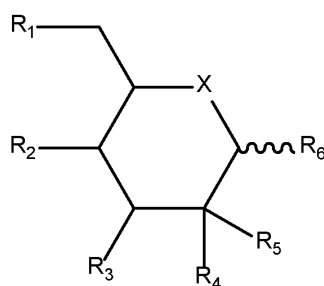


CLAIMS

What is claimed is:

1. A method of treating a viral infection comprising the administration, to a patient in need thereof, of a therapeutically effective amount of a compound of structural Formula I



5

(I)

or a pharmaceutically acceptable salt thereof, wherein:

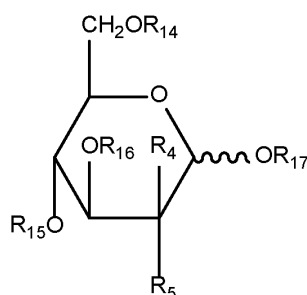
X is selected from the group consisting of O and S;

10 R₁, R₂, R₃, and R₆ are independently selected from the group consisting of hydrogen, hydroxyl, thiol, halogen, alkoxy, haloalkoxy, per haloalkoxy, alkoxyalkyloxy, -OC(O)alkyl, OCO₂alkyl, alkylthio, amino, alkylamino, N-sulfonamido, N-amido, and carbamate, any of which may be optionally substituted;

15 R₄ and R₅ are independently selected from the group consisting of hydrogen, hydroxyl, thiol, halogen, alkoxy, haloalkoxy, per haloalkoxy, alkoxyalkyloxy, -OC(O)alkyl, OCO₂alkyl, alkylthio, amino, alkylamino, N-sulfonamido, N-amido, carbamate, alkyl, haloalkyl, perhaloalkyl, -N(R₇)OR₈, -ON(R₉)₂, -N(R₁₀)N(R₁₁)₂, any of which may be optionally substituted, or R₄ and R₅, taken together, are selected from the group consisting of =N-OR₁₂ and =N-N(R₁₃)₂; and

20 R₇, R₈, R₉, R₁₀, R₁₁, R₁₂, and R₁₃ are each independently selected from the group consisting of hydrogen and alkyl, wherein said alkyl may be optionally substituted.

2. The method of claim 2, wherein said compound has structural Formula II



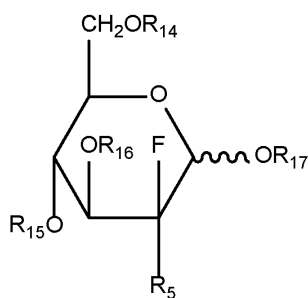
(II)

- 5 or a pharmaceutically acceptable salt thereof, wherein:

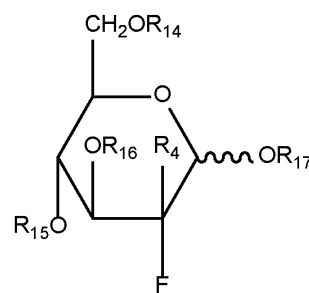
R₁₄, R₁₅, R₁₆, and R₁₇ are independently selected from the group consisting of hydrogen, COCH₃, COCH₂CH₃, and COCH₂CH₂CH₃; and

R₄ and R₅ are independently selected from the group consisting of hydrogen, Cl, Br, I, ¹⁸F, and ¹⁹F.

- 10 3. The method of claim 2, wherein R₄ and R₅ are independently selected from the group consisting of hydrogen, ¹⁸F, and ¹⁹F.
4. The method of claim 3, wherein R₁₄, R₁₅, R₁₆, and R₁₇ are independently selected from the group consisting of hydrogen and COCH₃.
5. The method of claim 1, wherein said compound has structural Formula III or structural
- 15 Formula IV



(III)



(IV)

- or a pharmaceutically acceptable salt thereof, wherein:

- 20 R₁₄, R₁₅, R₁₆, and R₁₇ are independently selected from the group consisting of hydrogen, COCH₃, COCH₂CH₃, and COCH₂CH₂CH₃;

R₄ and R₅ are independently selected from the group consisting of alkyl, lower alkyl, substituted alkyl, cycloalkyl, hydroxyl, alkoxy, acyl, alkenyl, alkylene, alkylamino, alkylthio, alkylidene, alkynyl, amido, carbamoyl, acylamino, carbamate,

