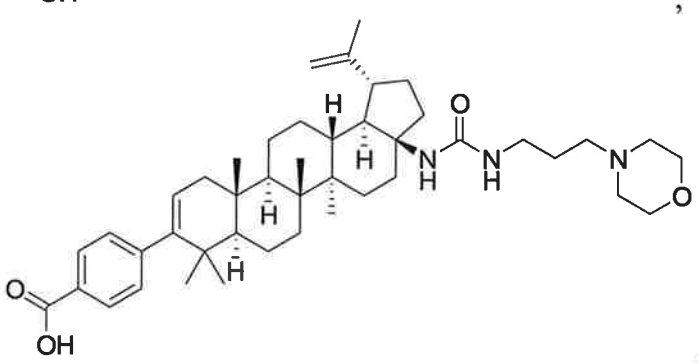



O
OH
H
H
H
H
O
N
H
N
H
N

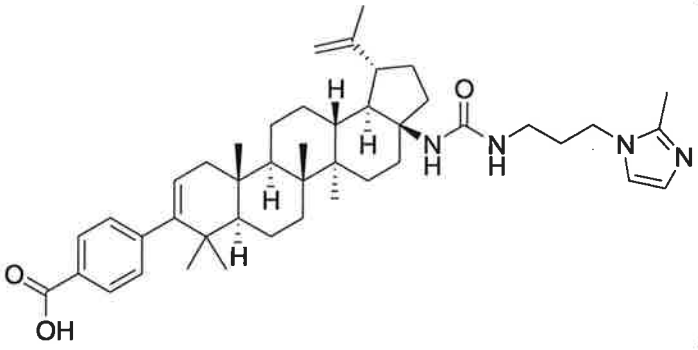
,


O
OH
H
H
H
H
O
N
H
N
H
N

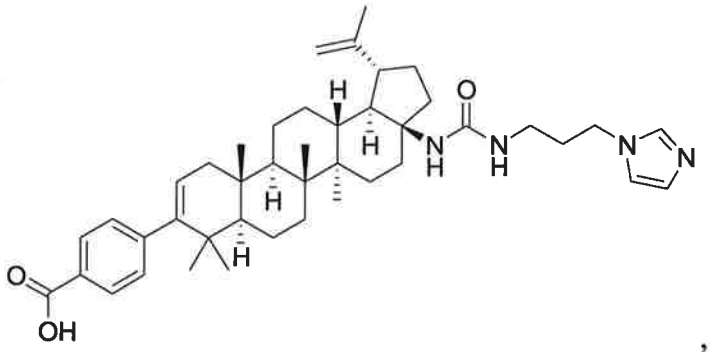
,


O
OH
H
H
H
H
O
N
H
N
H
N
O

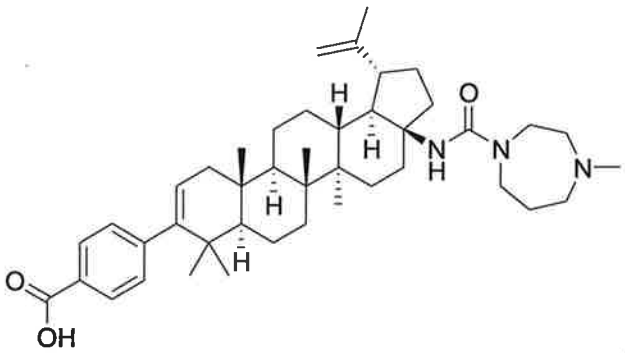
