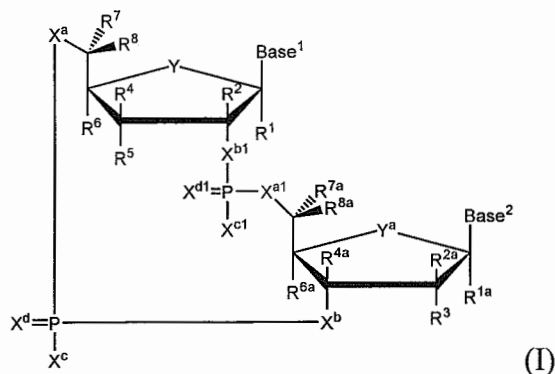
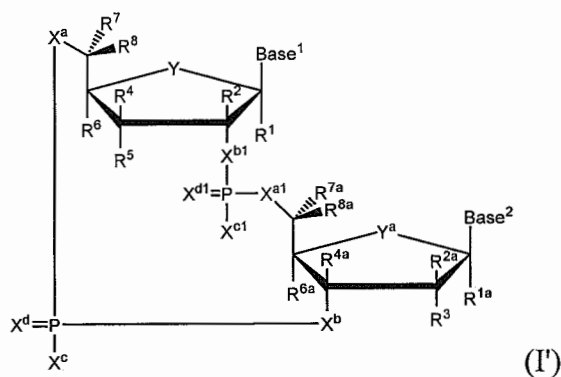


SUMMARY

The present disclosure relates to novel cyclic di-nucleotide compounds of general formula (I), general formula (I'), and/or general formula (I''). In particular, the present disclosure relates to compounds having the general structural formula (I):

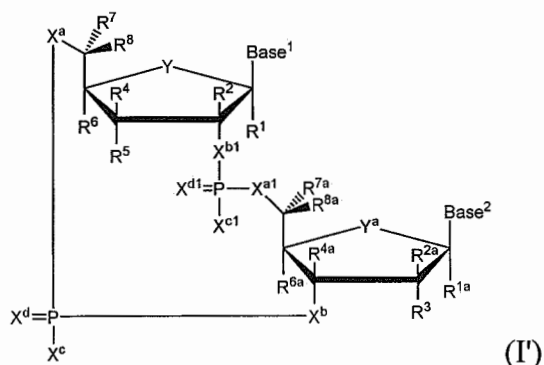


or pharmaceutically acceptable salts, hydrates, solvates, or prodrugs thereof, as described herein. The present disclosure also relates to compounds having general structural formula (I'):



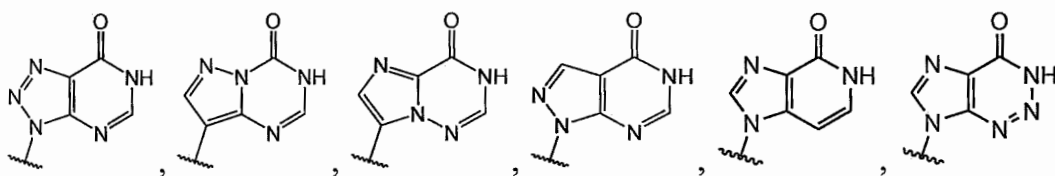
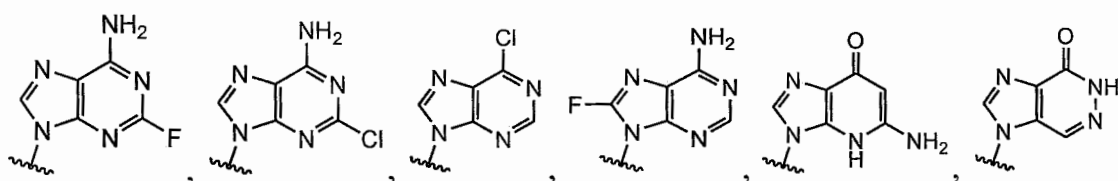
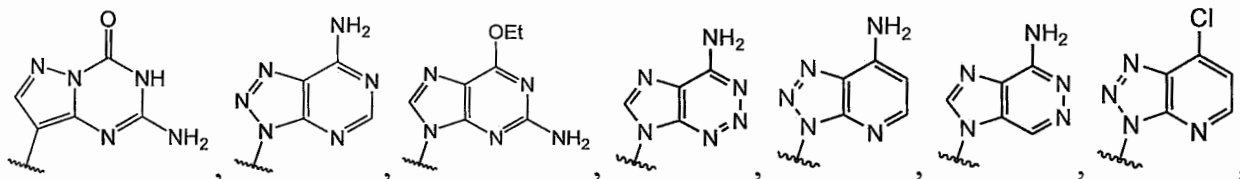
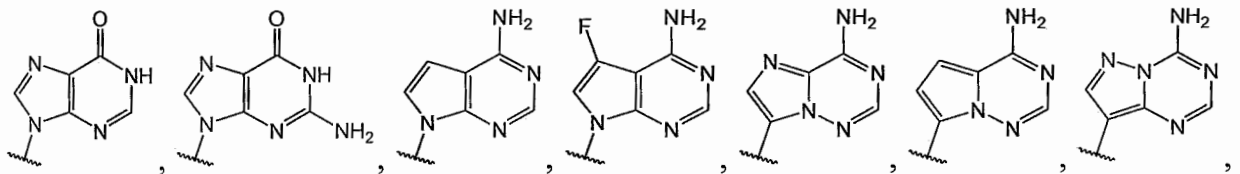
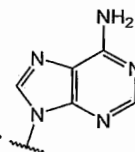
or pharmaceutically acceptable salts, hydrates, solvates, or prodrugs thereof, as described herein.

10 Thus, in one aspect, there is provided a compound of formula (I'):

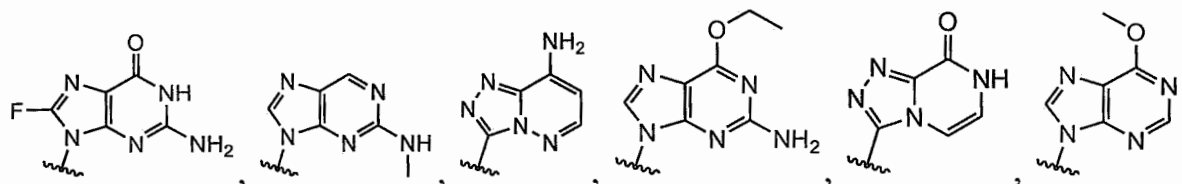
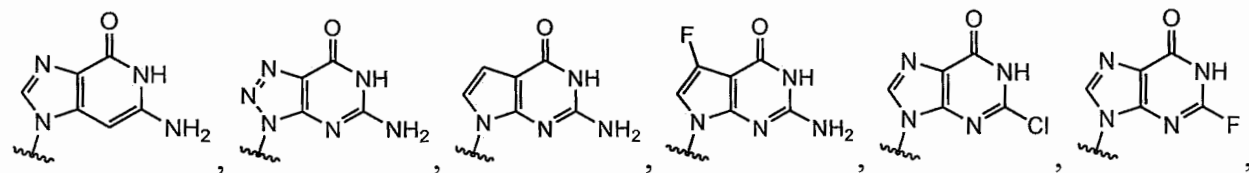
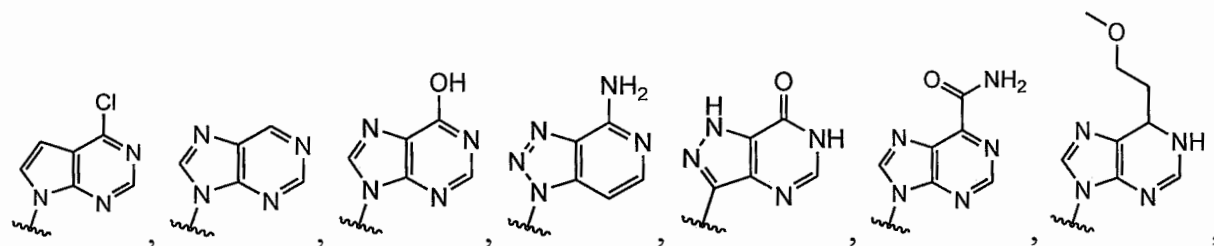
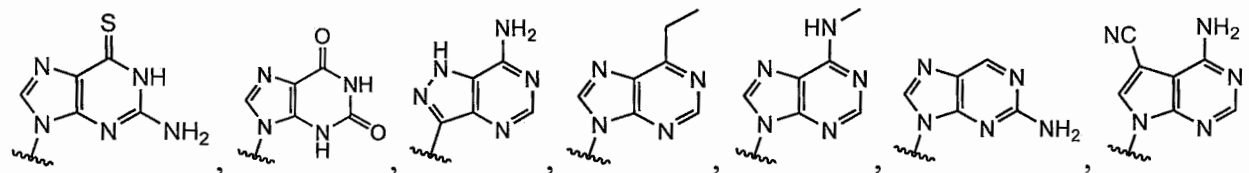


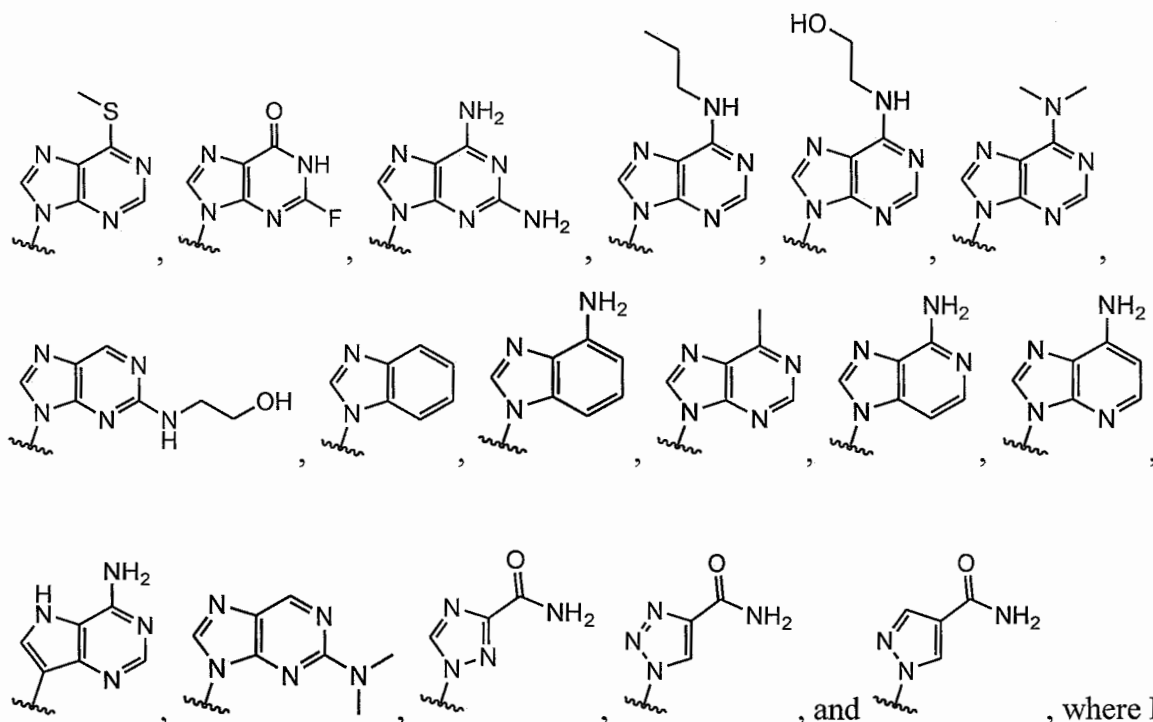
or a pharmaceutically acceptable salt thereof, wherein

Base¹ and Base² are each independently selected from the group consisting of



5





5 and Base² each may be independently substituted by 0-3 substituents R¹⁰, where each R¹⁰ is independently selected from the group consisting of F, Cl, I, Br, OH, SH, NH₂, C₁₋₃ alkyl, C₃₋₆ cycloalkyl, O(C₁₋₃ alkyl), O(C₃₋₆ cycloalkyl), S(C₁₋₃ alkyl), S(C₃₋₆ cycloalkyl), NH(C₁₋₃ alkyl), NH(C₃₋₆ cycloalkyl), N(C₁₋₃ alkyl)₂, and N(C₃₋₆ cycloalkyl)₂;

Y and Y^a are each independently selected from the group consisting of -O- and -S-;

10 X^a and X^{a1} are each independently selected from the group consisting of O, and S;

X^b and X^{b1} are each independently selected from the group consisting of O, and S;

X^c and X^{c1} are each independently selected from the group consisting of OR⁹, SR⁹, and NR⁹R⁹;

X^d and X^{d1} are each independently selected from the group consisting of O and S;

15 R¹ and R^{1a} are each independently selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ haloalkyl, C₂₋₆ haloalkenyl, C₂₋₆ haloalkynyl, -O-C₁₋₆ alkyl, -O-C₂₋₆ alkenyl, and -O-C₂₋₆ alkynyl, where said R¹ and R^{1a} C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ haloalkyl, C₂₋₆ haloalkenyl, C₂₋₆ haloalkynyl, -O-C₁₋₆ alkyl, -O-C₂₋₆ alkenyl, and -O-C₂₋₆ alkynyl are substituted by 0 to 3
20 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N₃;

R² and R^{2a} are each independently selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ haloalkyl, C₂₋₆ haloalkenyl, C₂₋₆ haloalkynyl, -O-C₁₋₆ alkyl, -O-C₂₋₆ alkenyl, and -O-C₂₋₆ alkynyl, where said R² and R^{2a} C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ haloalkyl, C₂₋₆ haloalkenyl, C₂₋₆

haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N₃;

R³ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl, where said R³ C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N₃;

R⁴ and R^{4a} are each independently selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl, where said R⁴ and R^{4a} C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N₃;

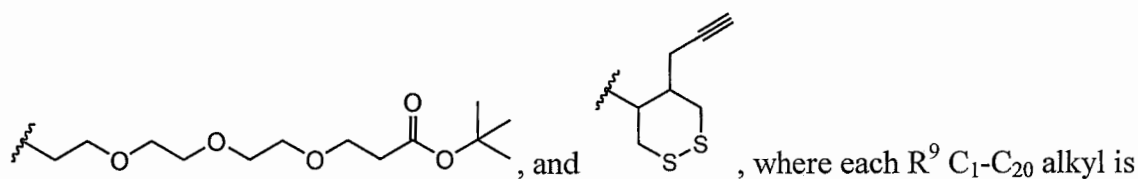
R⁵ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, NH₂, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl, where said R⁵ C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, NR⁹R⁹, and N₃;

R⁶ and R^{6a} are each independently selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl, where said R⁶ and R^{6a} C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N₃;

R⁷ and R^{7a} are each independently selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl, where said R⁷ and R^{7a} C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N₃;

R^8 and R^{8a} are each independently selected from the group consisting of H, F, Cl, Br, I, OH, CN, N_3 , C_1 - C_6 alkyl, C_2 - C_6 alkenyl, C_2 - C_6 alkynyl, C_1 - C_6 haloalkyl, C_2 - C_6 haloalkenyl, C_2 - C_6 haloalkynyl, -O- C_1 - C_6 alkyl, -O- C_2 - C_6 alkenyl, and -O- C_2 - C_6 alkynyl, where said R^8 and R^{8a} C_1 - C_6 alkyl, C_2 - C_6 alkenyl, C_2 - C_6 alkynyl, C_1 - C_6 haloalkyl, C_2 - C_6 haloalkenyl, C_2 - C_6 haloalkynyl, -O- C_1 - C_6 alkyl, -O- C_2 - C_6 alkenyl, and -O- C_2 - C_6 alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N_3 ;

each R^9 is independently selected from the group consisting of H, C_1 - C_{20} alkyl,



optionally substituted by 0 to 3 substituents independently selected from the group consisting of OH, -O- C_1 - C_{20} alkyl, -S-C(O) C_1 - C_6 alkyl, and C(O)OC C_1 - C_6 alkyl;

optionally R^{1a} and R^3 are connected to form C_1 - C_6 alkylene, C_2 - C_6 alkenylene, C_2 - C_6 alkynylene, -O- C_1 - C_6 alkylene, -O- C_2 - C_6 alkenylene, or -O- C_2 - C_6 alkynylene, such that where R^{1a} and R^3 are connected to form -O- C_1 - C_6 alkylene, -O- C_2 - C_6 alkenylene, or -O- C_2 - C_6 alkynylene, said O is bound at the R^3 position;

optionally R^{2a} and R^3 are connected to form C_1 - C_6 alkylene, C_2 - C_6 alkenylene, C_2 - C_6 alkynylene, -O- C_1 - C_6 alkylene, -O- C_2 - C_6 alkenylene, or -O- C_2 - C_6 alkynylene, such that where R^{2a} and R^3 are connected to form -O- C_1 - C_6 alkylene, -O- C_2 - C_6 alkenylene, or -O- C_2 - C_6 alkynylene, said O is bound at the R^3 position;

optionally R^3 and R^{6a} are connected to form -O- C_1 - C_6 alkylene, -O- C_2 - C_6 alkenylene, or -O- C_2 - C_6 alkynylene, such that where R^3 and R^{6a} are connected to form -O- C_1 - C_6 alkylene, -O- C_2 - C_6 alkenylene, or -O- C_2 - C_6 alkynylene, said O is bound at the R^3 position;

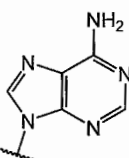
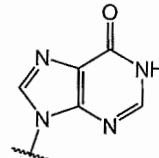
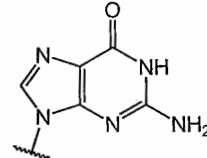
optionally R^4 and R^5 are connected to form C_1 - C_6 alkylene, C_2 - C_6 alkenylene, C_2 - C_6 alkynylene, -O- C_1 - C_6 alkylene, -O- C_2 - C_6 alkenylene, or -O- C_2 - C_6 alkynylene, such that where R^4 and R^5 are connected to form -O- C_1 - C_6 alkylene, -O- C_2 - C_6 alkenylene, or -O- C_2 - C_6 alkynylene, said O is bound at the R^5 position;

optionally R^5 and R^6 are connected to form -O- C_1 - C_6 alkylene, -O- C_2 - C_6 alkenylene, or -O- C_2 - C_6 alkynylene, such that where R^5 and R^6 are connected to form -O- C_1 - C_6 alkylene, -O- C_2 - C_6 alkenylene, or -O- C_2 - C_6 alkynylene, said O is bound at the R^5 position;

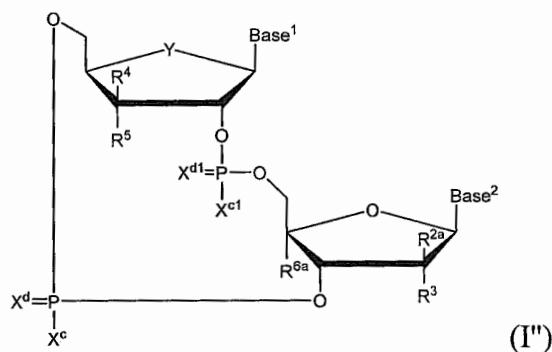
optionally R^7 and R^8 are connected to form C_1 - C_6 alkylene, C_2 - C_6 alkenylene, or C_2 - C_6 alkynylene; and

optionally R^{7a} and R^{8a} are connected to form C_1 - C_6 alkylene, C_2 - C_6 alkenylene, or C_2 - C_6 alkynylene; and

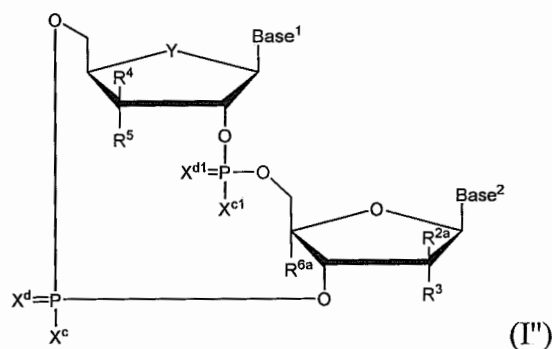
providing that when Y and Y^a are each O, X^a and X^{a1} are each O, X^b and X^{b1} are each O, and X^c and X^{c1} are each OH or SH, X^d and X^{d1} are each O, R^1 and R^{1a} are each H, R^2 is H, R^6 and R^{6a} are each H, R^7 and R^{7a} are each H, R^8 and R^{8a} are each H, and $Base^1$ and $Base^2$ are each

selected from the group consisting of , , and , R^5 and R^3 are not both selected from the group consisting of H, F and OH.

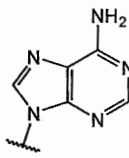
The present disclosure also relates to compounds having general structural formula (I''):

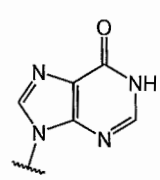
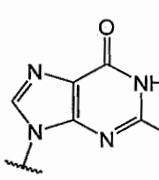
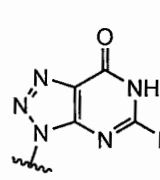
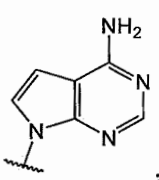
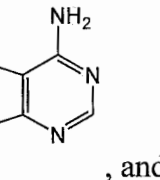
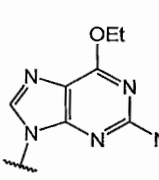


or pharmaceutically acceptable salts, hydrates, solvates, or prodrugs thereof, as described herein. Thus, in another aspect, there is provided a compound of formula (I''):



or a pharmaceutically acceptable salt thereof, wherein

$Base^1$ and $Base^2$ are each independently selected from the group consisting of ,

, , , , , and ;

Y is selected from the group consisting of -O- and -S-;

X^c and X^{c1} are each independently selected from the group consisting of OR⁹ and SR⁹;

X^d and X^{d1} are each independently selected from the group consisting of O and S;

R^{2a} is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl,

5 C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

R³ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl,

C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

10 R⁴ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl,

C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

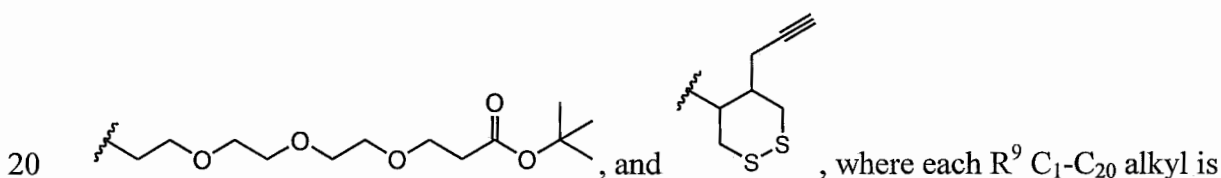
R⁵ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, NH₂, N₃, C₁-C₆ alkyl,

15 C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

R^{6a} is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl,

C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

each R⁹ is independently selected from the group consisting of H, C₁-C₂₀ alkyl,



optionally substituted by 0 to 3 substituents independently selected from the group consisting of OH, -O-C₁-C₂₀ alkyl, -S-C(O)C₁-C₆ alkyl, and C(O)OC₁-C₆ alkyl; and

optionally R³ and R^{6a} are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or

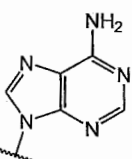
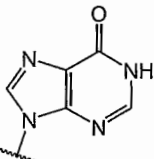
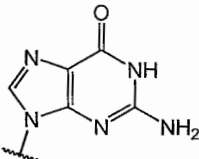
-O-C₂-C₆ alkynylene, such that where R³ and R^{6a} are connected to form -O-C₁-C₆ alkylene,

25 -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, said O is bound at the R³ position; and

providing that when Y and Y^a are each O, X^a and X^{a1} are each O, X^b and X^{b1} are each O,

and X^c and X^{c1} are each OH or SH, X^d and X^{d1} are each O, R¹ and R^{1a} are each H, R² is H, R⁶

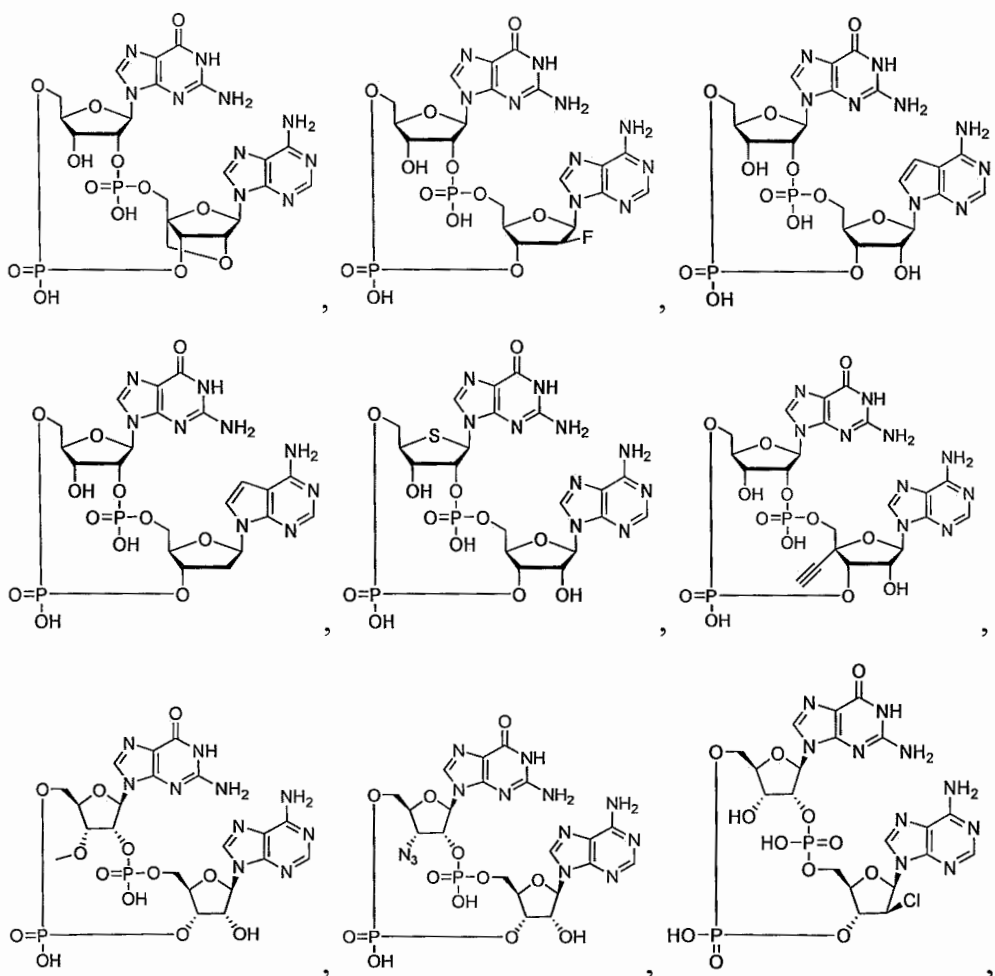
and R^{6a} are each H, R⁷ and R^{7a} are each H, R⁸ and R^{8a} are each H, and Base¹ and Base² are each

selected from the group consisting of , , and , R^5 and R^3 are not both selected from the group consisting of H, F and OH.

