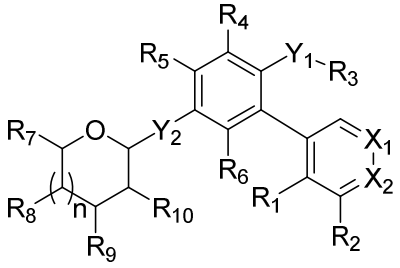
Summary

The present disclosure describes biaryl Hsp90 inhibitors with modified ether groups with therapeutic properties, pharmaceutical compositions thereof, methods for their manufacture, and methods for their use. The present disclosure refers to subject matter as defined in the attached set of claims.

In one aspect, the present disclosure refers to a compound of the formula:



(I)

wherein:

n is 0, 1, or 2;

Y_1 is −alkanediyl$_{(C\leq 6)}$−, −C(O)−alkanediyl$_{(C\leq 6)}$−, or a substituted version of any of these groups;

Y_2 is CH_2, O, or S;

R_1 is hydrogen, amino, halo, hydroxy, carboxy, or alkyl$_{(C\leq 6)}$, alkenyl$_{(C\leq 6)}$, alkynyl$_{(C\leq 6)}$, cycloalkyl$_{(C\leq 8)}$, heterocycloalkyl$_{(C\leq 8)}$, amido$_{(C\leq 6)}$, alkoxy$_{(C\leq 6)}$, alkylsulfonyl$_{(C\leq 6)}$, or a substituted version of any of these groups;

R_2 is hydrogen, amino, halo, hydroxy, carboxy, or alkyl$_{(C\leq 6)}$, alkenyl$_{(C\leq 6)}$, alkynyl$_{(C\leq 6)}$, cycloalkyl$_{(C\leq 8)}$, heterocycloalkyl$_{(C\leq 8)}$, aryl$_{(C\leq 12)}$, aralkyl$_{(C\leq 12)}$, amido$_{(C\leq 6)}$, alkoxy$_{(C\leq 6)}$, alkylthio$_{(C\leq 6)}$, alkylsulfonyl$_{(C\leq 6)}$, or a substituted version of any of these groups;

R_2 and R_{15} are taken together and are alkanediyl$_{(C\leq 6)}$, alkoxydiyl$_{(C\leq 6)}$, alkylaminodiyl$_{(C\leq 6)}$, or a substituted version of any of these groups;

R_3 is $–NR_{11}R_{11}'$ or $–C(O)NR_{12}R_{12}'$, wherein:

R_{11} and R_{11}' are each independently hydrogen, alkyl$_{(C\leq 6)}$, substituted alkyl$_{(C\leq 6)}$, acyl$_{(C\leq 6)}$, or substituted acyl$_{(C\leq 6)}$;

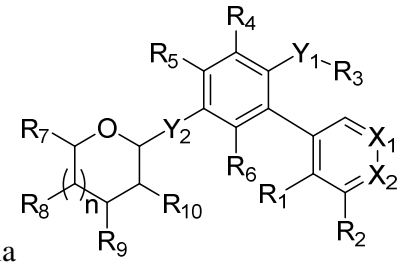
R_{12} and R_{12}' are each independently hydrogen, alkyl$_{(C\leq 6)}$, or substituted alkyl$_{(C\leq 6)}$;

R_4, R_5, and R_6 are each independently hydrogen, halo, alkyl$_{(C\leq 6)}$, substituted alkyl$_{(C\leq 6)}$, alkoxy$_{(C\leq 6)}$, substituted alkoxy$_{(C\leq 6)}$, acyloxy$_{(C\leq 6)}$, or substituted acyloxy$_{(C\leq 6)}$;

R_7 is carboxy or alkyl$_{(C\leq 6)}$, alkenyl$_{(C\leq 8)}$, alkynyl$_{(C\leq 8)}$, cycloalkyl$_{(C\leq 8)}$, heterocycloalkyl$_{(C\leq 8)}$, aryl$_{(C\leq 12)}$, heteroaryl$_{(C\leq 12)}$, aralkyl$_{(C\leq 12)}$, heteroaralkyl$_{(C\leq 12)}$, −alkanediyl$_{(C\leq 6)}$−OR_{13}, or a substituted version of any of these groups wherein:

CLAIMS

What is Claimed is:

1. A compound of the formula  (I), wherein:

n is 0, 1, or 2;

Y_1 is −alkanediyl$_{(C\leq 6)}$−, −C(O)−alkanediyl$_{(C\leq 6)}$−, or a substituted version of any of these groups;

Y_2 is CH_2, O, or S;

R_1 is hydrogen, amino, halo, hydroxy, carboxy, or alkyl$_{(C\leq 6)}$, alkenyl$_{(C\leq 6)}$, alkynyl$_{(C\leq 6)}$, cycloalkyl$_{(C\leq 8)}$, heterocycloalkyl$_{(C\leq 8)}$, amido$_{(C\leq 6)}$, alkoxy$_{(C\leq 6)}$, alkylsulfonyl$_{(C\leq 6)}$, or a substituted version of any of these groups;

R_2 is hydrogen, amino, halo, hydroxy, carboxy, or alkyl$_{(C\leq 6)}$, alkenyl$_{(C\leq 6)}$, alkynyl$_{(C\leq 6)}$, cycloalkyl$_{(C\leq 8)}$, heterocycloalkyl$_{(C\leq 8)}$, aryl$_{(C\leq 12)}$, aralkyl$_{(C\leq 12)}$, amido$_{(C\leq 6)}$, alkoxy$_{(C\leq 6)}$, alkylthio$_{(C\leq 6)}$, alkylsulfonyl$_{(C\leq 6)}$, or a substituted version of any of these groups;

R_2 and R_{15} are taken together and are alkanediyl$_{(C\leq 6)}$, alkoxydiyl$_{(C\leq 6)}$, alkylaminodiyl$_{(C\leq 6)}$, or a substituted version of any of these groups;

R_3 is $–NR_{11}R_{11}'$ or $–C(O)NR_{12}R_{12}'$, wherein:

R_{11} and R_{11}' are each independently hydrogen, alkyl$_{(C\leq 6)}$, substituted alkyl$_{(C\leq 6)}$, acyl$_{(C\leq 6)}$, or substituted acyl$_{(C\leq 6)}$;