,


O
OH
H
H
H
H
O
N
H
N
H
N
N

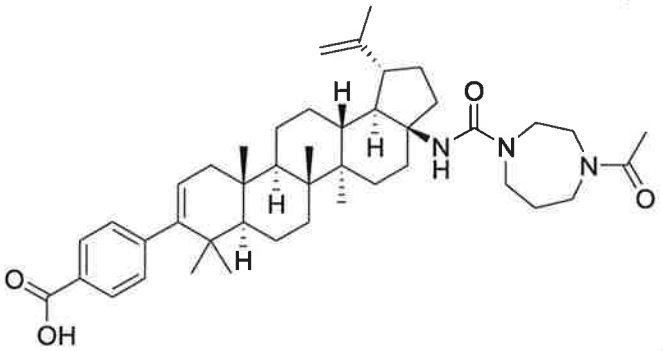
,



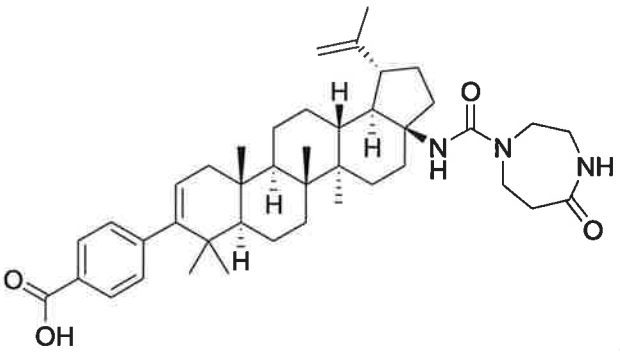
,



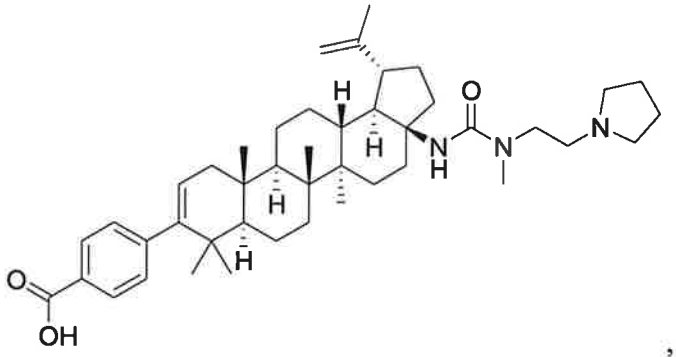
,



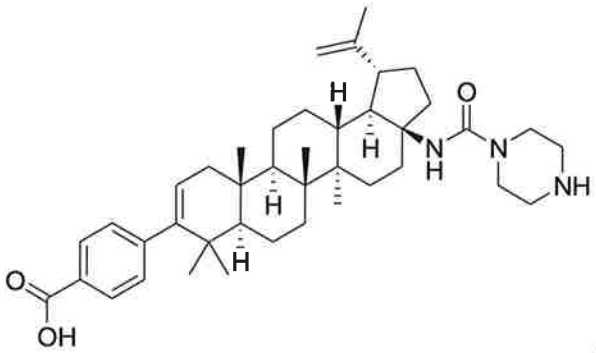
,



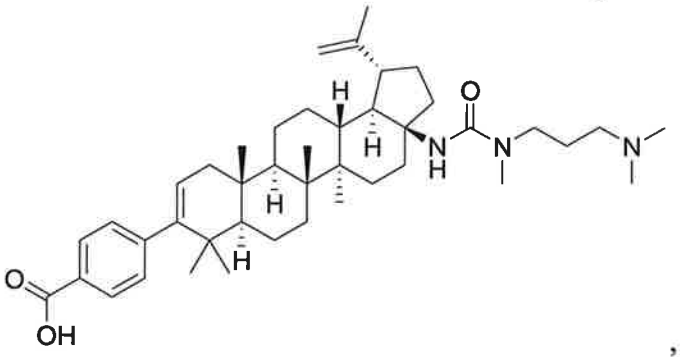