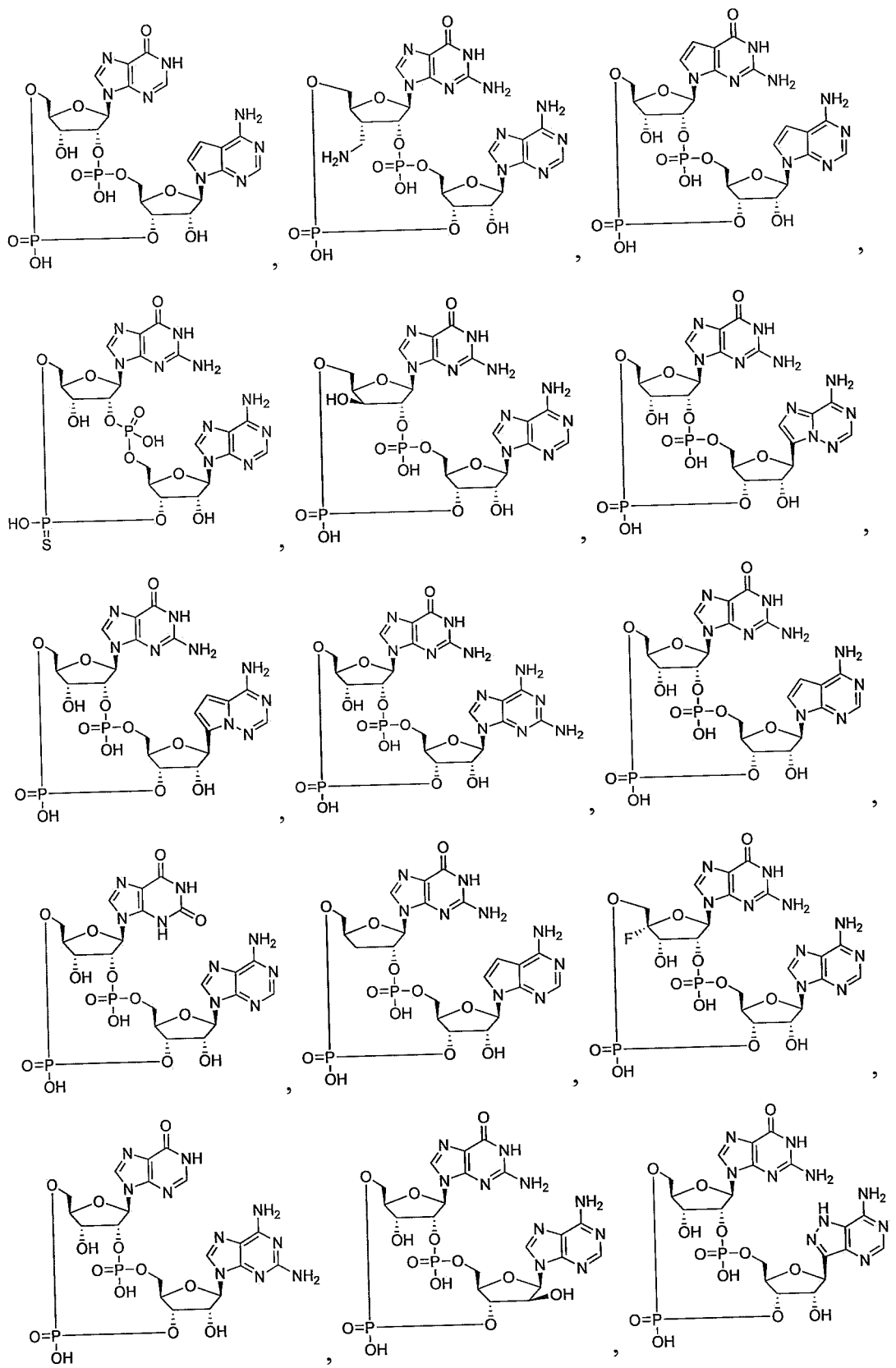
Embodiments of the disclosure include compounds of general formula (I), compounds of general formula (I'), and/or compounds of general formula (I''), and pharmaceutically acceptable salts, hydrates, solvates, or prodrugs thereof, as well as synthesis and isolation of compounds of

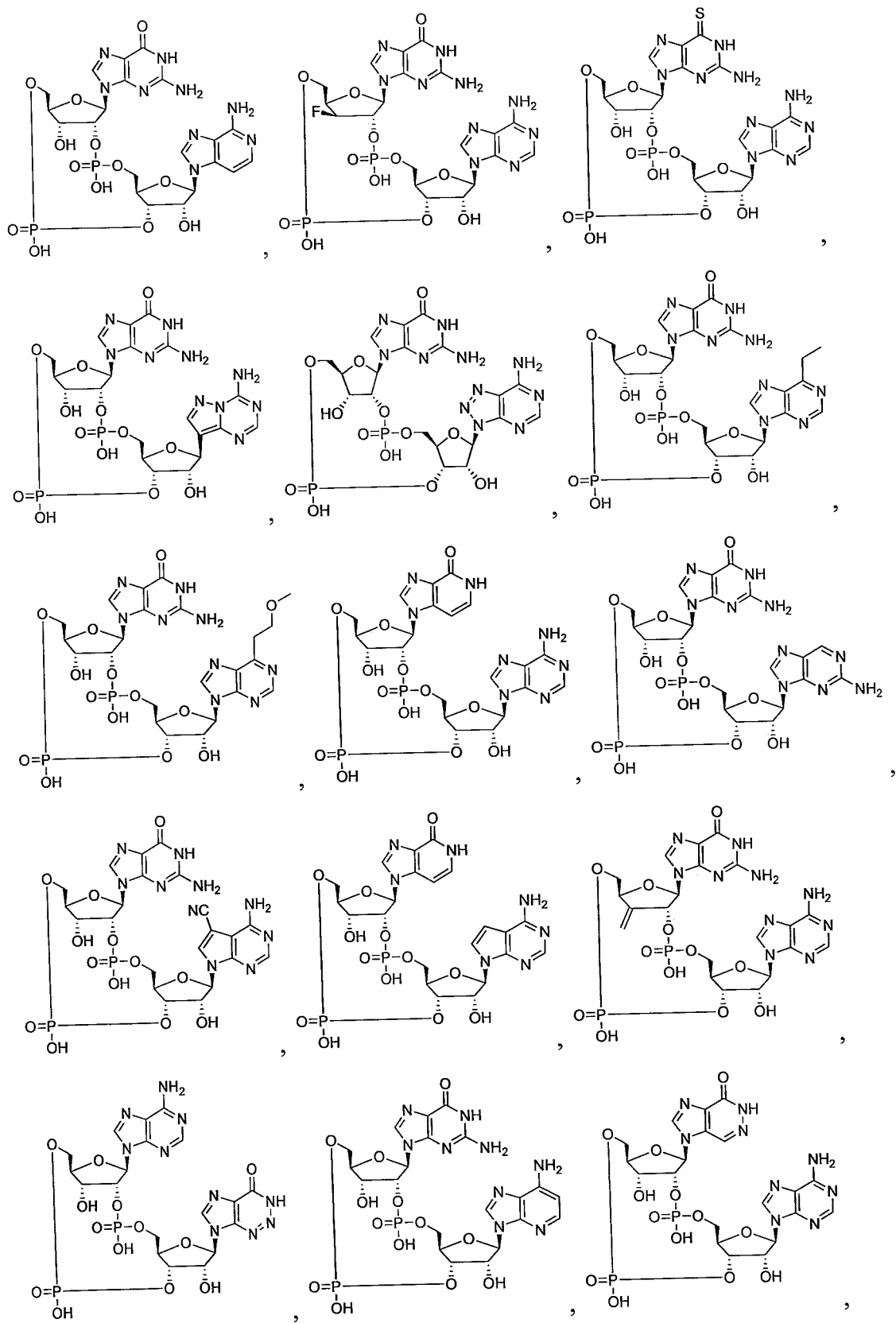
general formula (I), compounds of general formula (I'), and/or compounds of general formula (I''), and pharmaceutically acceptable salts, hydrates, solvates, or prodrugs thereof. Uses of compounds of general formula (I), compounds of general formula (I'), and/or compounds of general formula (I'') are also disclosed.

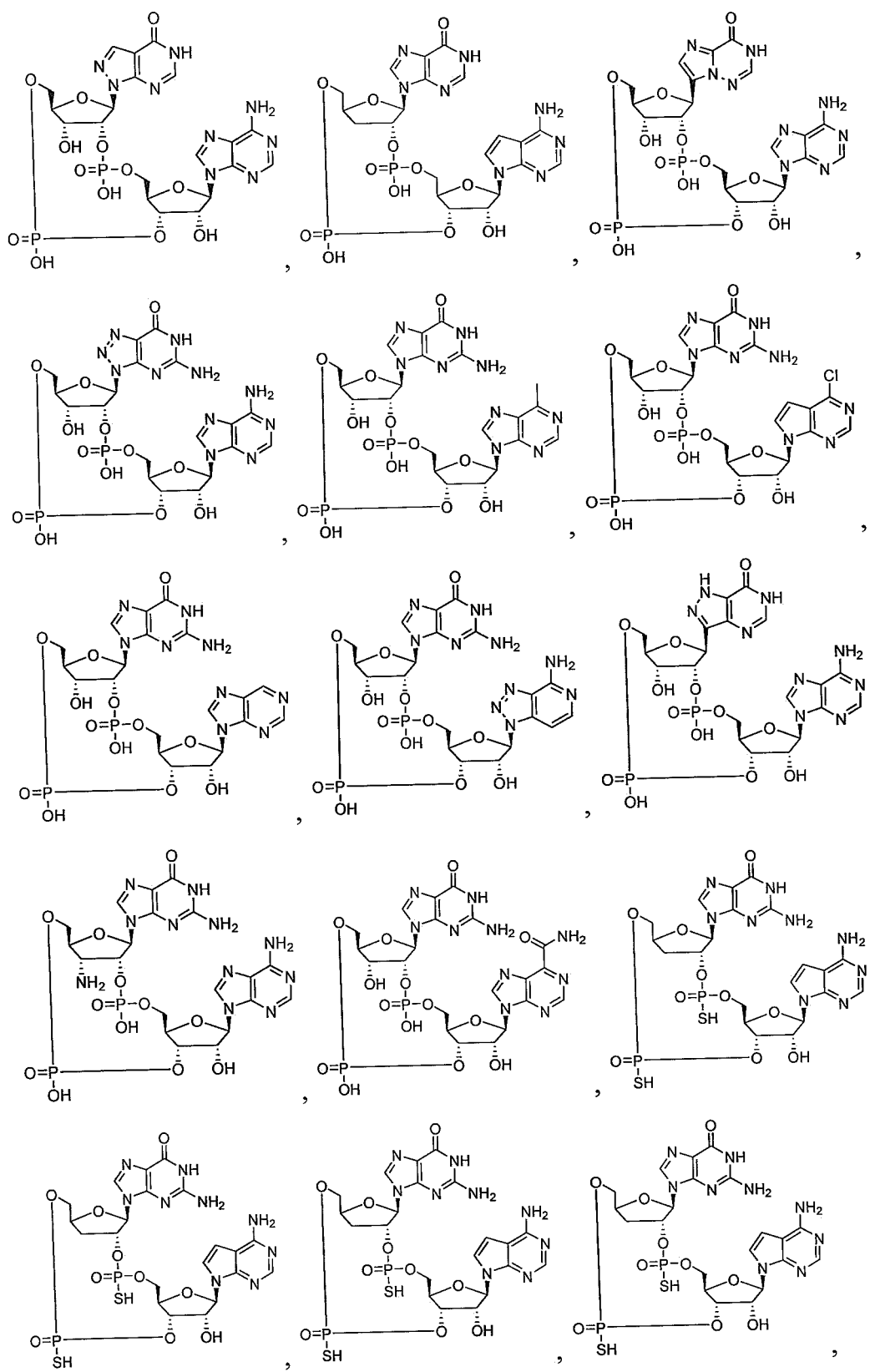
5 In another aspect, there is provided a compound selected from the group consisting of:

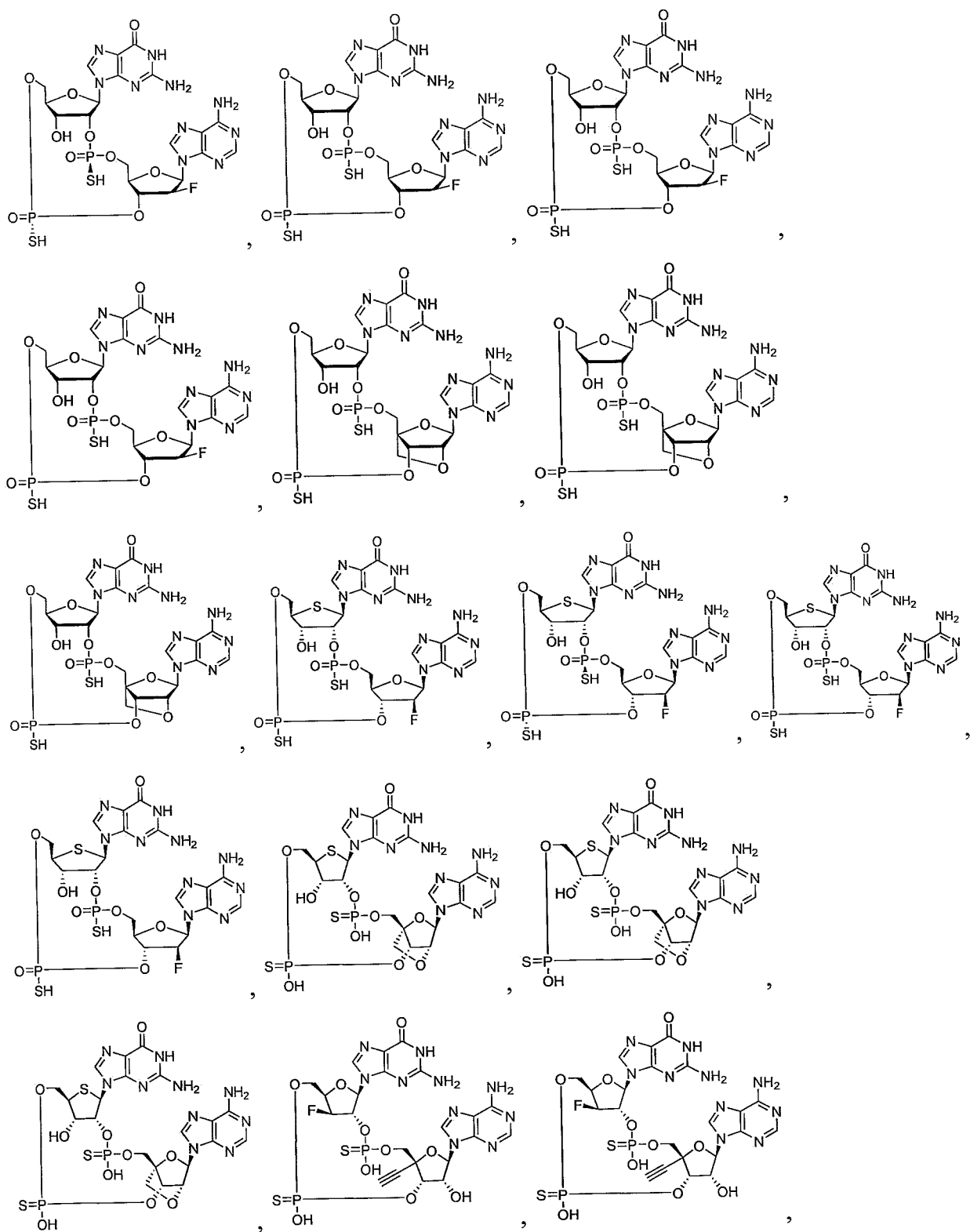


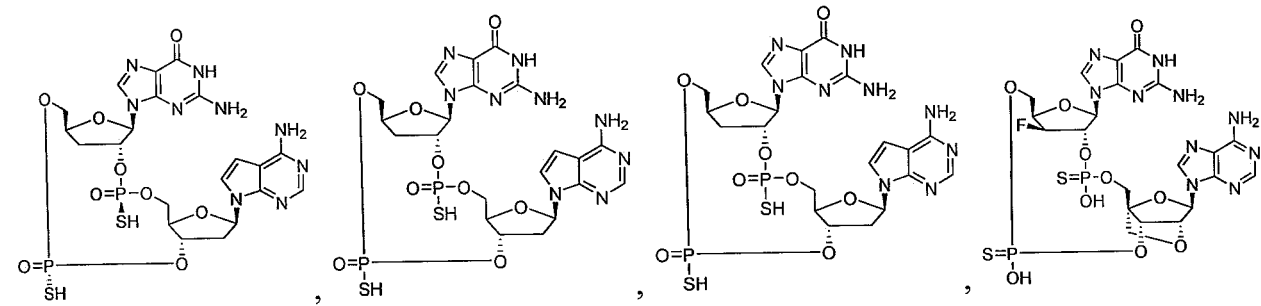
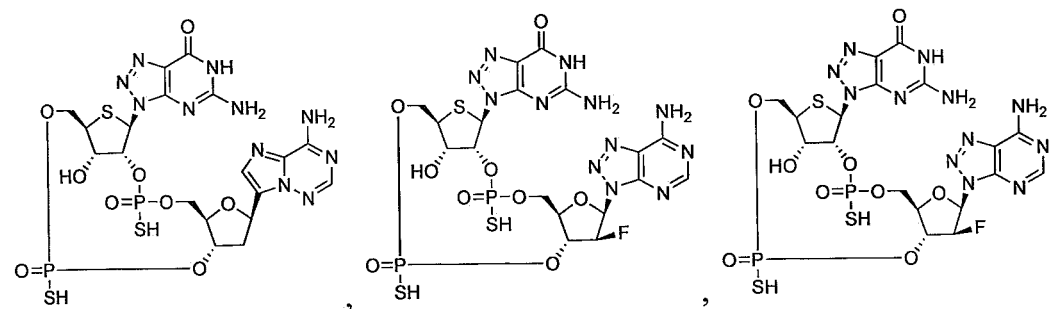
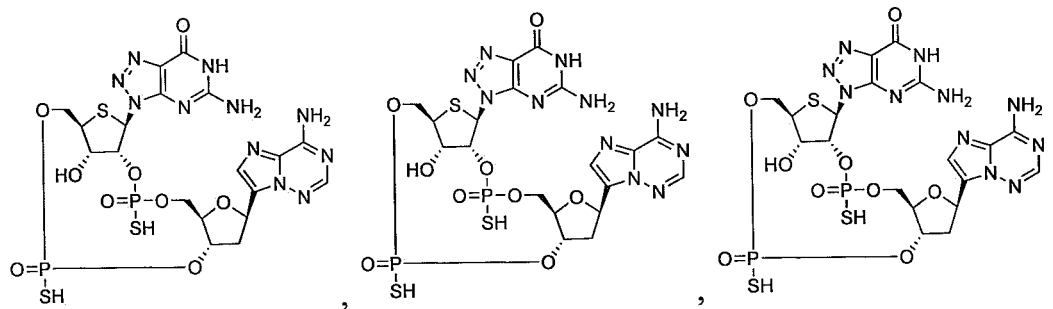
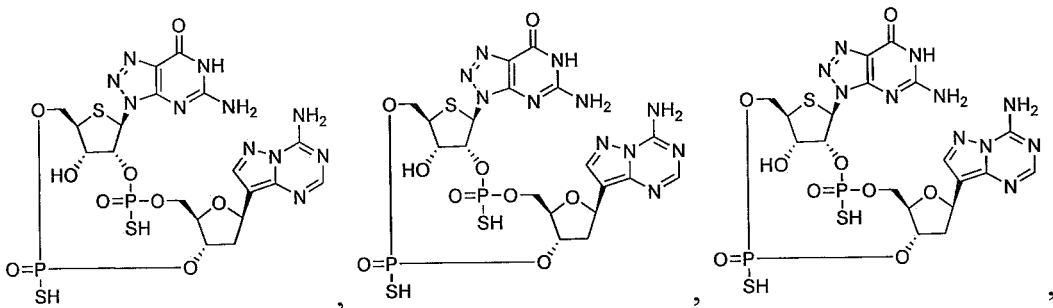
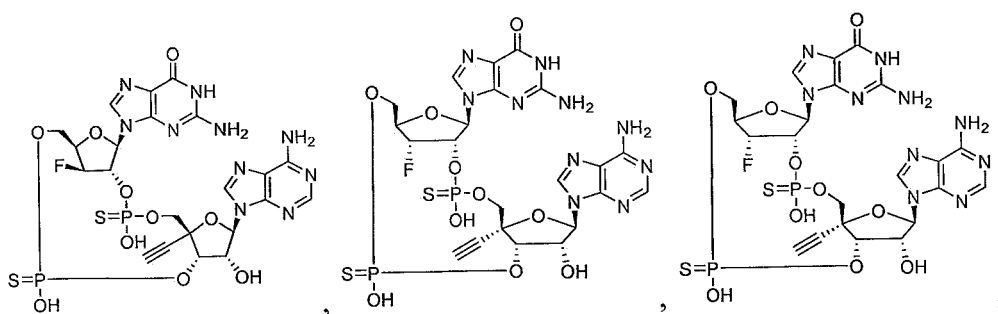




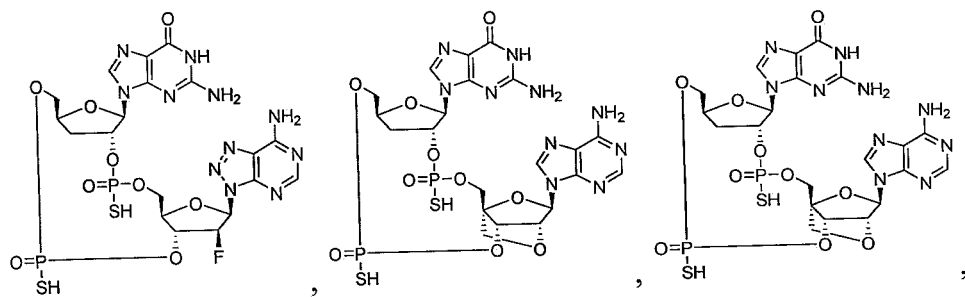
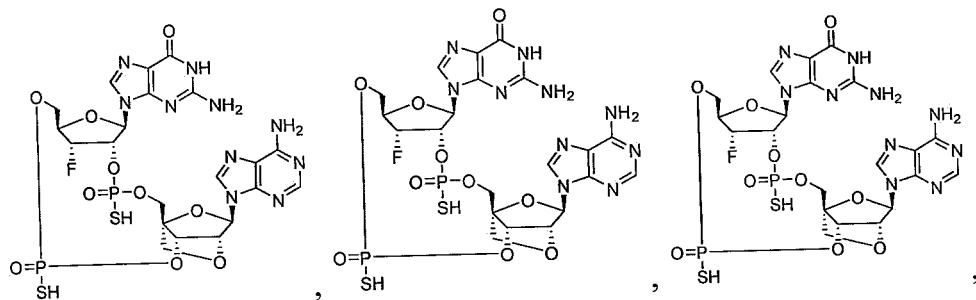
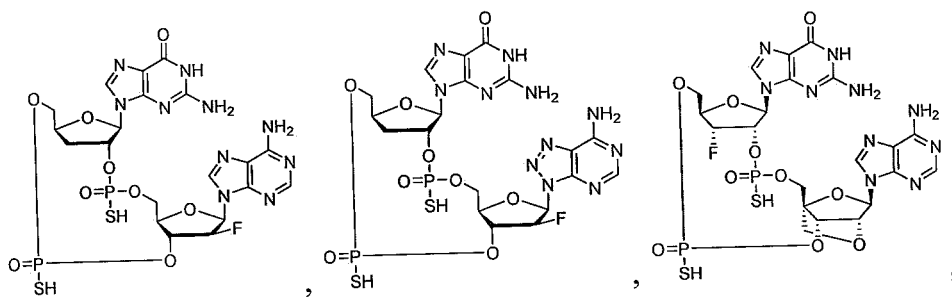
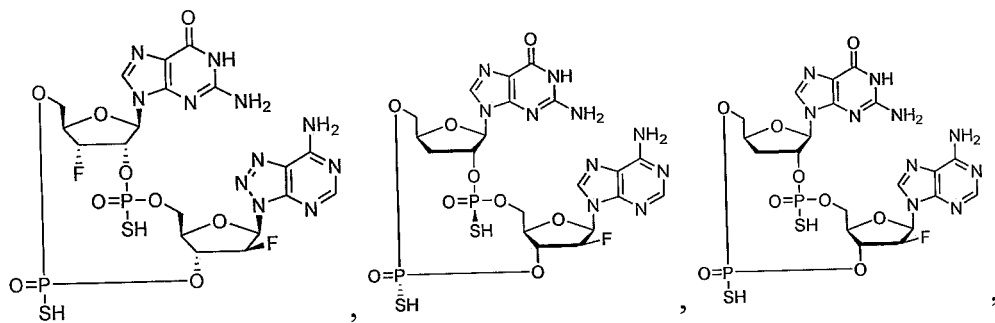
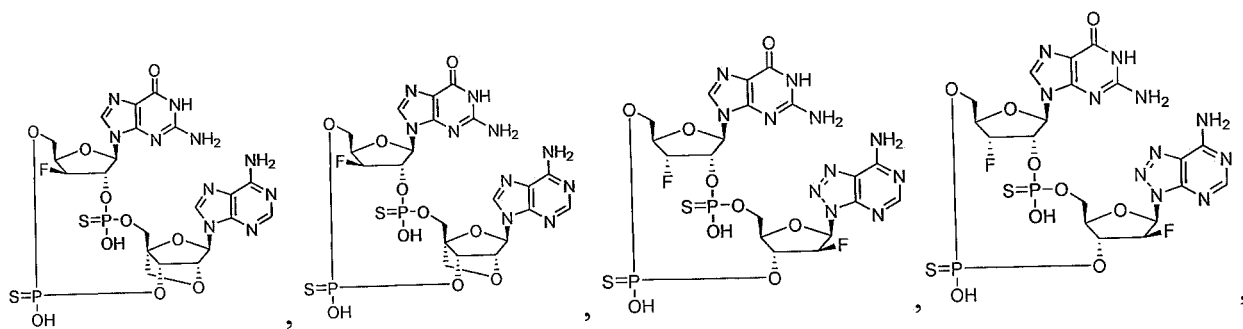




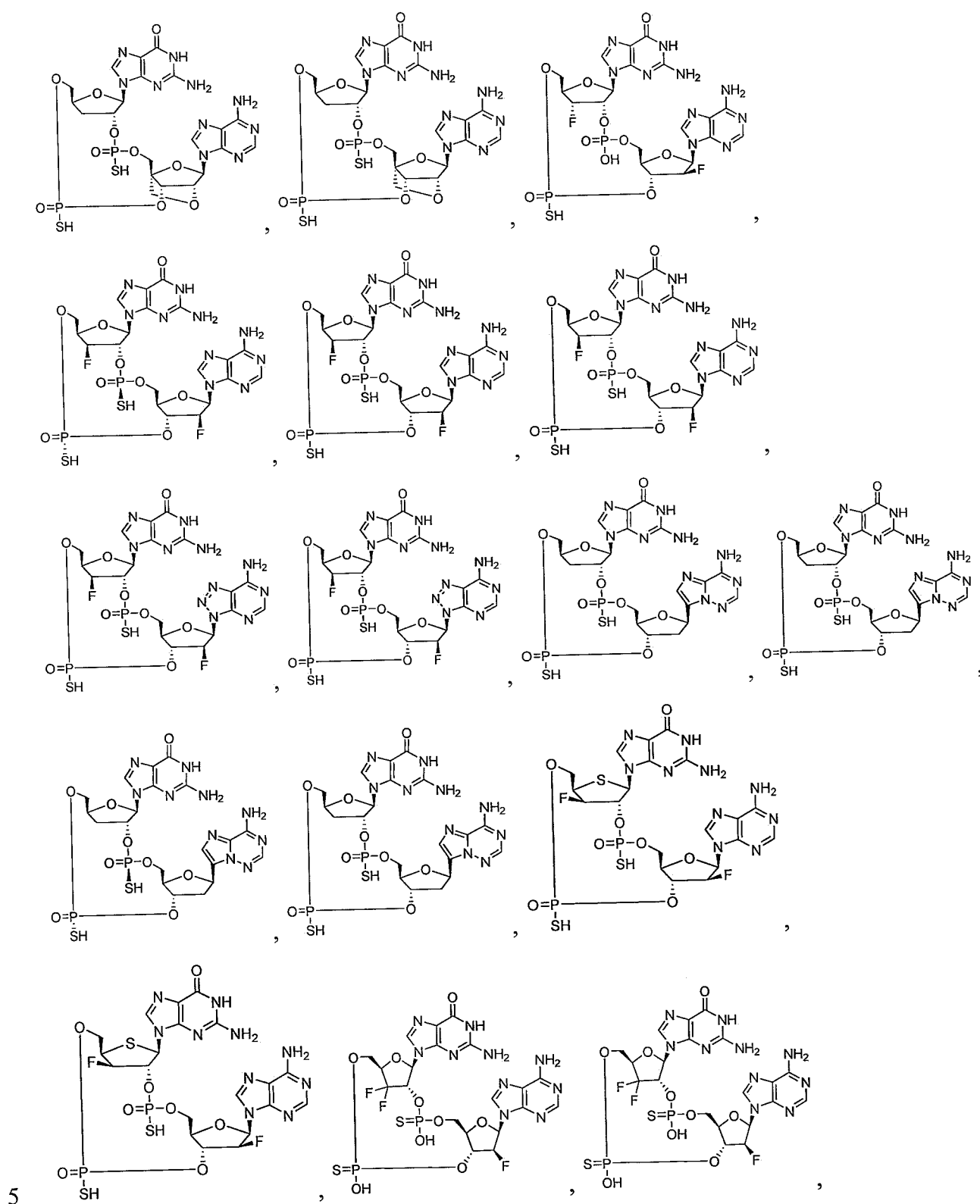


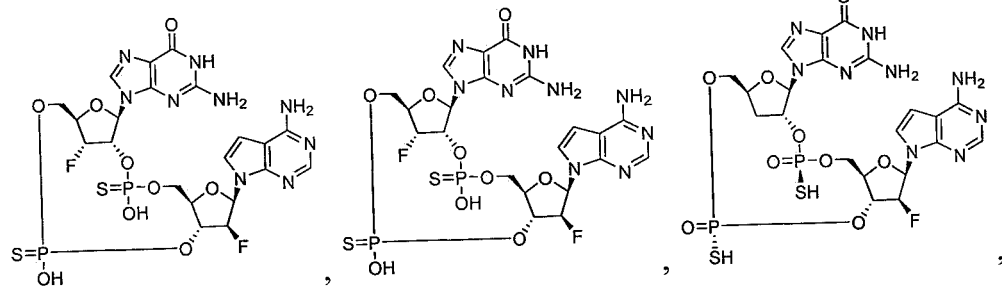
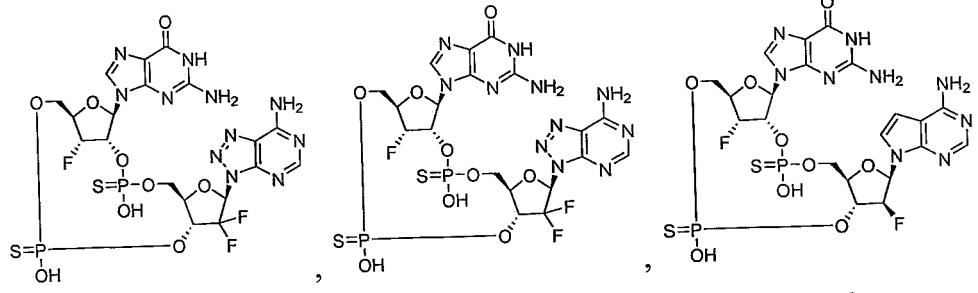
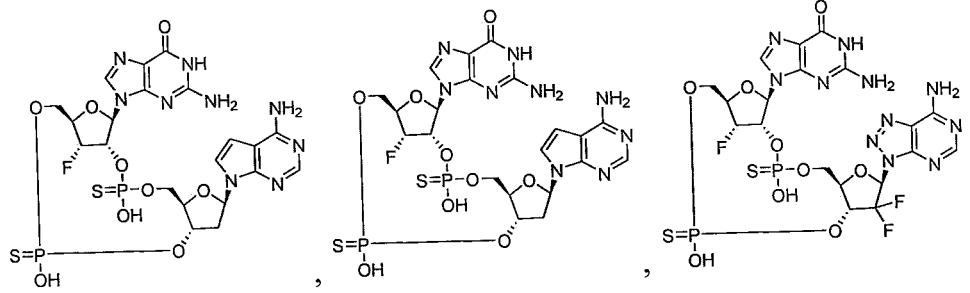
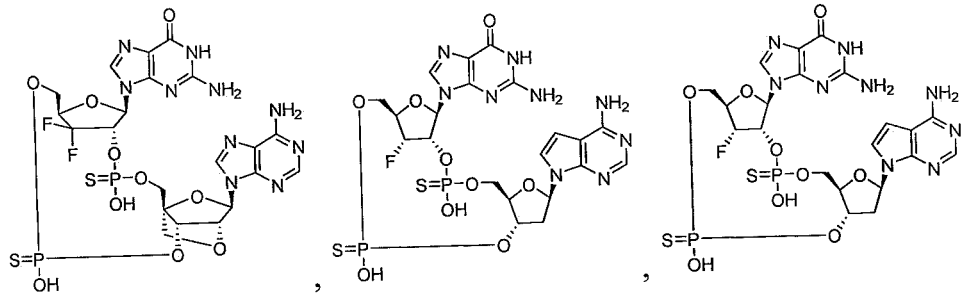
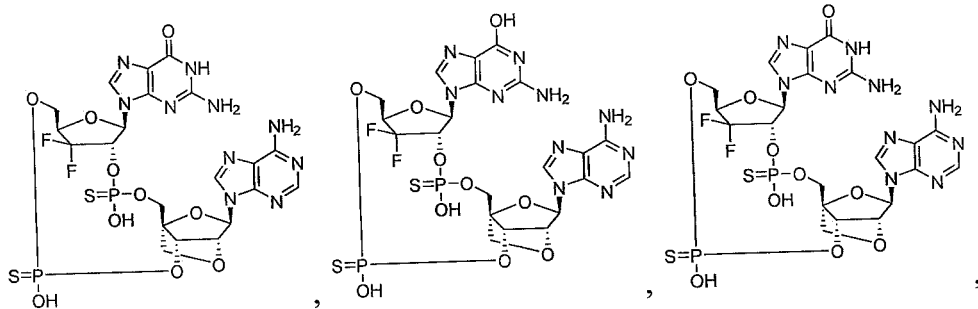


