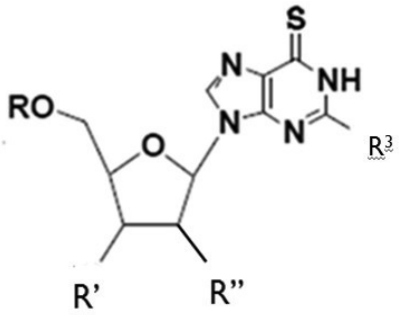
CLAIMS

1. A pharmaceutical composition comprising a 6-mercaptopurine ribonucleoside analogue, for use in treating cancer or a hyperproliferative disease.

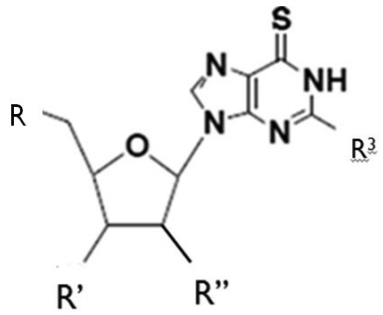
2. The composition of claim 1, wherein the 6-mercaptopurine ribonucleoside analogue comprises 6-thio-2'-deoxyguanosine.

3. The composition of claim 1, wherein the 6-mercaptopurine ribonucleoside analogue is a compound according to the following formula:



where R can be an H, hydroxyl group, an amino group, an alkyl amino group, a fluoride, an acyl group, a C_1-C_{20} alkyl or ether group, a phosphate, diphosphate, triphosphate, phosphonate, or a phosphodiester group; where R' can be an H, a hydroxyl group, flouride group, a C_1-C_{20} alkyl or ether group; where R" can be a hydroxyl group, a flouride, or an amino group in the ribo or arabino configuration; where R^3 can be an amino group or a alkyl-amino group; and pharmaceutically acceptable salts, solvates or polymorphs thereof.

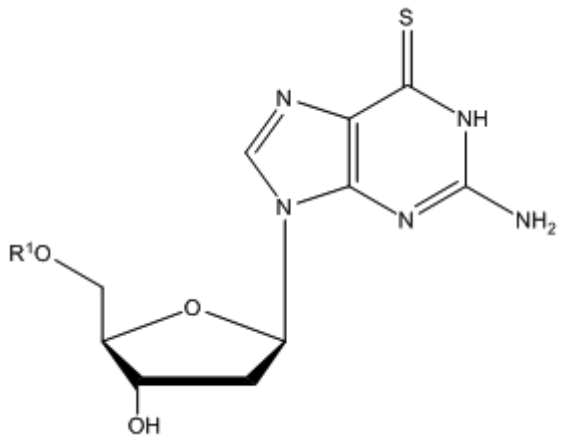
4. The composition of claim 1, wherein the 6-mercaptopurine ribonucleoside analogue is a compound according to the following formula:



where R can be an H, an acyl group, a C_1-C_{20} alkyl or ether group, a phosphate, diphosphate, triphosphate, phosphonate, or a phosphodiester group; where R' can be an H, a hydroxyl

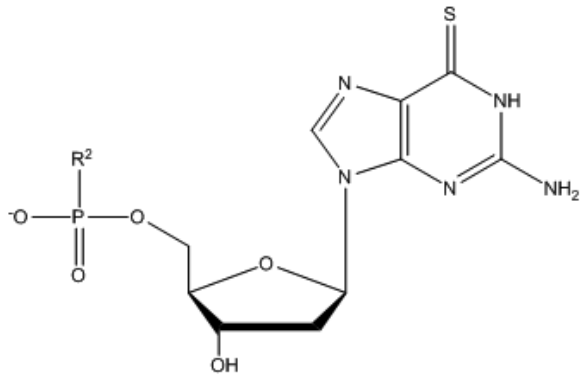
group, flouride, a C_1-C_{20} alkyl or ether group; where R" can be a hydroxyl group, a flouride, or an amino group in the ribo or arabino configuration; where R^3 can be an amino group or a alkyl-amino group; and pharmaceutically acceptable salts, solvates or polymorphs thereof.

5. The composition of claim 1, wherein the 6-mercaptopurine ribonucleoside analogue is a compound according to the following formula:

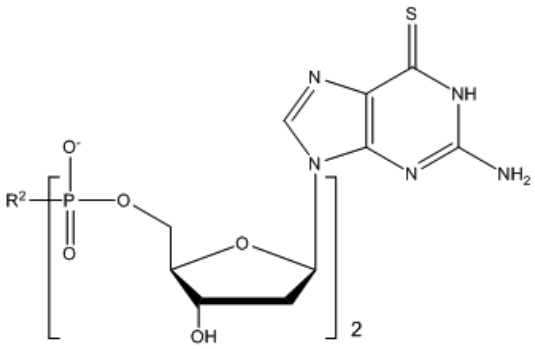


where R^1 can be an H, $-C(O)(CH_2)_nCH_3$ where n = 6-16 and pharmaceutically acceptable salts, solvates or polymorphs thereof.