R_{12} and R_{12}' are each independently hydrogen, alkyl$_{(C\leq 6)}$, or substituted alkyl$_{(C\leq 6)}$;

R_4, R_5, and R_6 are each independently hydrogen, halo, alkyl$_{(C\leq 6)}$, substituted alkyl$_{(C\leq 6)}$, alkoxy$_{(C\leq 6)}$, substituted alkoxy$_{(C\leq 6)}$, acyloxy$_{(C\leq 6)}$, or substituted acyloxy$_{(C\leq 6)}$;

R_7 is carboxy or $alkyl_{(C\leq6)}$, $alkenyl_{(C\leq8)}$, $alkynyl_{(C\leq8)}$, $cycloalkyl_{(C\leq8)}$, $heterocycloalkyl_{(C\leq8)}$, $aryl_{(C\leq12)}$, $heteroaryl_{(C\leq12)}$, $aralkyl_{(C\leq12)}$, $heteroaralkyl_{(C\leq12)}$, $-alkanediyl_{(C\leq6)}-OR_{13}$, or a substituted version of any of these groups wherein:

R_{13} is $alkyl_{(C\leq12)}$, substituted $alkyl_{(C\leq12)}$, $aralkyl_{(C\leq12)}$, or substituted $aralkyl_{(C\leq12)}$;

R_8, R_9, and R_{10} are each independently hydrogen, halo, hydroxy, or $alkyl_{(C\leq6)}$, $alkoxy_{(C\leq6)}$, $acyl_{(C\leq6)}$, $acyloxy_{(C\leq6)}$, $aralkyl_{(C\leq12)}$, $aralkoxy_{(C\leq12)}$, or a substituted version of any of these groups;

X_1 is CR_{14} or N, wherein:

R_{14} is hydrogen, halo, hydroxy, or $alkyl_{(C\leq6)}$, $alkenyl_{(C\leq6)}$, $alkynyl_{(C\leq6)}$, $alkoxy_{(C\leq6)}$, $alkylamino_{(C\leq6)}$, $-alkanediyl_{(C\leq6)}-heterocycloalkyl_{(C\leq8)}$, or a substituted version of any of these groups; or

R_{14} and R_{15} are taken together and are $alkanediyl_{(C\leq6)}$, $alkenediyl_{(C\leq6)}$, $alkoxydiyl_{(C\leq6)}$, $alkylaminodiyl_{(C\leq6)}$, or a substituted version of any of these groups; and

X_2 is CR_{15} or N, wherein:

R_{15} is hydrogen, halo, hydroxy, or $alkyl_{(C\leq6)}$, $alkenyl_{(C\leq6)}$, $alkynyl_{(C\leq6)}$, $alkoxy_{(C\leq6)}$, $alkylamino_{(C\leq6)}$, $-alkanediyl_{(C\leq6)}-heterocycloalkyl_{(C\leq8)}$, or a substituted version of any of these groups;

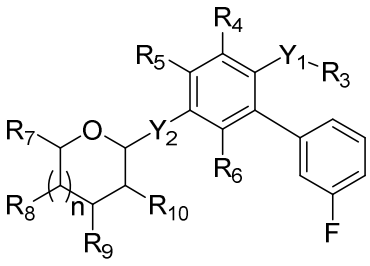
R_{15} and R_{14} are taken together and are $alkanediyl_{(C\leq6)}$, $alkenediyl_{(C\leq6)}$, $alkoxydiyl_{(C\leq6)}$, $alkylaminodiyl_{(C\leq6)}$, or a substituted version of any of these groups; or

R_{15} and R_2 are taken together and are $alkanediyl_{(C\leq6)}$, $alkoxydiyl_{(C\leq6)}$, $alkylaminodiyl_{(C\leq6)}$, or a substituted version of any of these groups;

wherein when any of the terms is used with the "substituted" modifier, one or more hydrogen atom has been independently replaced by $-OH$, $-F$, $-Cl$, $-Br$, $-I$, $-NH_2$, $-NO_2$, $-CO_2H$, $-CO_2CH_3$, $-CN$, $-SH$, $-OCH_3$, $-OCH_2CH_3$, $-C(O)CH_3$, $-NHCH_3$, $-NHCH_2CH_3$, $-N(CH_3)_2$, $-C(O)NH_2$, $-C(O)NHCH_3$, $-C(O)N(CH_3)_2$, $-OC(O)CH_3$, $-NHC(O)CH_3$, $-S(O)_2OH$, or $-S(O)_2NH_2$;

or a pharmaceutically acceptable salt of the formula.

2. The compound of claim 1 further defined as:



(VI),

wherein:

n is 0, 1, or 2;

Y_1 is −alkanediyl$_{(C\leq 6)}$−, −C(O)−alkanediyl$_{(C\leq 6)}$−, or a substituted version of any of these groups;

Y_2 is CH_2, O, or S;

R_3 is $–NR_{11}R_{11}'$ or $–C(O)NR_{12}R_{12}'$, wherein:

R_{11} and R_{11}' are each independently hydrogen, alkyl$_{(C\leq 6)}$, substituted alkyl$_{(C\leq 6)}$, acyl$_{(C\leq 6)}$, or substituted acyl$_{(C\leq 6)}$;

R_{12} and R_{12}' are each independently hydrogen, alkyl$_{(C\leq 6)}$, or substituted alkyl$_{(C\leq 6)}$;

R_4, R_5, and R_6 are each independently hydrogen, halo, alkyl$_{(C\leq 6)}$, substituted alkyl$_{(C\leq 6)}$, alkoxy$_{(C\leq 6)}$, substituted alkoxy$_{(C\leq 6)}$, acyloxy$_{(C\leq 6)}$, or substituted acyloxy$_{(C\leq 6)}$;

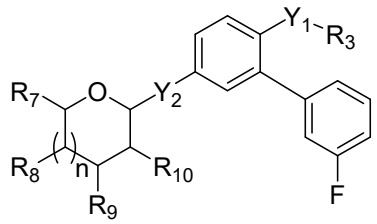
R_7 is carboxy or alkyl$_{(C\leq 6)}$, alkenyl$_{(C\leq 8)}$, alkynyl$_{(C\leq 8)}$, cycloalkyl$_{(C\leq 8)}$, heterocycloalkyl$_{(C\leq 8)}$, aryl$_{(C\leq 12)}$, heteroaryl$_{(C\leq 12)}$, aralkyl$_{(C\leq 12)}$, heteroaralkyl$_{(C\leq 12)}$, −alkanediyl$_{(C\leq 6)}$−OR_{13}, or a substituted version of any of these groups wherein:

R_{13} is alkyl$_{(C\leq 12)}$, substituted alkyl$_{(C\leq 12)}$, aralkyl$_{(C\leq 12)}$, or substituted aralkyl$_{(C\leq 12)}$; and

R_8, R_9, and R_{10} are each independently hydrogen, halo, hydroxy, or alkyl$_{(C\leq 6)}$, alkoxy$_{(C\leq 6)}$, acyl$_{(C\leq 6)}$, acyloxy$_{(C\leq 6)}$, aralkyl$_{(C\leq 12)}$, aralkoxy$_{(C\leq 12)}$, or a substituted version of any of these groups;

or a pharmaceutically acceptable salt of the formula.

3. The compound of either claim 1 or claim 2 further defined as:



(VII),

wherein:

n is 0, 1, or 2;

Y_1 is −alkanediyl$_{(C\leq 6)}$−, −C(O)−alkanediyl$_{(C\leq 6)}$−, or a substituted version of any of these groups;

Y_2 is CH_2, O, or S;

R_3 is $–NR_{11}R_{11}'$ or $–C(O)NR_{12}R_{12}'$, wherein:

R_{11} and R_{11}' are each independently hydrogen, alkyl$_{(C\leq 6)}$, substituted alkyl$_{(C\leq 6)}$, acyl$_{(C\leq 6)}$, or substituted acyl$_{(C\leq 6)}$;

R_{12} and R_{12}' are each independently hydrogen, alkyl$_{(C\leq 6)}$, or substituted alkyl$_{(C\leq 6)}$;

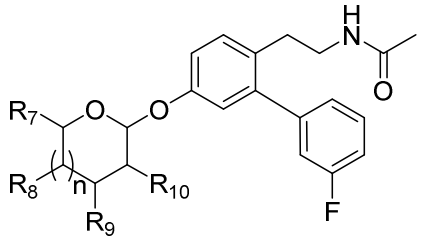
R_7 is carboxy or alkyl$_{(C\leq 6)}$, alkenyl$_{(C\leq 8)}$, alkynyl$_{(C\leq 8)}$, cycloalkyl$_{(C\leq 8)}$, heterocycloalkyl$_{(C\leq 8)}$, aryl$_{(C\leq 12)}$, heteroaryl$_{(C\leq 12)}$, aralkyl$_{(C\leq 12)}$, heteroaralkyl$_{(C\leq 12)}$, −alkanediyl$_{(C\leq 6)}$−OR_{13}, or a substituted version of any of these groups wherein:

R_{13} is alkyl$_{(C\leq 12)}$, substituted alkyl$_{(C\leq 12)}$, aralkyl$_{(C\leq 12)}$, or substituted aralkyl$_{(C\leq 12)}$; and

R_8, R_9, and R_{10} are each independently hydrogen, halo, hydroxy, or alkyl$_{(C\leq 6)}$, alkoxy$_{(C\leq 6)}$, acyl$_{(C\leq 6)}$, acyloxy$_{(C\leq 6)}$, aralkyl$_{(C\leq 12)}$, aralkoxy$_{(C\leq 12)}$, or a substituted version of any of these groups;

or a pharmaceutically acceptable salt of the formula.

4. The compound according to any one of claims 1-3 further defined as:



(VIII),

wherein:

n is 0, 1, or 2;

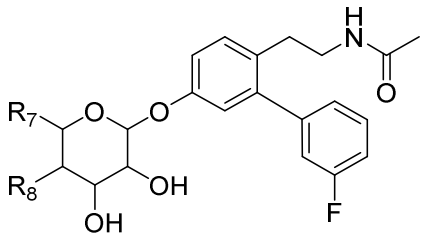
R_7 is carboxy or $alkyl_{(C\leq6)}$, $alkenyl_{(C\leq8)}$, $alkynyl_{(C\leq8)}$, $cycloalkyl_{(C\leq8)}$, $heterocycloalkyl_{(C\leq8)}$, $aryl_{(C\leq12)}$, $heteroaryl_{(C\leq12)}$, $aralkyl_{(C\leq12)}$, $heteroaralkyl_{(C\leq12)}$, $-alkanediyl_{(C\leq6)}-OR_{13}$, or a substituted version of any of these groups wherein:

R_{13} is $alkyl_{(C\leq12)}$, substituted $alkyl_{(C\leq12)}$, $aralkyl_{(C\leq12)}$, or substituted $aralkyl_{(C\leq12)}$; and

R_8, R_9, and R_{10} are each independently hydrogen, halo, hydroxy, or $alkyl_{(C\leq6)}$, $alkoxy_{(C\leq6)}$, $acyl_{(C\leq6)}$, $acyloxy_{(C\leq6)}$, $aralkyl_{(C\leq12)}$, $aralkoxy_{(C\leq12)}$, or a substituted version of any of these groups;

or a pharmaceutically acceptable salt of the formula.

5. The compound according to any one of claims 1-4, wherein the compound is further defined as:



(IX)

wherein:

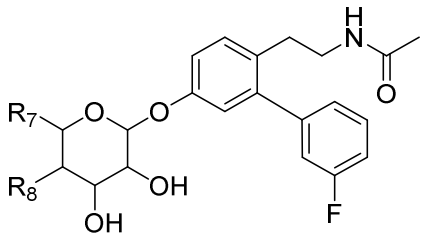
R_7 is carboxy or $alkyl_{(C\leq6)}$, $alkenyl_{(C\leq8)}$, $alkynyl_{(C\leq8)}$, $cycloalkyl_{(C\leq8)}$, $heterocycloalkyl_{(C\leq8)}$, $aryl_{(C\leq12)}$, $heteroaryl_{(C\leq12)}$, $aralkyl_{(C\leq12)}$, $heteroaralkyl_{(C\leq12)}$, $-alkanediyl_{(C\leq6)}-OR_{13}$, or a substituted version of any of these groups wherein:

R_{13} is $alkyl_{(C\leq12)}$, substituted $alkyl_{(C\leq12)}$, $aralkyl_{(C\leq12)}$, or substituted $aralkyl_{(C\leq12)}$; and

R_8 is hydrogen, halo, hydroxy, or $alkyl_{(C\leq6)}$, $alkoxy_{(C\leq6)}$, $acyl_{(C\leq6)}$, $acyloxy_{(C\leq6)}$, $aralkyl_{(C\leq12)}$, $aralkoxy_{(C\leq12)}$, or a substituted version of any of these groups;

or a pharmaceutically acceptable salt of the formula.