,



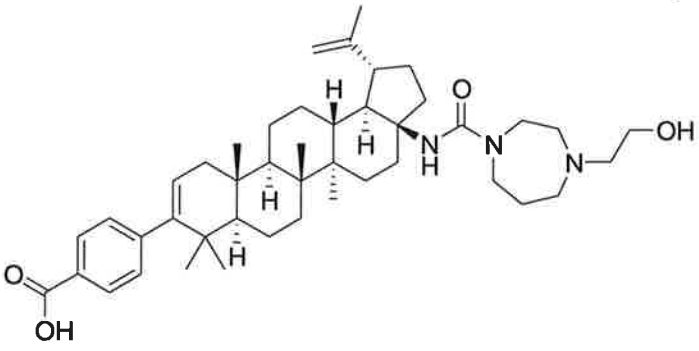
,



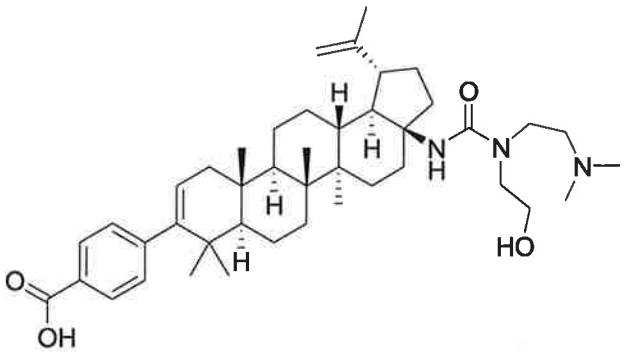
,

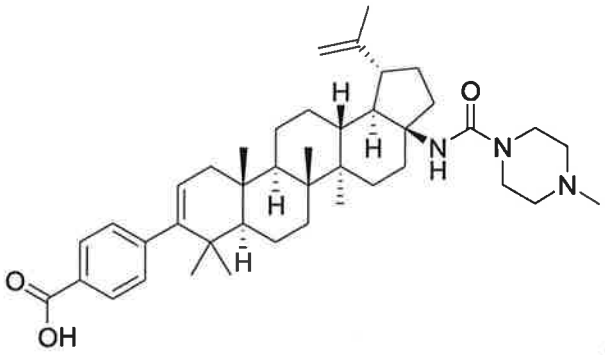


,

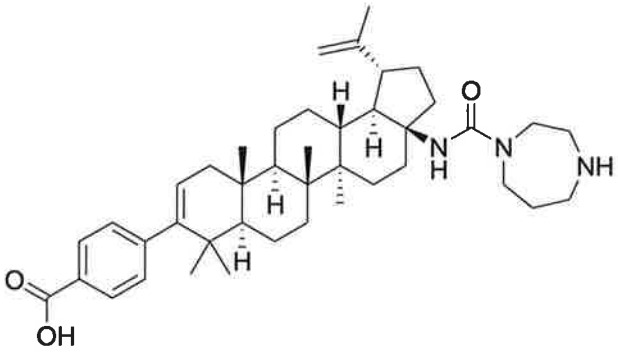


,

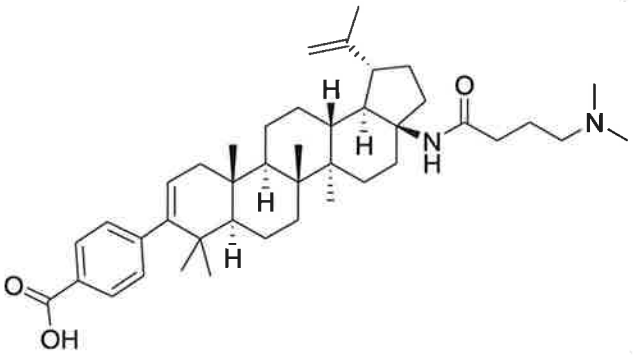

H
H
O
