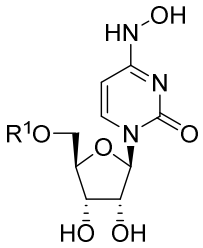
CLAIMS

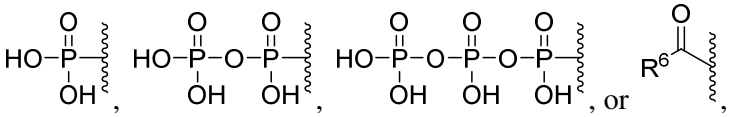
What is claimed is:

1. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula XXI,



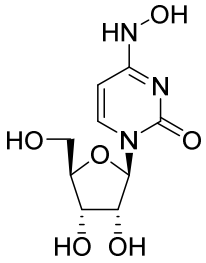
Formula XXI

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein R^1 is H,



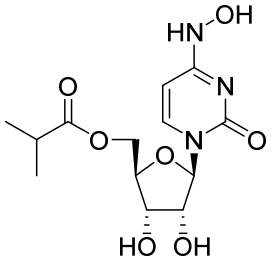
where R^6 is alkyl or carbocyclyl.

2. The pharmaceutical composition of claim 1, wherein the compound has the following structure:



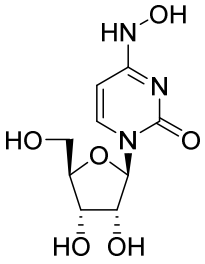
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof.

3. The pharmaceutical composition of claim 1, wherein the compound has the following structure:



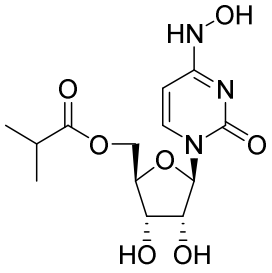
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof.

4. A pharmaceutical composition for the treatment of COVID-19, comprising a pharmaceutically acceptable excipient and a compound with the following structure:



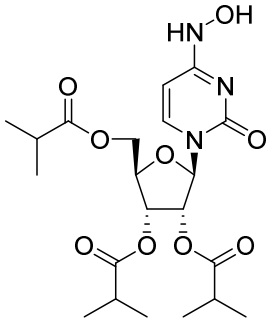
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof.

5. A pharmaceutical composition for the treatment of COVID-19, comprising a pharmaceutically acceptable excipient and a compound with the following structure:



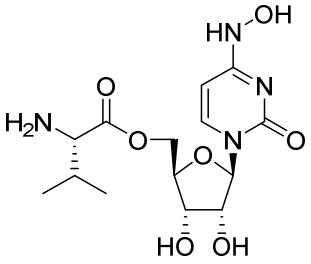
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof.

6. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound with the following structure:



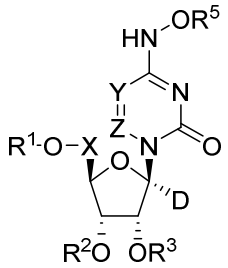
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof.

7. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound with the following structure:



or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof.

8. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula I,



Formula I

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

X is CH_2, $CHCH_3$, $C(CH_3)_2$, CHF, CF_2, or CD_2;

Y is N or CR';

Z is N or CR";

R' is hydrogen, deuterium, halogen, hydroxyl, amino, thiol, alkyl, alkenyl, alkynyl, aryl, heteroaryl, carbocyclyl, heterocarbocyclyl, cycloalkyl, heterocyclyl, or carbonyl, wherein R' is optionally substituted with one or more, the same or different, R^{10};

R" is hydrogen, deuterium, halogen, hydroxyl, amino, thiol, alkyl, alkenyl, alkynyl, aryl, heteroaryl, carbocyclyl, heterocarbocyclyl, cycloalkyl, heterocyclyl, hydroxyl, thiol, or carbonyl, wherein R" is optionally substituted with one or more, the same or different, R^{10};

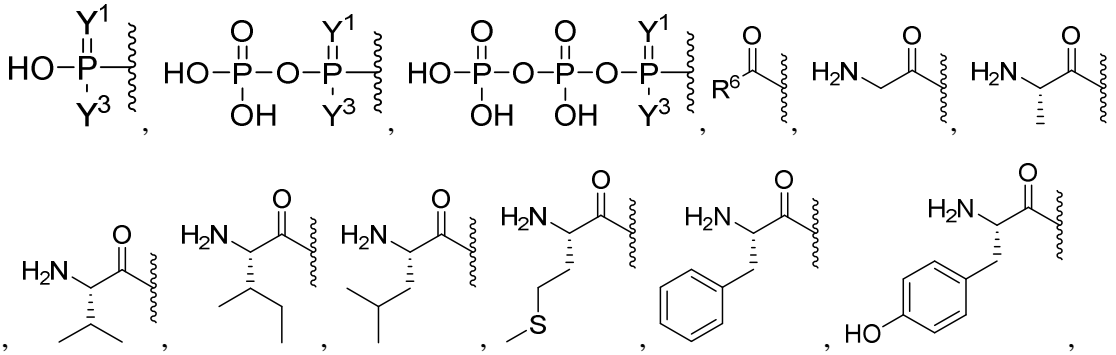
R^1, R^2, R^3, and R^5 are each independently selected from H, or together with the oxygen to which they are attached form optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^1, R^2, R^3, and R^5 are optionally substituted with one or more, the same or different, R^{10};

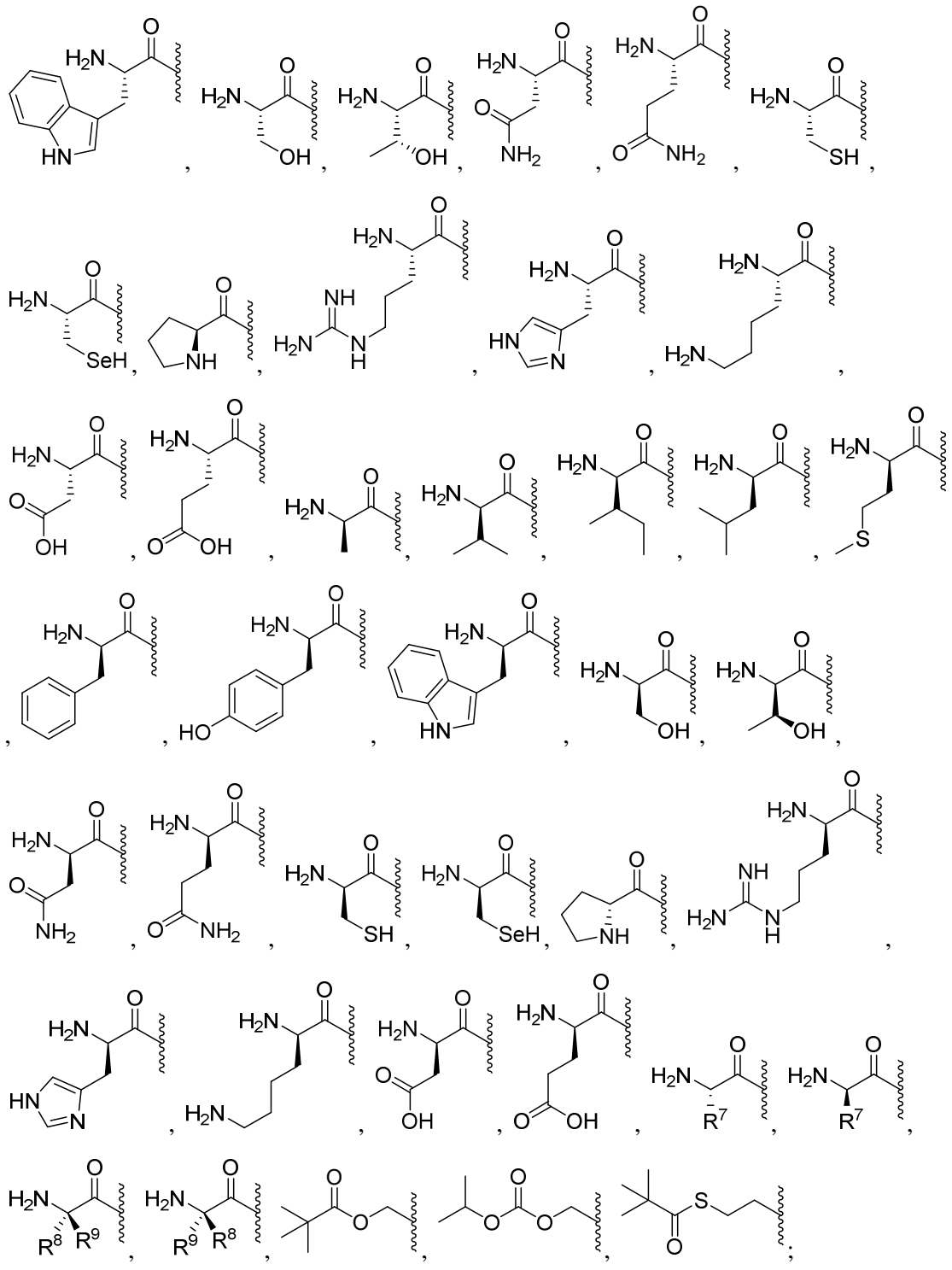
R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

9. The pharmaceutical composition of claim 8, wherein R^1, R^2, R^3, and R^5 are each independently selected from H,





Y^1 is O or S;

Y^3 is OH or $BH_3^-M^+$, where M is Li, Na, K, NH_4, $(CH_3CH_2)_3NH$, $(CH_3CH_2CH_2CH_2)_4N$;

R^6 is hydrogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, cyano, or lipid, wherein R^6 is optionally substituted with one or more, the same or different, R^{10};

R^7 is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^7 is optionally substituted with one or more, the same or different, R^{10};

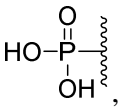
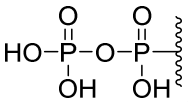
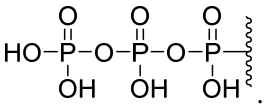
R^8 is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^8 is optionally substituted with one or more, the same or different, R^{10};