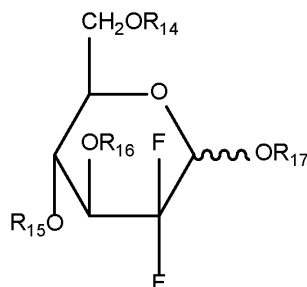
O-carbamyl, N-carbamyl, carbonyl, carboxy, carboxylate, ester, ether, halogen, haloalkoxy, haloalkyl, heteroalkyl, hydrazinyl, hydroxyalkyl, isocyanato, isothiocyanato, mercaptyl, nitro, oxy, NH_2 , $\text{NR}_{18}\text{R}_{19}$, and NHCOR_{20} ;

R_{18} and R_{19} are selected from the group consisting of hydrogen, alkyl, lower alkyl, substituted alkyl, cycloalkyl, acyl, alkenyl, alkylene, alkylamino, alkylthio, alkylidene, alkynyl, amido, haloalkyl, heteroalkyl, hydrazinyl, and hydroxyalkyl; and

R_{20} is selected from the group consisting of hydrogen, lower alkyl, substituted lower alkyl, alkenyl, alkylene, alkylamino, alkylthio, alkylidene, alkynyl, amido, carbamoyl, haloalkyl, and heteroalkyl.

6. The method of claim 5, wherein R_{14} , R_{15} , R_{16} , and R_{17} are hydrogen.

7. The method of claim 1, wherein said compound has structural Formula V



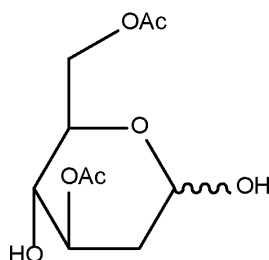
(V)

or a pharmaceutically acceptable salt thereof, wherein:

R_{14} , R_{15} , R_{16} , and R_{17} are independently selected from the group consisting of hydrogen, COCH_3 , COCH_2CH_3 , and $\text{COCH}_2\text{CH}_2\text{CH}_3$.

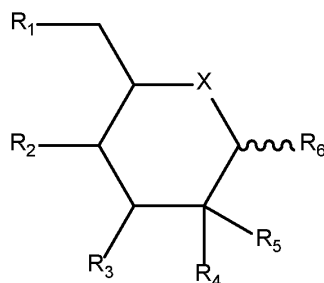
8. A method of treating a viral infection comprising the administration, to a patient in need thereof, a therapeutically effective amount of a compound selected from the group consisting of Examples 1 to 84, and pharmaceutically acceptable salts thereof.

9. The method of claim 2, wherein said compound has the structural formula:



and pharmaceutically acceptable salts thereof.

10. The method according to any one of claims 1-9, wherein said viral infection is caused by a virus selected from the group consisting of HIV-1, influenza virus, Lassa virus, corona virus including SARs-CoV-2, Zika virus, dengue virus, and Ebola virus.
11. The method according to any one of claims 1-9, wherein said viral infection is caused by a virus characterized by glycosylated envelope proteins on infected cells.
12. The method according to any one of claims 1-9, wherein the patient has COVID-19.
13. The method according to any one of claims 1-9, wherein the patient tests positive for COVID-19.
14. The method according to any one of claims 1-9, wherein the patient is asymptomatic.
15. A pharmaceutical composition for the treatment of a viral infection comprising a pharmaceutically acceptable carrier together with a compound of structural Formula I

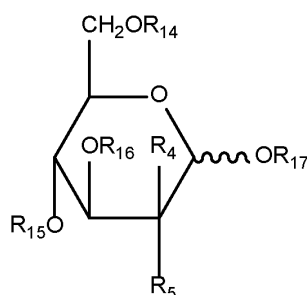


(I)

or a pharmaceutically acceptable salt thereof, wherein:

- 15 X is selected from the group consisting of O and S;
- R₁, R₂, R₃, and R₆ are independently selected from the group consisting of hydrogen, hydroxyl, thiol, halogen, alkoxy, haloalkoxy, per haloalkoxy, alkoxyalkyloxy, -OC(O)alkyl, OCO₂alkyl, alkylthio, amino, alkylamino, N-sulfonamido, N-amido, and carbamate, any of which may be optionally substituted;
- 20 R₄ and R₅ are independently selected from the group consisting of hydrogen, hydroxyl, thiol, halogen, alkoxy, haloalkoxy, per haloalkoxy, alkoxyalkyloxy, -OC(O)alkyl, OCO₂alkyl, alkylthio, amino, alkylamino, N-sulfonamido, N-amido, carbamate, alkyl, haloalkyl, perhaloalkyl, -N(R₇)OR₈, -ON(R₉)₂, -N(R₁₀)N(R₁₁)₂, any of which may be optionally substituted, or R₄ and R₅, taken together, are selected
- 25 from the group consisting of =N-OR₁₂ and =N-N(R₁₃)₂; and
- R₇, R₈, R₉, R₁₀, R₁₁, R₁₂, and R₁₃ are each independently selected from the group consisting of hydrogen and alkyl, wherein said alkyl may be optionally substituted.

16. The pharmaceutical composition of claim 15, wherein said compound has structural Formula II



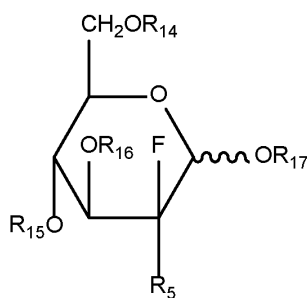
(II)

- 5 or a pharmaceutically acceptable salt thereof, wherein:

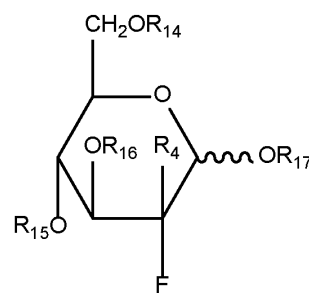
R_{14} , R_{15} , R_{16} , and R_{17} are independently selected from the group consisting of hydrogen, COCH_3 , COCH_2CH_3 , and $\text{COCH}_2\text{CH}_2\text{CH}_3$; and

R_4 and R_5 are independently selected from the group consisting of hydrogen, Cl, Br, I, ^{18}F , and ^{19}F .

- 10 17. The pharmaceutical composition of claim 16, wherein R_4 and R_5 are independently selected from the group consisting of hydrogen, ^{18}F , and ^{19}F .
18. The pharmaceutical composition of claim 17, wherein R_{14} , R_{15} , R_{16} , and R_{17} are independently selected from the group consisting of hydrogen and COCH_3 .
19. The pharmaceutical composition of claim 18, wherein said compound has structural Formula III or structural Formula IV



(III)



(IV)

- or a pharmaceutically acceptable salt thereof, wherein:

- 20 R_{14} , R_{15} , R_{16} , and R_{17} are independently selected from the group consisting of hydrogen, COCH_3 , COCH_2CH_3 , and $\text{COCH}_2\text{CH}_2\text{CH}_3$;

R_4 and R_5 are independently selected from the group consisting of alkyl, lower alkyl, substituted alkyl, cycloalkyl, hydroxyl, alkoxy, acyl, alkenyl, alkylene, alkylamino, alkylthio, alkylidene, alkynyl, amido, carbamoyl, acylamino, carbamate,

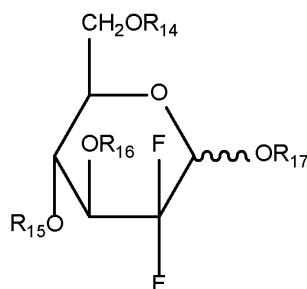
O-carbamyl, N-carbamyl, carbonyl, carboxy, carboxylate, ester, ether, halogen, haloalkoxy, haloalkyl, heteroalkyl, hydrazinyl, hydroxyalkyl, isocyanato, isothiocyanato, mercaptyl, nitro, oxy, NH_2 , $\text{NR}_{18}\text{R}_{19}$, and NHCOR_{20} ;

R_{18} and R_{19} are selected from the group consisting of hydrogen, alkyl, lower alkyl, substituted alkyl, cycloalkyl, acyl, alkenyl, alkylene, alkylamino, alkylthio, alkylidene, alkynyl, amido, haloalkyl, heteroalkyl, hydrazinyl, and hydroxyalkyl; and

R_{20} is selected from the group consisting of hydrogen, lower alkyl, substituted lower alkyl, alkenyl, alkylene, alkylamino, alkylthio, alkylidene, alkynyl, amido, carbamoyl, haloalkyl, and heteroalkyl.