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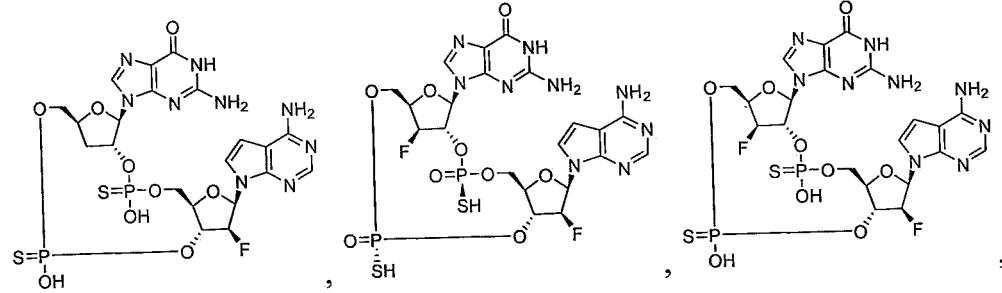


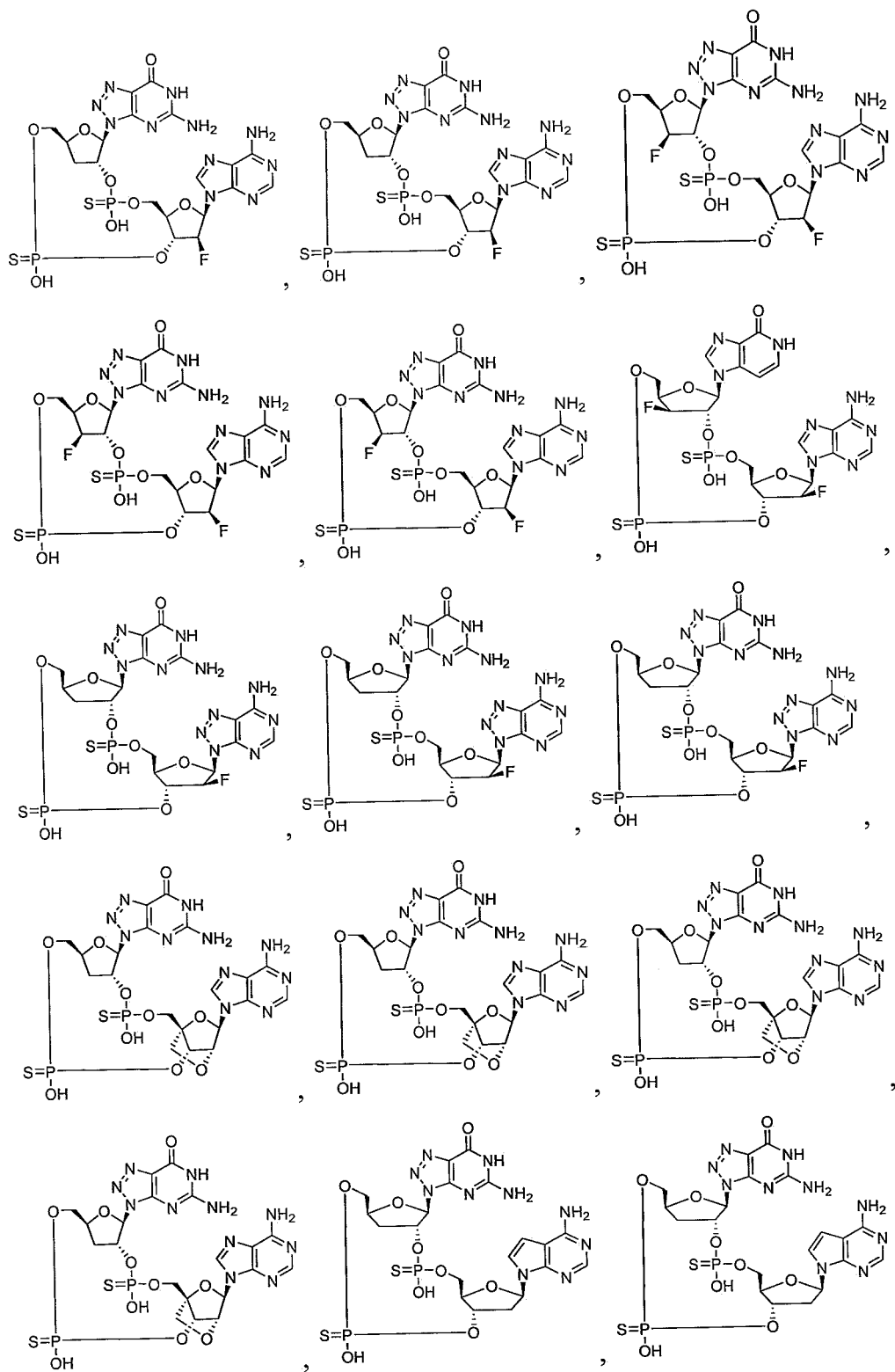
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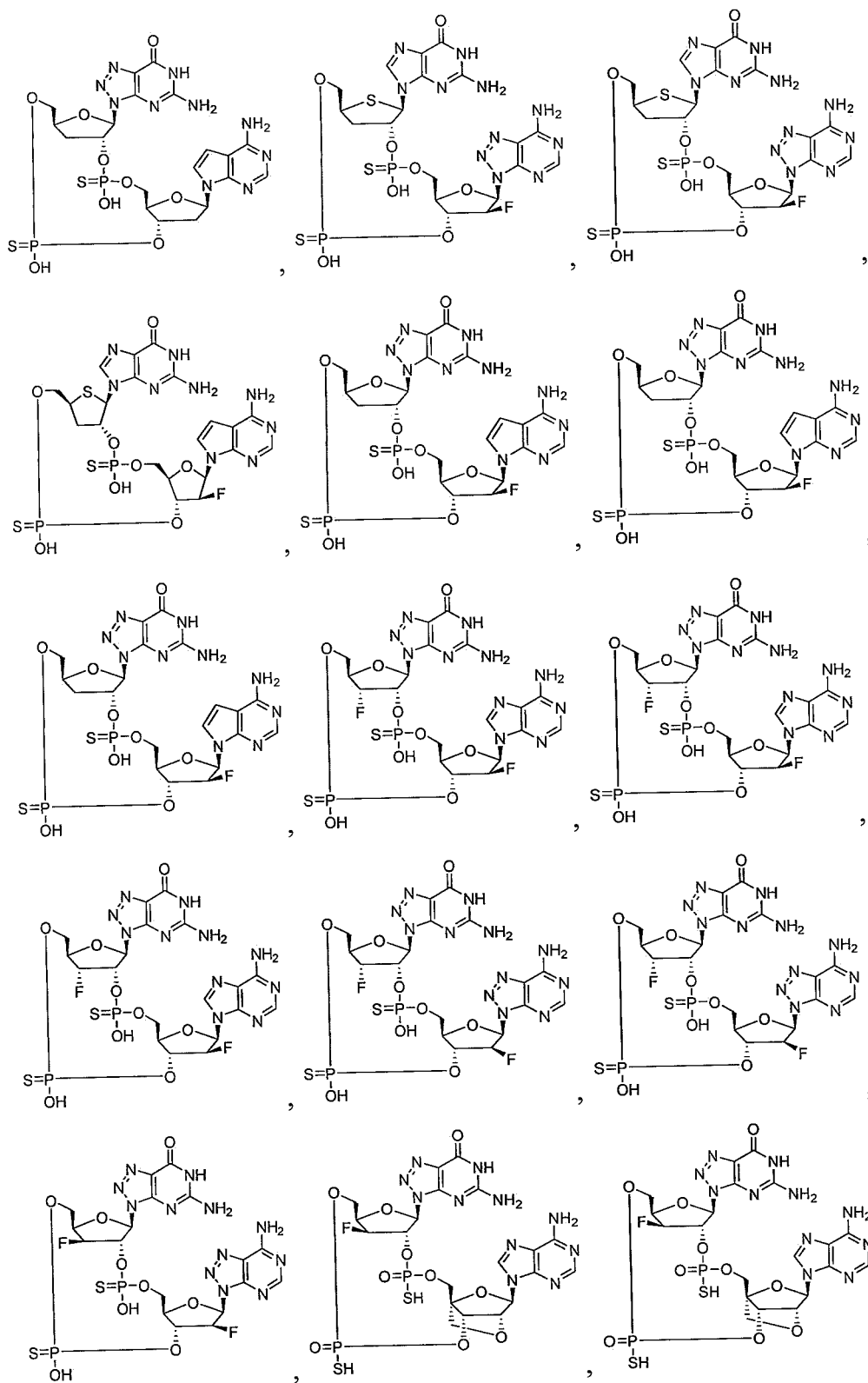


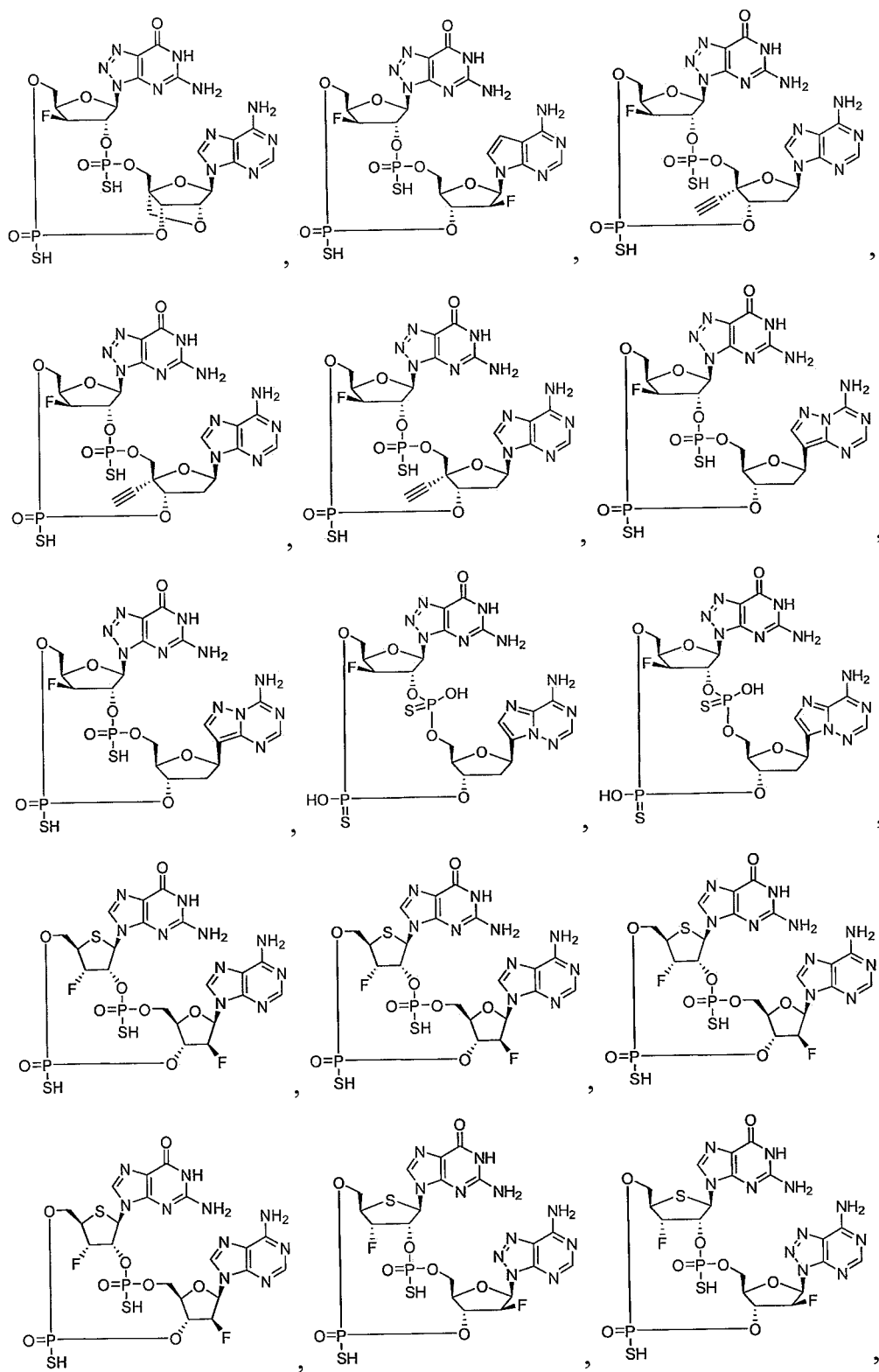


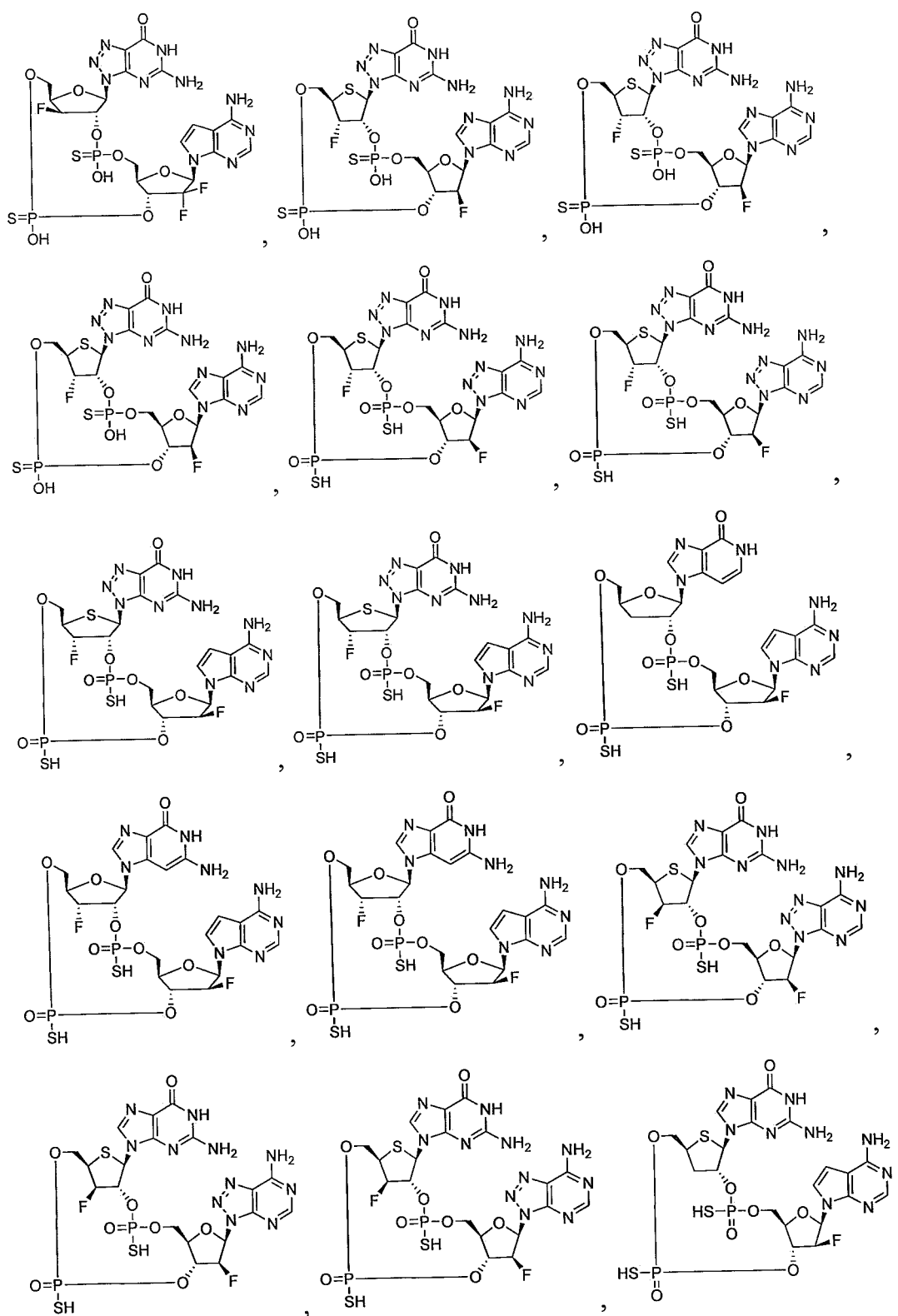
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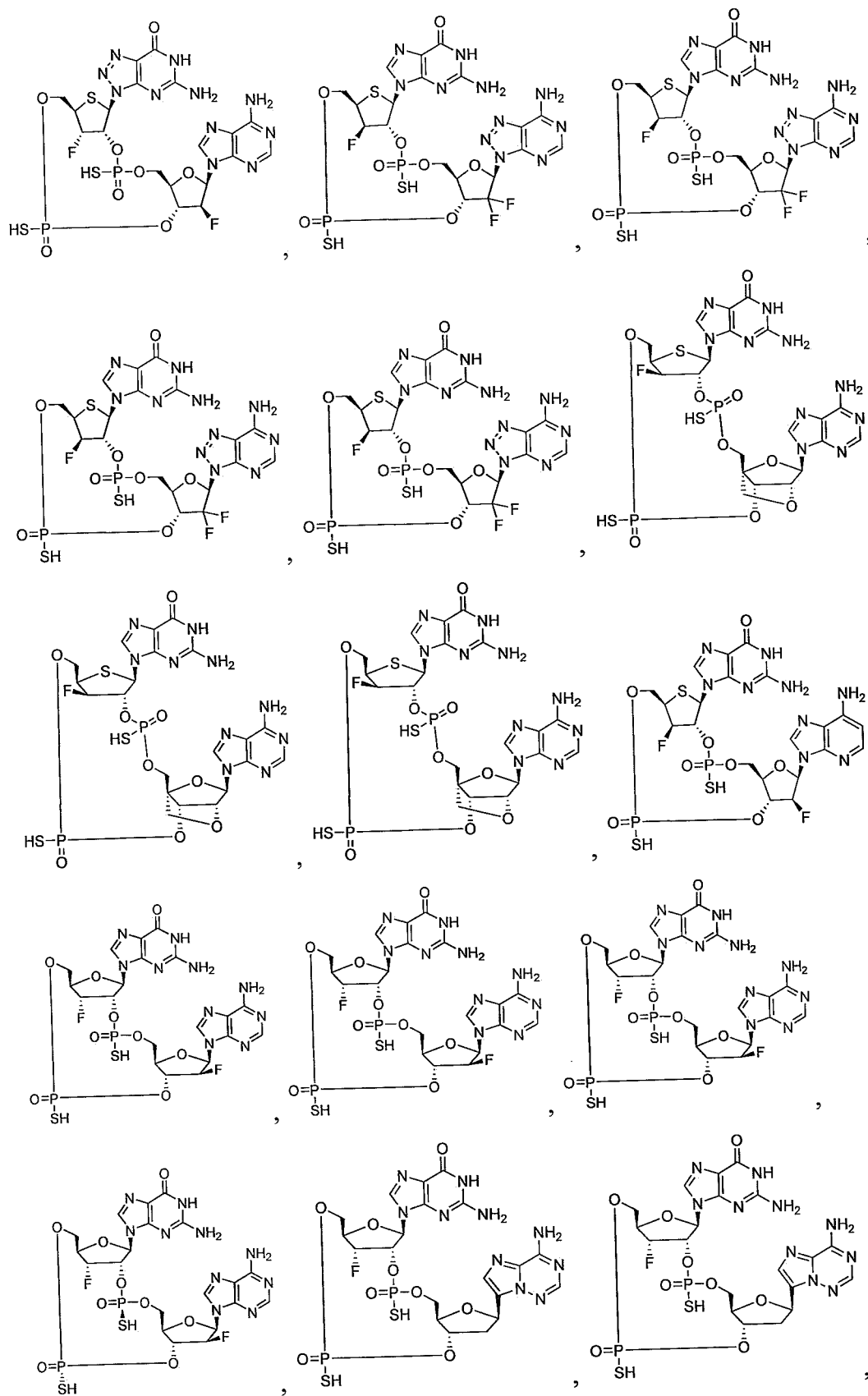


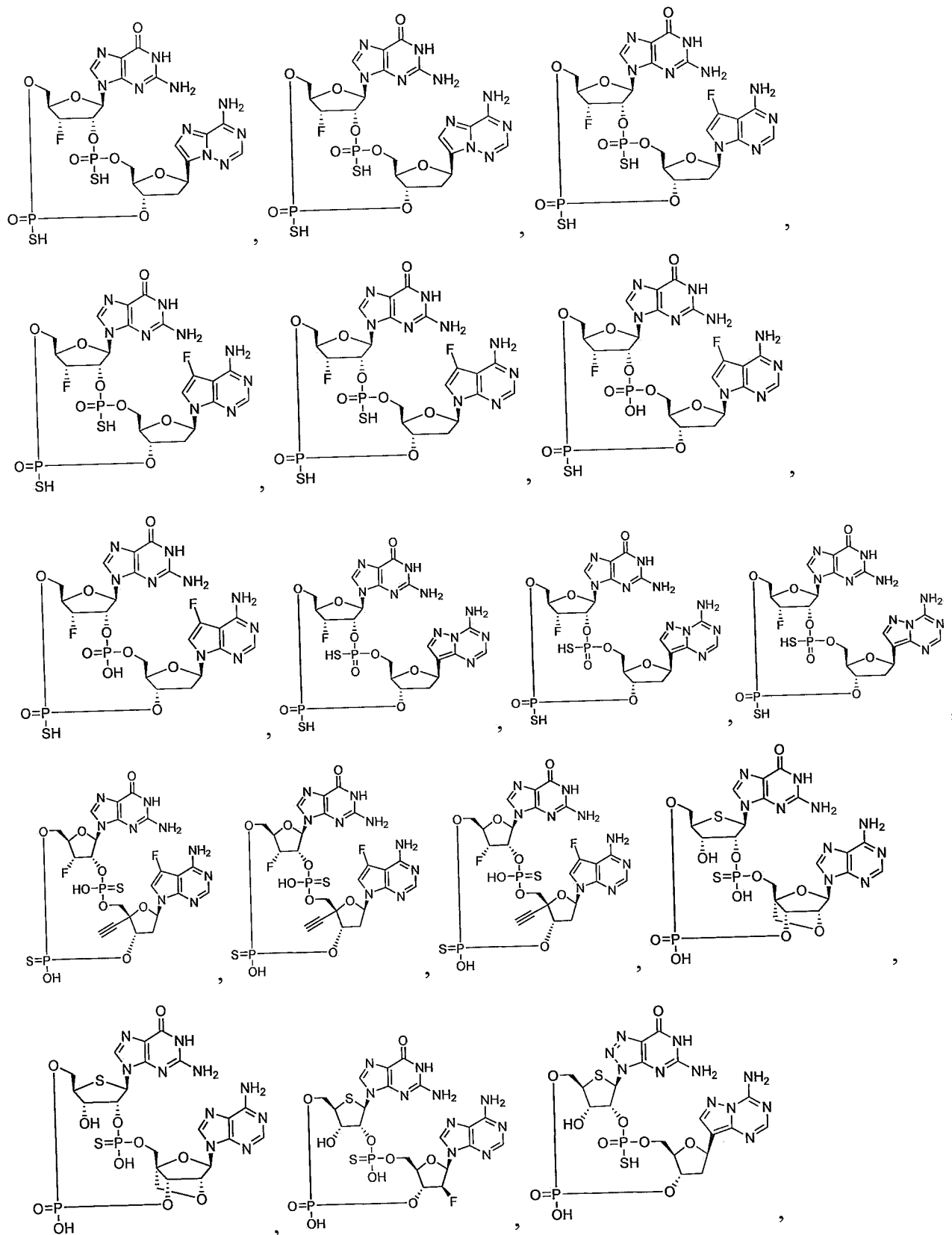




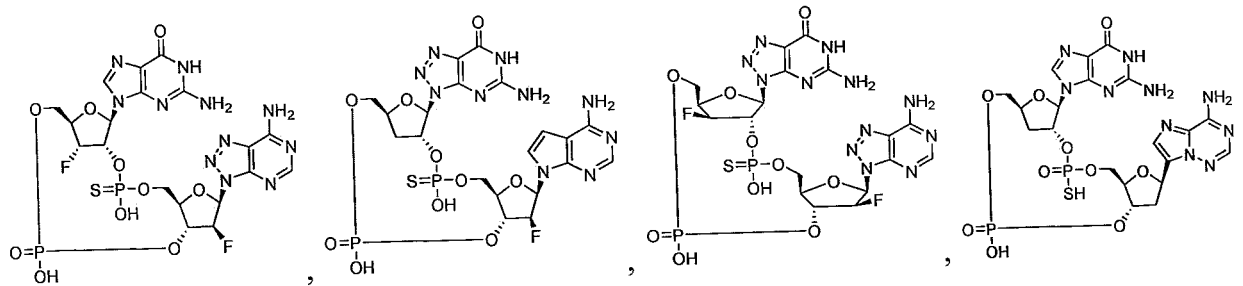
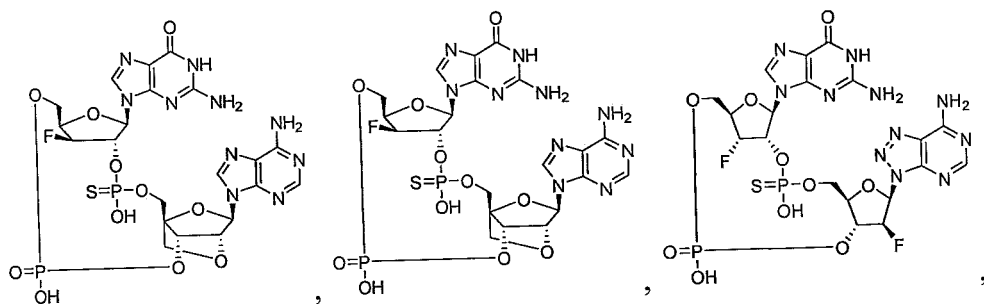
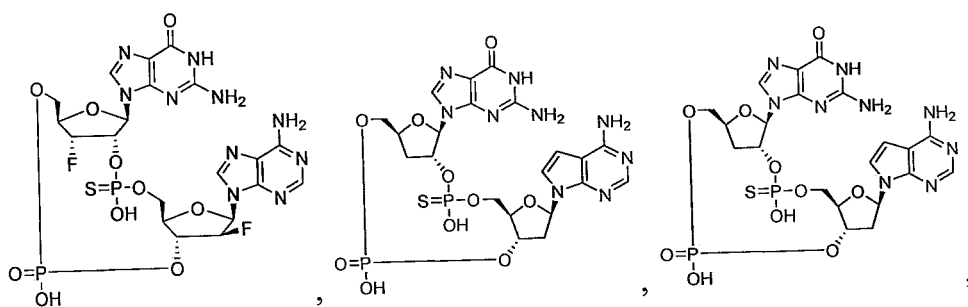
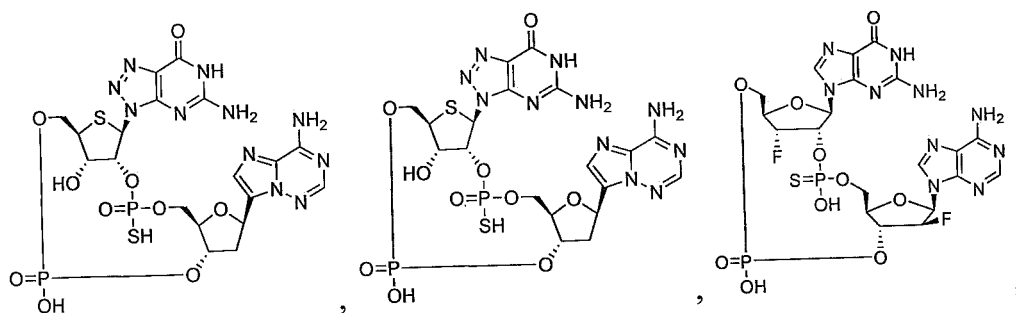
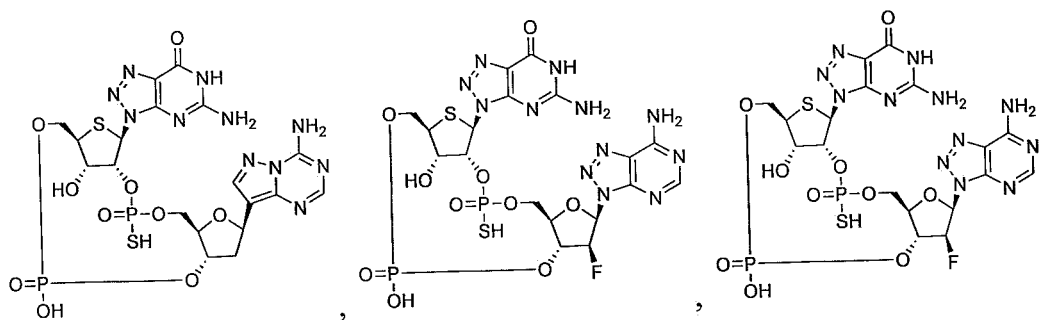