R^9 is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl,

lipid, nitro, or carbonyl, wherein R^9 is optionally substituted with one or more, the same or different, R^{10};

R^7, R^8, and R^9 can form a ring with the α-carbon they are attached to and the amino group attached to the α-carbon; and

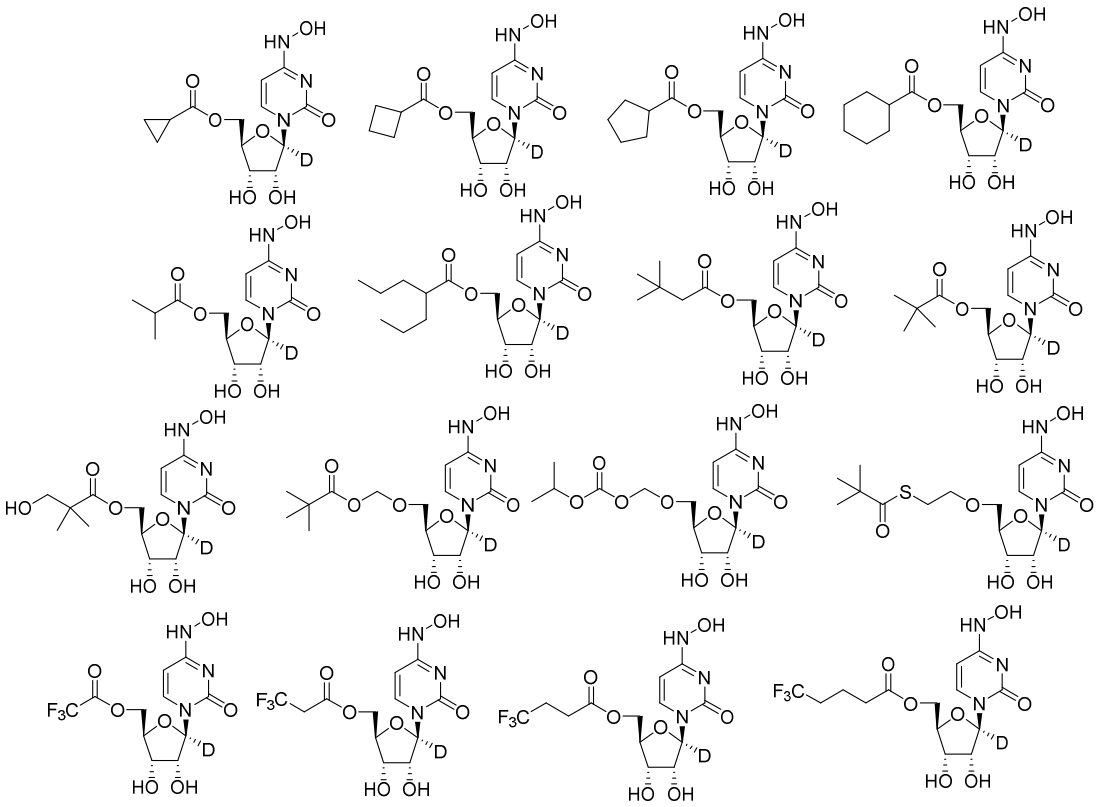
R^8 and R^9 can form a ring with the α-carbon to which they are attached.

10. The pharmaceutical composition of claim 9, wherein R^1 is hydrogen, , , or .

11. The pharmaceutical composition of claim 8, wherein R' is methyl, fluoro, hydroxymethyl, fluoromethyl, difluoromethyl, trifluoromethyl, trideuteromethyl, thiomethyl, carboxylic acid, formyl, vinyl, or ethynyl.

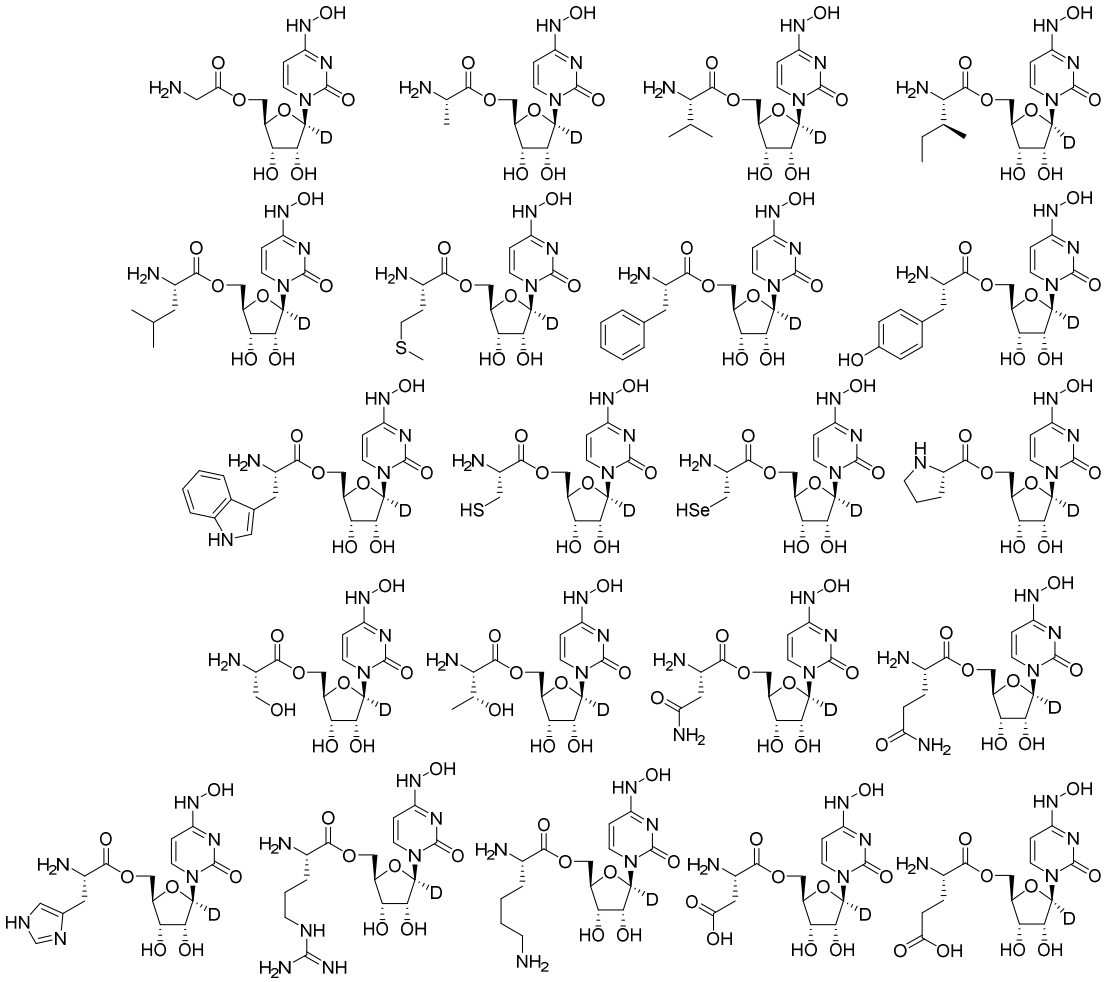
12. The pharmaceutical composition of claim 8, wherein R" is methyl, fluoro, hydroxymethyl, fluoromethyl, difluoromethyl, trifluoromethyl, trideuteromethyl, thiomethyl, carboxylic acid, formyl, vinyl, or ethynyl.

13. The pharmaceutical composition of claim 8, wherein the compound is selected from the following:



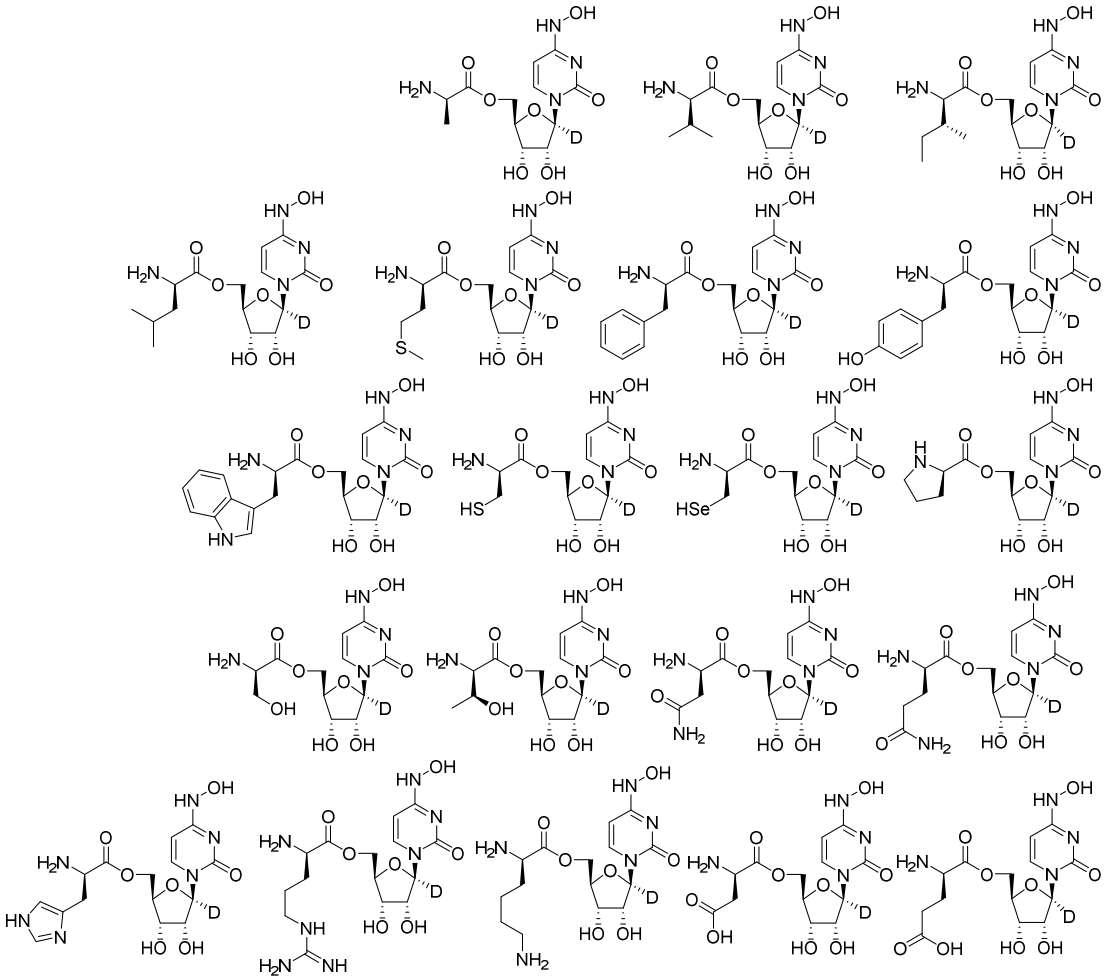
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof.