20. The pharmaceutical composition of claim 19, wherein R_{14} , R_{15} , R_{16} , and R_{17} are hydrogen.

21. The pharmaceutical composition of claim 19, wherein said compound has structural Formula V



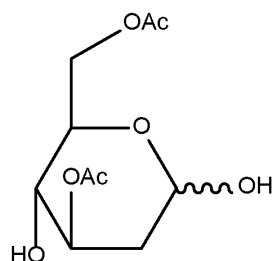
(V)

or a pharmaceutically acceptable salt thereof, wherein:

R_{14} , R_{15} , R_{16} , and R_{17} are independently selected from the group consisting of hydrogen, COCH_3 , COCH_2CH_3 , and $\text{COCH}_2\text{CH}_2\text{CH}_3$.

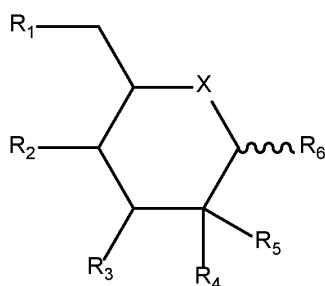
22. A pharmaceutical composition for the treatment of a viral infection comprising a pharmaceutically acceptable carrier together with a compound selected from the group consisting of Examples 1 to 84 and pharmaceutically acceptable salts thereof.

23. The pharmaceutical composition of claim 15 wherein the compound is



or pharmaceutically acceptable salt thereof.

24. A compound for use in the manufacture of a medicament for the prevention or treatment of a viral infection, having structural Formula I



(I)

5 or a pharmaceutically acceptable salt thereof, wherein:

X is selected from the group consisting of O and S;

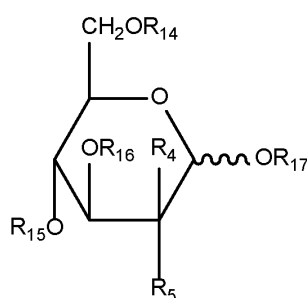
R₁, R₂, R₃, and R₆ are independently selected from the group consisting of hydrogen, hydroxyl, thiol, halogen, alkoxy, haloalkoxy, per haloalkoxy, alkoxyalkyloxy, -OC(O)alkyl, OCO₂alkyl, alkylthio, amino, alkylamino, N-sulfonamido, N-amido, and carbamate, any of which may be optionally substituted;

R₄ and R₅ are independently selected from the group consisting of hydrogen, hydroxyl, thiol, halogen, alkoxy, haloalkoxy, per haloalkoxy, alkoxyalkyloxy, -OC(O)alkyl, OCO₂alkyl, alkylthio, amino, alkylamino, N-sulfonamido, N-amido, carbamate, alkyl, haloalkyl, perhaloalkyl, -N(R₇)OR₈, -ON(R₉)₂, -N(R₁₀)N(R₁₁)₂, any of which may be optionally substituted, or R₄ and R₅, taken together, are selected from the group consisting of =N-OR₁₂ and =N-N(R₁₃)₂; and

R₇, R₈, R₉, R₁₀, R₁₁, R₁₂, and R₁₃ are each independently selected from the group consisting of hydrogen and alkyl, wherein said alkyl may be optionally substituted.

25. The compound of claim 24, wherein said viral infection is caused by a virus selected from the group consisting of HIV-1, influenza virus, Lassa virus, corona virus, including SARs-CoV-2, Zika virus, dengue virus, and Ebola virus.