6. The compound of claim 5 further defined as:



(IX)

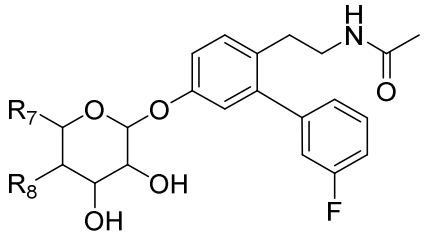
wherein:

R_7 is $alkyl_{(C\leq6)}$, $alkenyl_{(C\leq8)}$, $alkynyl_{(C\leq8)}$, or a substituted version of any of these groups; and

R_8 is hydrogen, hydroxy, or $alkyl_{(C\leq6)}$, $alkoxy_{(C\leq6)}$, or a substituted version of either of these groups;

or a pharmaceutically acceptable salt of the formula.

7. The compound of claim 6 further defined as:



(IX)

wherein:

R_7 is $alkyl_{(C\leq6)}$ or substituted $alkyl_{(C\leq6)}$; and

R_8 is hydroxy, $alkoxy_{(C\leq6)}$, or substituted $alkoxy_{(C\leq6)}$;

or a pharmaceutically acceptable salt of the formula.

8. The compound of claim 1, wherein R_1 is hydrogen and R_2 is halo such as fluoro.

9. The compound of either claim 1 or claim 8, wherein X_1 is CR_{14}, wherein R_{14} is hydrogen or X_2 is CR_{15}, wherein R_{15} is hydrogen.

10. The compound according to any one of claims 1, 2, 8, and 9, wherein Y_1 is $-alkanediyl_{(C\leq6)}-$ or substituted $-alkanediyl_{(C\leq6)}-$ and R_3 is $-NR_{11}R_{11}'$, wherein R_{11} is $acyl_{(C\leq6)}$ or substituted $acyl_{(C\leq6)}$, and R_{11}' is hydrogen.

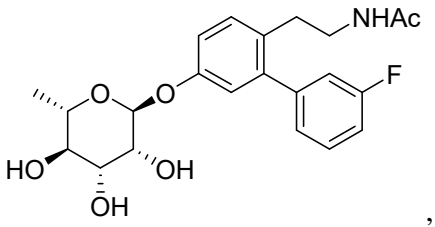
11. The compound according to any one of claims 1, 2, and 8-10, wherein R_4 is hydrogen, R_5 is hydrogen, or R_6 is hydrogen.

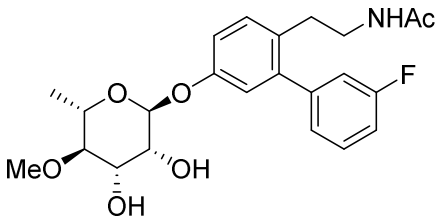
12. The compound according to any one of claims 1-3 and 8-11, wherein Y_2 is O and n is 1 or 2.

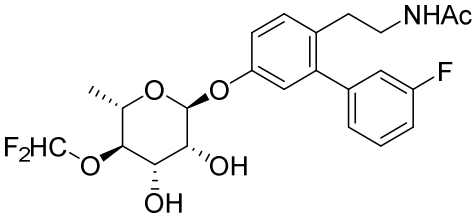
13. The compound according to any one of claims 1-4 and 8-12, wherein R_9 is hydroxy, R_{10} is hydroxy, or R_8 is hydroxy, $alkoxy_{(C\leq6)}$, or substituted $alkoxy_{(C\leq6)}$.

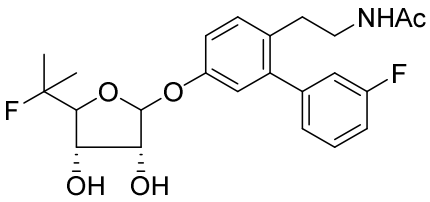
14. The compound according to any one of claims 1-13, wherein R_7 is $alkyl_{(C\leq6)}$ or substituted $alkyl_{(C\leq6)}$.

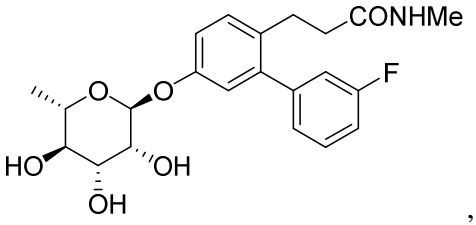
15. The compound of claim 1, wherein the compound is further defined as:

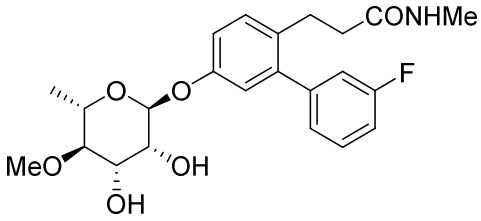


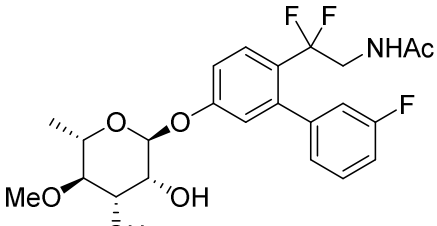
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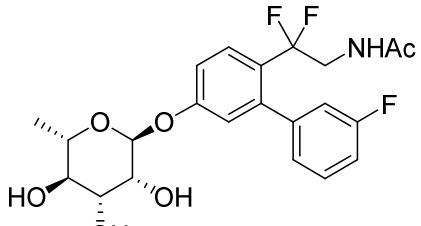
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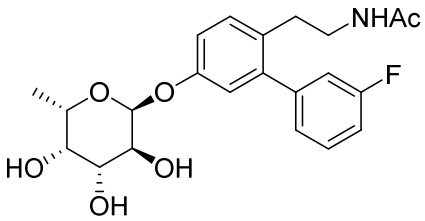
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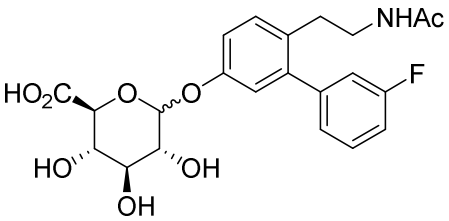
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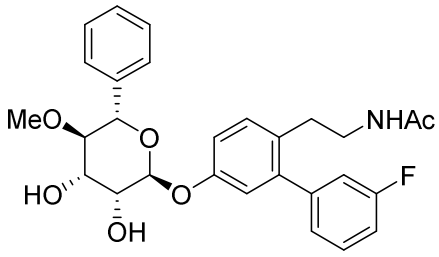
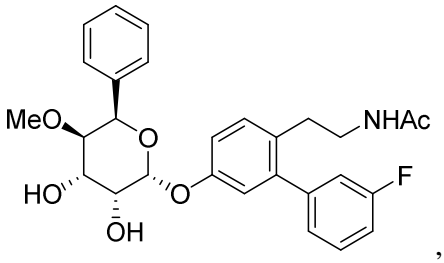
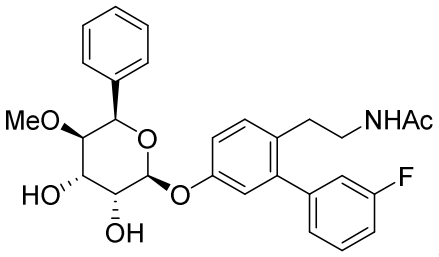
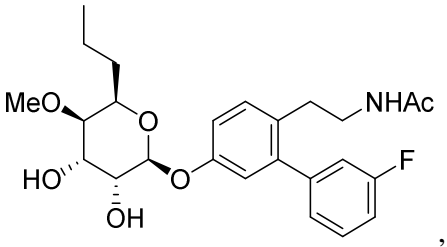
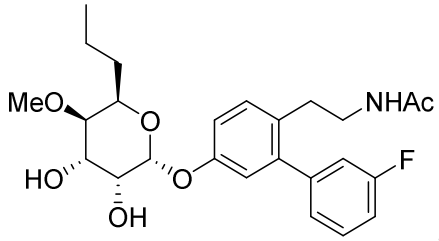
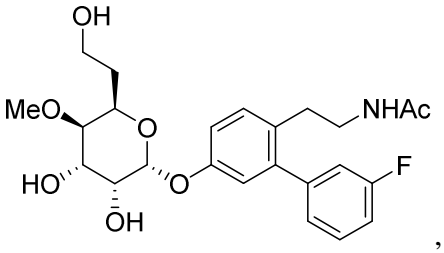
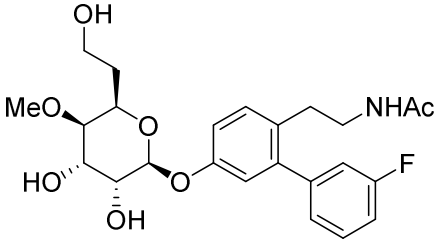
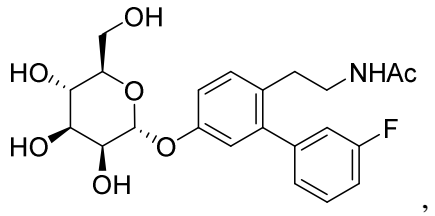
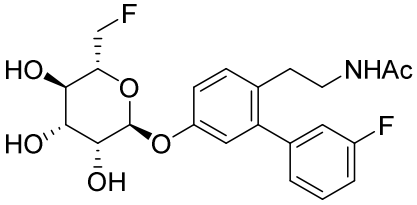
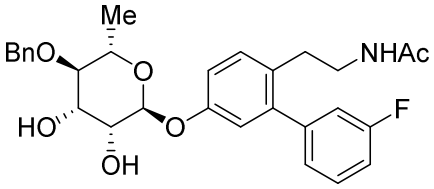
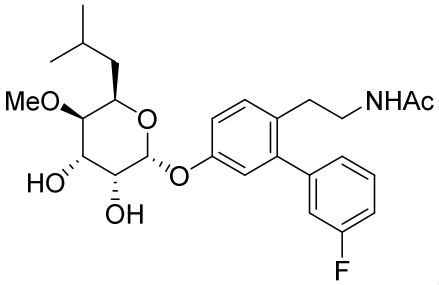
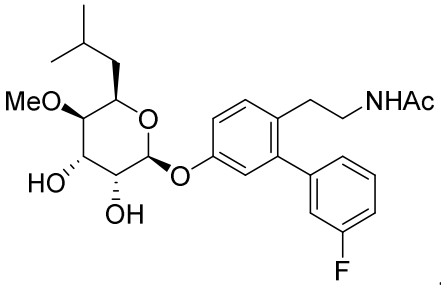
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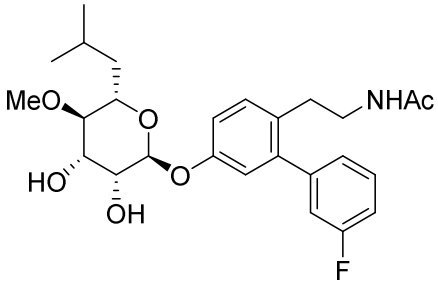
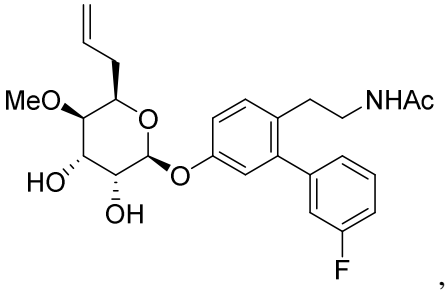
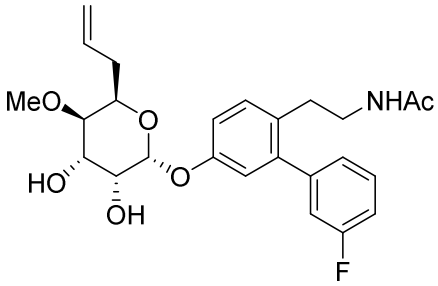
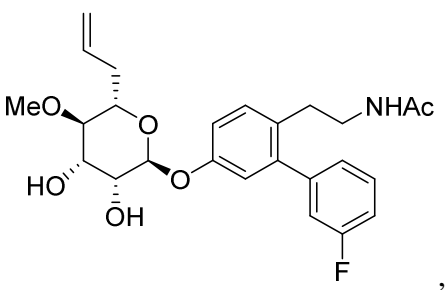
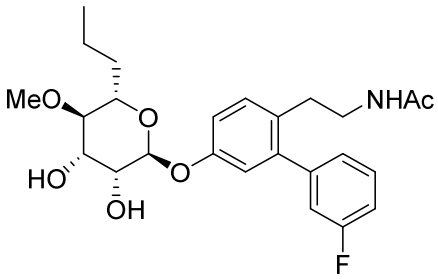
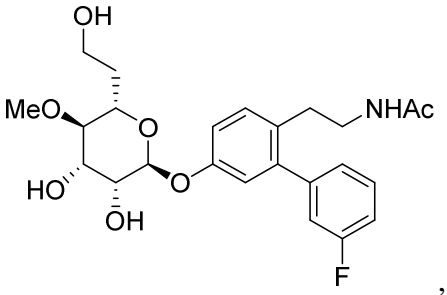
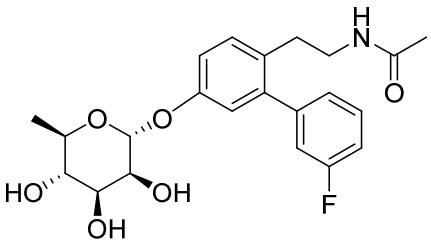
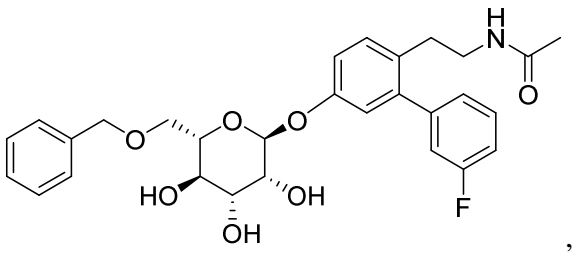
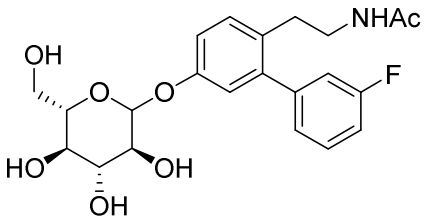
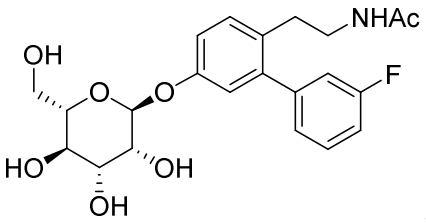
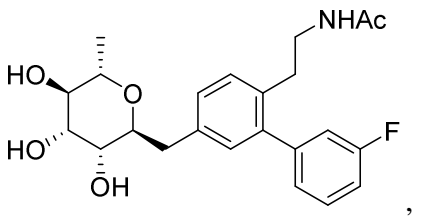
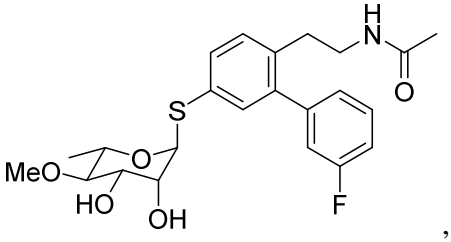
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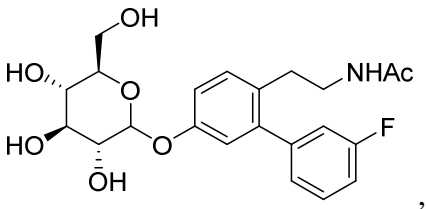
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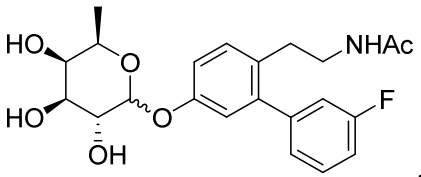
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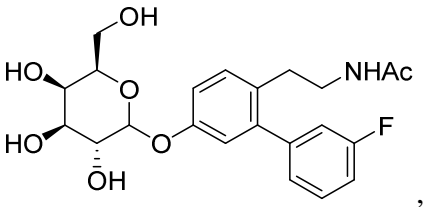
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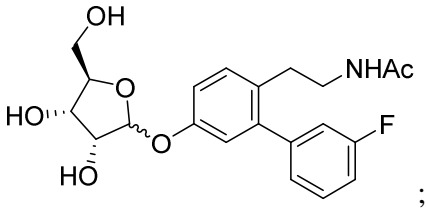