14. The pharmaceutical composition of claim 8, wherein the compound is selected from the following:



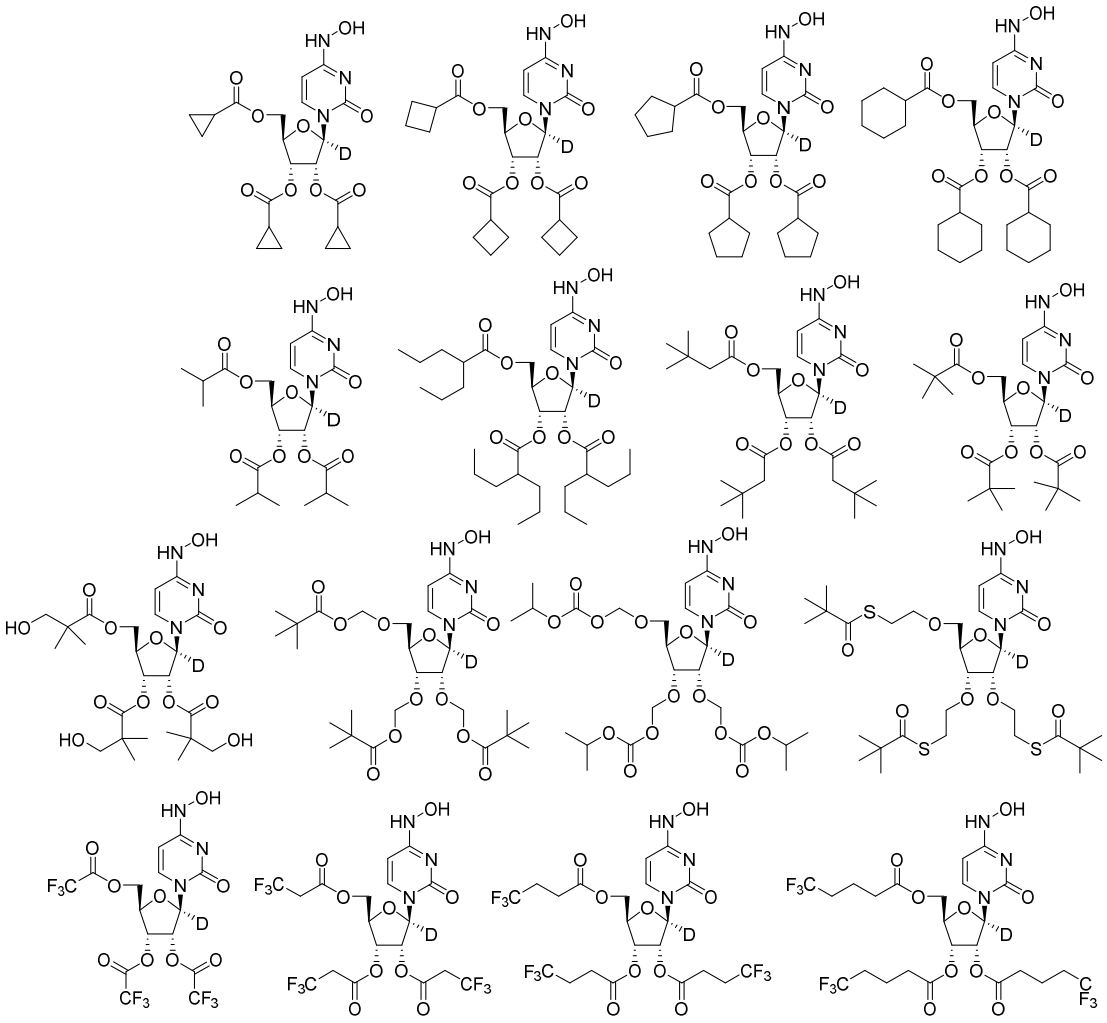
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof.

15. The pharmaceutical composition of claim 8, wherein the compound is selected from the following:



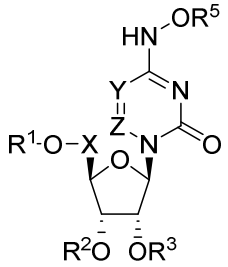
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof.

16. The pharmaceutical composition of claim 8, wherein the compound is selected from the following:



or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof.

17. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, wherein the compound is a compound of Formula II,



Formula II

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

X is CH_2, $CHCH_3$, $C(CH_3)_2$, CHF, CF_2, or CD_2;

Y is N or CR';

Z is N or CR";

R' is hydrogen, deuterium, halogen, hydroxyl, amino, thiol, alkyl, alkenyl, alkynyl, aryl, heteroaryl, carbocyclyl, heterocarbocyclyl, cycloalkyl, heterocyclyl, or carbonyl, wherein R' is optionally substituted with one or more, the same or different, R^{10};

R" is hydrogen, deuterium, halogen, hydroxyl, amino, thiol, alkyl, alkenyl, alkynyl, aryl, heteroaryl, carbocyclyl, heterocarbocyclyl, cycloalkyl, heterocyclyl, hydroxyl, thiol, or carbonyl, wherein R" is optionally substituted with one or more, the same or different, R^{10};

R^1, R^2, R^3, and R^5 are each independently selected from H, or, together with the oxygen to which they are bound, form optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-

esters, wherein R^1, R^2, R^3, and R^5 are optionally substituted with one or more, the same or different, R^{10};

with the proviso that R^1, R^2, R^3, and R^5 are not all H;

R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

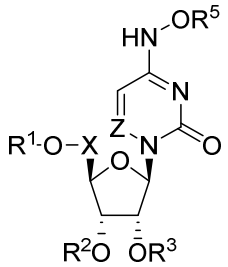
R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

18. The pharmaceutical composition of claim 17, wherein R' is methyl, fluoro, hydroxymethyl, fluoromethyl, difluoromethyl, trifluoromethyl, trideuteromethyl, thiomethyl, carboxylic acid, formyl, vinyl, or ethynyl.

19. The pharmaceutical composition of claim 17, wherein R" is methyl, fluoro, hydroxymethyl, fluoromethyl, difluoromethyl, trifluoromethyl, trideuteromethyl, thiomethyl, carboxylic acid, formyl, vinyl, or ethynyl.

20. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula III,



Formula III

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

X is CH_2, $CHCH_3$, $C(CH_3)_2$, CHF, CF_2, or CD_2;

Z is N or CR";

R" is hydrogen, deuterium, halogen, hydroxyl, amino, thiol, alkyl, alkenyl, alkynyl, aryl, heteroaryl, carbocyclyl, heterocarbocyclyl, cycloalkyl, heterocyclyl, hydroxyl, thiol, or carbonyl, wherein R" is optionally substituted with one or more, the same or different, R^{10};

R^1, R^2, R^3, and R^5 are each independently selected from H, or, together with the oxygen to which they are bound, form optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal,

optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^1, R^2, R^3, and R^5 are optionally substituted with one or more, the same or different, R^{10};

with the proviso that R^1, R^2, R^3, and R^5 are not all H;

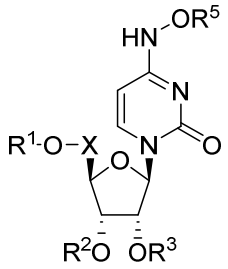
R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

21. The pharmaceutical composition of claim 20, wherein R" is methyl, fluoro, hydroxymethyl, fluoromethyl, difluoromethyl, trifluoromethyl, trideuteromethyl, thiomethyl, carboxylic acid, formyl, vinyl, or ethynyl.

22. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula IV,



Formula IV

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

X is $CHCH_3$, $C(CH_3)_2$, CHF, CF_2, or CD_2;

R^1, R^2, R^3, and R^5 are each independently selected from H, or, together with the oxygen to which they are bound, form optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally

substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^1, R^2, R^3, and R^5 are optionally substituted with one or more, the same or different, R^{10};

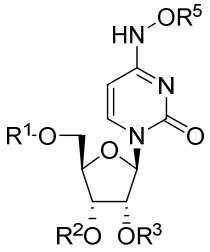
with the proviso that R^1, R^2, R^3, and R^5 are not all H;

R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

23. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula V,



Formula V

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

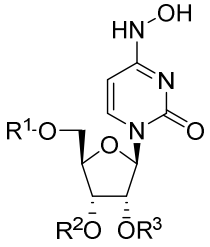
-O-R^1, -O-R^2, -O-R^3, and -O-R^5 are each independently selected from the following: optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^1, R^2, R^3, and R^5 are optionally substituted with one or more, the same or different, R^{10};

R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

24. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula VI,



Formula VI

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

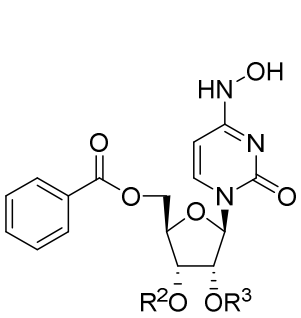
-O-R^1, -O-R^2, and -O-R^3 are each independently selected from the following: optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, oxymethoxy amino ester, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^1, R^2, and R^3 are optionally substituted with one or more, the same or different, R^{10};