6. The composition of claim 1, wherein the 6-mercaptopurine ribonucleoside analogue is a compound according to the following formula:



or



where R^2 can be spermine or spermidine and pharmaceutically acceptable salts, solvates or polymorphs thereof.

7. The composition of any one of claim 1 to 6, wherein the composition comprises an effective amount of the a 6-mercaptopurine ribonucleoside analogue and the effective amount comprises an amount between 0.5 mg of the analogue per 1 kg of subject to 3 mg of the analogue per 1 kg of subject.

8. The composition of any one of claim 1 to 7, further comprising a second anti-cancer agent.

9. The composition of any one of claim 1 to 8, further comprising a second pharmaceutical composition comprising a second anti-cancer agent, wherein the pharmaceutical composition is administered in a first stage of treatment and the second pharmaceutical composition is administered in a second stage of treatment, wherein the second pharmaceutical composition is administered in a first stage of treatment and the pharmaceutical composition is delivered in a second stage of treatment, or wherein the first pharmaceutical composition and the second pharmaceutical composition are administered on the same day or simultaneously.

10. The composition of any one of claims 8 and 9, wherein the anti-cancer agent comprises a telomerase inhibitor.

11. The composition of any one of claims 8 and 9, wherein the anti-cancer agent comprise imetelstat sodium.

12. The composition of any one of claims 1 to 11, wherein an effective amount of the pharmaceutical composition is administered at least twice per week for at least 2 weeks, at least 4 weeks, at least 6 weeks, at least 8 weeks, or at least 12 weeks.

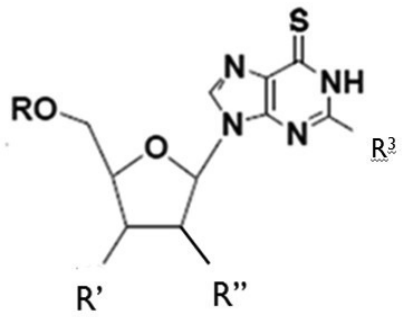
13. The composition of any one of claims 1 to 12, wherein the pharmaceutical composition can be injected or administered orally.

14. The composition of any one of claims 1 to 13, wherein the size of a tumor is reduced or the growth rate of the tumor is reduced.

15. A method for treating a subject in need thereof comprising administering to a subject a pharmaceutical composition comprising a 6-mercaptopurine ribonucleoside analogue, wherein the subject has been diagnosed with cancer or a hyperproliferative disease.

16. The method of claim 15, wherein the 6-mercaptopurine ribonucleoside analogue comprises 6-thio-2'-deoxyguanosine.

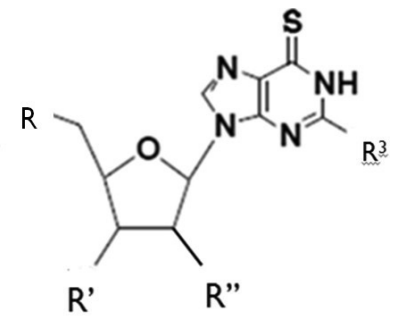
17. The method of claim 15, wherein the 6-mercaptopurine ribonucleoside analogue is a compound according to the following formula:



where R can be an H, hydroxyl group, an amino group, an alkyl amino group, a fluoride, an acyl group, a C_1-C_{20} alkyl or ether group, a phosphate, diphosphate, triphosphate, phosphonate, or a phosphodiester group; where R' can be an H, a hydroxyl group, flouride group, a C_1-C_{20} alkyl or ether group; where R" can be a hydroxyl group, a flouride, or an

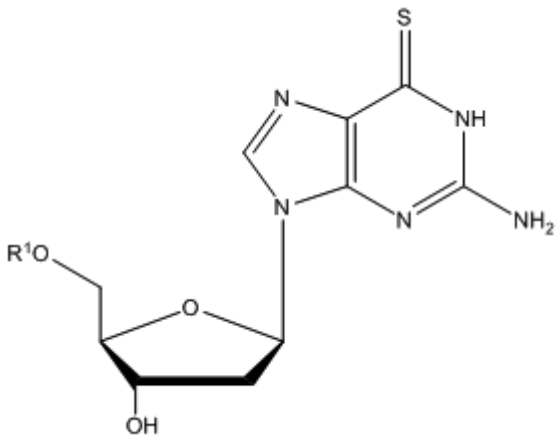
amino group in the ribo or arabino configuration; where R^3 can be an amino group or a alkyl-amino group; and pharmaceutically acceptable salts, solvates or polymorphs thereof.