N
H
N
N
HO
H
O
OH


H
H
O
N
H
N
N
H
O
OH

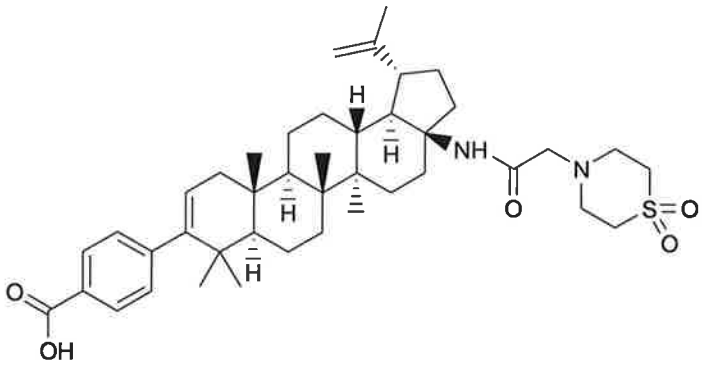
,

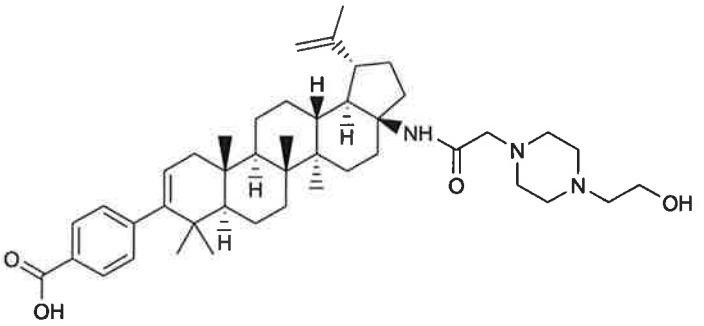

H
H
O
N
H
N
NH
H
O
OH

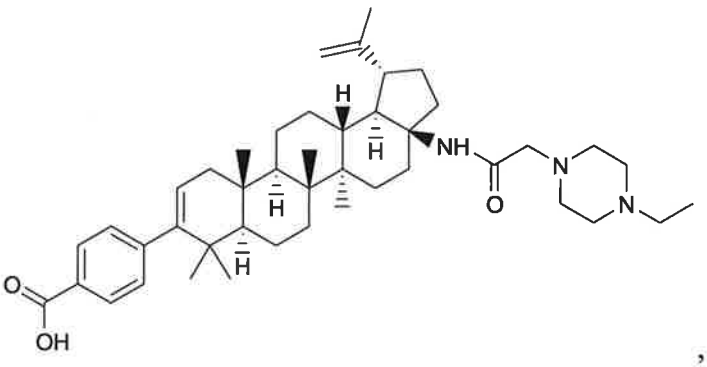
,


H
H
O
N
H
N
H
O
OH

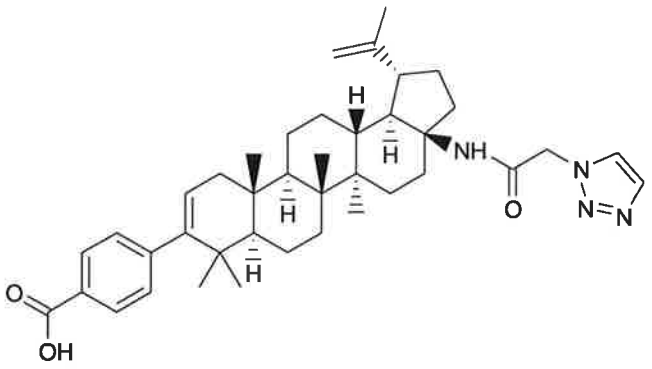