R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

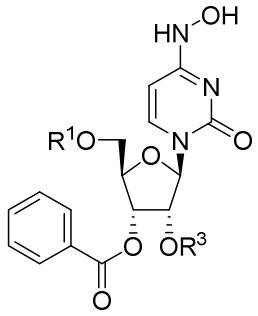
R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

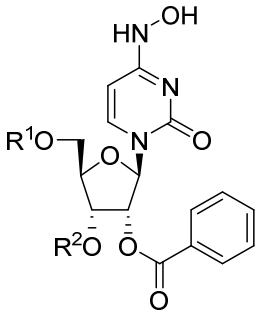
25. The pharmaceutical composition of claim 24, wherein the compound has Formula VIa-f,



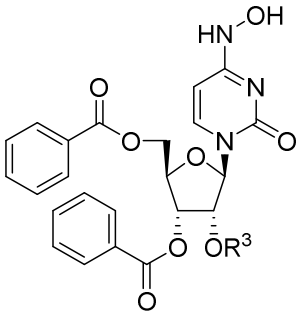
Formula VIa



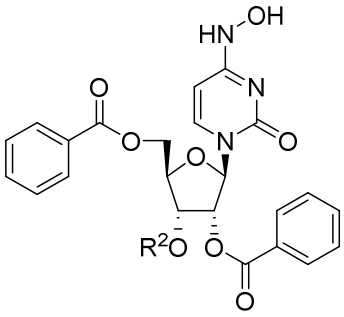
Formula VIb



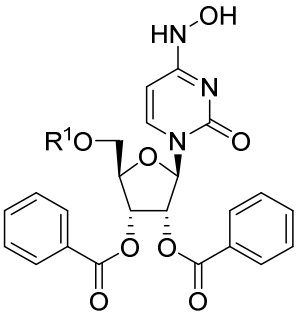
Formula Vic



Formula VId

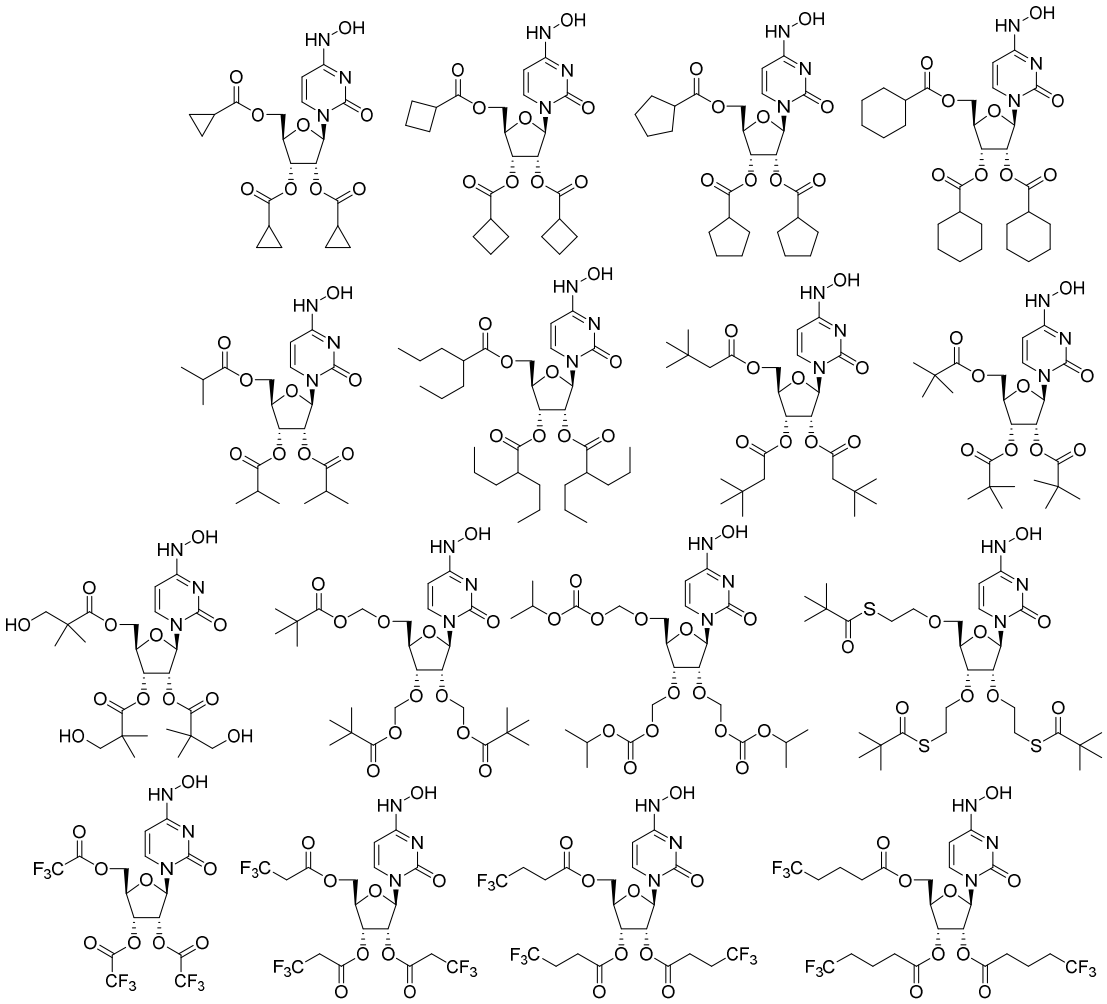


Formula VIe



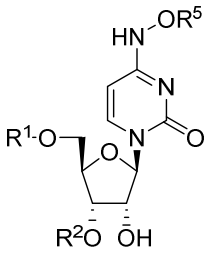
Formula VIf or a tautomer thereof, or a or a pharmaceutical salt or physiological salt thereof.

26. The pharmaceutical composition of claim 24, wherein the compound is selected from the following:



or a tautomer thereof, or a or a pharmaceutical salt or physiological salt thereof.

27. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula VII,



Formula VII

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

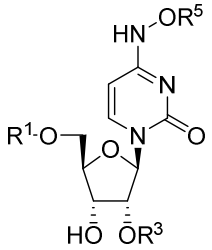
-O-R^1, -O-R^2, and -O-R^5 are each independently selected from the following: optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^1, R^2, and R^5 are optionally substituted with one or more, the same or different, R^{10};

R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

28. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula VIII,



Formula VIII

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

-O-R^1, -O-R^3, and -O-R^5 are each independently selected from the following: optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally

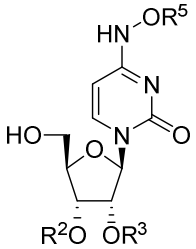
substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^1, R^3, and R^5 are optionally substituted with one or more, the same or different, R^{10};

R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

29. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula IX,



Formula IX

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

-O-R^2, -O-R^3, and -O-R^5 are each independently selected from the following: optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally

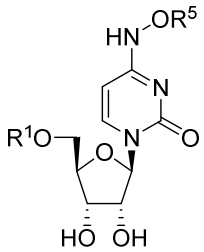
substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^2, R^3, and R^5 are optionally substituted with one or more, the same or different, R^{10};

R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

30. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula X,



Formula X

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

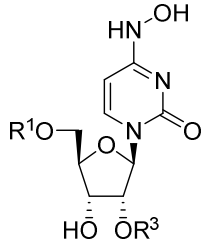
-O-R^1 and -O-R^5 are each independently selected from the following: optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^1 and R^5 are optionally substituted with one or more, the same or different, R^{10};

R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

31. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula XI,



Formula XI

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

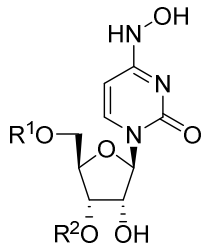
-O-R^1 and -O-R^3 are each independently selected from the following: optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^1 and R^3 are optionally substituted with one or more, the same or different, R^{10};

R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

32. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula XII,



Formula XII

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

-O-R^1 and -O-R^2 are each independently selected from the following: optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters,

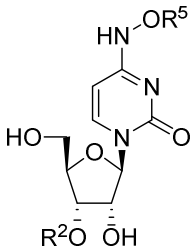
oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^1 and R^2 are optionally substituted with one or more, the same or different, R^{10};

R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

33. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula XIII,



Formula XIII

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

-O-R^2 and -O-R^5 are each independently selected from the following: optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted

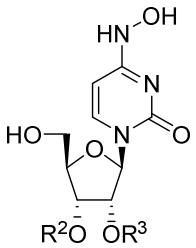
(acyloxybenzyl)esters, or BAB-esters, wherein R^2 and R^5 are optionally substituted with one or more, the same or different, R^{10};

R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

34. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula XIV,



Formula XIV

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

-O-R^2 and -O-R^3 are each independently selected from the following: optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^2 and R^3 are optionally substituted with one or more, the same or different, R^{10};

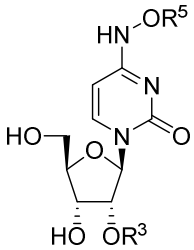
R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl,

lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

35. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula XV,



Formula XV

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

-O-R^3 and -O-R^5 are each independently selected from the following: optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate,

optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^3 and R^5 are optionally substituted with one or more, the same or different, R^{10};

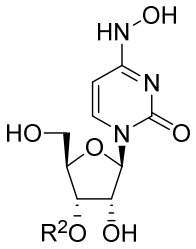
R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio,

heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

36. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula XVI,



Formula XVI

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

-O-R^2 is selected from the following: optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal,

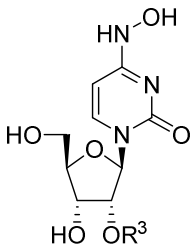
optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^2 are optionally substituted with one or more, the same or different, R^{10};