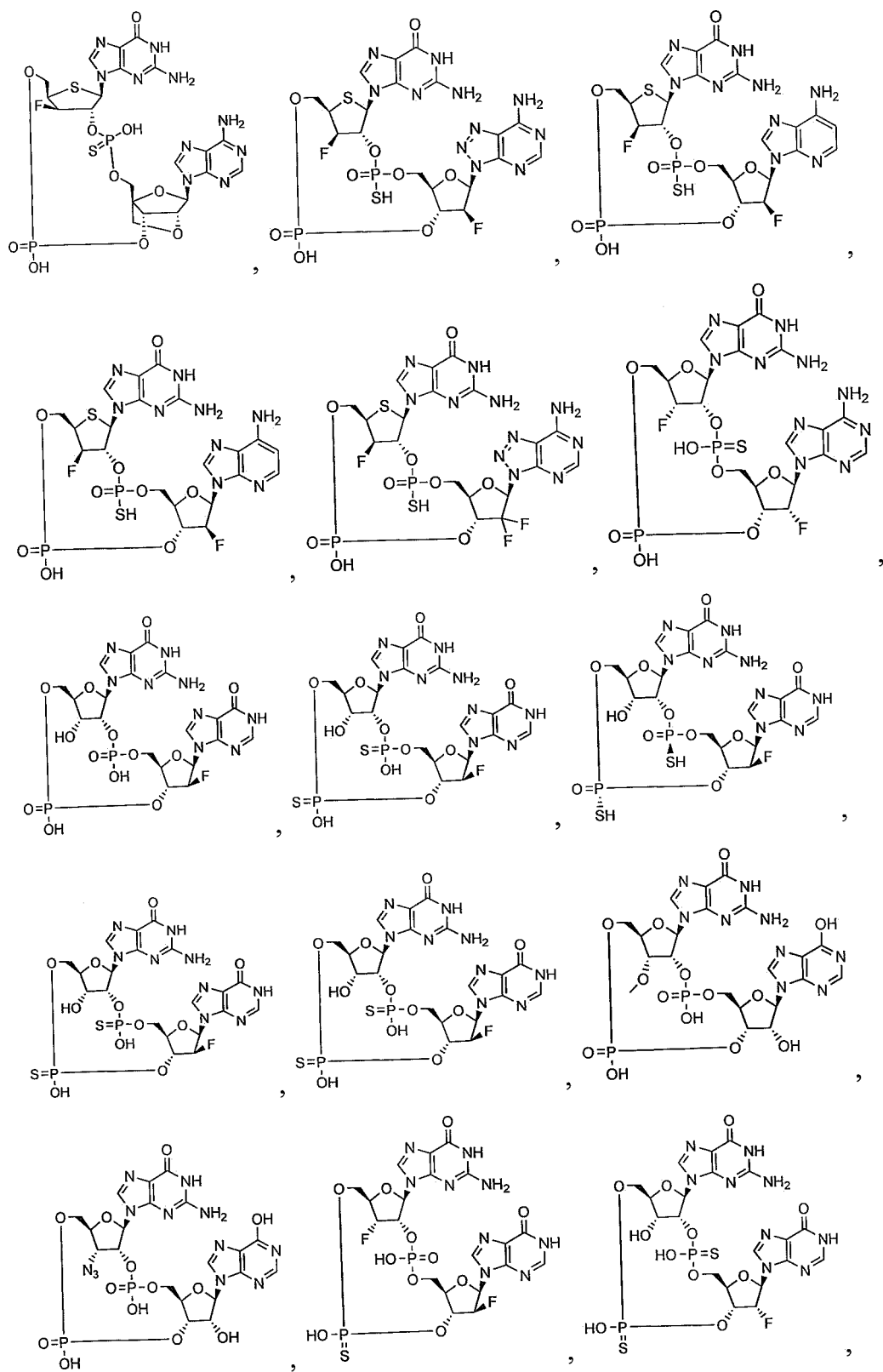




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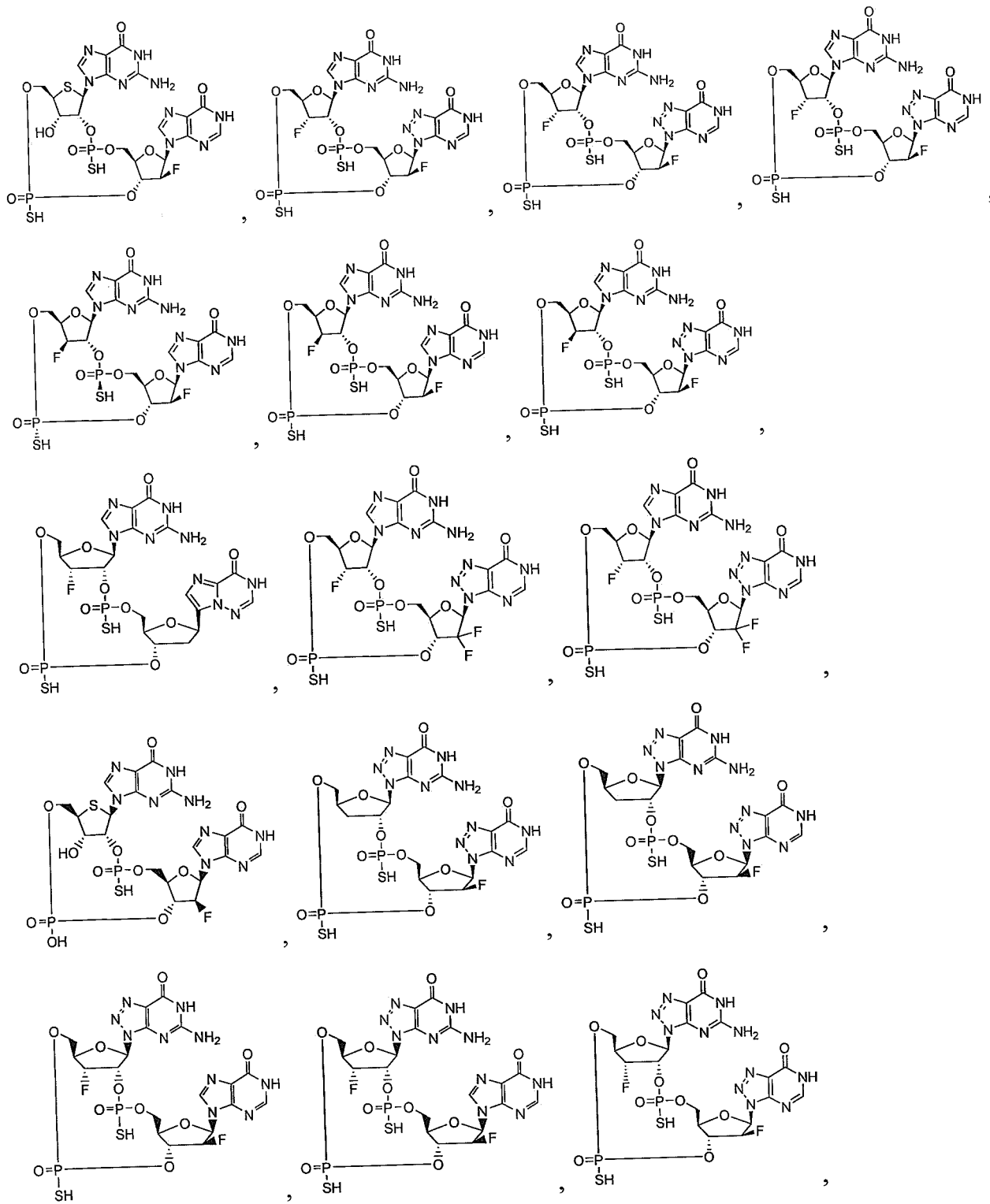


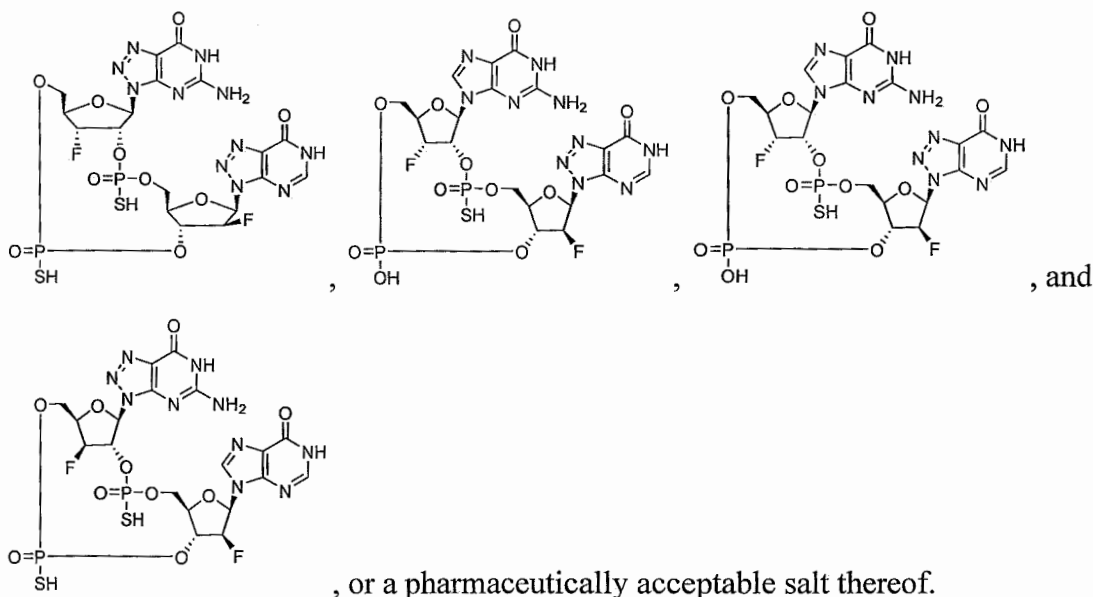
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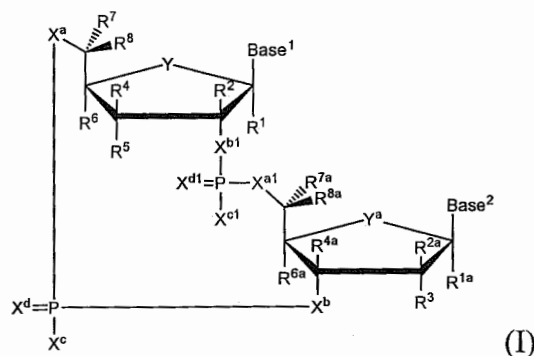
In another aspect, there is provided a pharmaceutical composition, said pharmaceutical composition comprising: (a) a compound as defined herein or a pharmaceutically acceptable salt thereof; and (b) a pharmaceutically acceptable carrier.

Other embodiments, aspects and features of the present disclosure are either further described in or will be apparent from the ensuing description, examples and appended claims.

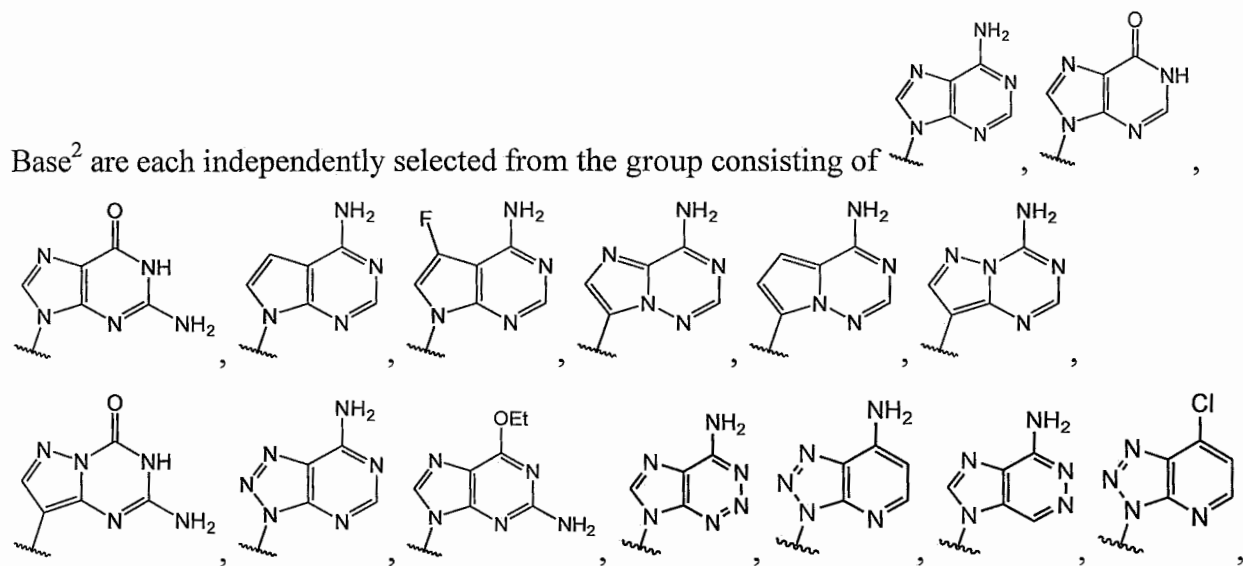
DETAILED DESCRIPTION OF THE INVENTION

The present disclosure includes compounds of general formula (I), compounds of general formula (I'), and/or compounds of general formula (I'') above, and pharmaceutically acceptable salts, hydrates, solvates, or prodrugs thereof. These compounds and their pharmaceutically acceptable salts, hydrates, solvates, and/or prodrugs are useful as agents to induce interferon production.

A first embodiment of the disclosure relates to cyclic di-nucleotide compounds of general formula (I):

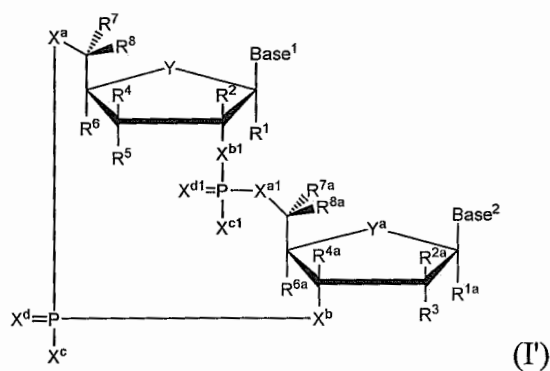


or a pharmaceutically acceptable salt, hydrate, solvate, or prodrug thereof, wherein Base¹ and



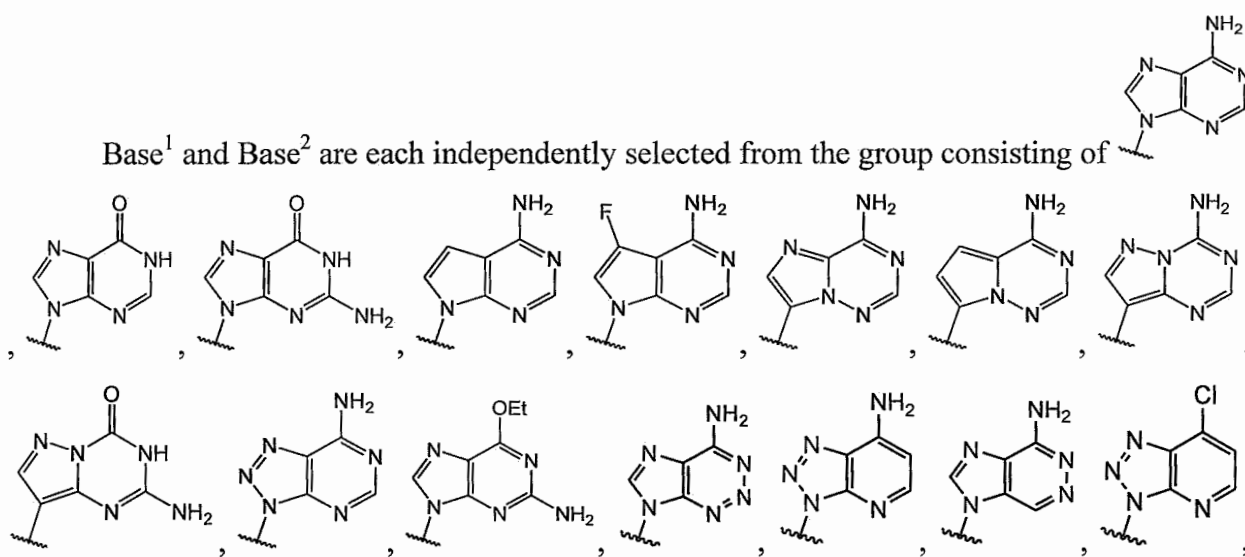
WHAT IS CLAIMED IS:

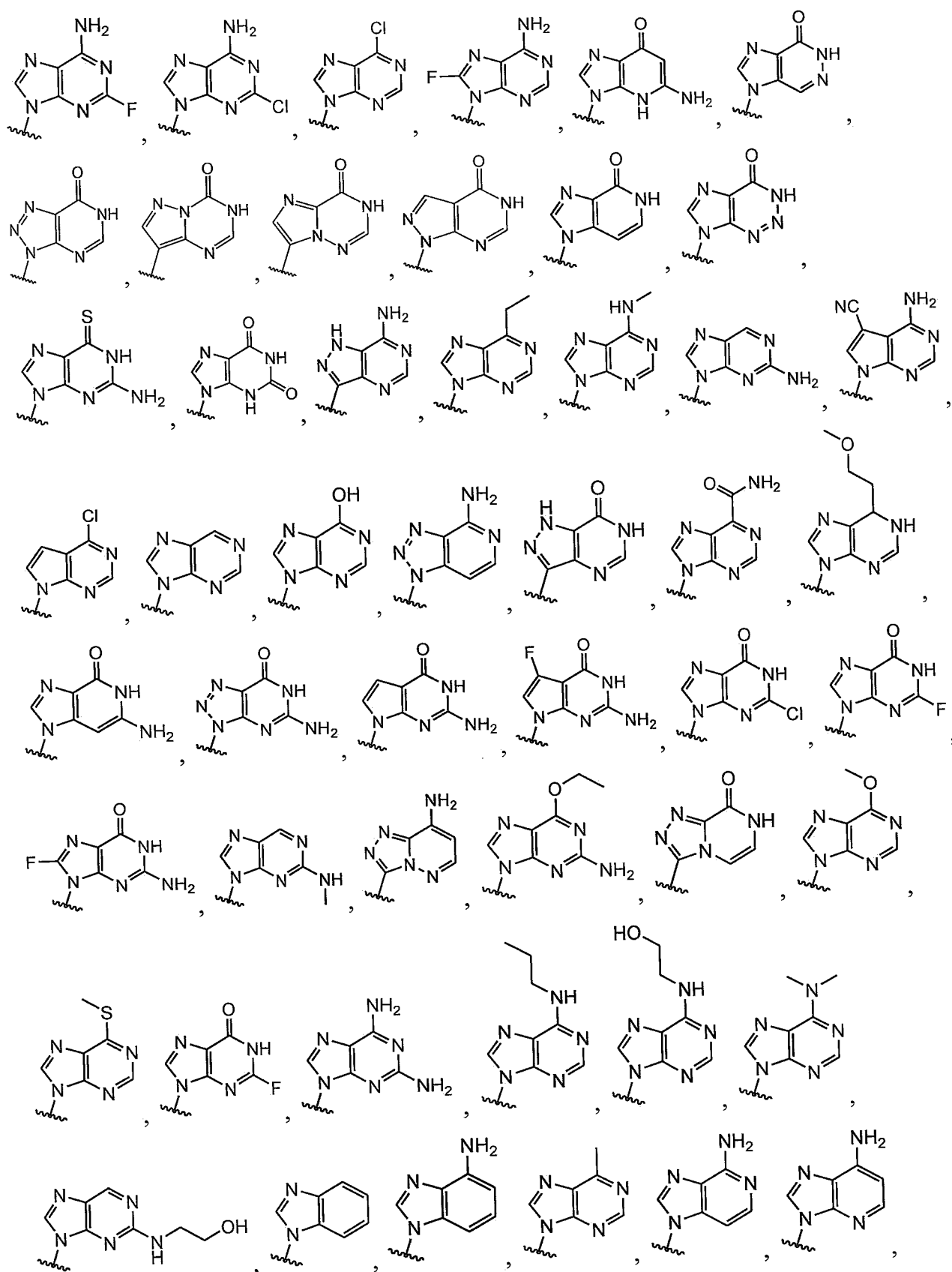
1. A compound of formula (I'):

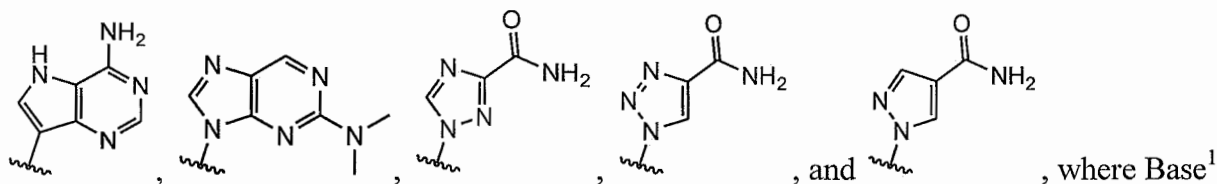


or a pharmaceutically acceptable salt thereof, wherein

Base¹ and Base² are each independently selected from the group consisting of







and Base² each may be independently substituted by 0-3 substituents R¹⁰, where each R¹⁰ is independently selected from the group consisting of F, Cl, I, Br, OH, SH, NH₂, C₁₋₃ alkyl, C₃₋₆ cycloalkyl, O(C₁₋₃ alkyl), O(C₃₋₆ cycloalkyl), S(C₁₋₃ alkyl), S(C₃₋₆ cycloalkyl), NH(C₁₋₃ alkyl), NH(C₃₋₆ cycloalkyl), N(C₁₋₃ alkyl)₂, and N(C₃₋₆ cycloalkyl)₂;

Y and Y^a are each independently selected from the group consisting of -O- and -S-;

X^a and X^{a1} are each independently selected from the group consisting of O, and S;

X^b and X^{b1} are each independently selected from the group consisting of O, and S;

X^c and X^{c1} are each independently selected from the group consisting of OR⁹, SR⁹, and NR⁹R⁹;

X^d and X^{d1} are each independently selected from the group consisting of O and S;

R¹ and R^{1a} are each independently selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ haloalkyl, C₂₋₆ haloalkenyl, C₂₋₆ haloalkynyl, -O-C₁₋₆ alkyl, -O-C₂₋₆ alkenyl, and -O-C₂₋₆ alkynyl, where said R¹ and R^{1a} C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ haloalkyl, C₂₋₆ haloalkenyl, C₂₋₆ haloalkynyl, -O-C₁₋₆ alkyl, -O-C₂₋₆ alkenyl, and -O-C₂₋₆ alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N₃;

R² and R^{2a} are each independently selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ haloalkyl, C₂₋₆ haloalkenyl, C₂₋₆ haloalkynyl, -O-C₁₋₆ alkyl, -O-C₂₋₆ alkenyl, and -O-C₂₋₆ alkynyl, where said R² and R^{2a} C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ haloalkyl, C₂₋₆ haloalkenyl, C₂₋₆ haloalkynyl, -O-C₁₋₆ alkyl, -O-C₂₋₆ alkenyl, and -O-C₂₋₆ alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N₃;

R³ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ haloalkyl, C₂₋₆ haloalkenyl, C₂₋₆ haloalkynyl, -O-C₁₋₆ alkyl, -O-C₂₋₆ alkenyl, and -O-C₂₋₆ alkynyl, where said R³ C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ haloalkyl, C₂₋₆ haloalkenyl, C₂₋₆ haloalkynyl, -O-C₁₋₆ alkyl, -O-C₂₋₆ alkenyl, and -O-C₂₋₆ alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N₃;

R^4 and R^{4a} are each independently selected from the group consisting of H, F, Cl, Br, I, OH, CN, N_3 , C_1 - C_6 alkyl, C_2 - C_6 alkenyl, C_2 - C_6 alkynyl, C_1 - C_6 haloalkyl, C_2 - C_6 haloalkenyl, C_2 - C_6 haloalkynyl, -O- C_1 - C_6 alkyl, -O- C_2 - C_6 alkenyl, and -O- C_2 - C_6 alkynyl, where said R^4 and R^{4a} C_1 - C_6 alkyl, C_2 - C_6 alkenyl, C_2 - C_6 alkynyl, C_1 - C_6 haloalkyl, C_2 - C_6 haloalkenyl, C_2 - C_6 haloalkynyl, -O- C_1 - C_6 alkyl, -O- C_2 - C_6 alkenyl, and -O- C_2 - C_6 alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N_3 ;

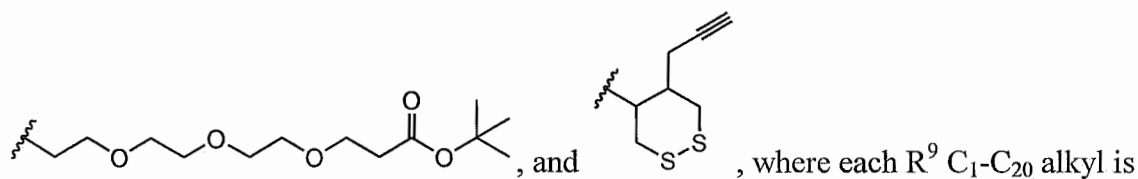
R^5 is selected from the group consisting of H, F, Cl, Br, I, OH, CN, NH_2 , N_3 , C_1 - C_6 alkyl, C_2 - C_6 alkenyl, C_2 - C_6 alkynyl, C_1 - C_6 haloalkyl, C_2 - C_6 haloalkenyl, C_2 - C_6 haloalkynyl, -O- C_1 - C_6 alkyl, -O- C_2 - C_6 alkenyl, and -O- C_2 - C_6 alkynyl, where said R^5 C_1 - C_6 alkyl, C_2 - C_6 alkenyl, C_2 - C_6 alkynyl, C_1 - C_6 haloalkyl, C_2 - C_6 haloalkenyl, C_2 - C_6 haloalkynyl, -O- C_1 - C_6 alkyl, -O- C_2 - C_6 alkenyl, and -O- C_2 - C_6 alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, NR^9R^9 , and N_3 ;

R^6 and R^{6a} are each independently selected from the group consisting of H, F, Cl, Br, I, OH, CN, N_3 , C_1 - C_6 alkyl, C_2 - C_6 alkenyl, C_2 - C_6 alkynyl, C_1 - C_6 haloalkyl, C_2 - C_6 haloalkenyl, C_2 - C_6 haloalkynyl, -O- C_1 - C_6 alkyl, -O- C_2 - C_6 alkenyl, and -O- C_2 - C_6 alkynyl, where said R^6 and R^{6a} C_1 - C_6 alkyl, C_2 - C_6 alkenyl, C_2 - C_6 alkynyl, C_1 - C_6 haloalkyl, C_2 - C_6 haloalkenyl, C_2 - C_6 haloalkynyl, -O- C_1 - C_6 alkyl, -O- C_2 - C_6 alkenyl, and -O- C_2 - C_6 alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N_3 ;

R^7 and R^{7a} are each independently selected from the group consisting of H, F, Cl, Br, I, OH, CN, N_3 , C_1 - C_6 alkyl, C_2 - C_6 alkenyl, C_2 - C_6 alkynyl, C_1 - C_6 haloalkyl, C_2 - C_6 haloalkenyl, C_2 - C_6 haloalkynyl, -O- C_1 - C_6 alkyl, -O- C_2 - C_6 alkenyl, and -O- C_2 - C_6 alkynyl, where said R^7 and R^{7a} C_1 - C_6 alkyl, C_2 - C_6 alkenyl, C_2 - C_6 alkynyl, C_1 - C_6 haloalkyl, C_2 - C_6 haloalkenyl, C_2 - C_6 haloalkynyl, -O- C_1 - C_6 alkyl, -O- C_2 - C_6 alkenyl, and -O- C_2 - C_6 alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N_3 ;

R^8 and R^{8a} are each independently selected from the group consisting of H, F, Cl, Br, I, OH, CN, N_3 , C_1 - C_6 alkyl, C_2 - C_6 alkenyl, C_2 - C_6 alkynyl, C_1 - C_6 haloalkyl, C_2 - C_6 haloalkenyl, C_2 - C_6 haloalkynyl, -O- C_1 - C_6 alkyl, -O- C_2 - C_6 alkenyl, and -O- C_2 - C_6 alkynyl, where said R^8 and R^{8a} C_1 - C_6 alkyl, C_2 - C_6 alkenyl, C_2 - C_6 alkynyl, C_1 - C_6 haloalkyl, C_2 - C_6 haloalkenyl, C_2 - C_6 haloalkynyl, -O- C_1 - C_6 alkyl, -O- C_2 - C_6 alkenyl, and -O- C_2 - C_6 alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N_3 ;

each R⁹ is independently selected from the group consisting of H, C₁-C₂₀ alkyl,



optionally substituted by 0 to 3 substituents independently selected from the group consisting of OH, -O-C₁-C₂₀ alkyl, -S-C(O)C₁-C₆ alkyl, and C(O)OC₁-C₆ alkyl;

optionally R^{1a} and R³ are connected to form C₁-C₆ alkylene, C₂-C₆ alkenylene, C₂-C₆ alkynylene, -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, such that where R^{1a} and R³ are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, said O is bound at the R³ position;

optionally R^{2a} and R³ are connected to form C₁-C₆ alkylene, C₂-C₆ alkenylene, C₂-C₆ alkynylene, -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, such that where R^{2a} and R³ are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, said O is bound at the R³ position;

optionally R³ and R^{6a} are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, such that where R³ and R^{6a} are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, said O is bound at the R³ position;

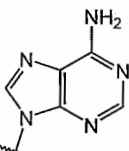
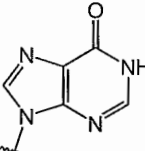
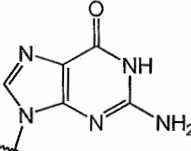
optionally R⁴ and R⁵ are connected to form are connected to form C₁-C₆ alkylene, C₂-C₆ alkenylene, C₂-C₆ alkynylene, -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, such that where R⁴ and R⁵ are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, said O is bound at the R⁵ position;

optionally R⁵ and R⁶ are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, such that where R⁵ and R⁶ are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, said O is bound at the R⁵ position;

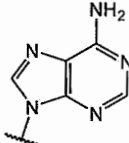
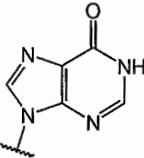
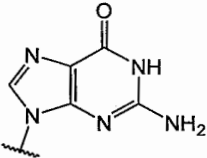
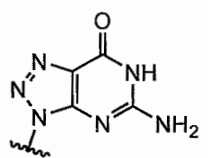
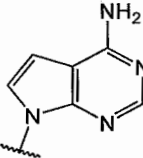
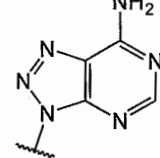
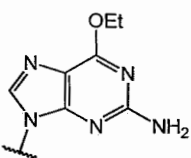
optionally R⁷ and R⁸ are connected to form C₁-C₆ alkylene, C₂-C₆ alkenylene, or C₂-C₆ alkynylene; and

optionally R^{7a} and R^{8a} are connected to form C₁-C₆ alkylene, C₂-C₆ alkenylene, or C₂-C₆ alkynylene; and

providing that when Y and Y^a are each O, X^a and X^{a1} are each O, X^b and X^{b1} are each O, and X^c and X^{c1} are each OH or SH, X^d and X^{d1} are each O, R¹ and R^{1a} are each H, R² is H, R⁶ and R^{6a} are each H, R⁷ and R^{7a} are each H, R⁸ and R^{8a} are each H, and Base¹ and Base² are each

selected from the group consisting of , , and , R^5 and R^3 are not both selected from the group consisting of H, F and OH.