18. The method of claim 15, wherein the 6-mercaptopurine ribonucleoside analogue is a compound according to the following formula:



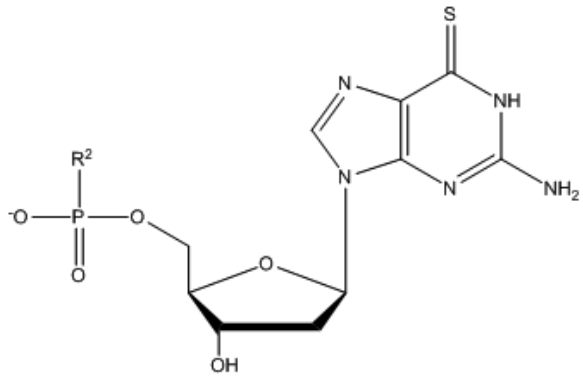
where R can be an H, an acyl group, a C_1-C_{20} alkyl or ether group, a phosphate, diphosphate, triphosphate, phosphonate, or a phosphodiester group; where R' can be an H, a hydroxyl group, flouride, a C_1-C_{20} alkyl or ether group; where R" can be a hydroxyl group, a flouride, or an amino group in the ribo or arabino configuration; where R^3 can be an amino group or a alkyl-amino group; and pharmaceutically acceptable salts, solvates or polymorphs thereof.

19. The method of claim 15, wherein the 6-mercaptopurine ribonucleoside analogue is a compound according to the following formula:

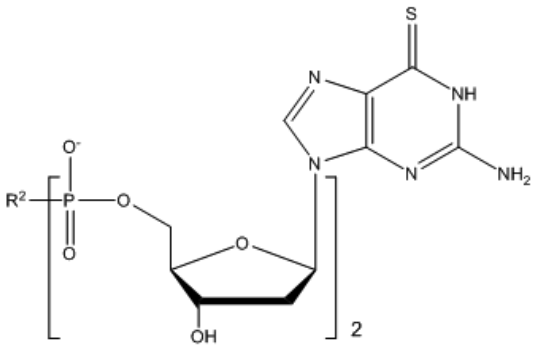


where R^1 can be an H, $-C(O)(CH_2)_nCH_3$ where n = 6-16 and pharmaceutically acceptable salts, solvates or polymorphs thereof.

20. The method of claim 15, wherein the 6-mercaptopurine ribonucleoside analogue is a compound according to the following formula:



or



where R^2 can be spermine or spermidine and pharmaceutically acceptable salts, solvates or polymorphs thereof.

21. The method of any one of claims 15 to 20, wherein an effective amount of the pharmaceutical composition is administered to the subject per day and the effective amount comprises an amount between 0.5 mg of the analogue per 1 kg of subject to 3 mg of the analogue per 1 kg of subject.

22. The method of any one of claims 15 to 21, further comprising the step of administering to the subject a second pharmaceutical composition comprising an anti-cancer agent.

23. The method of claim 22, wherein the pharmaceutical composition is delivered in a first stage of treatment and the second pharmaceutical composition is delivered in a second stage of treatment.

24. The method of claim 22, wherein the second pharmaceutical composition is delivered in a first stage of treatment and the pharmaceutical composition is delivered in a second stage of treatment.

25. The method of claim 22, wherein the first pharmaceutical composition and the second pharmaceutical composition are administered on the same day or simultaneously.

26. The method of any one of claims 22 to 25, wherein the anti-cancer agent comprises a telomerase inhibitor.

27. The method of any one of claims 22 to 25, wherein the anti-cancer agent comprise imetelstat sodium.

28. The method of any one of claims 22 to 27, wherein an effective amount of the pharmaceutical composition is administered at least twice per week for at least 2 weeks, at least 4 weeks, at least 6 weeks, at least 8 weeks, or at least 12 weeks.

29. The method of any one of claims 15 to 28 wherein the pharmaceutical composition is administered orally or injection.

30. The method of any one of claims 15 to 29, wherein the pharmaceutical composition is administered by intratumoral injection

31. The method of any one of claims 15 to 30, wherein the size of a tumor is reduced or the growth rate of the tumor is reduced.

32. The method of claim 15, wherein the subject is a human being.