R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

37. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula XVII,



Formula XVII

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

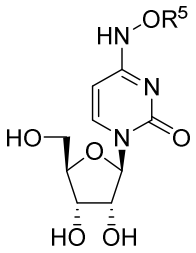
-O-R^3 is selected from the following: optionally substituted esters, optionally substituted branched esters, optionally substituted carbonates, optionally substituted carbamates, optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^3 are optionally substituted with one or more, the same or different, R^{10};

R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

38. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound of Formula XIX,



Formula XIX

or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, wherein

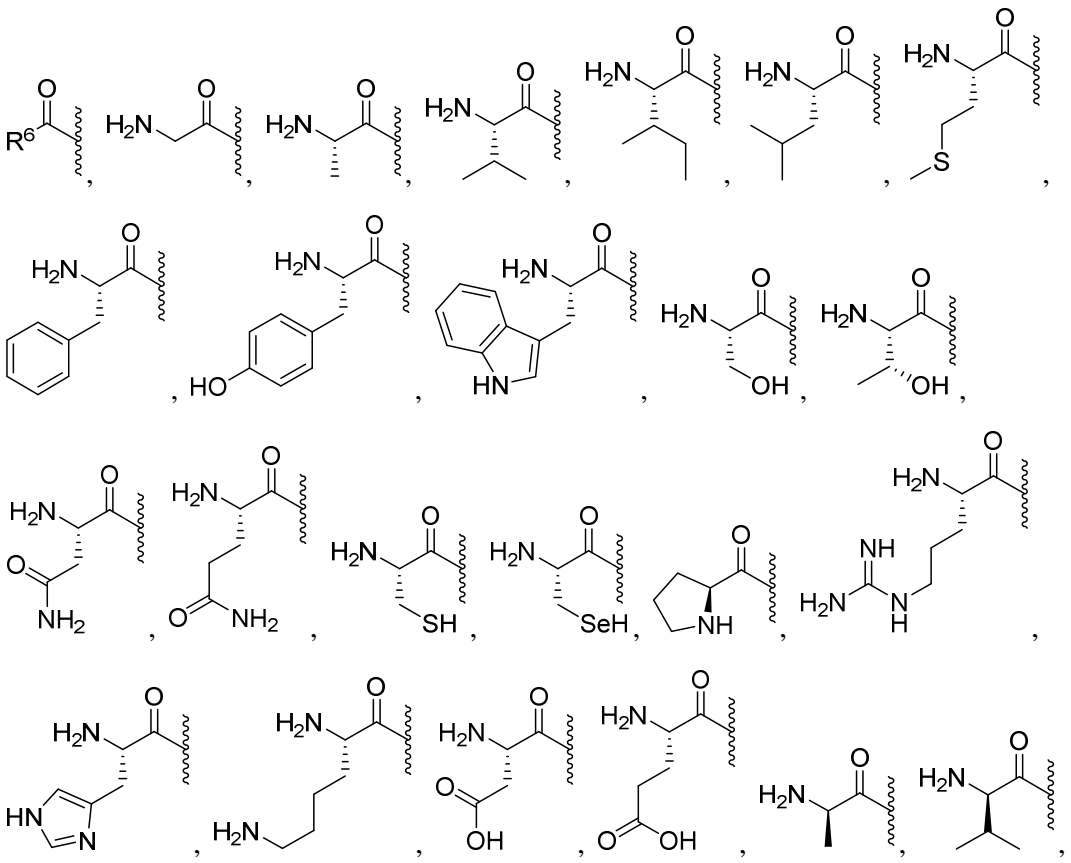
-O-R^5 is selected from the following: optionally substituted thioesters, optionally substituted branched thioesters, optionally substituted thiocarbonates, sulfenyl thiocarbonates, optionally substituted sulfenyl thiocarbonates, 2-hydroxypropanoate ester, optionally substitute 2-hydroxypropanoate ester, optionally substituted S-thiocarbonate, optionally substituted dithiocarbonates, optionally substituted thiocarbamates, optionally substituted oxymethoxycarbonyl, oxymethoxycarbonate, optionally substituted oxymethoxycarbonate, optionally substituted oxymethoxythiocarbonyl, optionally substituted oxymethylcarbonyl, optionally substituted oxymethylthiocarbonyl, oxymethoxythiocarbonate, optionally substituted oxymethoxythiocarbonate, L-amino acid esters, D-amino acid esters, oxymethoxy amino ester, N-substituted L-amino acid esters, N,N-disubstituted L-amino acid esters, N-substituted D-amino acid esters, N,N-disubstituted D-amino acid esters, optionally substituted sulfenyl, sulfinyl, sulfonyl, sulfite, sulfate, sulfonamide, optionally substituted imidate, optionally substituted hydrazonate, optionally substituted oximyl, optionally substituted imidinyl, optionally substituted imidyl, optionally substituted aminal, optionally substituted hemiaminal, optionally substituted acetal, optionally substituted hemiacetal, optionally substituted carbonimidate, optionally substituted thiocarbonimidate, optionally substituted carbonimidyl, optionally substituted carbamimidate, optionally substituted carbamimidyl, optionally substituted thioacetal, optionally substituted S-acyl-2-thioethyl, (acyloxybenzyl)ether, (acyloxybenzyl)ester, PEG ester, PEG carbonate, optionally substituted bis-(acyloxybenzyl)esters, optionally substituted (acyloxybenzyl)esters, or BAB-esters, wherein R^5 are optionally substituted with one or more, the same or different, R^{10};

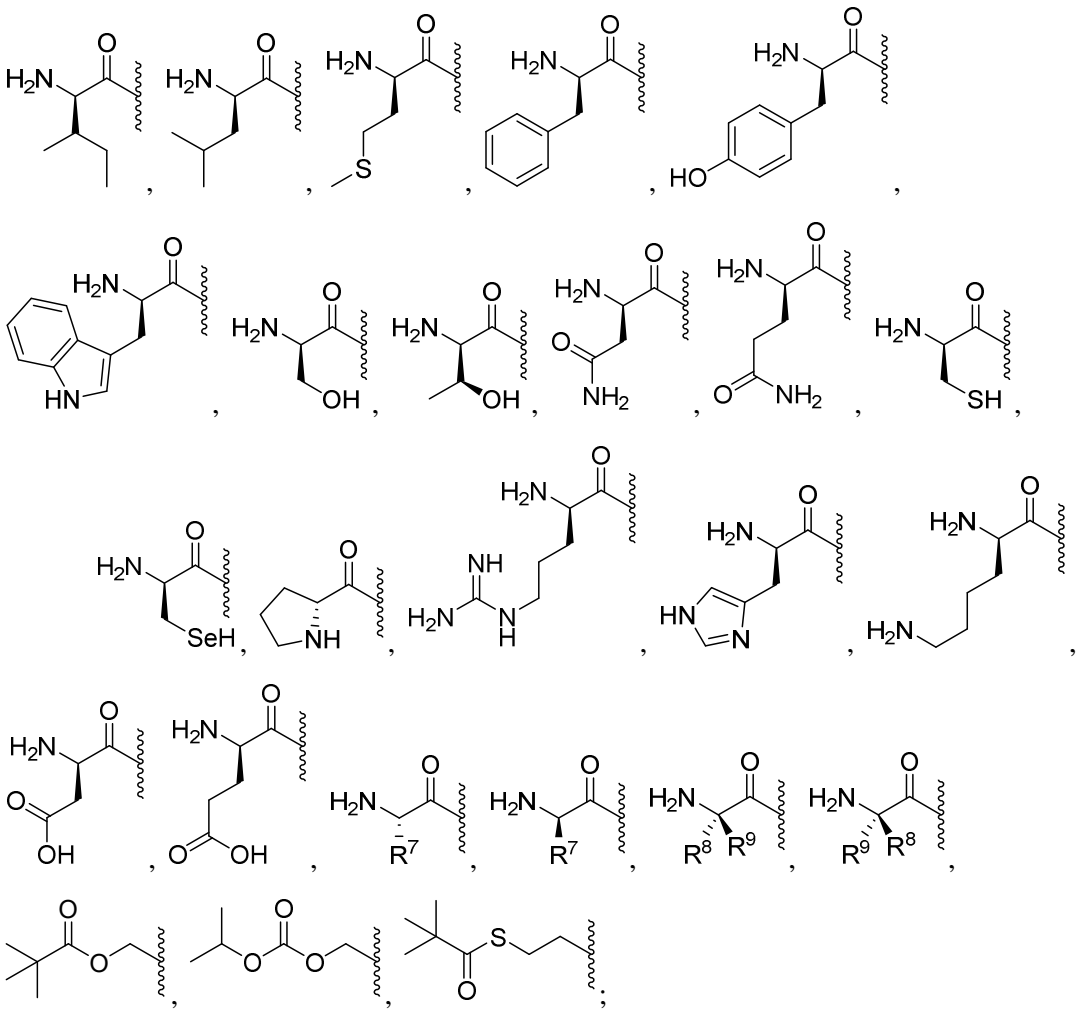
R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

39. The pharmaceutical composition of claim 38, wherein R^5 is selected from the following:





R^6 is hydrogen, C_2-C_7 n-alkyl, optionally substituted C_8 n-alkyl, C_9-C_{22} n-alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, C_3-C_9 cycloalkyl, C_{11}-C_{22} cycloalkyl, optionally substituted C_{10} cycloalkyl, cycloalkenyl, -O(C_1-C_6 n-alkyl), -O(optionally substituted C_7 n-alkyl), -O(C_8-C_{21} n-alkyl), -O(branched alkyl), carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, -N(C_2-C_{21} n-alkyl)$_2$, -N(optionally substituted C_1 alkyl)$_2$, -NH(optionally substituted C_1 alkyl), -NH(C_2-C_6 n-alkyl), -NH(optionally substituted C_7 n-alkyl), -NH(C_8-C_{15} n-alkyl), -NH(optionally substituted C_{16} n-alkyl), -NH(C_{17} n-alkyl), -NH(optionally substituted C_{18} n-alkyl), -NH(C_{19}-C_{21} n-alkyl), -NH(branched alkyl), -N(branched alkyl)$_2$, carbocyclamino, heterocarbocyclamino, optionally substituted arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, cyano, or lipid, wherein R^6 is optionally substituted with one or more, the same or different, R^{10};