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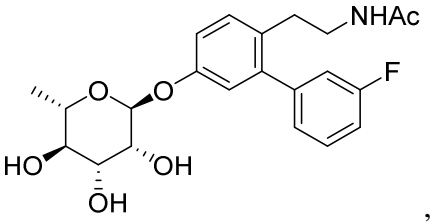
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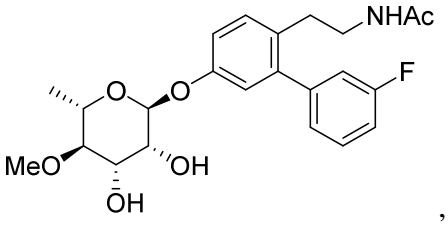
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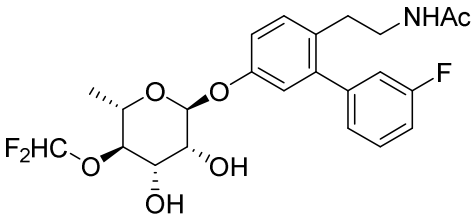
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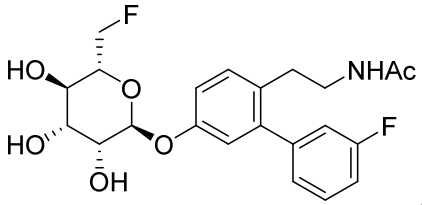
or a pharmaceutically acceptable salt of any of these formulas.