,

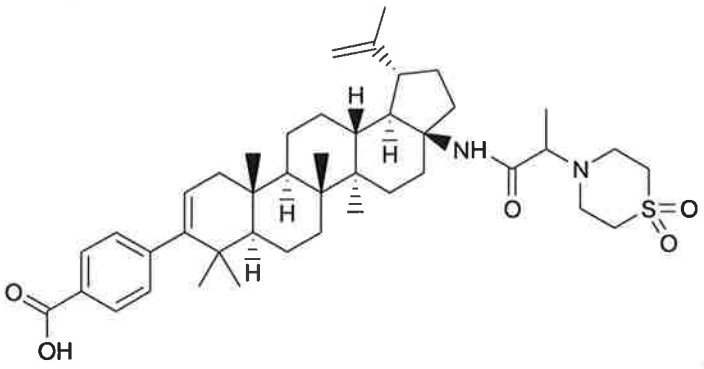




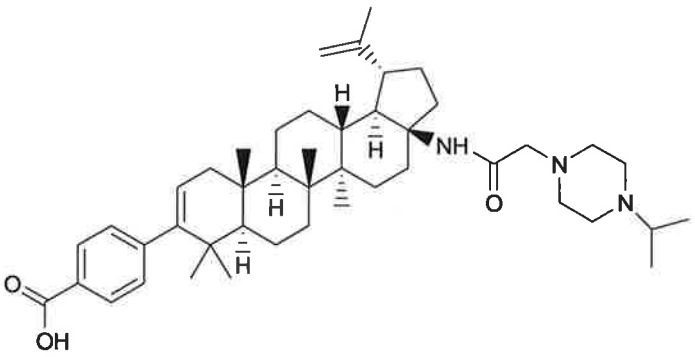


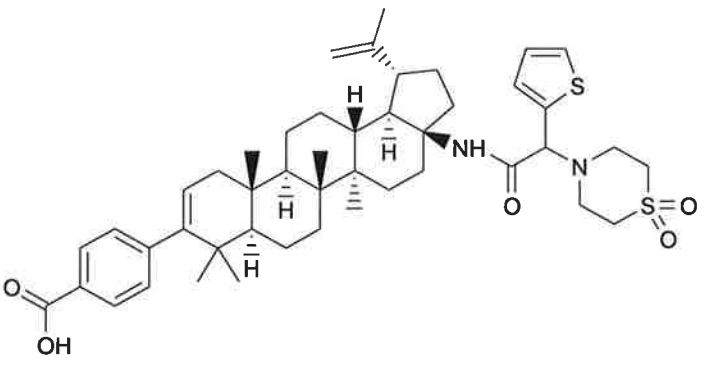
,

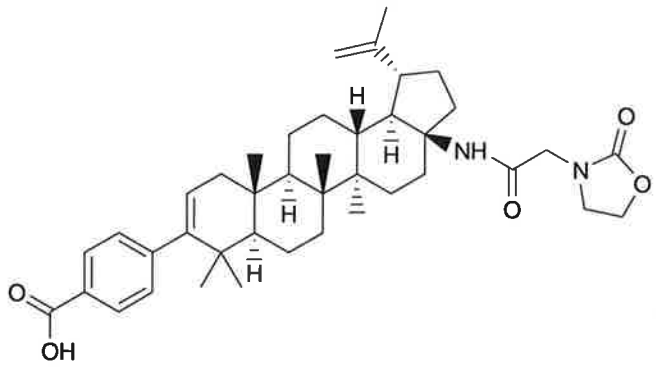


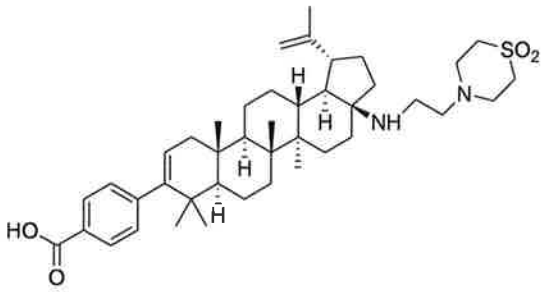