R^7 is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^7 is optionally substituted with one or more, the same or different, R^{10};

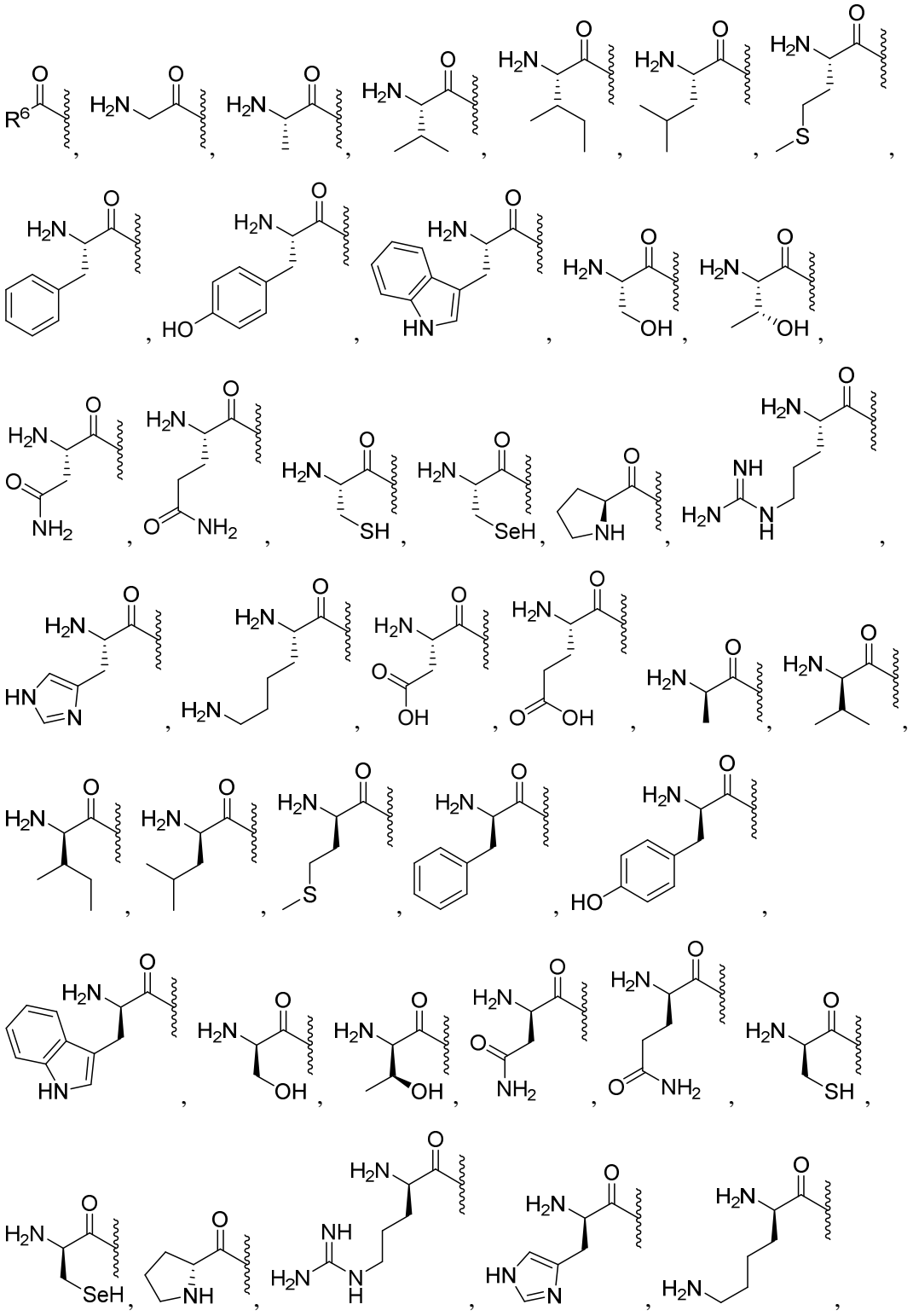
R^8 is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^8 is optionally substituted with one or more, the same or different, R^{10};

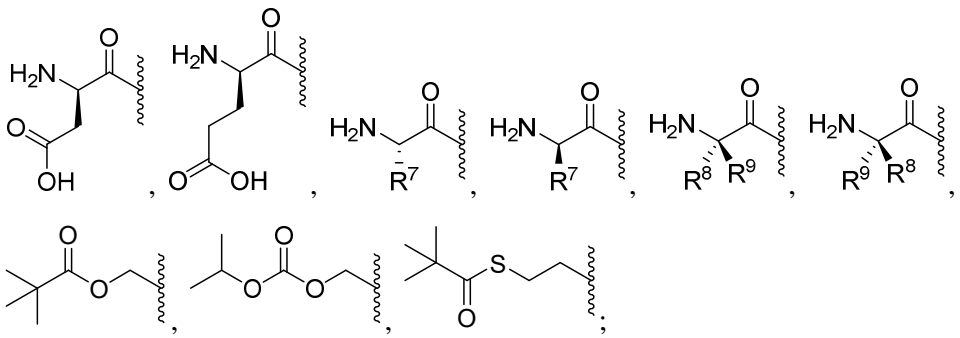
R^9 is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^9 is optionally substituted with one or more, the same or different, R^{10};

R^7, R^8, and R^9 can form a ring with the α-carbon they are attached to and the amino group attached to the α-carbon; and

R^8 and R^9 can form a ring with the α-carbon to which they are attached.

40. The pharmaceutical composition of any one of claims 8, 11, 12, 17-23, or 26-38, wherein R^1, R^2, R^3, and R^5 are each independently selected from H,





with the proviso that R^1, R^2, R^3, and R^5 are not all H;

R^6 is hydrogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, cyano, or lipid, wherein R^6 is optionally substituted with one or more, the same or different, R^{10};

R^7 is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^7 is optionally substituted with one or more, the same or different, R^{10};

R^8 is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl,

lipid, nitro, or carbonyl, wherein R^8 is optionally substituted with one or more, the same or different, R^{10};

R^9 is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^9 is optionally substituted with one or more, the same or different, R^{10};

R^7, R^8, and R^9 can form a ring with the α-carbon they are attached to and the amino group attached to the α-carbon;

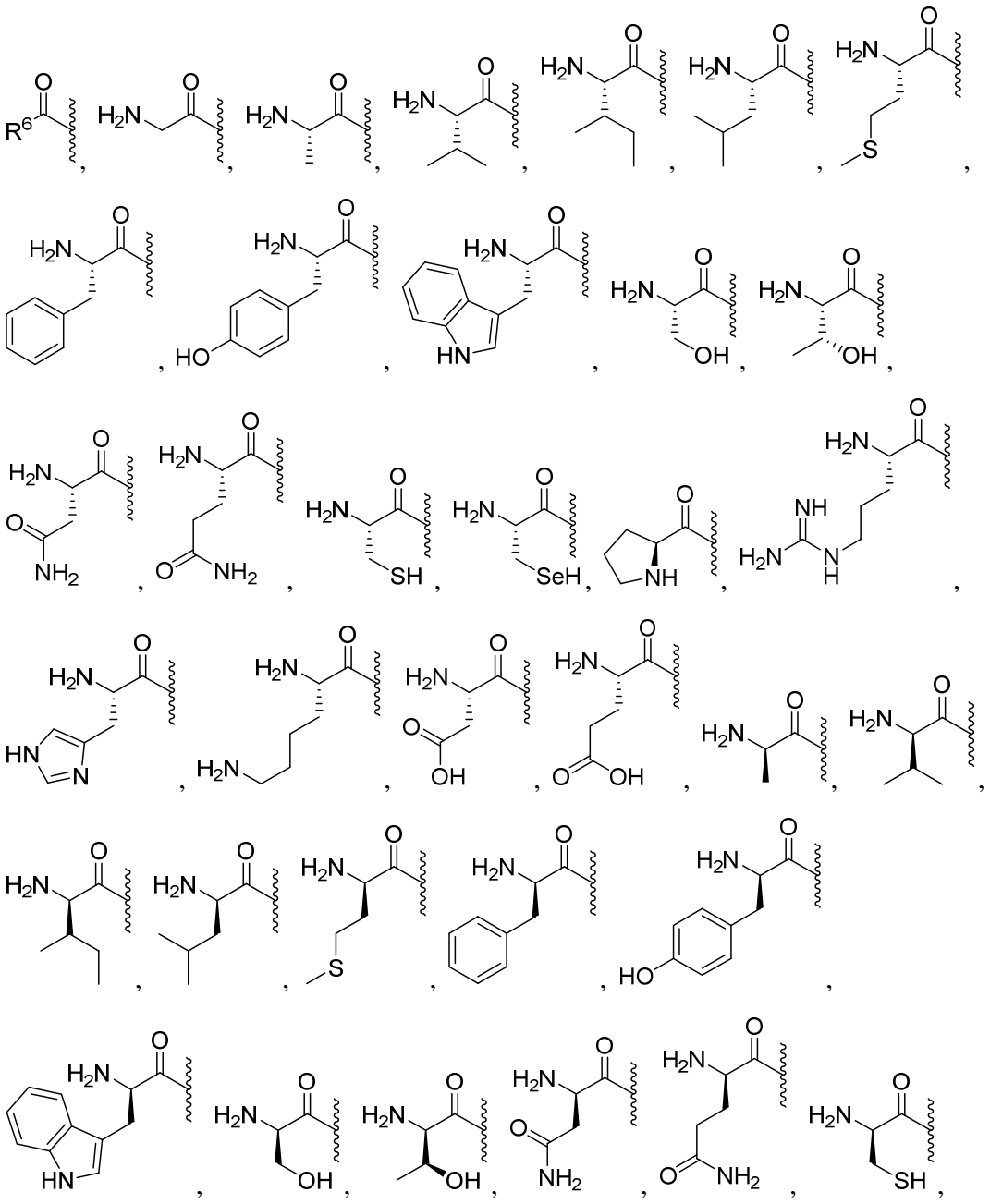
R^8 and R^9 can form a ring with the α-carbon to which they are attached;