2. The compound according to claim 1, or a pharmaceutically acceptable salt thereof, wherein

Base¹ and Base² are each independently selected from the group consisting of , , , , , , and ,

where Base¹ and Base² each may be independently substituted by 0-3 substituents R^{10} , where each R^{10} is independently selected from the group consisting of F, Cl, I, Br, OH, SH, NH₂, C₁₋₃ alkyl, C₃₋₆ cycloalkyl, O(C₁₋₃ alkyl), O(C₃₋₆ cycloalkyl), S(C₁₋₃ alkyl), S(C₃₋₆ cycloalkyl), NH(C₁₋₃ alkyl), NH(C₃₋₆ cycloalkyl), N(C₁₋₃ alkyl)₂, and N(C₃₋₆ cycloalkyl)₂;

Y and Y^a are each independently selected from the group consisting of -O- and -S-;

X^a and X^{a1} are each independently selected from the group consisting of O and S;

X^b and X^{b1} are each independently selected from the group consisting of O and S;

X^c and X^{c1} are each independently selected from the group consisting of OR⁹, SR⁹, and NR⁹R⁹;

X^d and X^{d1} are each independently selected from the group consisting of O and S;

R¹ and R^{1a} are each H;

R² and R^{2a} are each independently selected from the group consisting of H, F, Cl, Br, I, OH, N₃, C₁₋₆ alkyl, and C₁₋₆ haloalkyl, where said R² and R^{2a} C₁₋₆ alkyl or C₁₋₆ haloalkyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N₃;

R³ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁₋₆ alkyl, and C₁₋₆ haloalkyl, where said R³ C₁₋₆ alkyl or C₁₋₆ haloalkyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N₃;

R^4 and R^{4a} are each independently selected from the group consisting of H, C₁-C₆ alkyl, and C₁-C₆ haloalkyl, where said R^4 and R^{4a} C₁-C₆ alkyl or C₁-C₆ haloalkyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N₃;

R^5 is selected from the group consisting of H, F, Cl, Br, I, OH, NH₂, N₃, C₁-C₆ alkyl, and C₁-C₆ haloalkyl, where said R^5 C₁-C₆ alkyl or C₁-C₆ haloalkyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, NR⁹R⁹, and N₃;

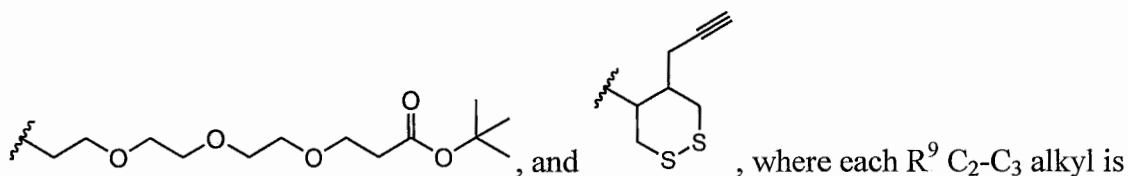
R^3 and R^5 are not both selected from the group consisting of OH, C₁-C₆ alkyl substituted with OH, and C₁-C₆ haloalkyl substituted with OH;

R^6 and R^{6a} are each independently selected from the group consisting of H, F, Cl, Br, I, OH, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, and C₁-C₆ haloalkyl, where said R^6 and R^{6a} C₁-C₆ alkyl or C₁-C₆ haloalkyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N₃;

R^7 and R^{7a} are each H;

R^8 and R^{8a} are each H;

each R^9 is independently selected from the group consisting of H, C₂-C₃ alkyl,



optionally substituted by 1 to 2 substituents independently selected from the group consisting of OH, -O-C₁-C₂₀ alkyl, -S-C(O)C₁-C₆ alkyl, and C(O)OC₁-C₆ alkyl;

optionally R^3 and R^{6a} are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, and -O-C₂-C₆ alkynylene, such that where R^3 and R^{6a} are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, said O is bound at the R^3 position; and

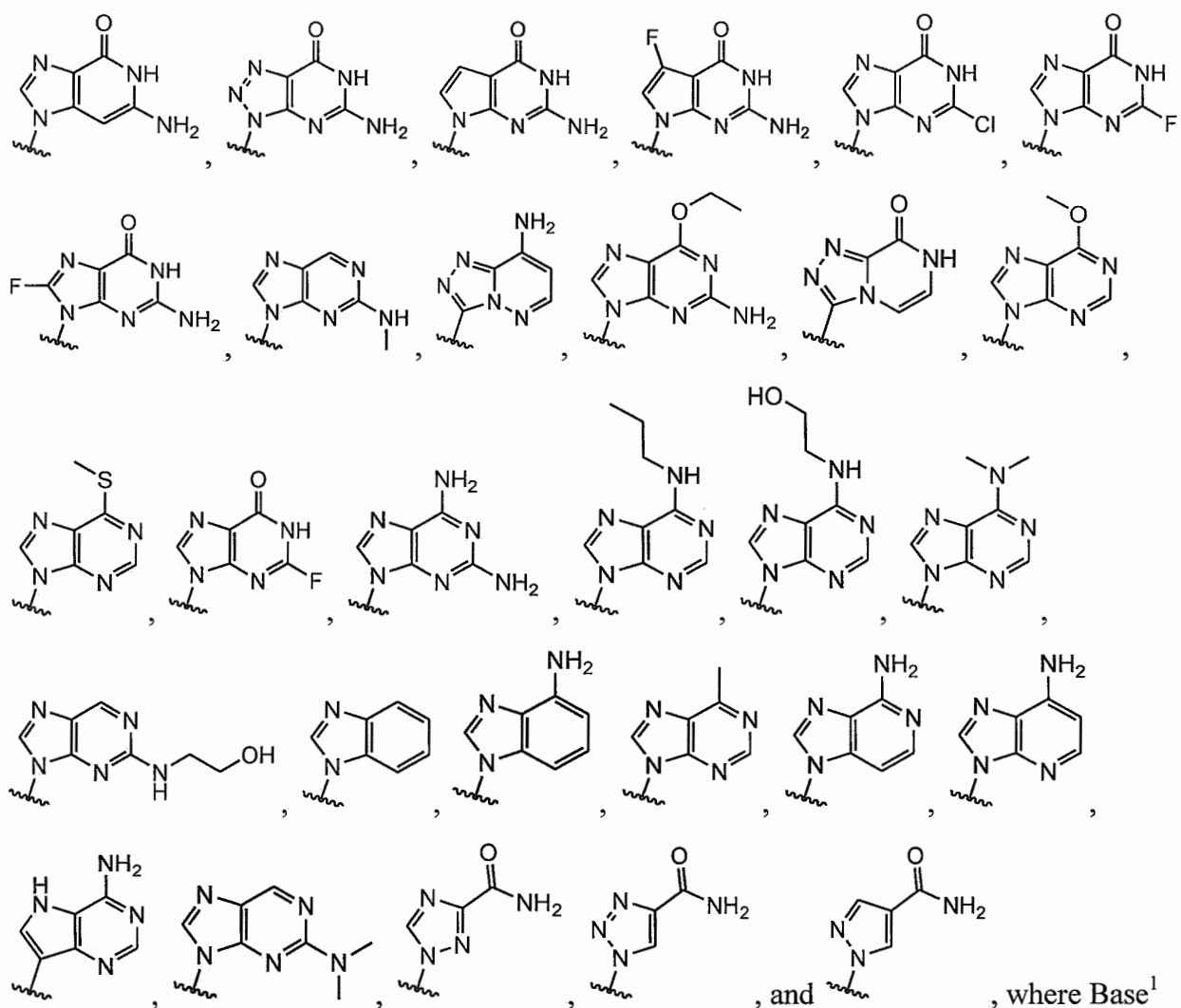
optionally R^4 and R^5 are connected by C₁-C₆ alkylene, -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, such that where R^4 and R^5 are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, said O is bound at the R^5 position.

3. The compound according to claim 1, wherein the compound of formula (I') is a compound of formula (I'b):



Base¹ and Base² are each independently selected from the group consisting of





, and , where Base¹ and Base² each may be independently substituted by 0-3 substituents R¹⁰, where each R¹⁰ is independently selected from the group consisting of F, Cl, I, Br, OH, SH, NH₂, C₁₋₃ alkyl, C₃₋₆ cycloalkyl, O(C₁₋₃ alkyl), O(C₃₋₆ cycloalkyl), S(C₁₋₃ alkyl), S(C₃₋₆ cycloalkyl), NH(C₁₋₃ alkyl), NH(C₃₋₆ cycloalkyl), N(C₁₋₃ alkyl)₂, and N(C₃₋₆ cycloalkyl)₂;

X^c and X^{c1} are each independently selected from the group consisting of OR⁹, SR⁹, and NR⁹R⁹;

R^{1a} is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ haloalkyl, C₂₋₆ haloalkenyl, C₂₋₆ haloalkynyl, -O-C₁₋₆ alkyl, -O-C₂₋₆ alkenyl, and -O-C₂₋₆ alkynyl, where said R^{1a} C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ haloalkyl, C₂₋₆ haloalkenyl, C₂₋₆ haloalkynyl, -O-C₁₋₆ alkyl, -O-C₂₋₆ alkenyl, and -O-C₂₋₆ alkynyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, OH, CN, and N₃;

R^{2a} is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N_3 , C_1 - C_6 alkyl, and C_1 - C_6 haloalkyl, where said R^{2a} C_1 - C_6 alkyl or C_1 - C_6 haloalkyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, and OH;

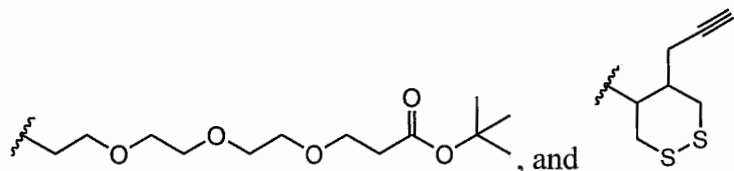
R^3 is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N_3 , C_1 - C_6 alkyl, and C_1 - C_6 haloalkyl, where said R^3 C_1 - C_6 alkyl or C_1 - C_6 haloalkyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, and OH;

R^5 is selected from the group consisting of H, F, Cl, Br, I, OH, CN, NH_2 , N_3 , C_1 - C_6 alkyl, and C_1 - C_6 haloalkyl, where said R^5 C_1 - C_6 alkyl or C_1 - C_6 haloalkyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, and OH;

R^3 and R^5 are not both selected from the group consisting of OH, C_1 - C_6 alkyl substituted with OH, and C_1 - C_6 haloalkyl substituted with OH;

R^{6a} is selected from the group consisting of H, F, Cl, Br, I, OH, C_1 - C_6 alkyl, C_2 - C_6 alkenyl, and C_2 - C_6 alkynyl;

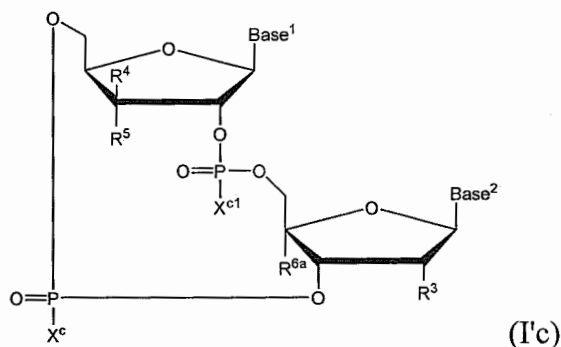
each R^9 is independently selected from the group consisting of H, C_2 - C_3 alkyl,



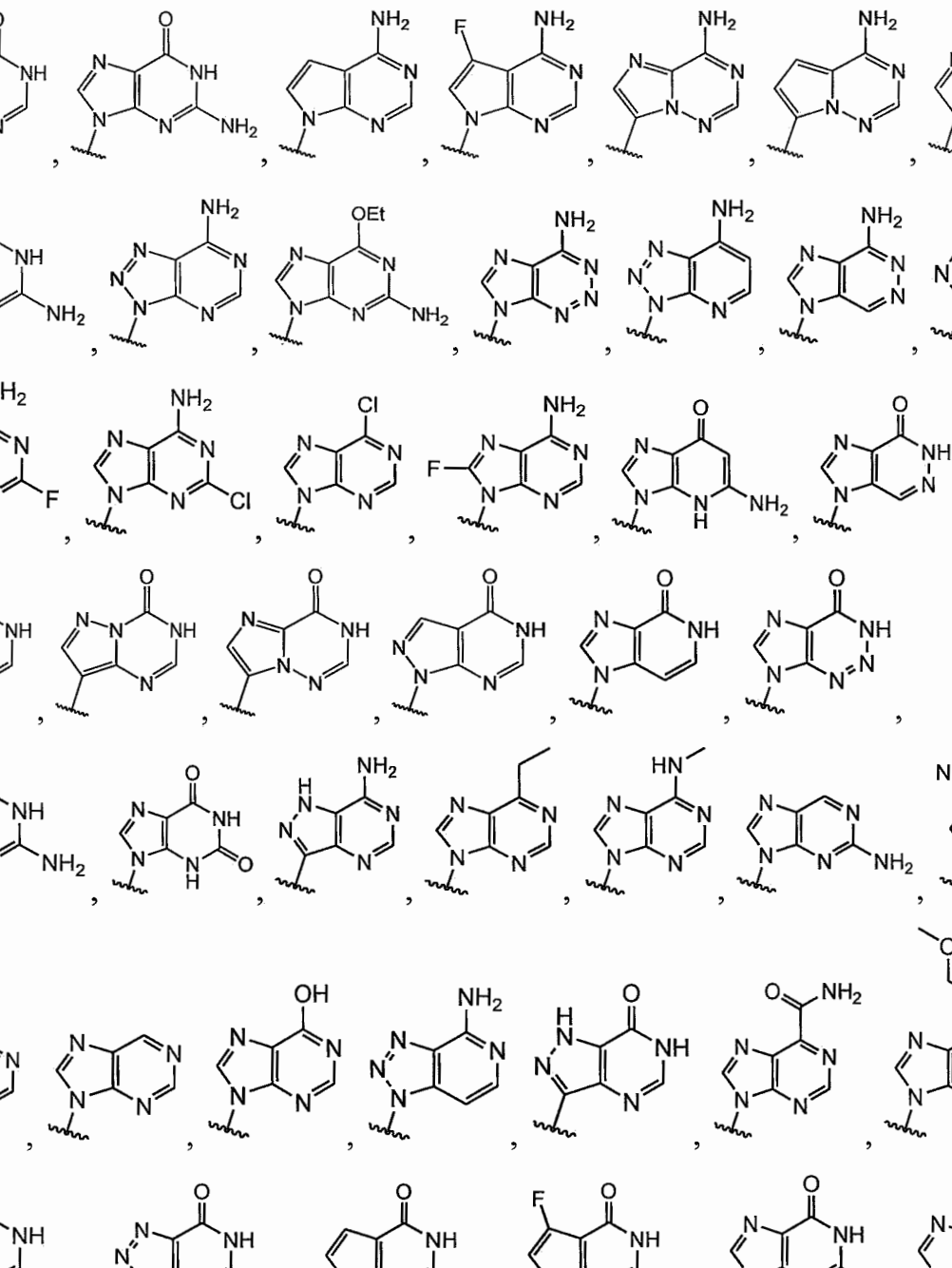
, where each R^9 C_2 - C_3 alkyl is optionally substituted by 1 to 2 substituents independently selected from the group consisting of OH, $-O-C_1-C_{20}$ alkyl, $-S-C(O)C_1-C_6$ alkyl, and $C(O)OC_1-C_6$ alkyl; and

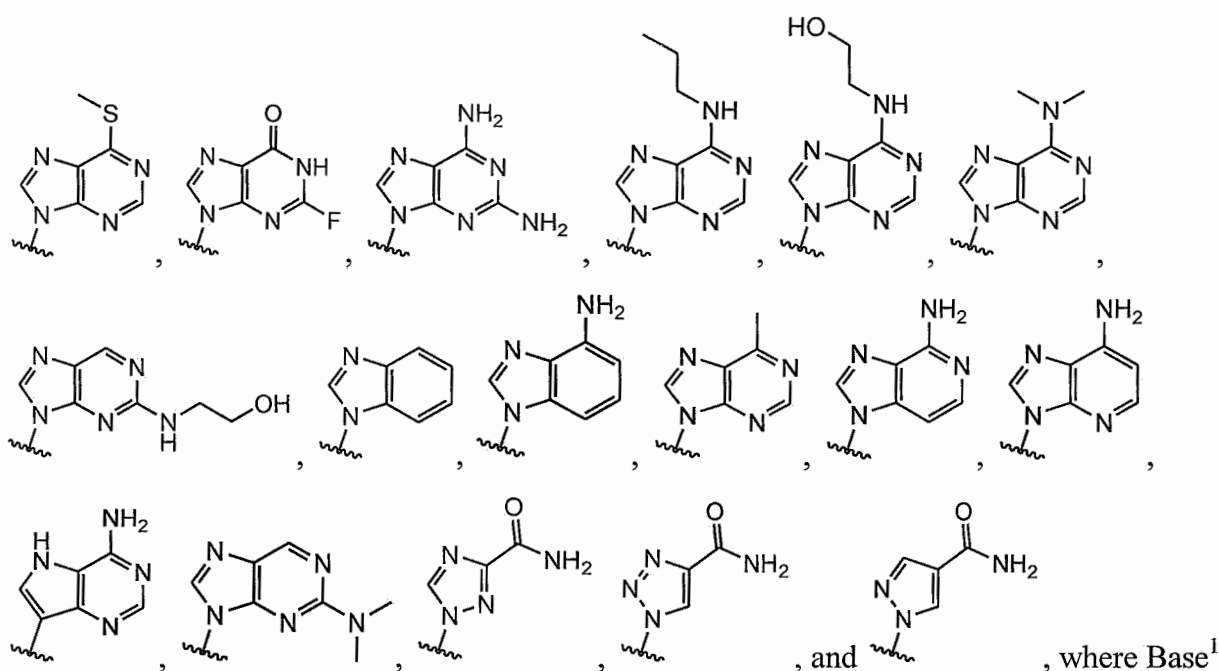
optionally R^3 and R^{6a} are connected to form $-O-C_1-C_6$ alkylene, $-O-C_2-C_6$ alkenylene, and $-O-C_2-C_6$ alkynylene, such that where R^3 and R^{6a} are connected to form $-O-C_1-C_6$ alkylene, $-O-C_2-C_6$ alkenylene, or $-O-C_2-C_6$ alkynylene, said O is bound at the R^3 position.

4. The compound according to claim 1, wherein the compound of formula (I') is a compound of formula (I'c):



Base¹ and Base² are each independently selected from the group consisting of





and Base² each may be independently substituted by 0-3 substituents R¹⁰, where each R¹⁰ is independently selected from the group consisting of F, Cl, I, Br, OH, SH, NH₂, C₁₋₃ alkyl, C₃₋₆ cycloalkyl, O(C₁₋₃ alkyl), O(C₃₋₆ cycloalkyl), S(C₁₋₃ alkyl), S(C₃₋₆ cycloalkyl), NH(C₁₋₃ alkyl), NH(C₃₋₆ cycloalkyl), N(C₁₋₃ alkyl)₂, and N(C₃₋₆ cycloalkyl)₂;

X^c and X^{c1} are each independently selected from the group consisting of OR⁹, SR⁹, and NR⁹R⁹;

R³ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁₋₆ alkyl, and C₁₋₆ haloalkyl, where said R³ C₁₋₆ alkyl or C₁₋₆ haloalkyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, and OH;

R⁴ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁₋₆ alkyl, and C₁₋₆ haloalkyl, where said R⁴ C₁₋₆ alkyl or C₁₋₆ haloalkyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, and OH;

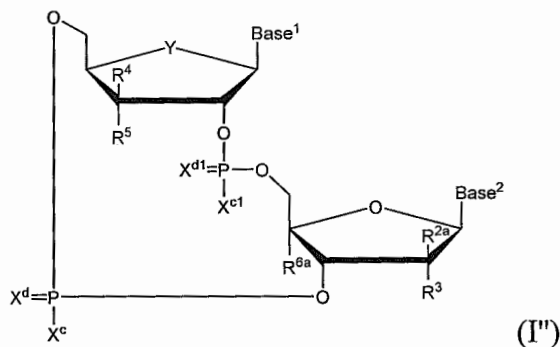
R⁵ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, NH₂, N₃, C₁₋₆ alkyl, and C₁₋₆ haloalkyl, where said R⁵ C₁₋₆ alkyl or C₁₋₆ haloalkyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, and OH;

R^{6a} is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁₋₆ alkyl, and C₁₋₆ haloalkyl, where said R^{6a} C₁₋₆ alkyl or C₁₋₆ haloalkyl are substituted by 0 to 3 substituents selected from the group consisting of F, Cl, Br, I, and OH;

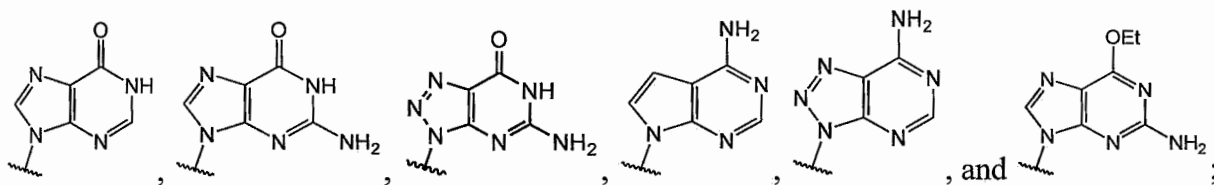


 , where each R⁹ C₂-C₃ alkyl is optionally substituted by 1 to 2 substituents independently selected from the group consisting of OH, -O-C₁-C₂₀ alkyl, -S-C(O)C₁-C₆ alkyl, and C(O)OC₁-C₆ alkyl; and

5. A compound of formula (I''):



Base¹ and Base² are each independently selected from the group consisting of 



R^{2a} is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

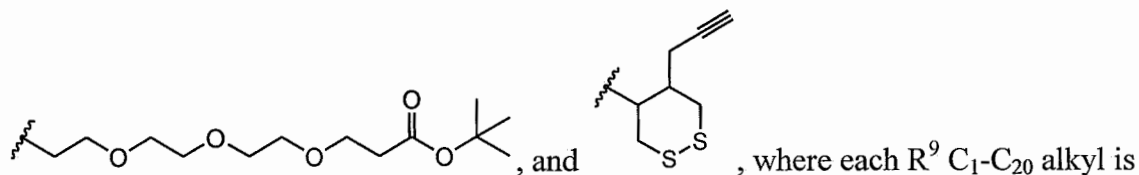
R³ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

R⁴ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

R⁵ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, NH₂, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

R^{6a} is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

each R⁹ is independently selected from the group consisting of H, C₁-C₂₀ alkyl,



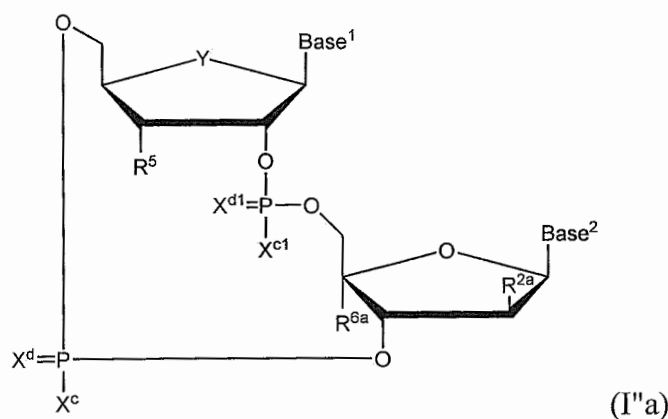
optionally substituted by 0 to 3 substituents independently selected from the group consisting of OH, -O-C₁-C₂₀ alkyl, -S-C(O)C₁-C₆ alkyl, and C(O)OC₁-C₆ alkyl; and

optionally R³ and R^{6a} are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, such that where R³ and R^{6a} are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, said O is bound at the R³ position; and

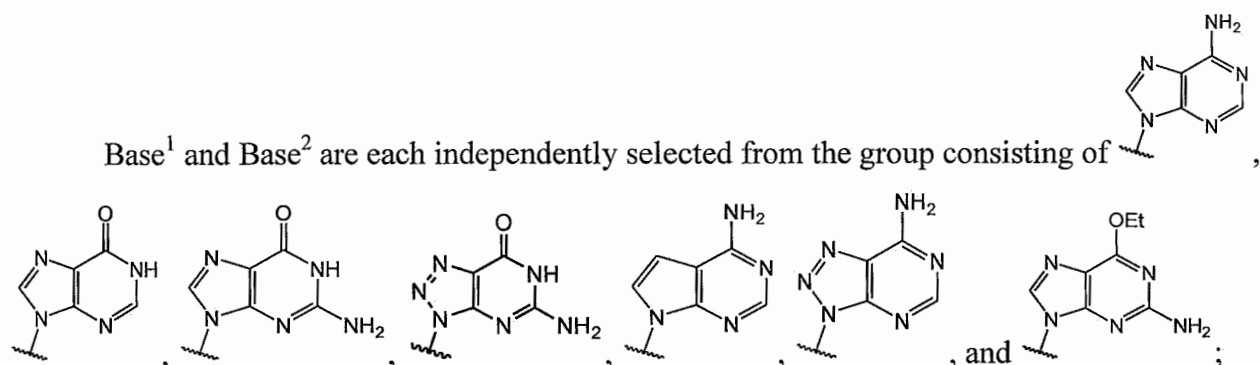
providing that when Y and Y^a are each O, X^a and X^{a1} are each O, X^b and X^{b1} are each O, and X^c and X^{c1} are each OH or SH, X^d and X^{d1} are each O, R¹ and R^{1a} are each H, R² is H, R⁶ and R^{6a} are each H, R⁷ and R^{7a} are each H, R⁸ and R^{8a} are each H, and Base¹ and Base² are each

selected from the group consisting of , R⁵ and R³ are not both selected from the group consisting of H, F and OH.

6. The compound according to claim 5, wherein the compound of formula (I'') is a compound of formula (I''a):



or a pharmaceutically acceptable salt thereof, wherein



Y is selected from the group consisting of -O- and -S-;

X^c and X^{c1} are each independently selected from the group consisting of OR⁹ and SR⁹;

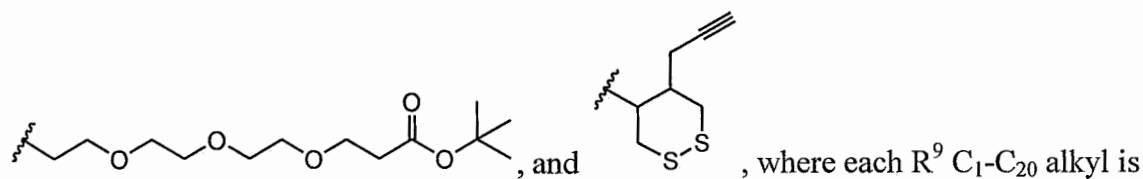
X^d and X^{d1} are each independently selected from the group consisting of O and S;

R^{2a} is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

R⁵ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, NH₂, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

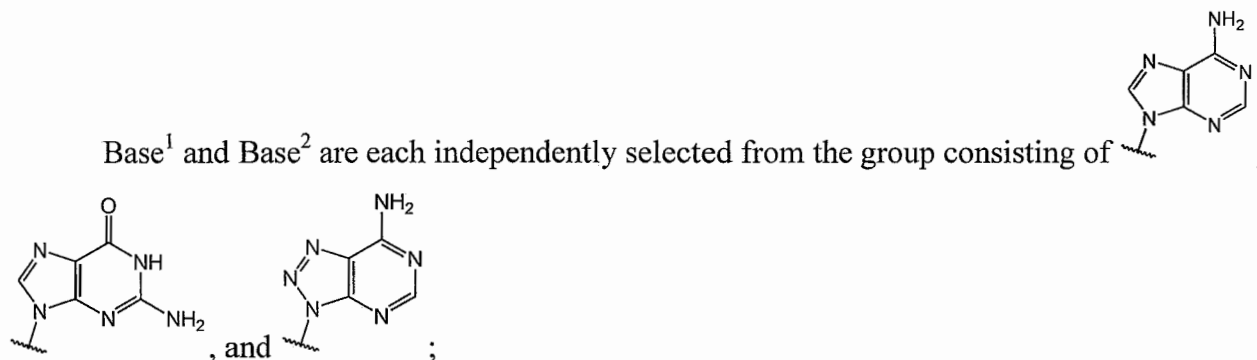
R^{6a} is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl; and

each R⁹ is independently selected from the group consisting of H, C₁-C₂₀ alkyl,



optionally substituted by 0 to 3 substituents independently selected from the group consisting of OH, -O-C₁-C₂₀ alkyl, -S-C(O)C₁-C₆ alkyl, and C(O)OC₁-C₆ alkyl.

7. The compound according to claim 6, or a pharmaceutically acceptable salt thereof, wherein



Y is selected from the group consisting of -O- and -S-;

X^c and X^{cl} are each independently selected from the group consisting of OR⁹ and SR⁹;

X^d and X^{d1} are each independently selected from the group consisting of O and S;

R^{2a} is F;

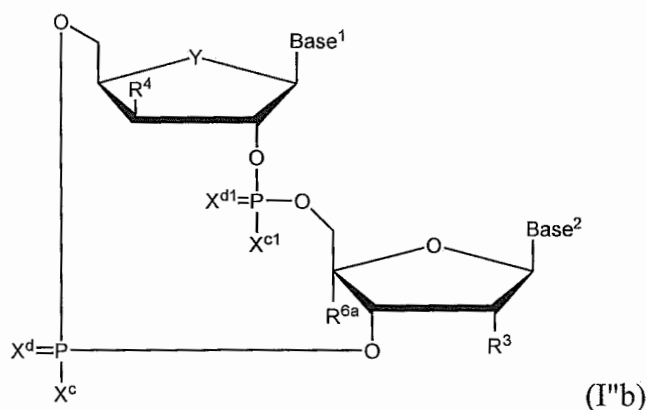
R⁵ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, NH₂, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

R^{6a} is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl; and

each R⁹ is independently H.