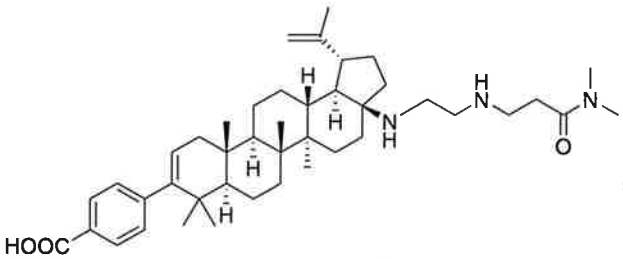
,

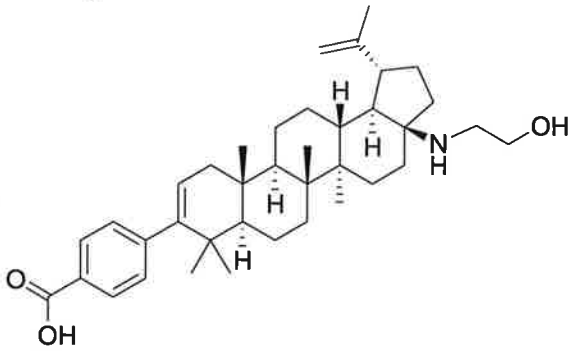


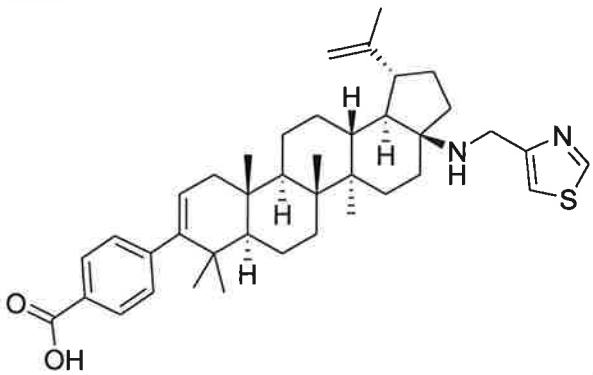


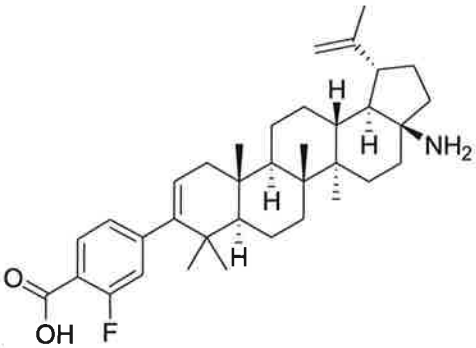




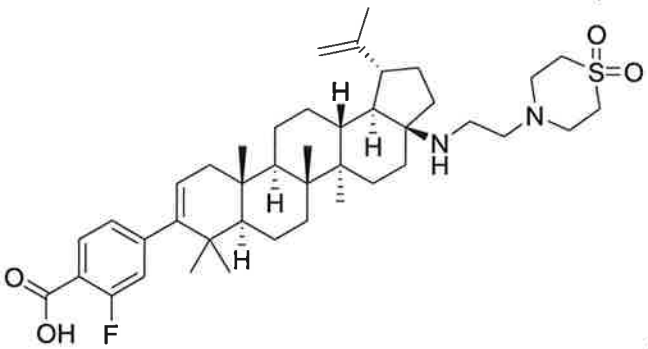




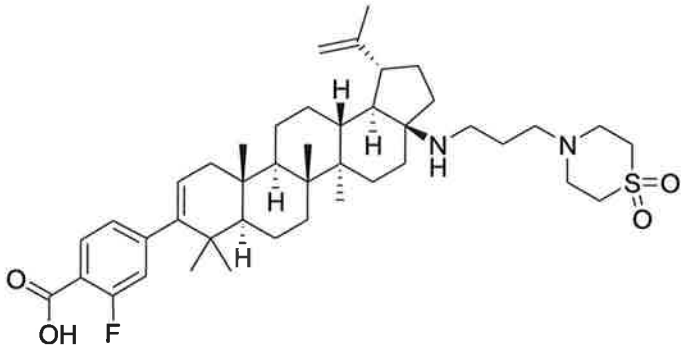




,