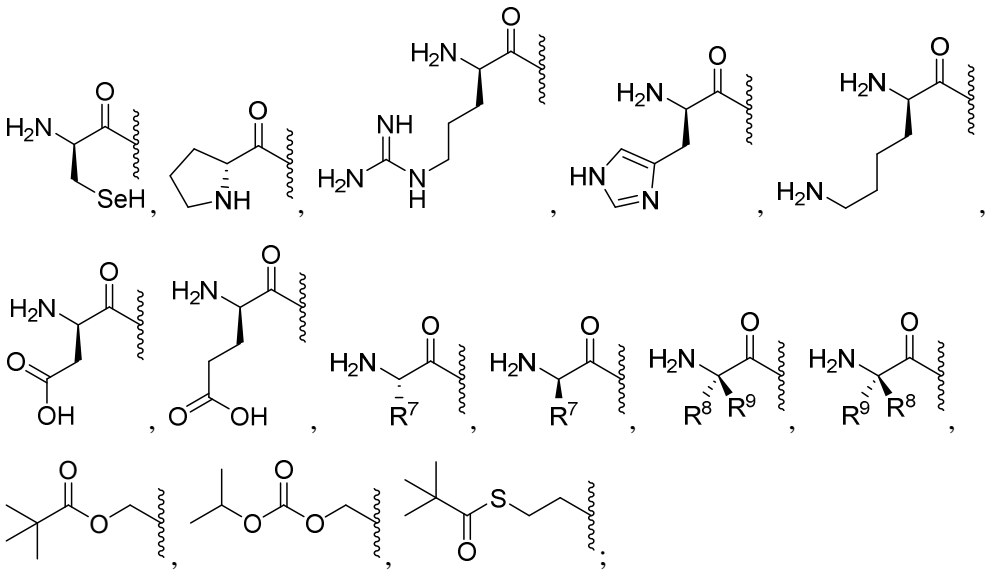
R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

41. The pharmaceutical composition of claim 24 or 25, wherein R^1, R^2, and R^3 are each independently selected from the following:





R^6 is hydrogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, optionally substituted phenyl, optionally substituted aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, cyano, or lipid, wherein R^6 is optionally substituted with one or more, the same or different, R^{10};

R^7 is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^7 is optionally substituted with one or more, the same or different, R^{10};

R^8 is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy,

heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^8 is optionally substituted with one or more, the same or different, R^{10};

R^9 is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^9 is optionally substituted with one or more, the same or different, R^{10};

R^7, R^8, and R^9 can form a ring with the α-carbon they are attached to and the amino group attached to the α-carbon;

R^8 and R^9 can form a ring with the α-carbon to which they are attached;

R^{10} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino, heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl, wherein R^{10} is optionally substituted with one or more, the same or different, R^{11};

R^{11} is hydrogen, deuterium, hydroxy, azido, thiol, amino, cyano, halogen, alkyl, alkenyl, alkynyl, carbocyclyl, heterocarbocyclyl, aryl, heteroaryl, heterocyclyl, cycloalkyl, cycloalkenyl, alkoxy, carbocycloxy, heterocarbocycloxy, aryloxy, heteroaryloxy, heterocycloxy, cycloalkoxy, cycloalkenoxy, alkylamino, $(alkyl)_2$amino, carbocyclamino,

heterocarbocyclamino, arylamino, heteroarylamino, heterocyclamino, cycloalkamino, cycloalkenamino, alkylthio, carbocyclylthio, heterocarbocyclylthio, arylthio, heteroarylthio, heterocyclylthio, cycloalkylthio, cycloalkenylthio, allenyl, sulfinyl, sulfamoyl, sulfonyl, lipid, nitro, or carbonyl; and

Lipid is a C_{11}-C_{22} higher alkyl, C_{11}-C_{22} higher alkoxy, polyethylene glycol, or aryl substituted with an alkyl group, or a lipid as described herein.

42. The pharmaceutical composition of any one of claims 1-41, further comprising a propellant.

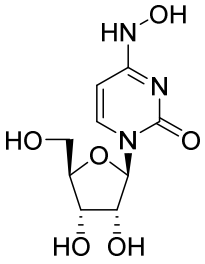
43. The pharmaceutical composition of claim 42, wherein the propellant is compressed air, ethanol, nitrogen, carbon dioxide, nitrous oxide, hydrofluoroalkanes (HFA), 1,1,1,2,-tetrafluoroethane, 1,1,1,2,3,3,3-heptafluoropropane or combinations thereof.

44. A pressurized container comprising a pharmaceutical composition of any one of claims 1-41.

45. The container of claim 44, which is a manual pump spray, inhaler, meter-dosed inhaler, dry powder inhaler, nebulizer, vibrating mesh nebulizer, jet nebulizer, or ultrasonic wave nebulizer.

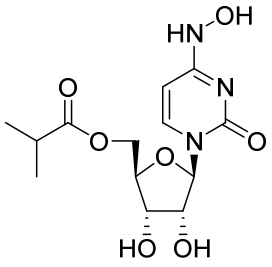
46. Use of an effective amount of a composition of any one of claims 1-43 in the manufacture of a medicament for treating or preventing 2019nCoV/SARS-CoV-2 infection in a subject.

47. Use of an effective amount of a compound with the structure:



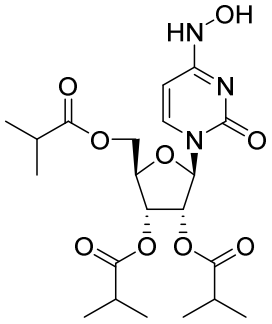
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, in the manufacture of a medicament for treating 2019nCoV/SARS-CoV-2 virus infection in a patient.

48. Use of an effective amount of a compound with the structure:



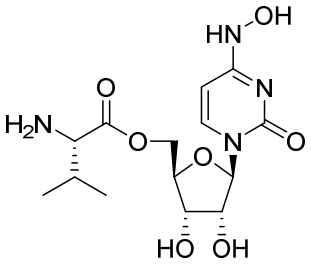
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, in the manufacture of a medicament for treating 2019nCoV/SARS-CoV-2 virus infection in a patient.

49. Use of an effective amount of a compound with the structure:



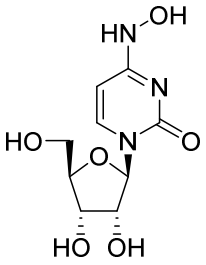
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, in the manufacture of a medicament for treating or preventing 2019nCoV/SARS-CoV-2 infection in a patient.

50. Use of an effective amount of a compound with the structure:



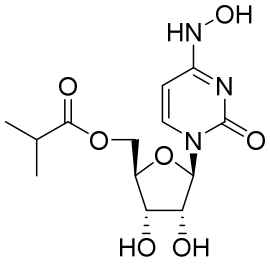
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, in the manufacture of a medicament for treating or preventing 2019nCoV/SARS-CoV-2 infection in a patient.

51. Use of an effective amount of a compound with the structure:



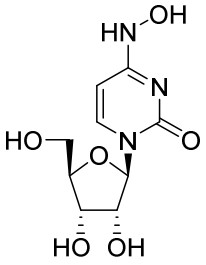
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, in the manufacture of a medicament for treating COVID in a patient.

52. Use of an effective amount of a compound with the structure:



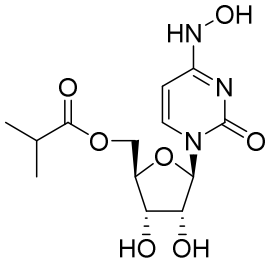
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, in the manufacture of a medicament for treating COVID-19 in a patient.

53. Use of an effective amount of a compound with the structure:



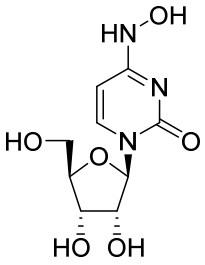
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, in the manufacture of a medicament for preventing 2019nCoV/SARS-CoV-2 virus infection in a patient in need thereof.

54. Use of an effective amount of a compound with the structure:



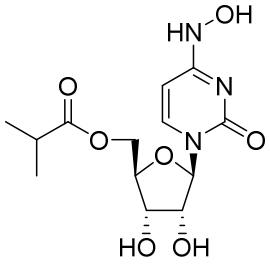
or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, in the manufacture of a medicament for preventing 2019nCoV/SARS-CoV-2 virus infection in a patient.

55. Use of an effective amount of a compound with the structure:



or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, in the manufacture of a medicament for preventing COVID in a patient.

56. Use of an effective amount of a compound with the structure:

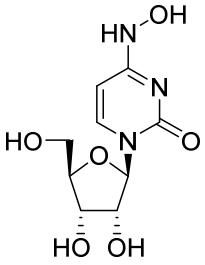


or a tautomer thereof, or a pharmaceutical salt or physiological salt thereof, in the manufacture of a medicament for preventing COVID-19 in a patient.

57. A pharmaceutical composition of any one of claims 1-43, further comprising one or more antiviral agent.

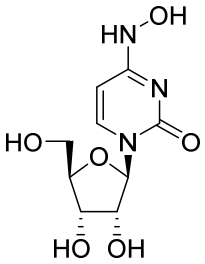
58. The pharmaceutical composition of claim 57, wherein the one or more antiviral agent is selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, BCX4430/Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir, delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine, enfuvirtide, entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, GS-5734/Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir, inosine, interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine, zalcitabine, zanamivir, and zidovudine and combinations thereof.

59. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound with the following structure:



or a tautomer thereof, or pharmaceutical salt or physiological salt thereof, and one or more antiviral agent selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir, delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine, enfuvirtide, entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir, inosine, interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine zalcitabine, zanamivir, and zidovudine, and combinations thereof.