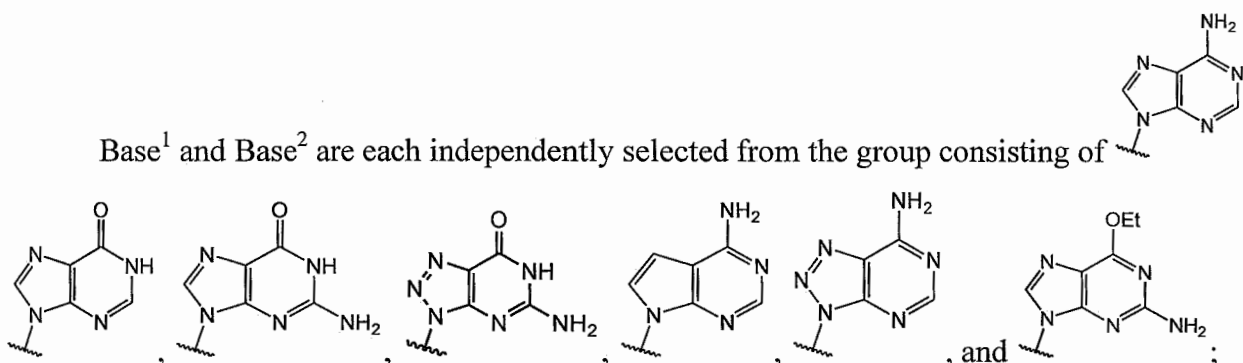
8. The compound according to claim 5, wherein R³ and R^{6a} are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, such that where R³ and R^{6a} are connected to form -O-C₁-C₆ alkylene, -O-C₂-C₆ alkenylene, or -O-C₂-C₆ alkynylene, said O is bound at the R³ position.

9. The compound according to claim 5, wherein the compound of formula (I'') is a compound of formula (I''b):



or a pharmaceutically acceptable salt thereof, wherein

Base¹ and Base² are each independently selected from the group consisting of



Y is selected from the group consisting of -O- and -S-;

X^c and X^{c1} are each independently selected from the group consisting of OR⁹ and SR⁹;

X^d and X^{d1} are each independently selected from the group consisting of O and S;

R³ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

R⁴ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

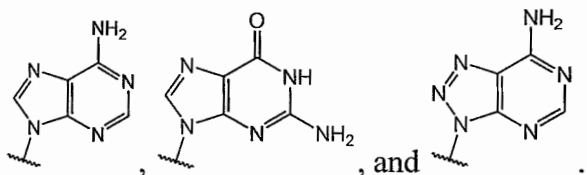
R⁵ is selected from the group consisting of H, F, Cl, Br, I, OH, CN, NH₂, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

R^{6a} is selected from the group consisting of H, F, Cl, Br, I, OH, CN, N₃, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₁-C₆ haloalkyl, C₂-C₆ haloalkenyl, C₂-C₆ haloalkynyl, -O-C₁-C₆ alkyl, -O-C₂-C₆ alkenyl, and -O-C₂-C₆ alkynyl;

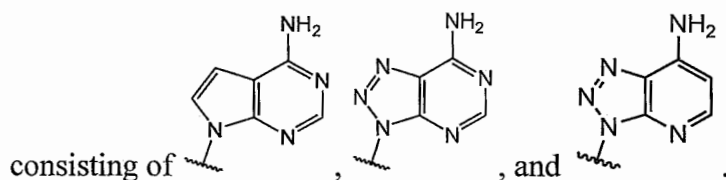
each R⁹ is independently H; and

R^3 and R^{6a} are connected to form $-O-C_1-C_6$ alkylene, $-O-C_2-C_6$ alkenylene, or $-O-C_2-C_6$ alkynylene, such that where R^3 and R^{6a} are connected to form $-O-C_1-C_6$ alkylene, $-O-C_2-C_6$ alkenylene, or $-O-C_2-C_6$ alkynylene, said O is bound at the R^3 position.

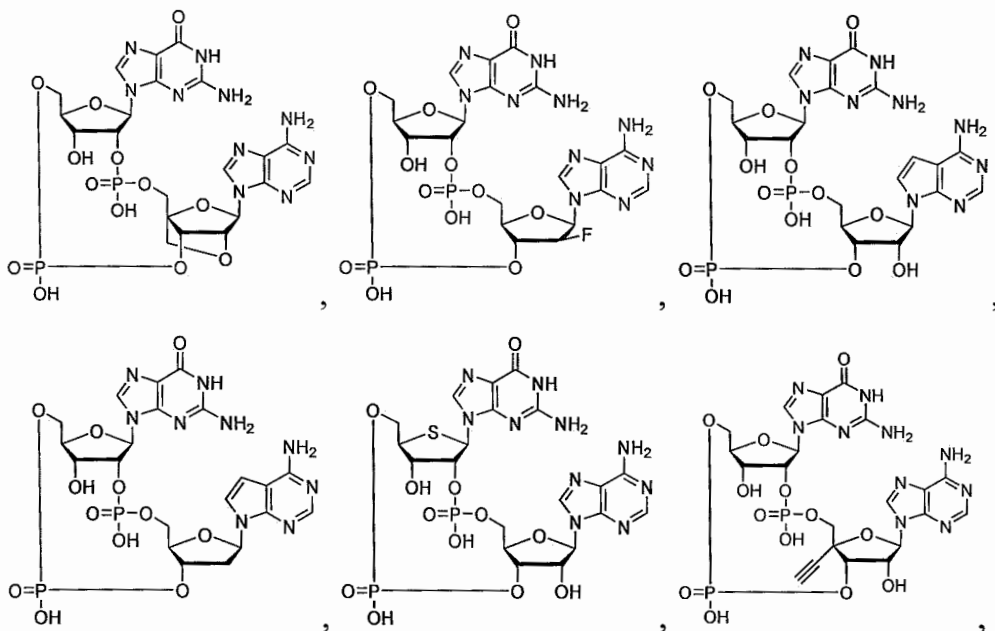
10. The compound according to claim 9, or a pharmaceutically acceptable salt thereof, wherein $Base^1$ and $Base^2$ are each independently selected from the group consisting of



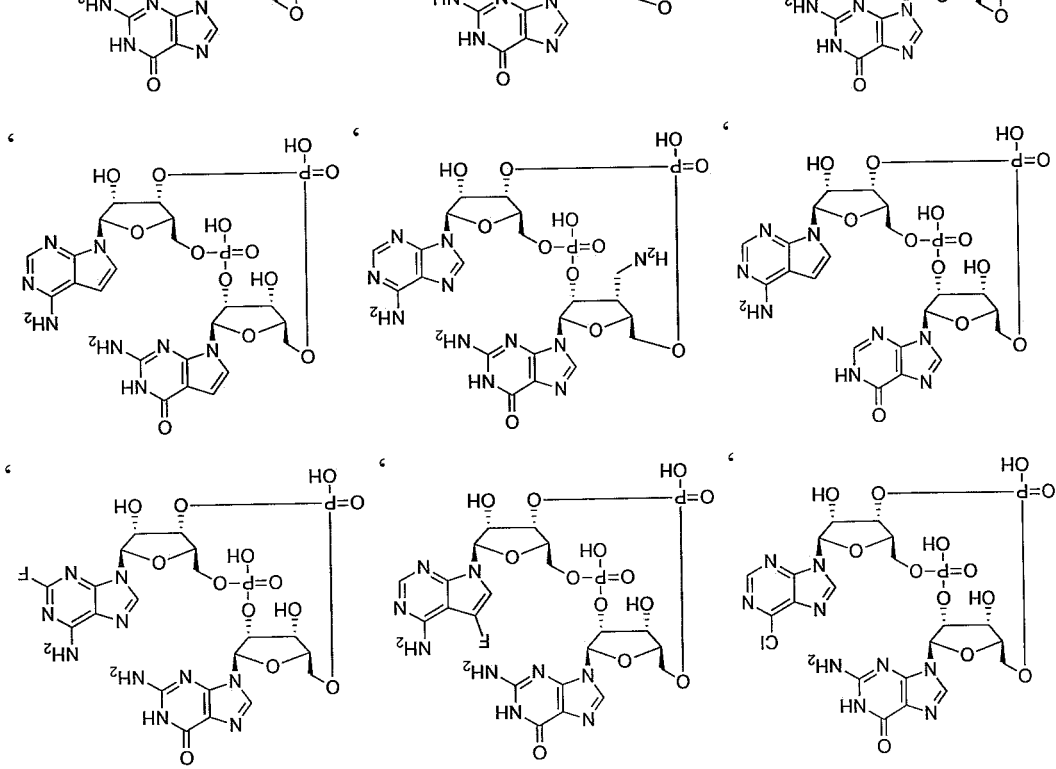
11. The compound according to claim 5, or a pharmaceutically acceptable salt thereof, wherein at least one of $Base^1$ and $Base^2$ are each independently selected from the group



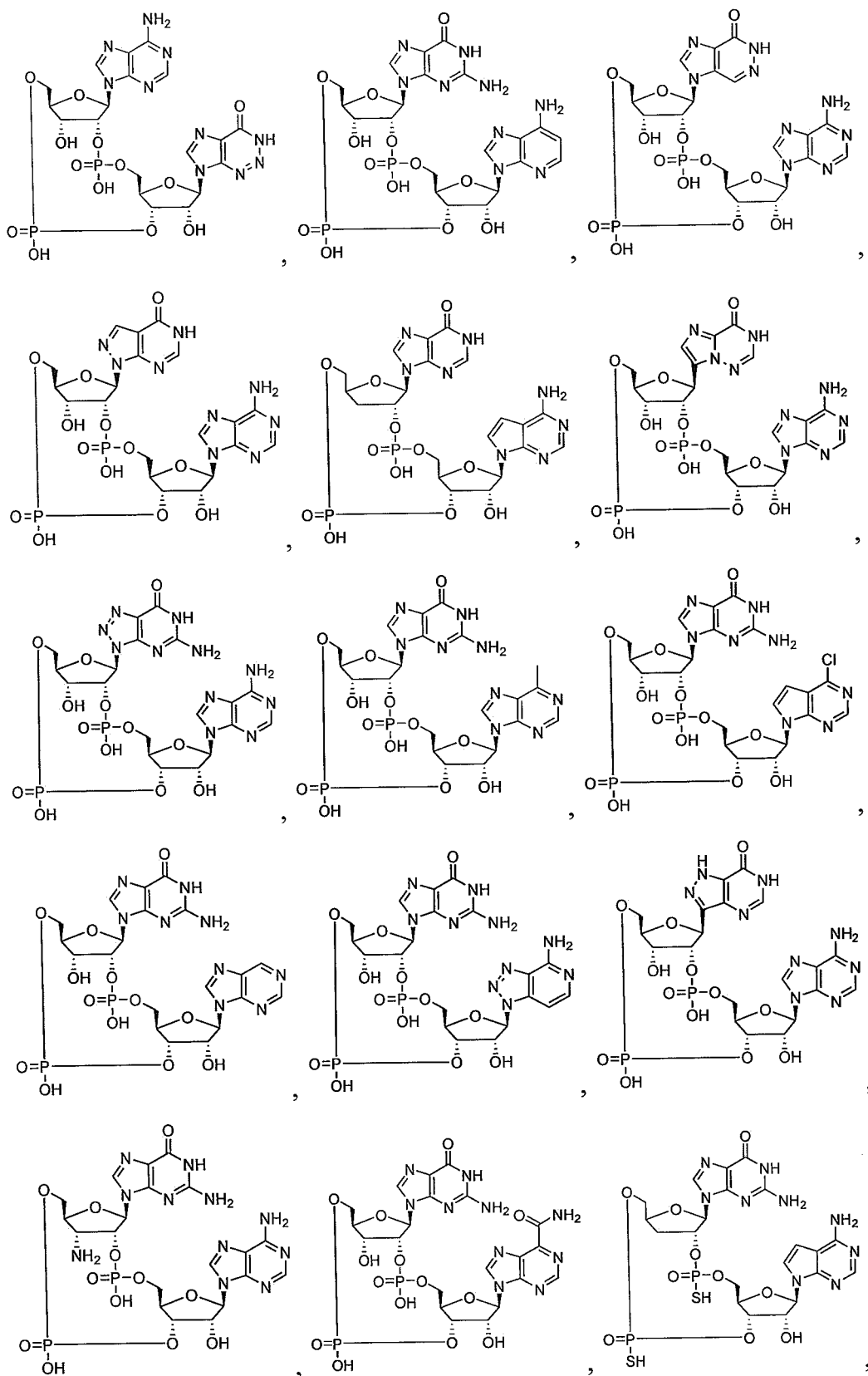
12. A compound selected from the group consisting of:

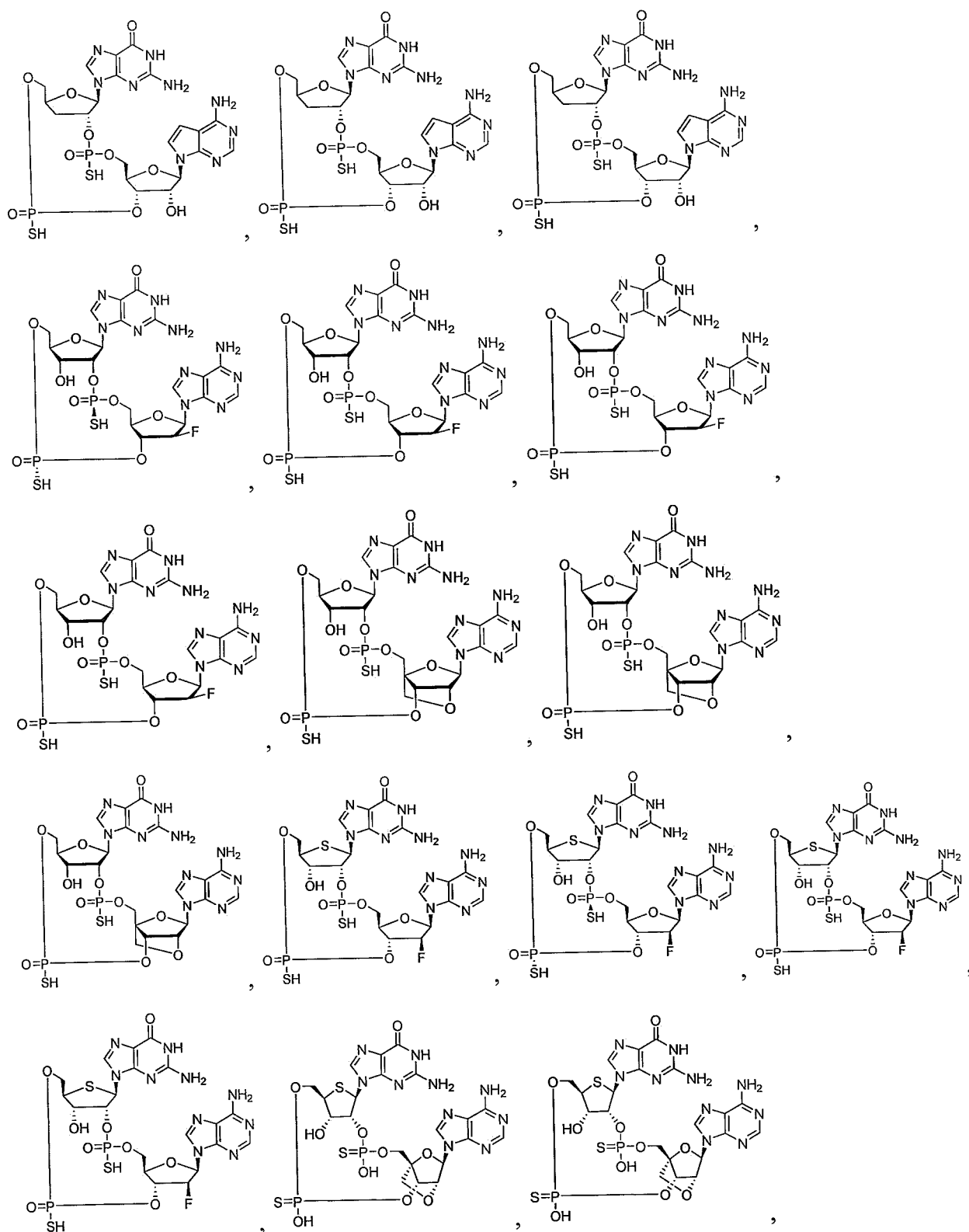


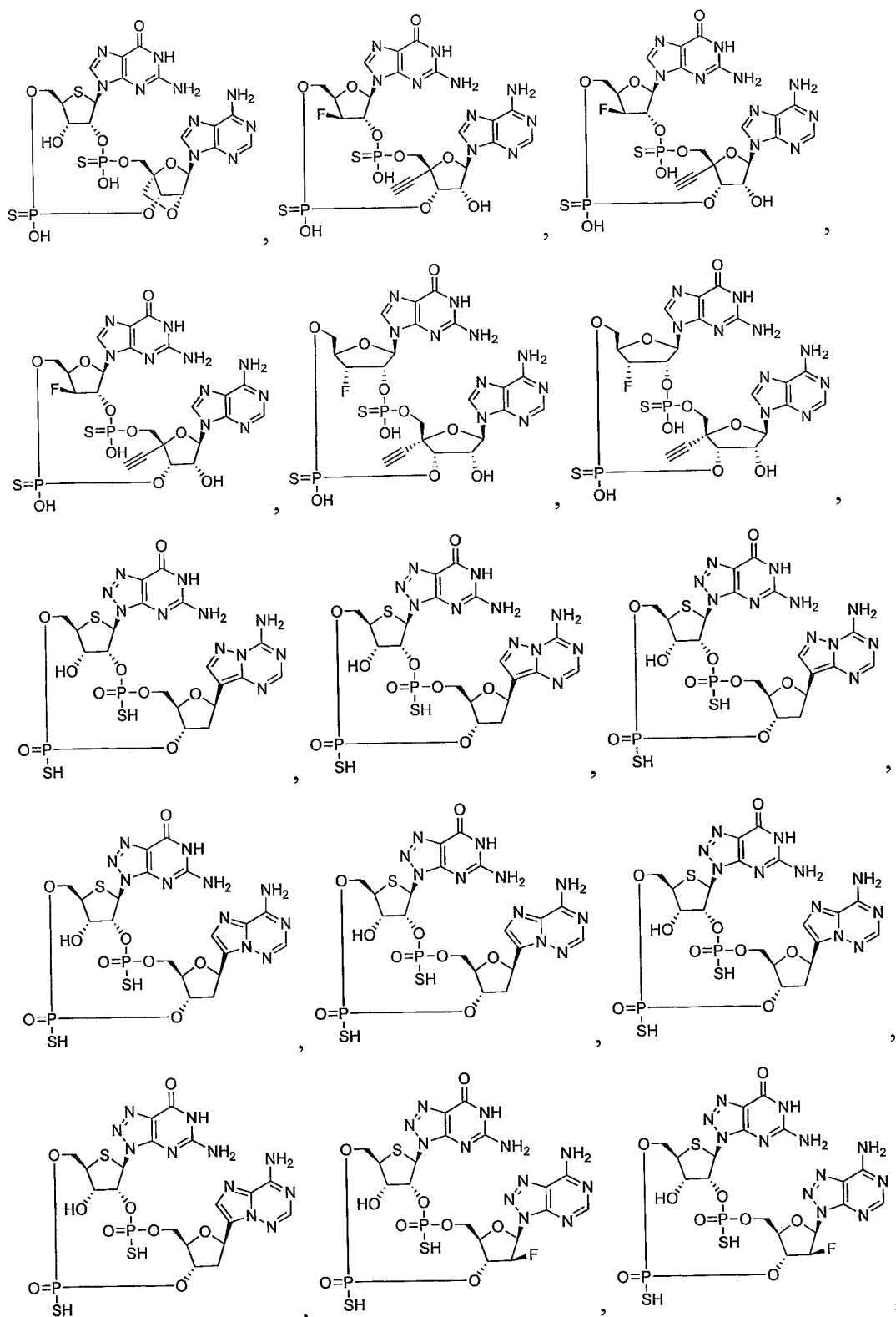


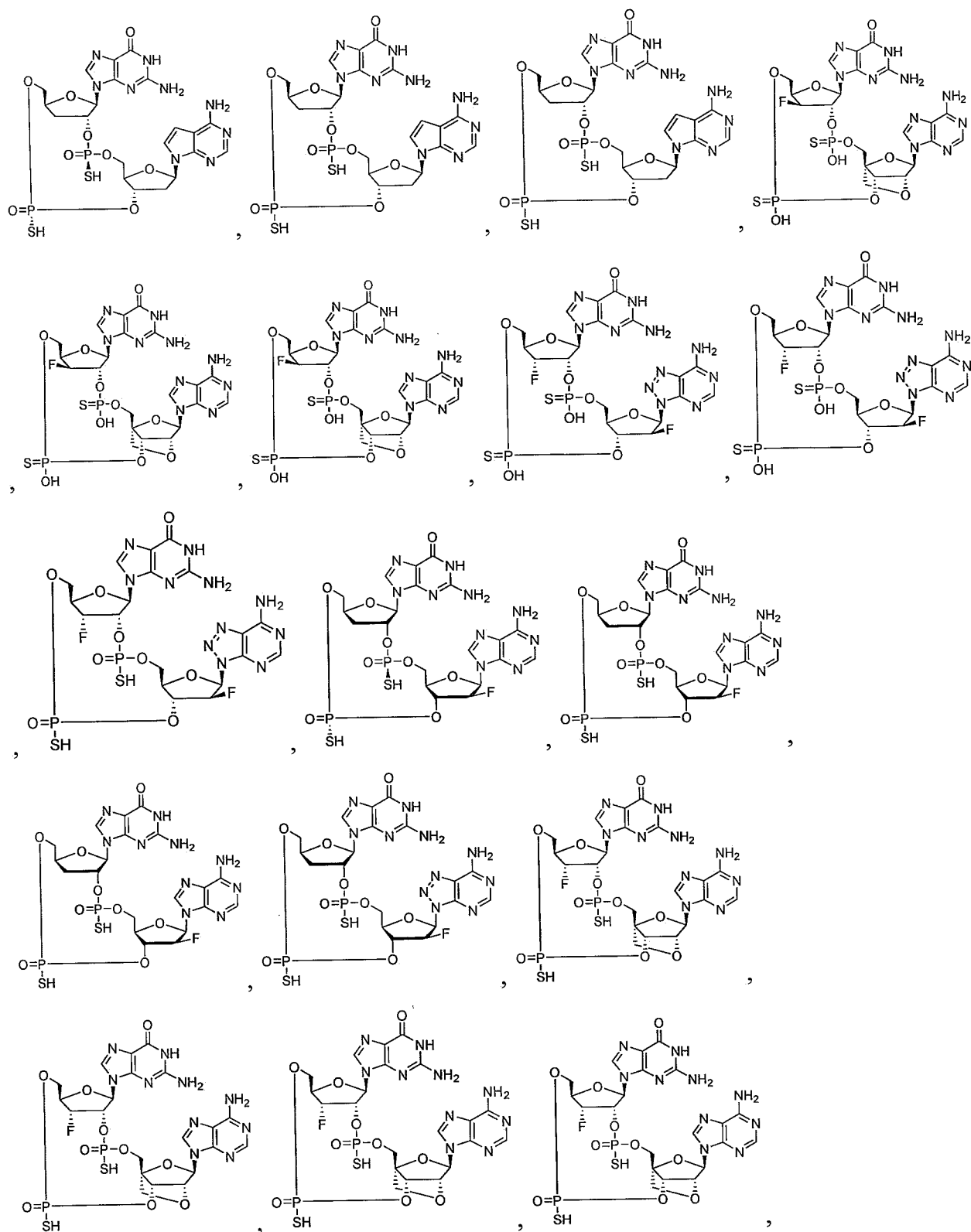


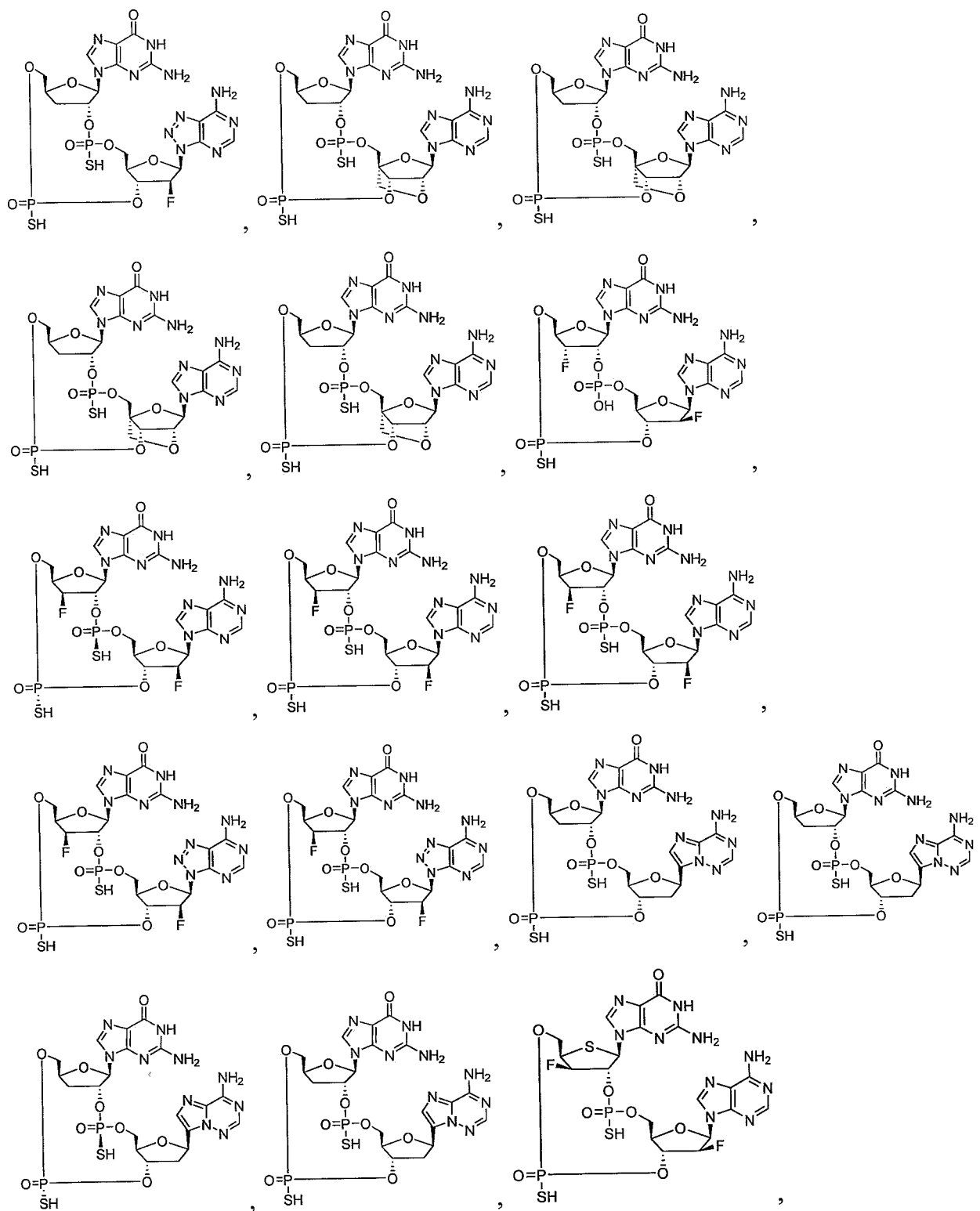


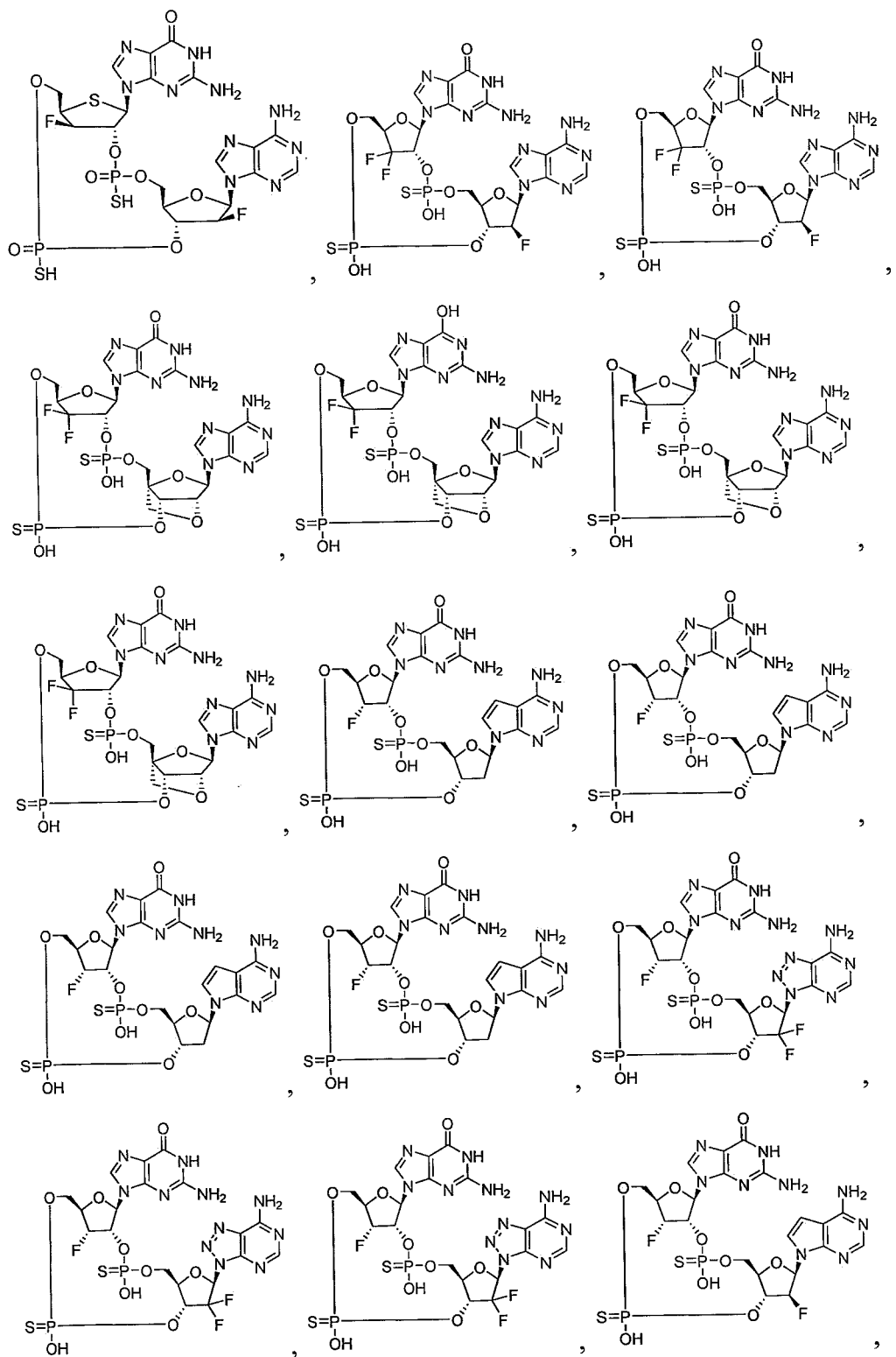


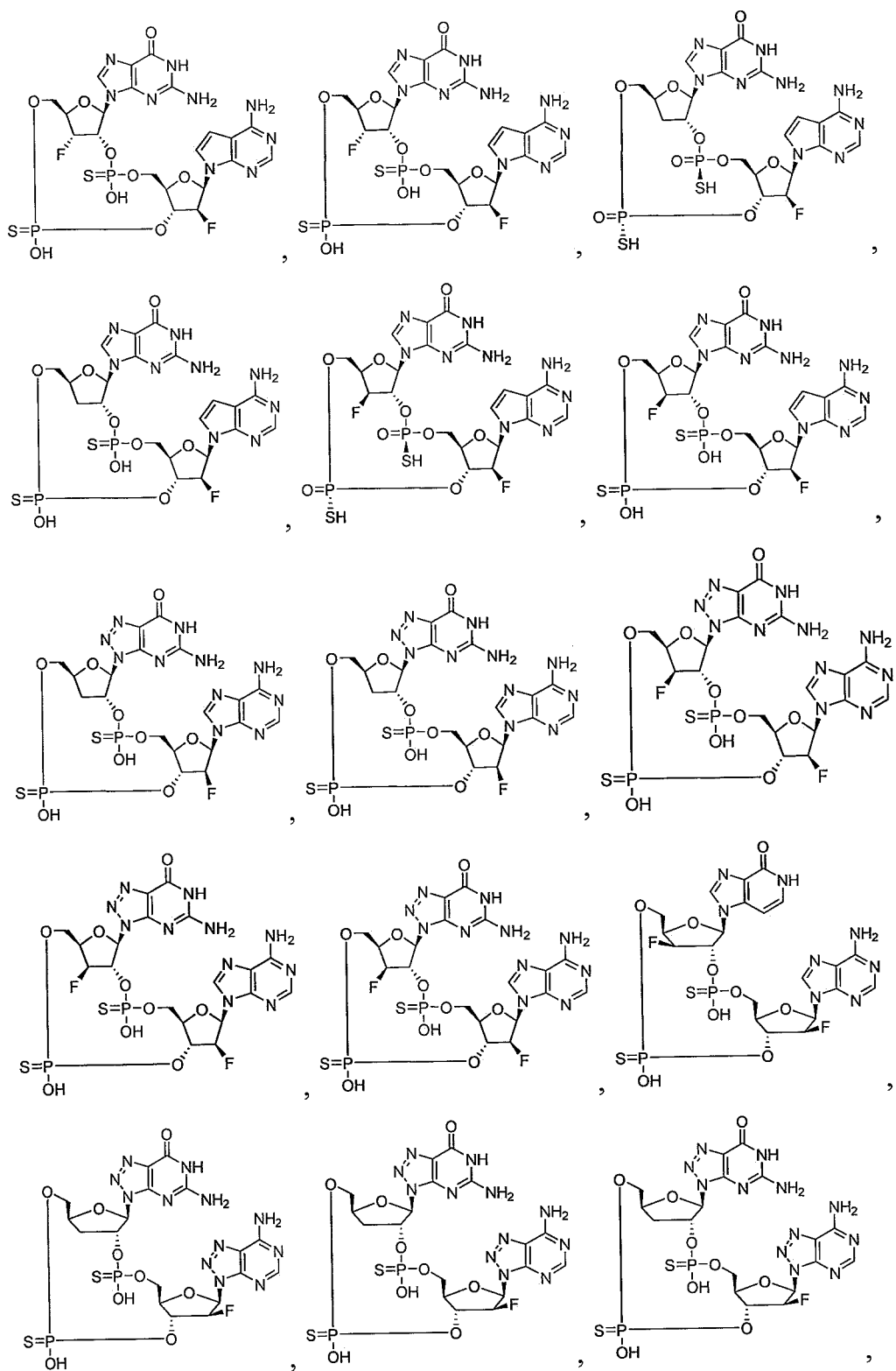


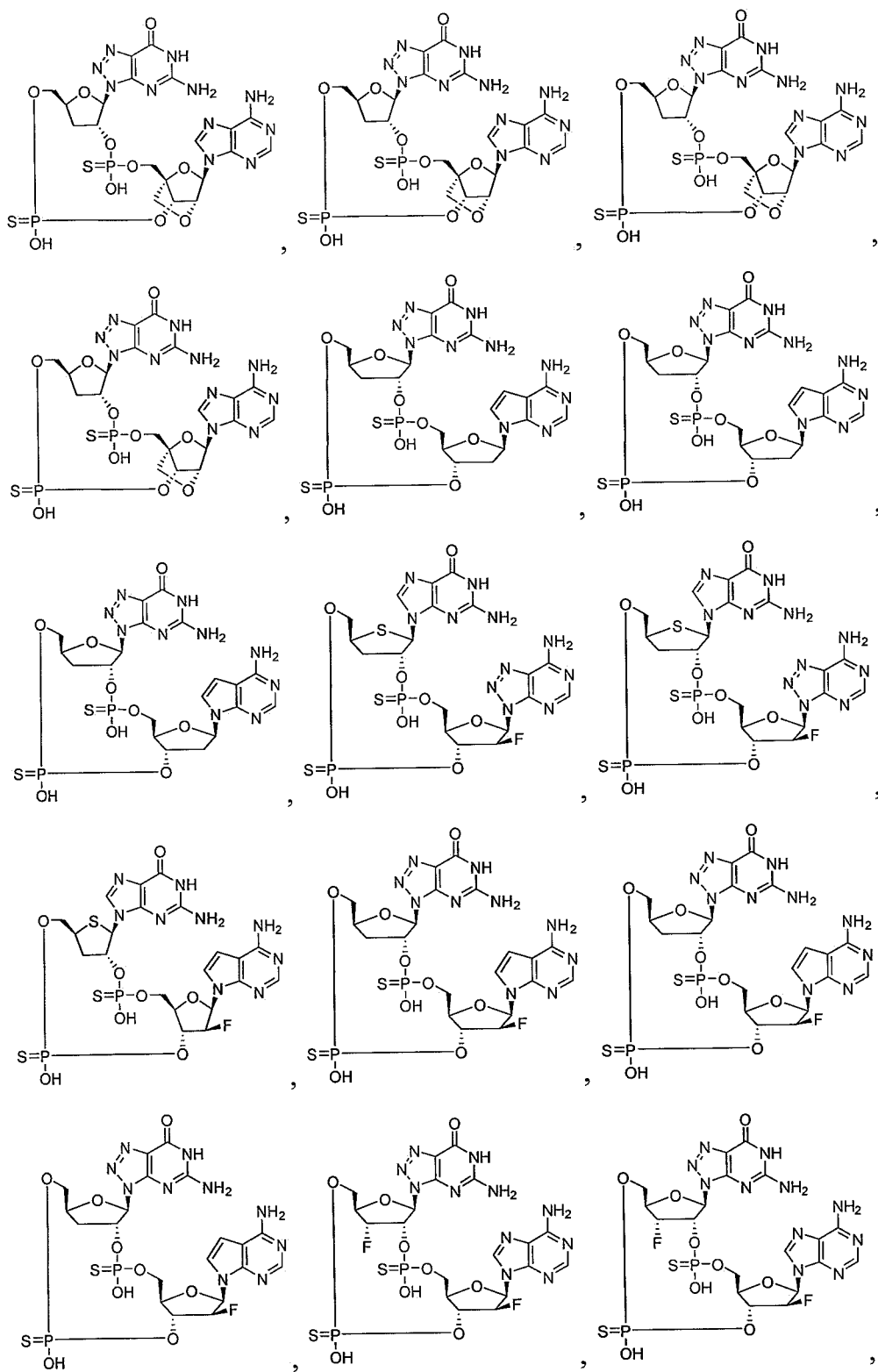




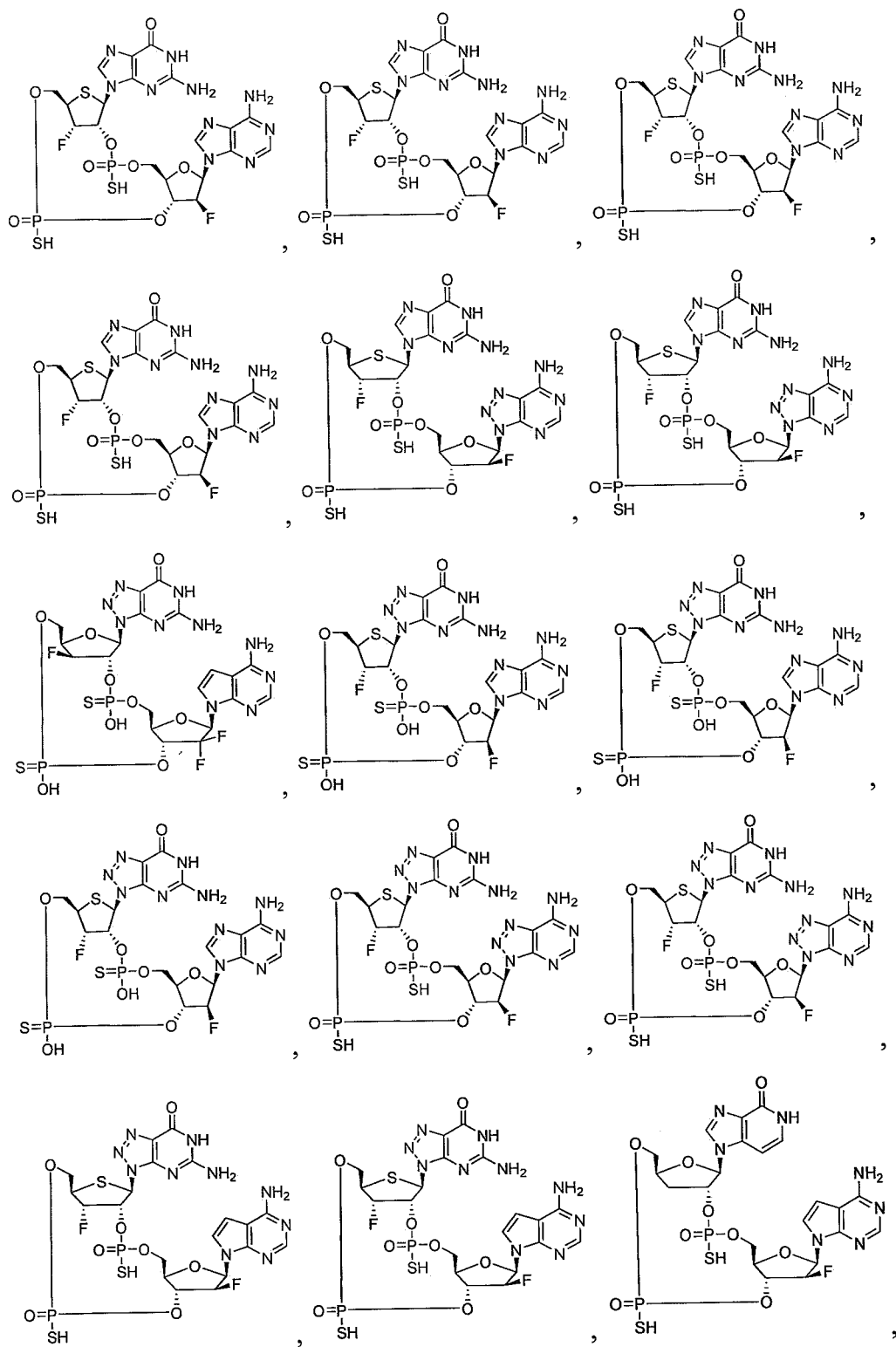


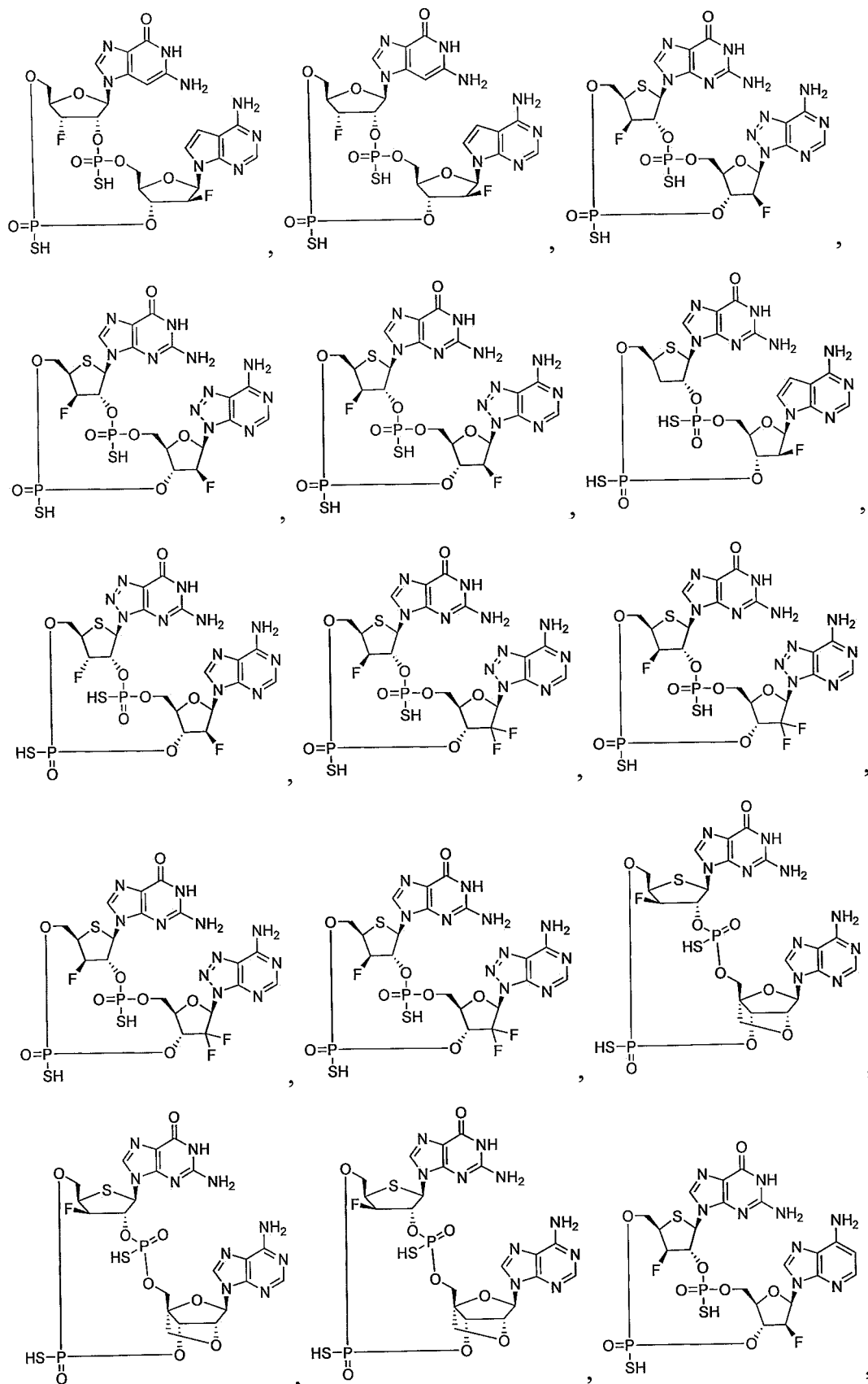


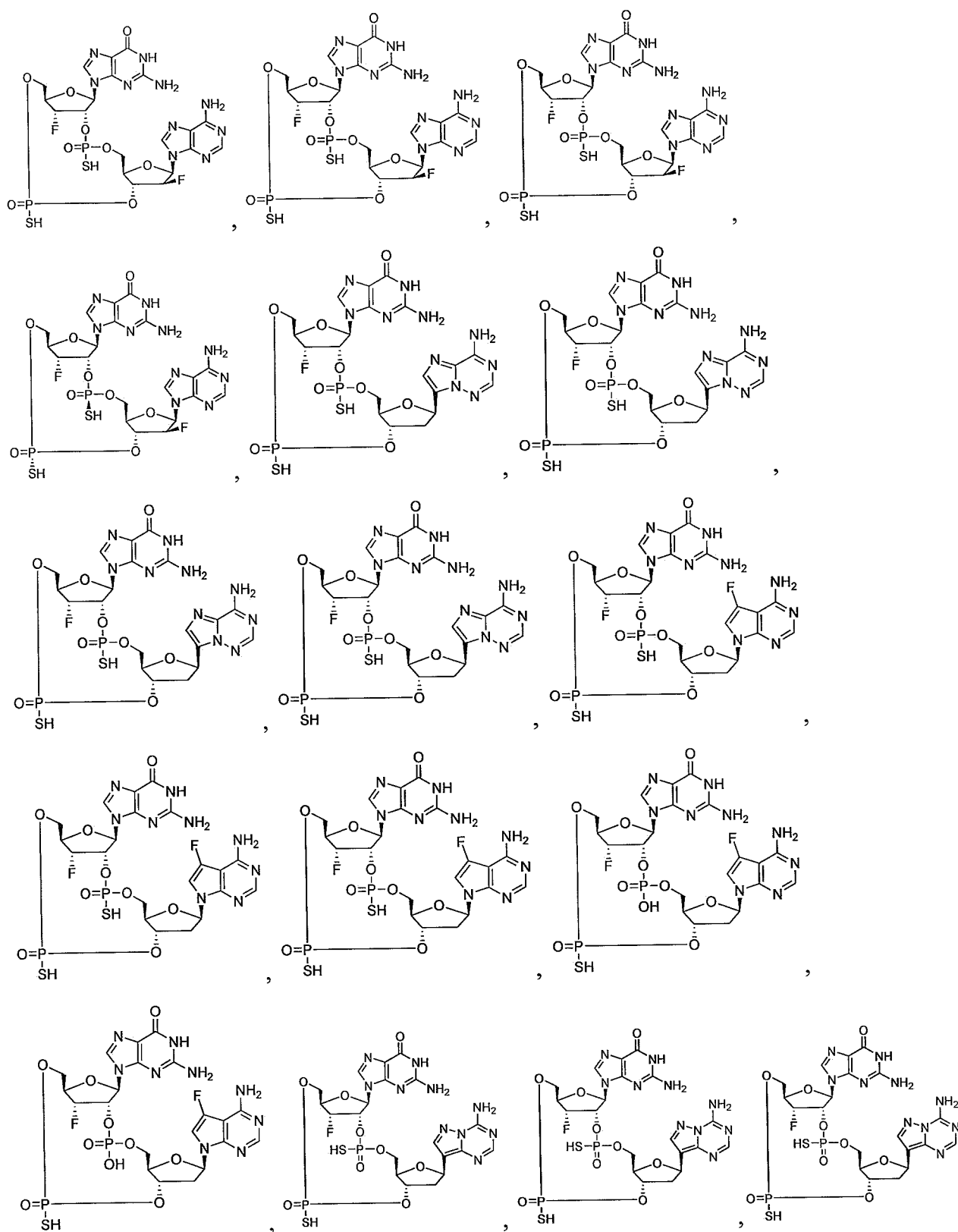


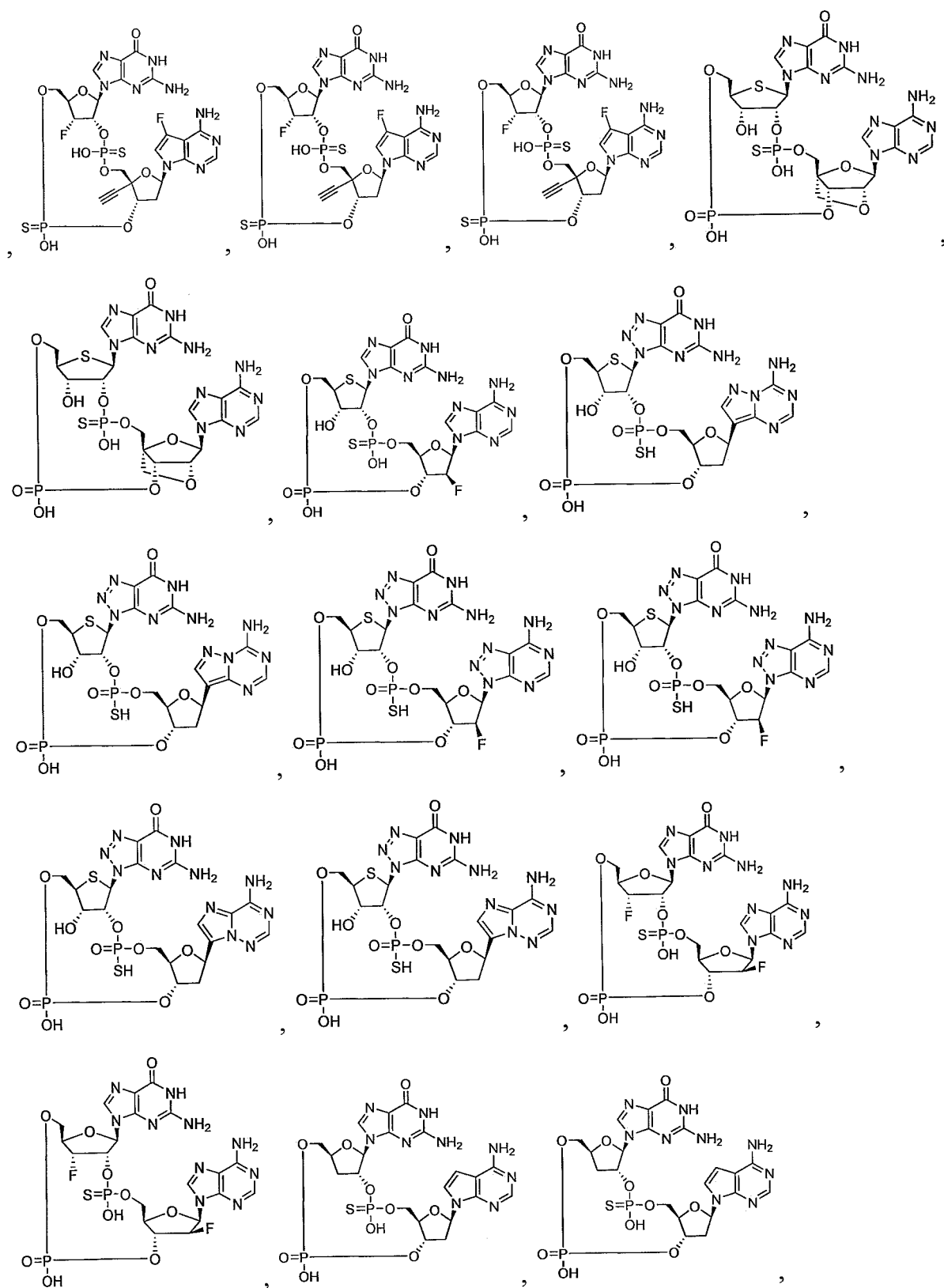


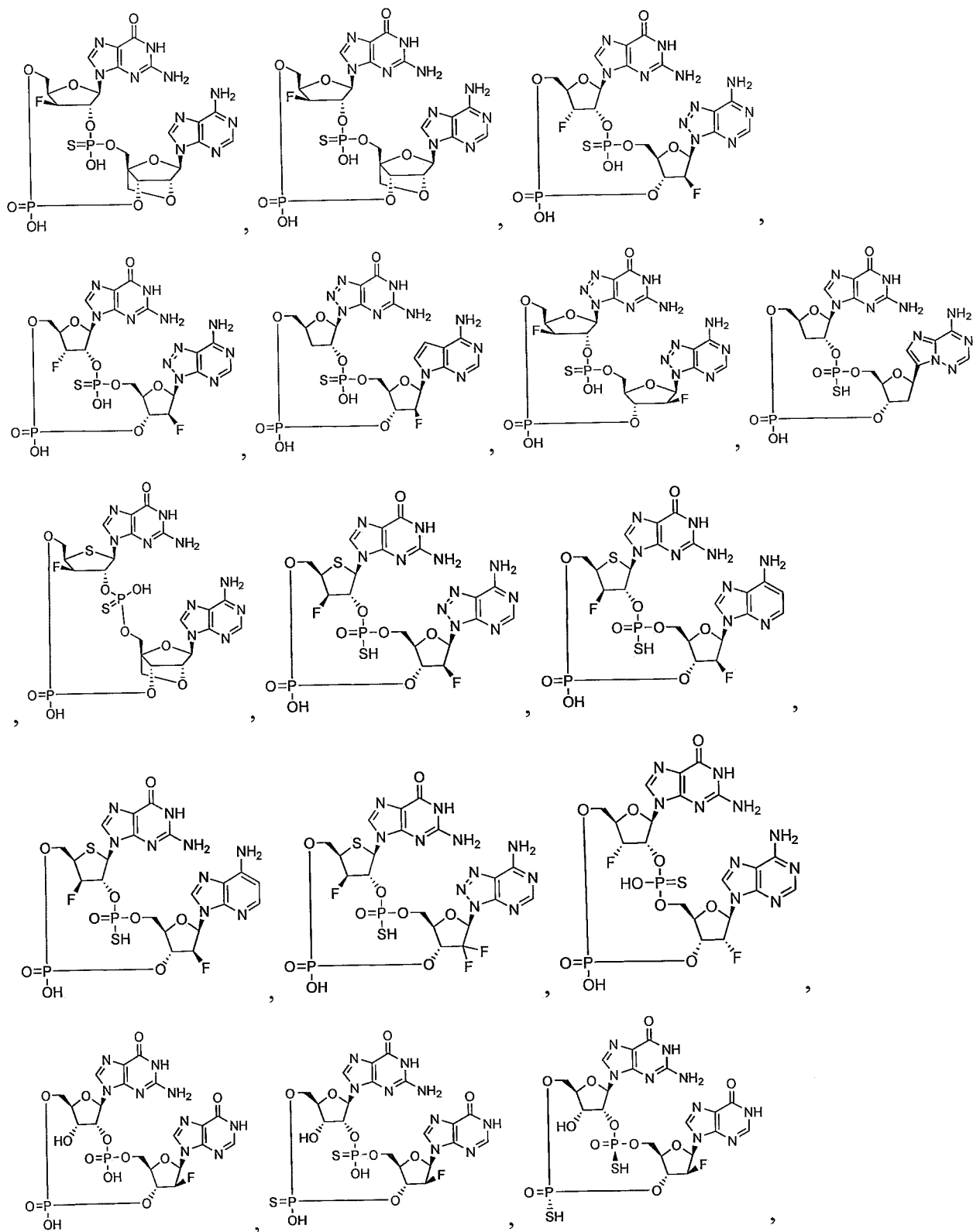


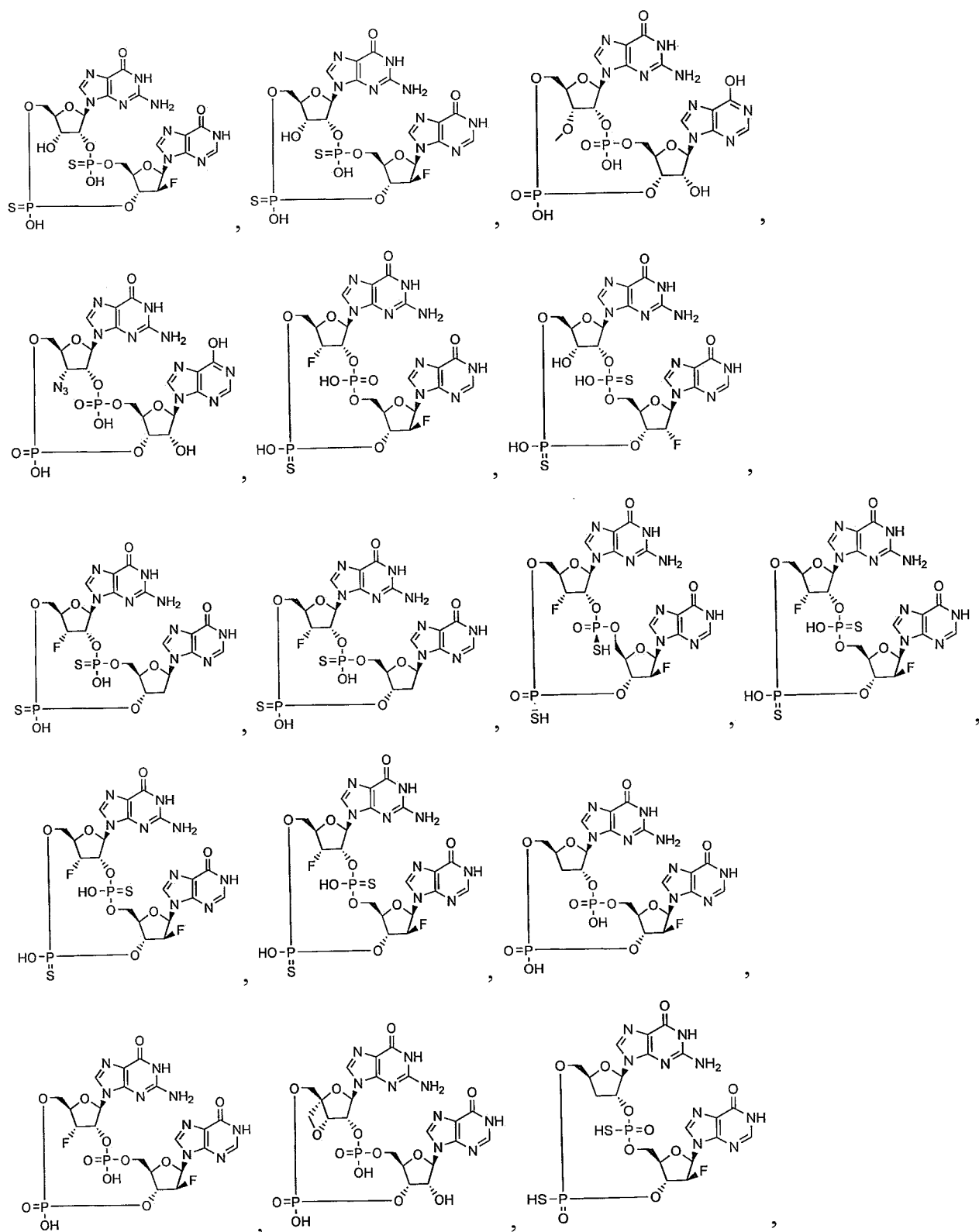


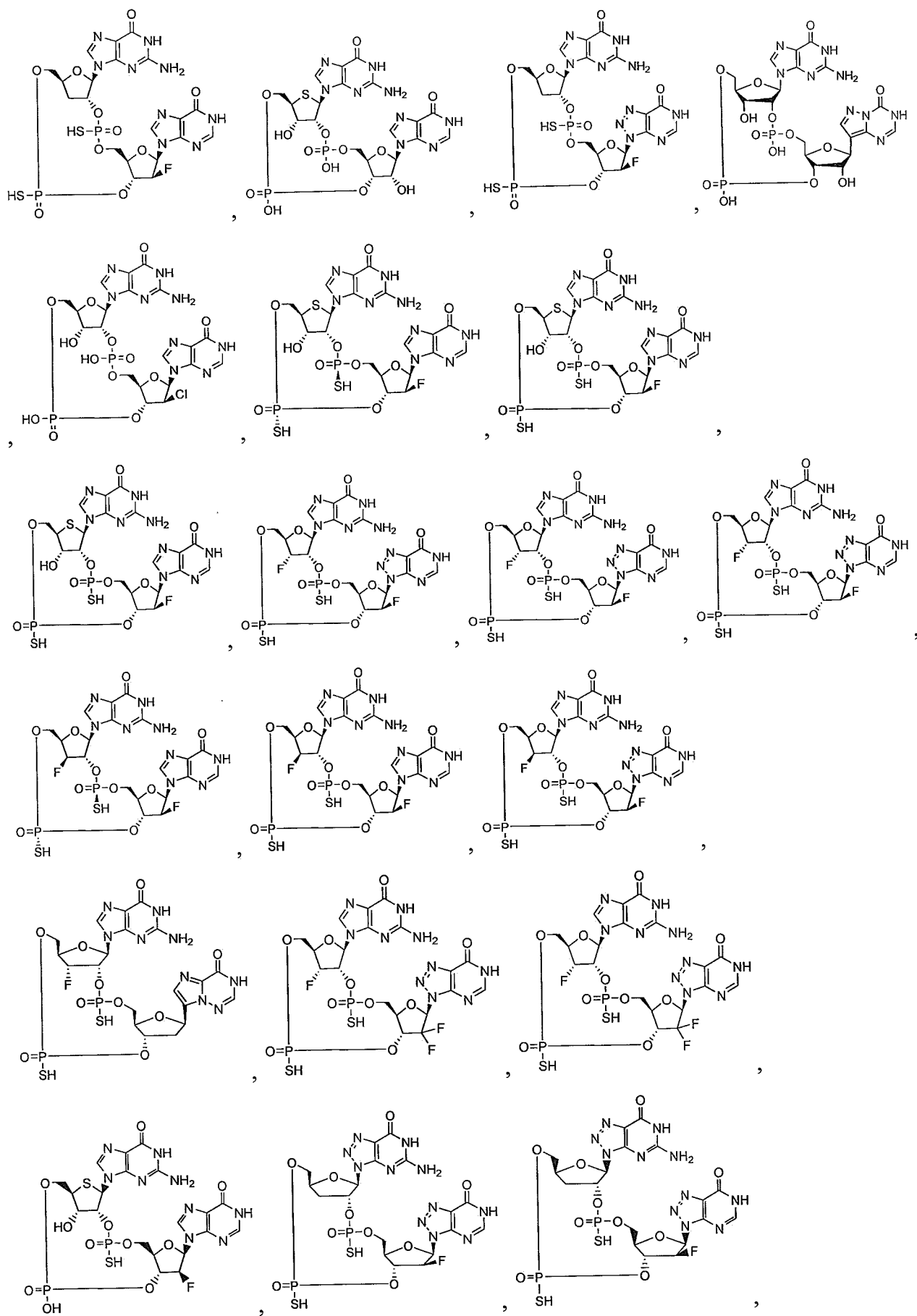


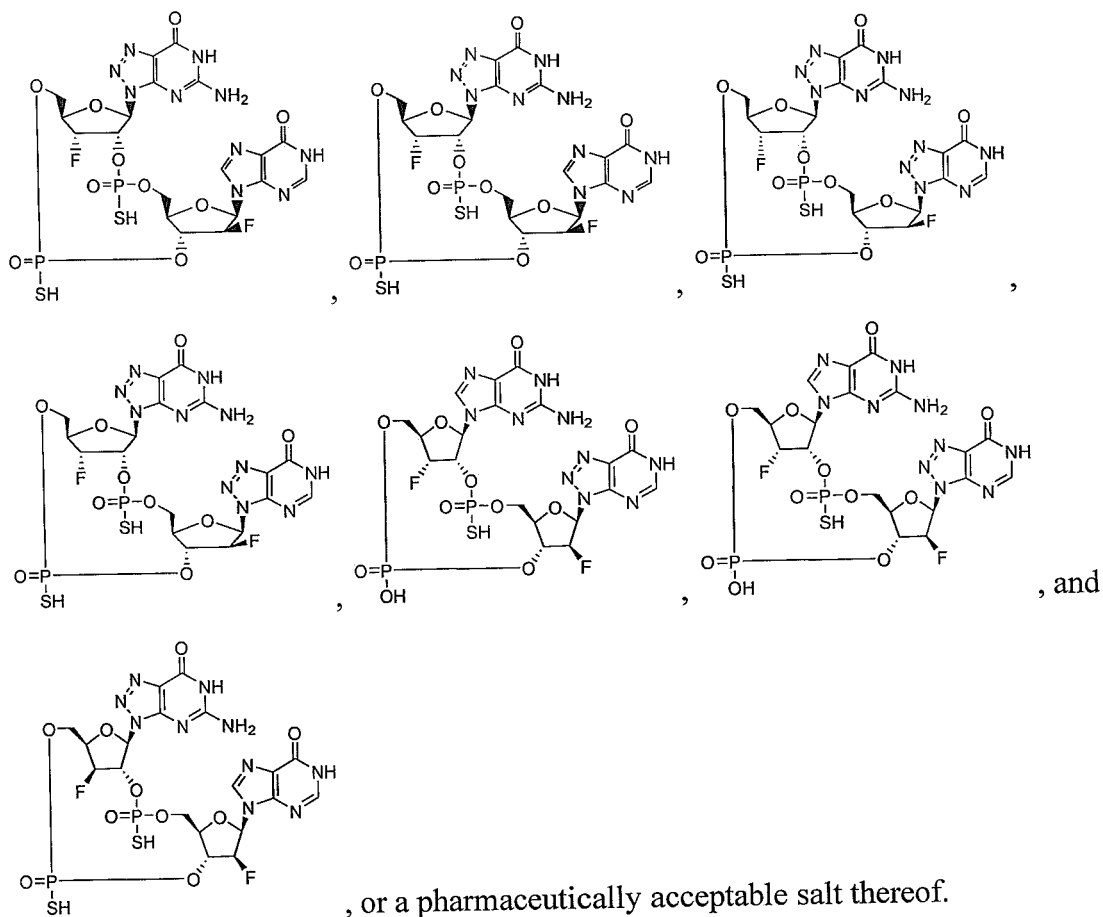




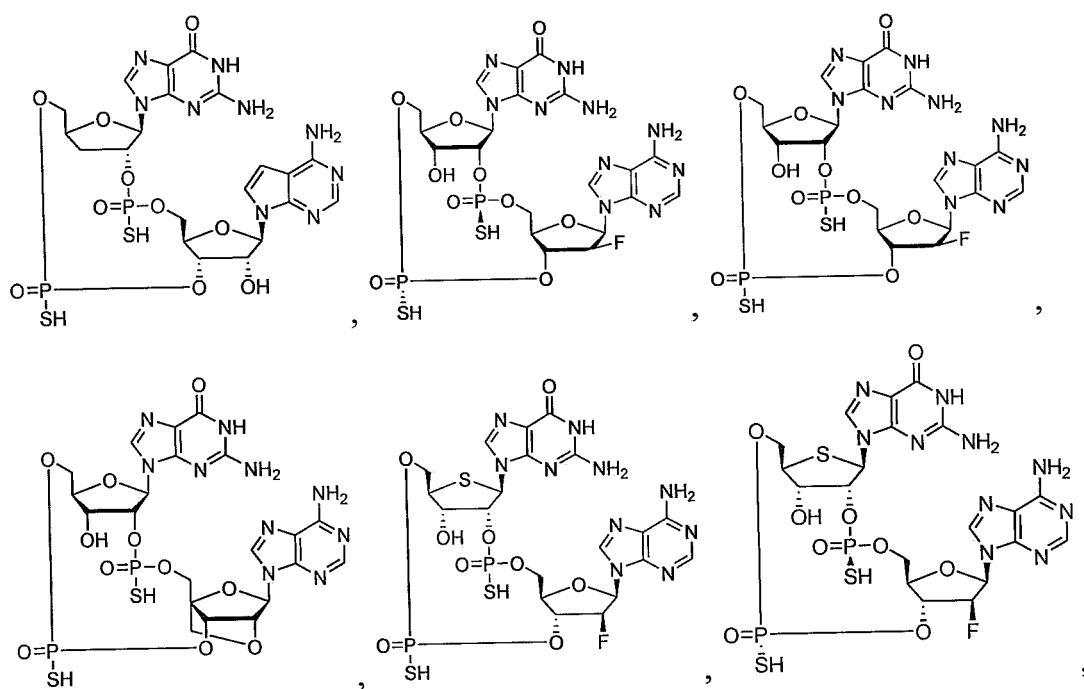


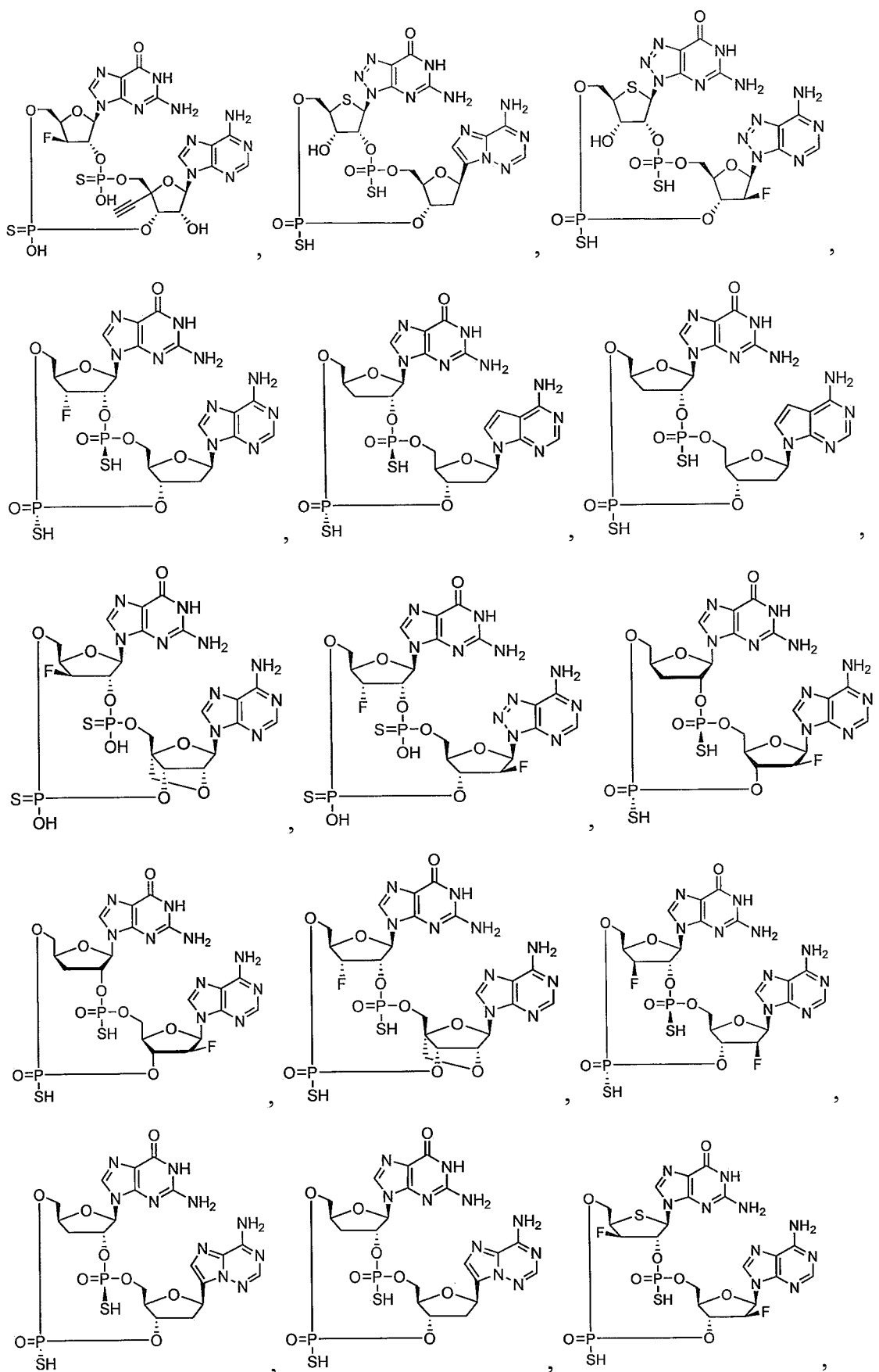