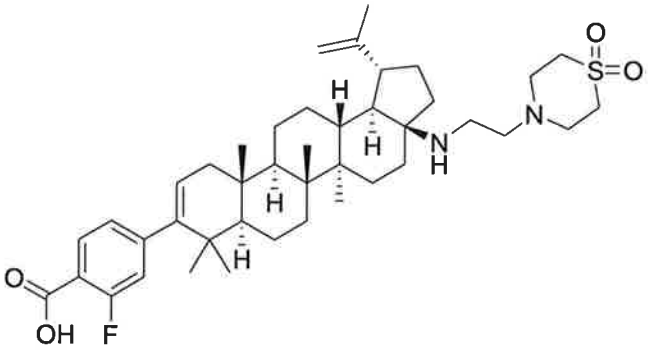


, and

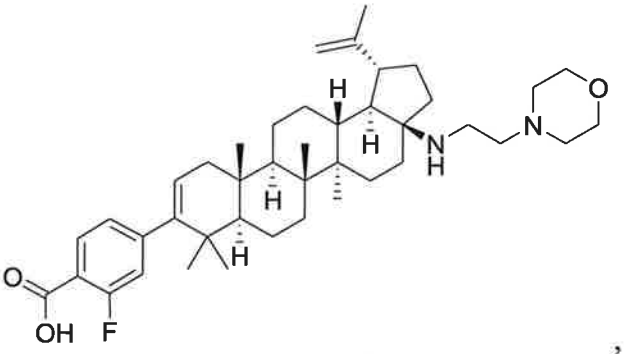


; and pharmaceutically acceptable salts thereof.

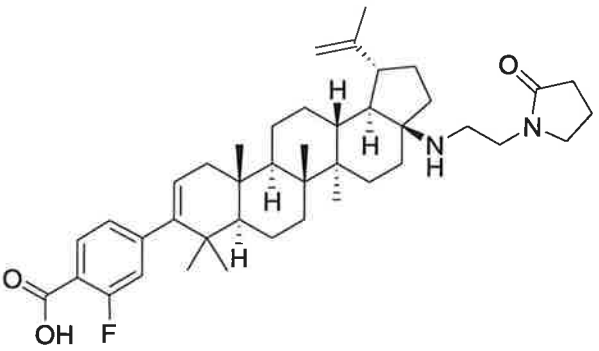
16. A compound which is selected from the group consisting of:



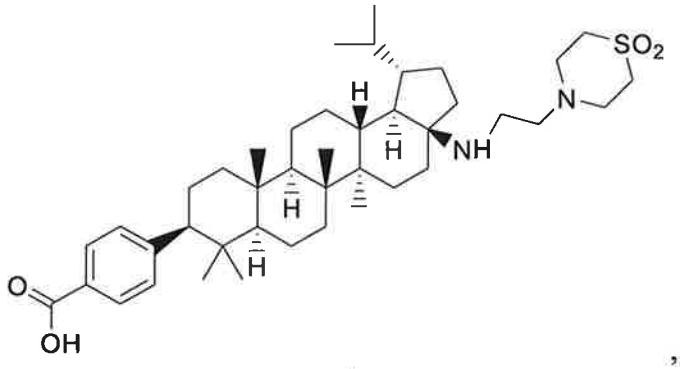
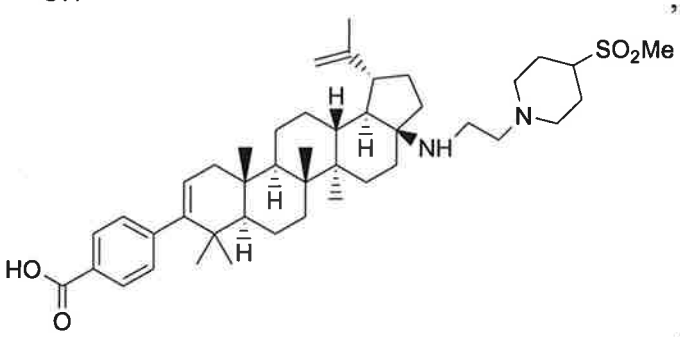
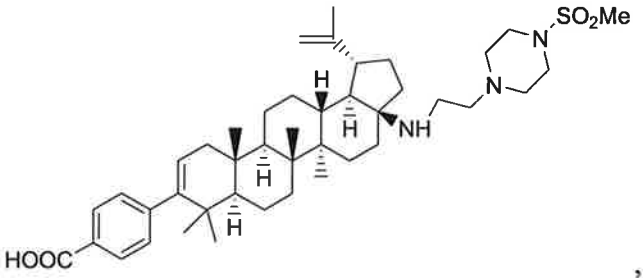
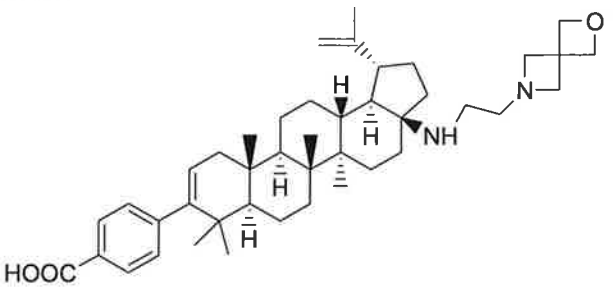
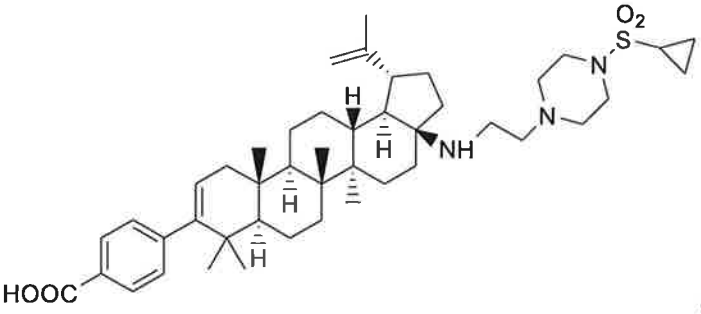
,

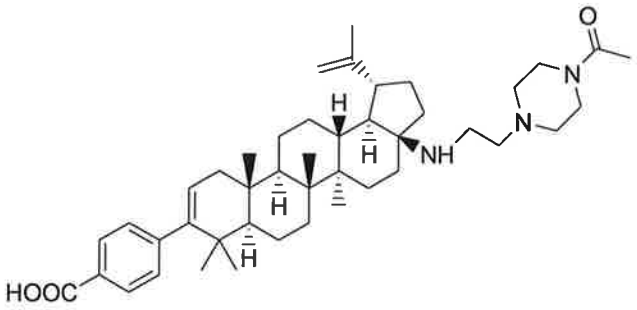


,

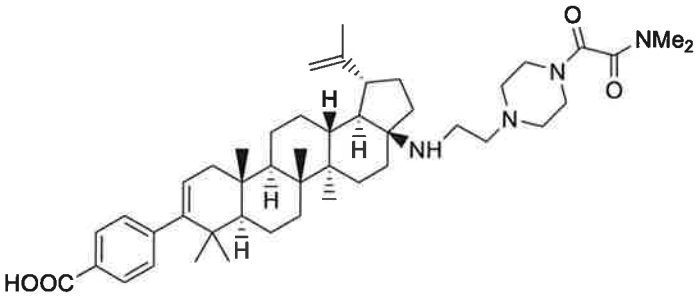


,


SO2
N
H
NH
H
H
O
OH
,

SO2Me
N
H
NH
H
H
HO
O
,

SO2Me
N
N
H
NH
H
H
HOOC
,

O
N
H
NH
H
H
HOOC

O2
S
N
N
H
NH
H
H
HOOC
,



and



; and pharmaceutically acceptable salts thereof.