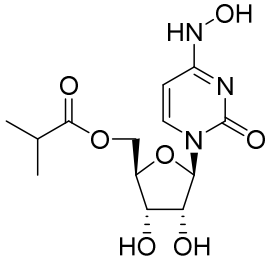
60. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a compound with the following structure:



or a tautomer thereof, or pharmaceutical salt or physiological salt thereof, and one or more antiviral agent selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir,

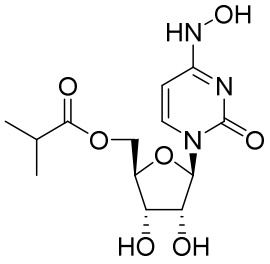
delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine, enfuvirtide, entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir, inosine, interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine zalcitabine, zanamivir, and zidovudine, and combinations thereof.

61. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound with the following structure:



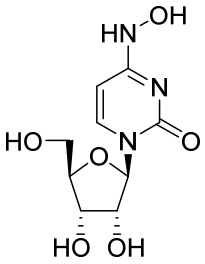
or a tautomer thereof, or pharmaceutical salt or physiological salt thereof, and one or more antiviral agent selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir, delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine, enfuvirtide, entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir, inosine, interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine zalcitabine, zanamivir, and zidovudine, and combinations thereof.

62. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a compound with the following structure:



or a tautomer thereof, or pharmaceutical salt or physiological salt thereof , and one or more antiviral agent selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir, delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine, enfuvirtide, entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir, inosine, interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine zalcitabine, zanamivir, and zidovudine, and combinations thereof.

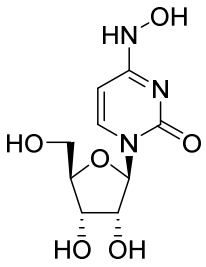
63. A pharmaceutical composition for the treatment of COVID-19, comprising a pharmaceutically acceptable excipient and a compound with the following structure:



or a tautomer thereof, or pharmaceutical salt or physiological salt thereof, and one or more antiviral agent selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir, delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine, enfuvirtide,

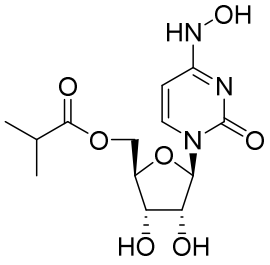
entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir, inosine, interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine zalcitabine, zanamivir, and zidovudine, and combinations thereof.

64. A pharmaceutical composition for the treatment of COVID-19, comprising a compound with the following structure:



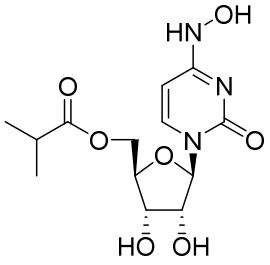
or a tautomer thereof, or pharmaceutical salt or physiological salt thereof, and one or more antiviral agent selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir, delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine, enfuvirtide, entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir, inosine, interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine, zalcitabine, zanamivir, and zidovudine, and combinations thereof.

65. A pharmaceutical composition for the treatment of COVID-19, comprising a pharmaceutically acceptable excipient and a compound with the following structure:



or a tautomer thereof, or pharmaceutical salt or physiological salt thereof, and one or more antiviral agent selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir, delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine, enfuvirtide, entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir, inosine, interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine, zalcitabine, zanamivir, and zidovudine, and combinations thereof.

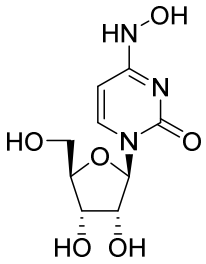
66. A pharmaceutical composition for the treatment of COVID-19, comprising a compound with the following structure:



or a tautomer thereof, or pharmaceutical salt or physiological salt thereof, and one or more antiviral agent selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir, delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine, enfuvirtide, entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir,

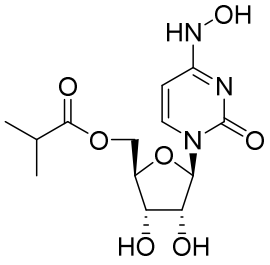
inosine, interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine, zalcitabine, zanamivir, and zidovudine, and combinations thereof.

67. Use of an effective amount of a compound with the following structure:



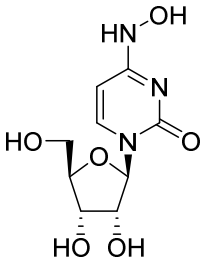
or a tautomer thereof, or pharmaceutical salt or physiological salt thereof, and one or more antiviral agent selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir, delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine, enfuvirtide, entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir, inosine, interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine, zalcitabine, zanamivir, and zidovudine, and combinations thereof, in the manufacture of a medicament for treating a 2019nCoV/SARS-CoV-2 infection.

68. Use of an effective amount of a compound with the following structure:



or a tautomer thereof, or pharmaceutical salt or physiological salt thereof, and one or more antiviral agent selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir, delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine, enfuvirtide, entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir, inosine, interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine, zalcitabine, zanamivir, and zidovudine, and combinations thereof, in the manufacture of a medicament for treating a 2019nCoV/SARS-CoV-2 infection.

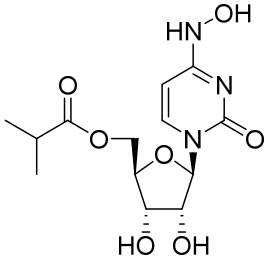
69. Use of an effective amount of a compound with the following structure:



or a tautomer thereof, or pharmaceutical salt or physiological salt thereof, and one or more antiviral agent selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir, delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine, enfuvirtide, entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir, inosine,

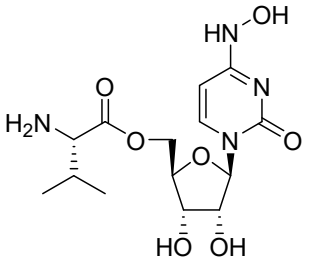
interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine zalcitabine, zanamivir, and zidovudine, and combinations thereof, in the manufacture of a medicament for treating COVID-19.

70. Use of an effective amount of a compound with the following structure:



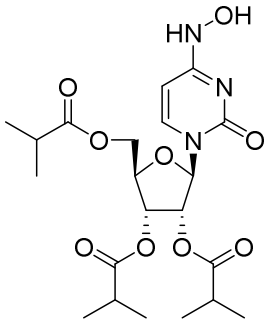
or a tautomer thereof, or pharmaceutical salt or physiological salt thereof, and one or more antiviral agent selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir, delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine, enfuvirtide, entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir, inosine, interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine, zalcitabine, zanamivir, and zidovudine, and combinations thereof, in the manufacture of a medicament for treating COVID-19.

71. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound with the following structure:



or a tautomer thereof, or pharmaceutical salt or physiological salt thereof, and one or more antiviral agent selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir, delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine, enfuvirtide, entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir, inosine, interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine, zalcitabine, zanamivir, and zidovudine, and combinations thereof.

72. A pharmaceutical composition for the treatment of 2019nCoV/SARS-CoV-2 infection, comprising a pharmaceutically acceptable excipient and a compound with the following structure:

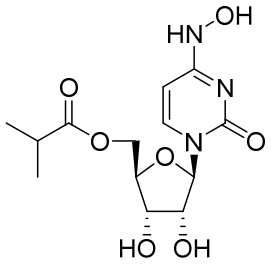


or a tautomer thereof, or pharmaceutical salt or physiological salt thereof, and one or more antiviral agent selected from the group consisting of abacavir, acyclovir, acyclovir, adefovir, amantadine, amprenavir, ampligen, arbidol, atazanavir, atripla, balapiravir, Galidesivir, boceprevir, cidofovir, combivir, daclatasvir, darunavir, dasabuvir, delavirdine, didanosine, docosanol, edoxudine, efavirenz, emtricitabine,

enfuvirtide, entecavir, famciclovir, favipiravir, fomivirsen, fosamprenavir, foscarnet, fosfonet, ganciclovir, Remdesivir, ibacitabine, imunovir, idoxuridine, imiquimod, indinavir, inosine, interferon type III, interferon type II, interferon type I, lamivudine, ledipasvir, lopinavir, loviride, maraviroc, moroxydine, methisazone, nelfinavir, nevirapine, nexavir, NITD008, ombitasvir, oseltamivir, paritaprevir, peginterferon alfa-2a, penciclovir, peramivir, pleconaril, podophyllotoxin , raltegravir, ribavirin, rimantadine, ritonavir, pyramidine, saquinavir, simeprevir, sofosbuvir, stavudine, telaprevir, telbivudine, tenofovir, tenofovir disoproxil, Tenofovir Exalidex, tipranavir, trifluridine, trizivir, tromantadine, truvada, valaciclovir, valganciclovir, vicriviroc, vidarabine, viramidine, zalcitabine, zanamivir, and zidovudine, and combinations thereof.

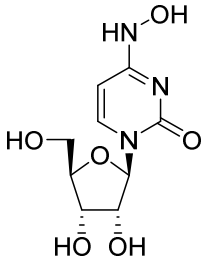
73. Use of an effective amount of a compound or composition of any one of claims 57-65 or 71-72 in the manufacture of a medicament for treating or preventing infections caused by 2019-nCoV/SARS-CoV-2 in a host.

74. Use of an effective amount of the compound



or a tautomer thereof, or pharmaceutical salt or physiological salt thereof in the manufacture of a medicament for treating or preventing infections caused by 2019-nCoV/SARS-CoV-2 infection in a host.

75. Use of an effective amount of the compound



or a tautomer thereof, or pharmaceutical salt or physiological salt thereof in the manufacture of a medicament for treating or preventing infections caused by 2019-nCoV/SARS-CoV-2 in a host.

76. Use of an effective amount of a composition of any one of claims 1-43, 57-65, or 71-72 in the manufacture of a medicament for treating a viral CNS infection in a patient.

77. The use of claim 76, wherein the viral CNS infection is 2019-nCoV/SARS-CoV-2.