26. The compound of claim 25, wherein said compound has structural Formula II



(II)

or a pharmaceutically acceptable salt thereof, wherein:

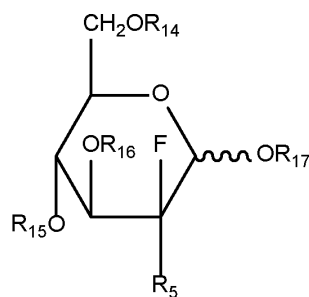
R_{14} , R_{15} , R_{16} , and R_{17} are independently selected from the group consisting of hydrogen, COCH_3 , COCH_2CH_3 , and $\text{COCH}_2\text{CH}_2\text{CH}_3$; and

R_4 and R_5 are independently selected from the group consisting of hydrogen, Cl, Br, I, ^{18}F , and ^{19}F .

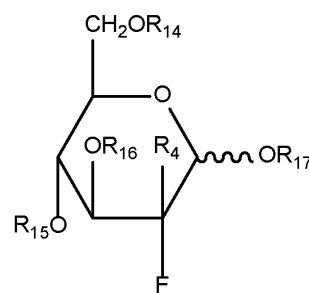
27. The compound of claim 26, wherein R_4 and R_5 are independently selected from the group consisting of hydrogen, ^{18}F , and ^{19}F .

28. The compound of claim 27, wherein R_{14} , R_{15} , R_{16} , and R_{17} are independently selected from the group consisting of hydrogen and COCH_3 .

29. The compound of claim 25, wherein said compound has structural Formula III or structural Formula IV



(III)



(IV)

or a pharmaceutically acceptable salt thereof, wherein:

R_{14} , R_{15} , R_{16} , and R_{17} are independently selected from the group consisting of hydrogen, COCH_3 , COCH_2CH_3 , and $\text{COCH}_2\text{CH}_2\text{CH}_3$;

R_4 and R_5 are independently selected from the group consisting of alkyl, lower alkyl, substituted alkyl, cycloalkyl, hydroxyl, alkoxy, acyl, alkenyl, alkylene, alkylamino, alkylthio, alkylidene, alkynyl, amido, carbamoyl, acylamino, carbamate, O-carbamyl, N-carbamyl, carbonyl, carboxy, carboxylate, ester, ether, halogen,

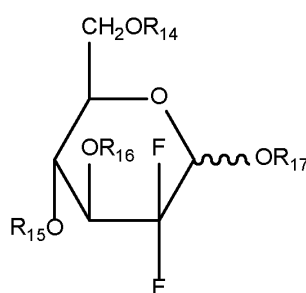
haloalkoxy, haloalkyl, heteroalkyl, hydrazinyl, hydroxyalkyl, isocyanato, isothiocyanato, mercaptyl, nitro, oxy, NH_2 , $\text{NR}_{18}\text{R}_{19}$, and NHCOR_{20} ;

R_{18} and R_{19} are selected from the group consisting of hydrogen, alkyl, lower alkyl, substituted alkyl, cycloalkyl, acyl, alkenyl, alkylene, alkylamino, alkylthio, alkylidene, alkynyl, amido, haloalkyl, heteroalkyl, hydrazinyl, and hydroxyalkyl; and

R_{20} is selected from the group consisting of hydrogen, lower alkyl, substituted lower alkyl, alkenyl, alkylene, alkylamino, alkylthio, alkylidene, alkynyl, amido, carbamoyl, haloalkyl, and heteroalkyl.

30. The compound of claim 29, wherein R_{14} , R_{15} , R_{16} , and R_{17} are hydrogen.

31. The compound of claim 25, wherein said compound has structural Formula V



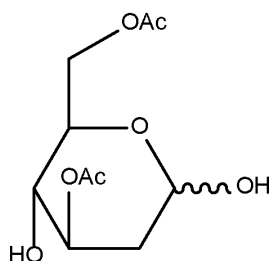
(V)

or a pharmaceutically salt thereof, wherein:

R_{14} , R_{15} , R_{16} , and R_{17} are independently selected from the group consisting of hydrogen, COCH_3 , COCH_2CH_3 , and $\text{COCH}_2\text{CH}_2\text{CH}_3$.

32. A compound for use in the manufacture of a medicament for the prevention or treatment of a viral infection, wherein the compound is selected from the group consisting of Examples 1 to 84, and pharmaceutically acceptable salts thereof.

33. The compound for use in the manufacture of a medicament for the prevention or treatment of a viral infection according to claim 25, wherein said compound has the structural formula:



or a pharmaceutically acceptable salt thereof.