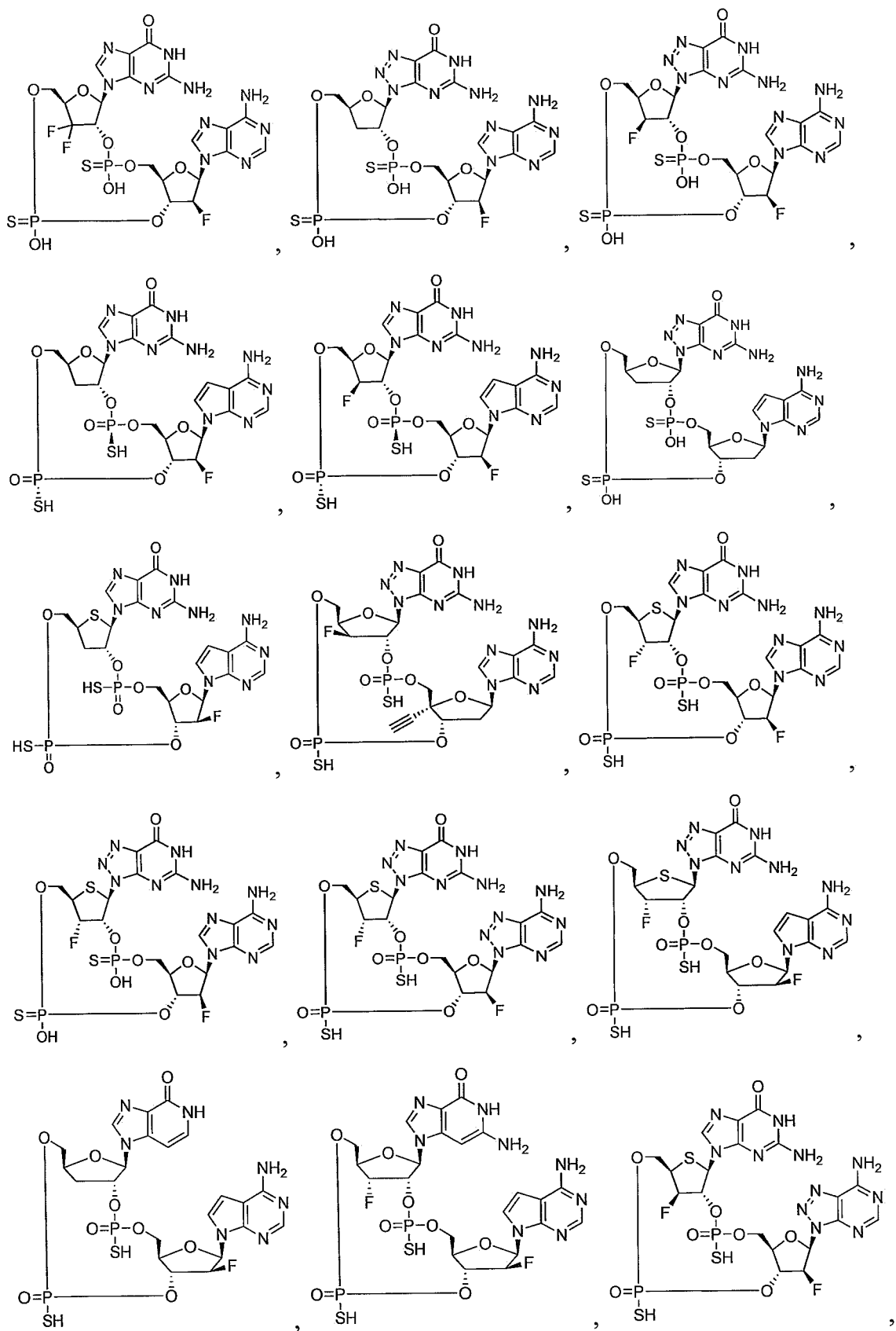


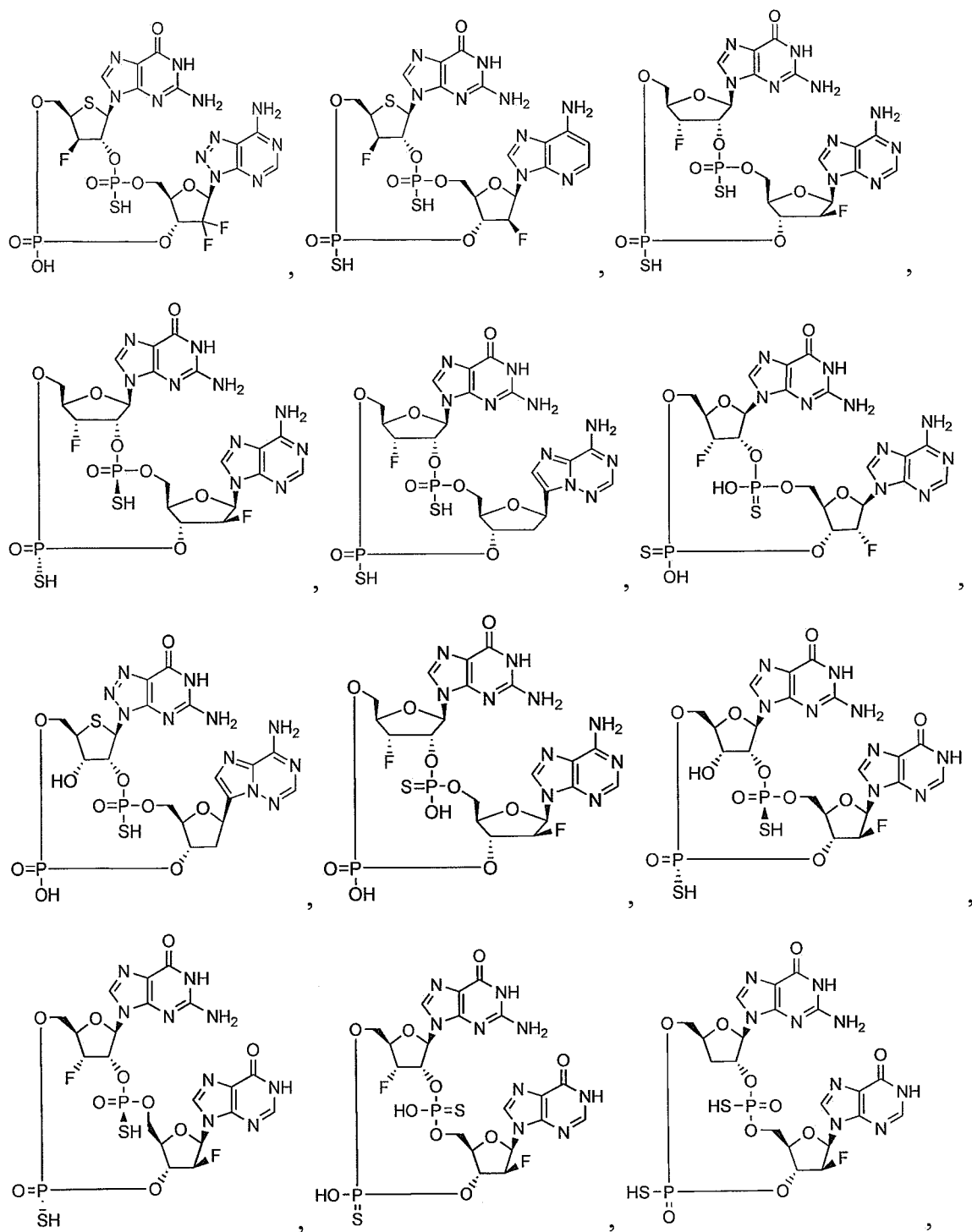


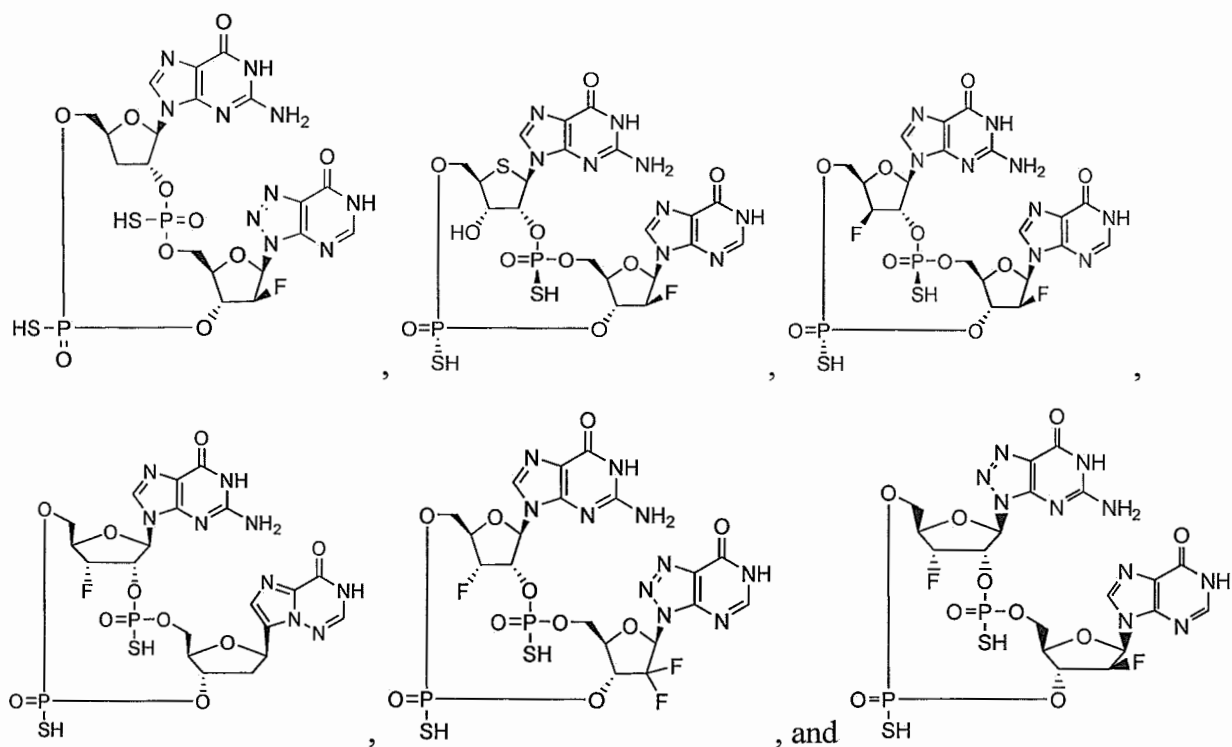
13. The compound according to claim 12, wherein the compound is selected from the group consisting of:





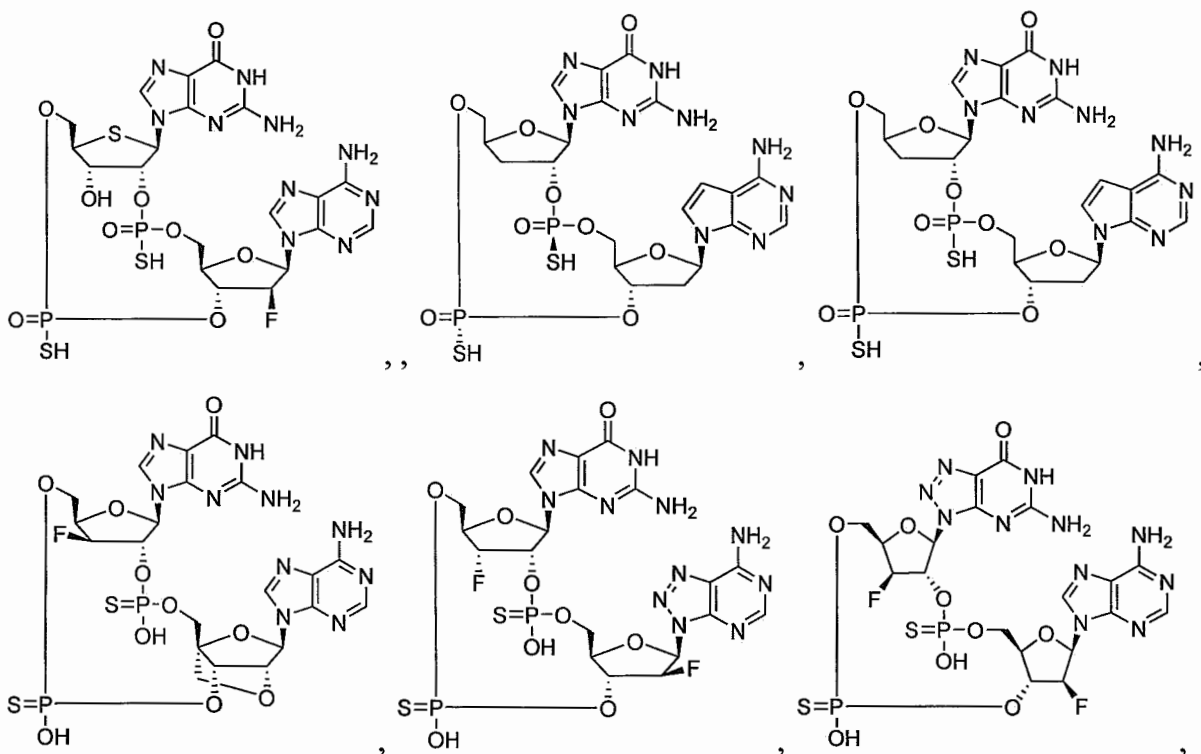


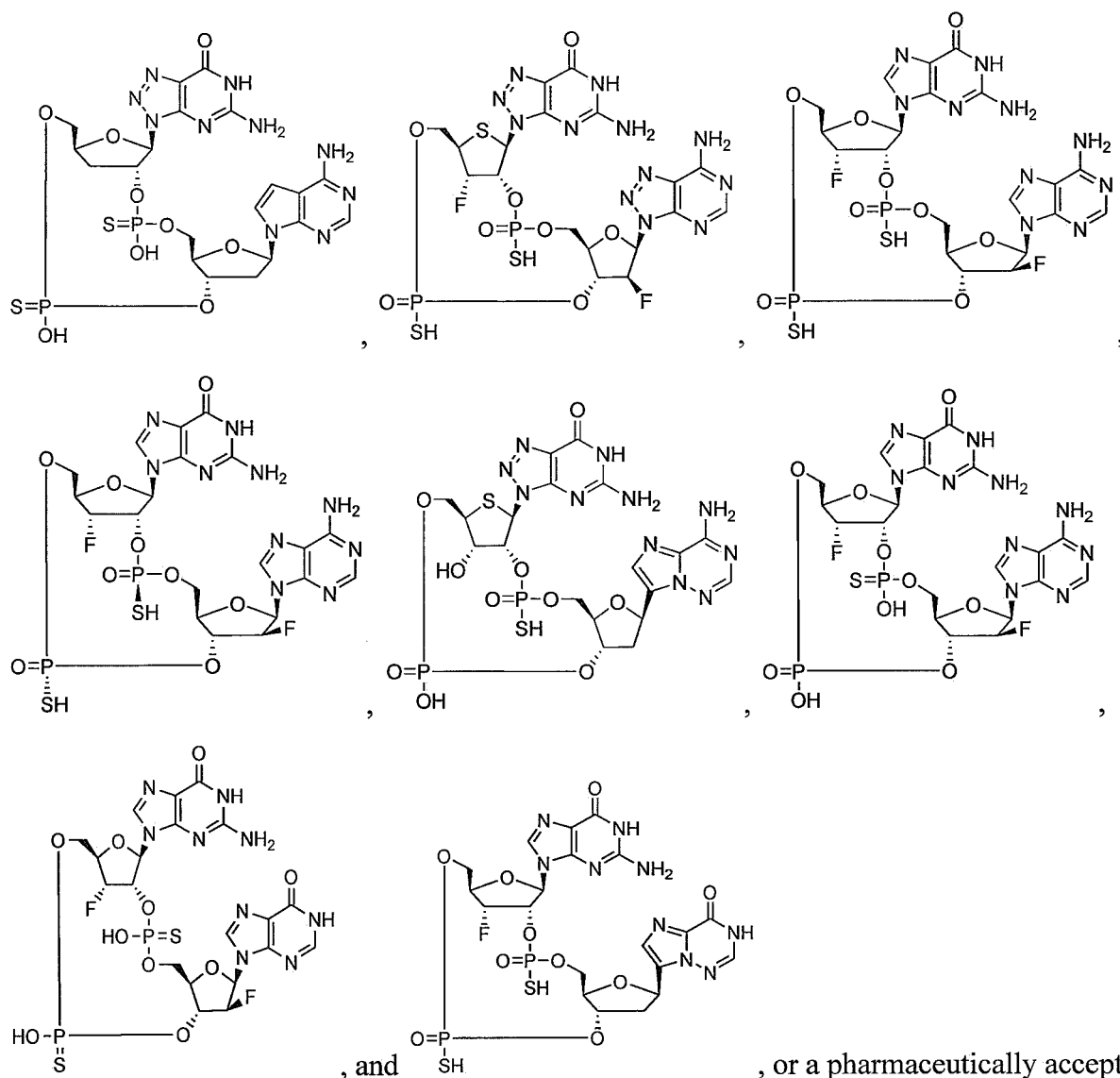




or a pharmaceutically acceptable salt thereof.

14. The compound according to claim 12, wherein the compound is selected from the group consisting of:





, and , or a pharmaceutically acceptable salt thereof.

15. A pharmaceutical composition, said pharmaceutical composition comprising:
 - (a) a compound according to any one of claims 1 to 14 or a pharmaceutically acceptable salt thereof; and
 - (b) a pharmaceutically acceptable carrier.