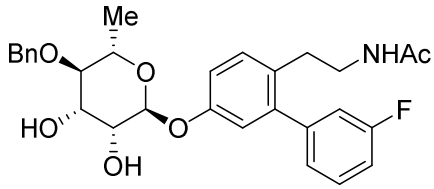
16. The compound of claim 15, wherein the compound is further defined as:

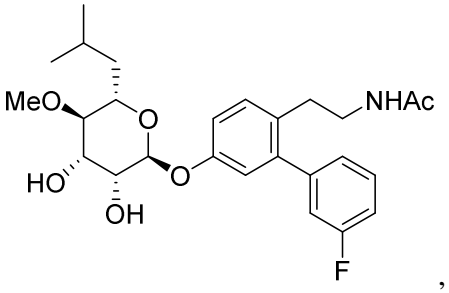


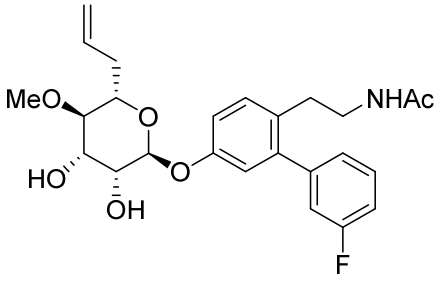
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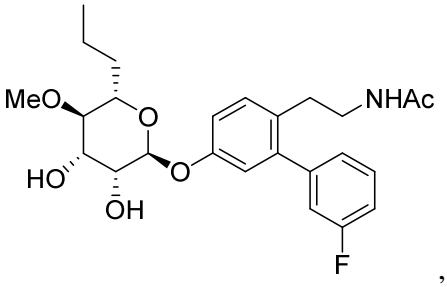
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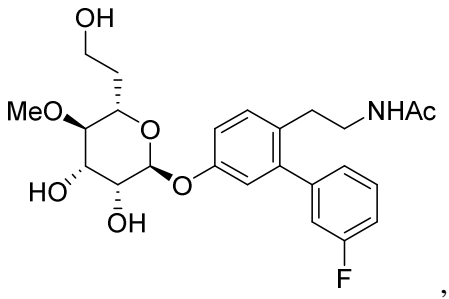
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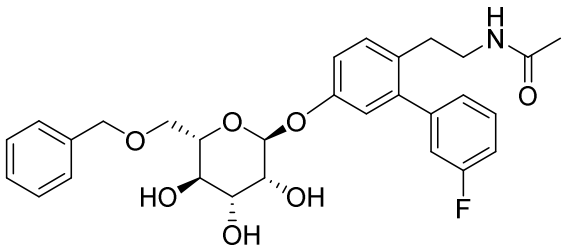
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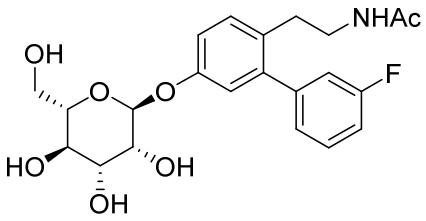
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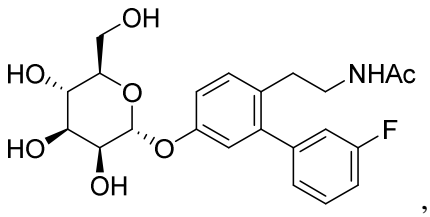
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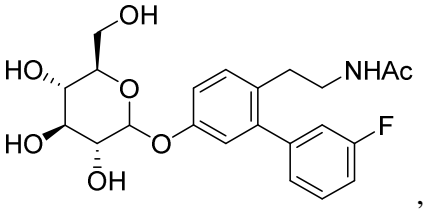
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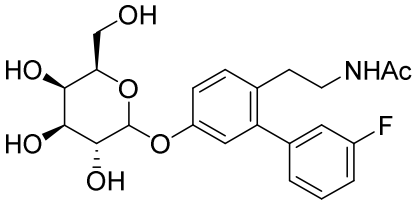


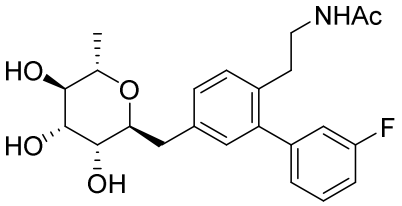
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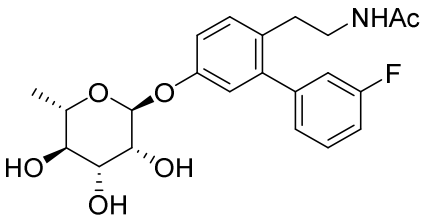
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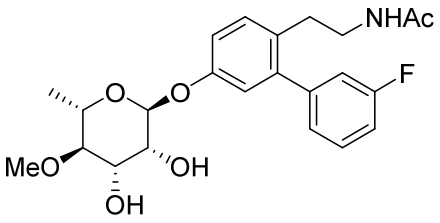
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or a pharmaceutically acceptable salt of any of these formulas.

17. The compound of claim 16, wherein the compound is further defined as:

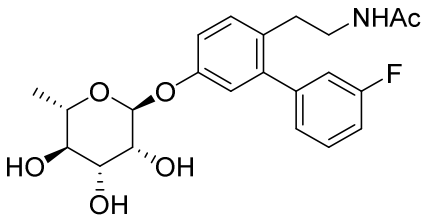


or


;

or a pharmaceutically acceptable salt of any of these formulas.

18. The compound of claim 17, wherein the compound is further defined as:



;

or a pharmaceutically acceptable salt of this formula.

19. A pharmaceutical composition comprising:

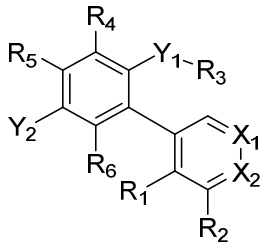
(A) a compound according to any one of claims 1-18; and

(B) an excipient.

20. A therapeutically effective amount of a compound or composition according to any one of claims 1-19 for use in therapy.

21. A method of making a compound according to any one of claims 1-19, comprising reacting (a) with (b) in the presence of a coupling agent:

(a) a compound of the formula:



(XXXIII),

wherein:

n is 0, 1, or 2;

Y_1 is −alkanediyl$_{(C\leq6)}$−, −C(O)−alkanediyl$_{(C\leq6)}$−, −alkanediyl$_{(C\leq6)}$−C(O)R_{17}, or a substituted version of any of these groups, wherein:

R_{17} is alkyl$_{(C\leq6)}$ or substituted alkyl$_{(C\leq6)}$;

Y_2 is hydroxy or mercapto;

R_1 is hydrogen, amino, halo, hydroxy, carboxy, or alkyl$_{(C\leq6)}$, alkenyl$_{(C\leq6)}$, alkynyl$_{(C\leq6)}$, cycloalkyl$_{(C\leq8)}$, heterocycloalkyl$_{(C\leq8)}$, amido$_{(C\leq6)}$, alkoxy$_{(C\leq6)}$, alkylsulfonyl$_{(C\leq6)}$, or a substituted version of any of these groups;

R_2 is hydrogen, amino, halo, hydroxy, carboxy, or alkyl$_{(C\leq6)}$, alkenyl$_{(C\leq6)}$, alkynyl$_{(C\leq6)}$, cycloalkyl$_{(C\leq8)}$, heterocycloalkyl$_{(C\leq8)}$, aryl$_{(C\leq12)}$, aralkyl$_{(C\leq12)}$, amido$_{(C\leq6)}$, alkoxy$_{(C\leq6)}$, alkylthio$_{(C\leq6)}$, alkylsulfonyl$_{(C\leq6)}$, or a substituted version of any of these groups;

R_2 and R_{15} are taken together and are alkanediyl$_{(C\leq6)}$, alkoxydiyl$_{(C\leq6)}$, alkylaminodiyl$_{(C\leq6)}$, or a substituted version of any of these groups;

R_3 is carboxy, $-NR_{11}R_{11}'$, or $-C(O)NR_{12}R_{12}'$, wherein:

R_{11} and R_{11}' are each independently hydrogen, alkyl$_{(C\leq6)}$, substituted alkyl$_{(C\leq6)}$, acyl$_{(C\leq6)}$, or substituted acyl$_{(C\leq6)}$;

R_{12} and R_{12}' are each independently hydrogen, alkyl$_{(C\leq6)}$, or substituted alkyl$_{(C\leq6)}$;

R_4, R_5, and R_6 are each independently absent, hydrogen, halo, alkyl$_{(C\leq6)}$, substituted alkyl$_{(C\leq6)}$, alkoxy$_{(C\leq6)}$, substituted alkoxy$_{(C\leq6)}$, aralkoxy$_{(C\leq12)}$, substituted aralkoxy$_{(C\leq12)}$, acyloxy$_{(C\leq6)}$, or substituted acyloxy$_{(C\leq6)}$;

X_1 is CR_{14} or N, wherein:

R_{14} is hydrogen, halo, hydroxy, or alkyl$_{(C\leq6)}$, alkenyl$_{(C\leq6)}$, alkynyl$_{(C\leq6)}$, alkoxy$_{(C\leq6)}$, alkylamino$_{(C\leq6)}$, −alkanediyl$_{(C\leq6)}$−heterocycloalkyl$_{(C\leq8)}$, or a substituted version of any of these groups; or

R_{14} and R_{15} are taken together and are alkanediyl$_{(C\leq6)}$, alkenediyl$_{(C\leq6)}$, alkoxydiyl$_{(C\leq6)}$, alkylaminodiyl$_{(C\leq6)}$, or a substituted version of any of these groups;

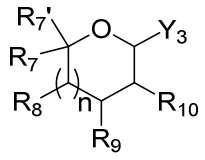
X_2 is CR_{15} or N, wherein:

R_{15} is hydrogen, halo, hydroxy, or alkyl$_{(C\leq6)}$, alkenyl$_{(C\leq6)}$, alkynyl$_{(C\leq6)}$, alkoxy$_{(C\leq6)}$, alkylamino$_{(C\leq6)}$, −alkanediyl$_{(C\leq6)}$−heterocycloalkyl$_{(C\leq8)}$, or a substituted version of any of these groups;

R_{15} and R_{14} are taken together and are alkanediyl$_{(C\leq6)}$, alkenediyl$_{(C\leq6)}$, alkoxydiyl$_{(C\leq6)}$, alkylaminodiyl$_{(C\leq6)}$, or a substituted version of any of these groups; or

R_{15} and R_2 are taken together and are alkanediyl$_{(C\leq6)}$, alkoxydiyl$_{(C\leq6)}$, alkylaminodiyl$_{(C\leq6)}$, or a substituted version of any of these groups;

(b) a compound of the formula:



(XXXIV),

wherein:

n is 0, 1, or 2;

Y_3 is hydroxy, halo, acyloxy$_{(C\leq 8)}$, iminooxy$_{(C\leq 8)}$,or a substituted version of either of these groups;

R_7 is hydroxy, carboxy, or alkyl$_{(C\leq 8)}$, alkenyl$_{(C\leq 8)}$, alkynyl$_{(C\leq 8)}$, cycloalkyl$_{(C\leq 8)}$, heterocycloalkyl$_{(C\leq 8)}$, aryl$_{(C\leq 12)}$, heteroaryl$_{(C\leq 12)}$, aralkyl$_{(C\leq 12)}$, heteroaralkyl$_{(C\leq 12)}$, −alkanediyl$_{(C\leq 6)}$−OR_{13}, or a substituted version of any of these groups wherein:

R_{13} is aralkyl$_{(C\leq 12)}$ or substituted aralkyl$_{(C\leq 12)}$;

R_7' is hydrogen; and

R_8, R_9, and R_{10} are each independently hydrogen, hydroxy, or alkyl$_{(C\leq 6)}$, alkoxy$_{(C\leq 6)}$, acyl$_{(C\leq 6)}$, acyloxy$_{(C\leq 6)}$, aralkyl$_{(C\leq 12)}$, aralkoxy$_{(C\leq 12)}$, or a substituted version of any of these groups.