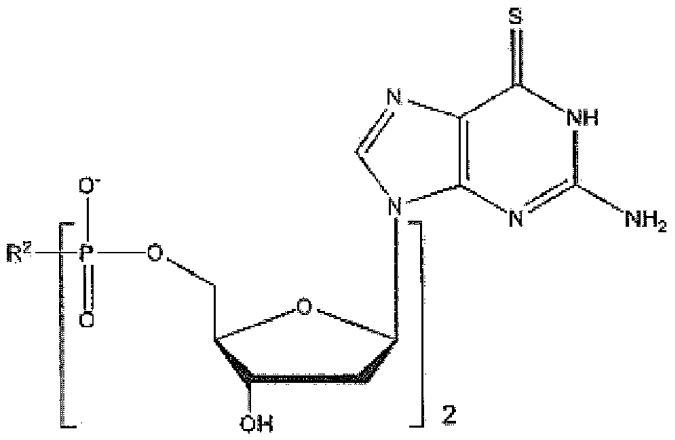


where R^2 can be spermine or spermidine and such compounds are referred to herein as 6-thio-2'-deoxyguanosine.

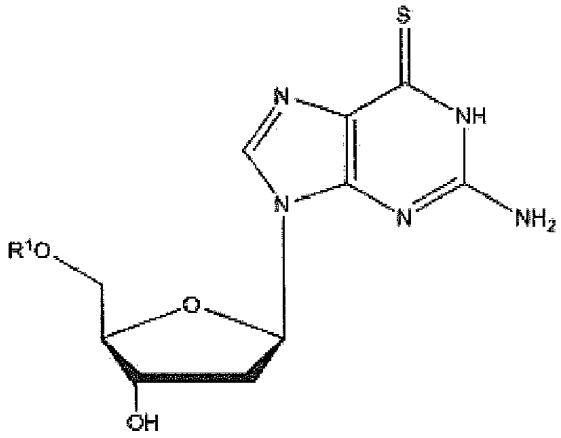
[0013] Pharmaceutical compositions comprising an anti-cancer effective amount of one or more of the compounds of Formula I, II, III, IV, or V, optionally in combination with an effective amount of at least one additional anti-cancer agent or at least one carrier, additive or excipient are additional embodiments of the present disclosure.

[0014] Further embodiments of the present disclosure relate to methods for treating cancer and other hyperproliferative diseases, including tumors, especially malignant tumors and cancer, and any cell which possesses an over-activation of telomerase.

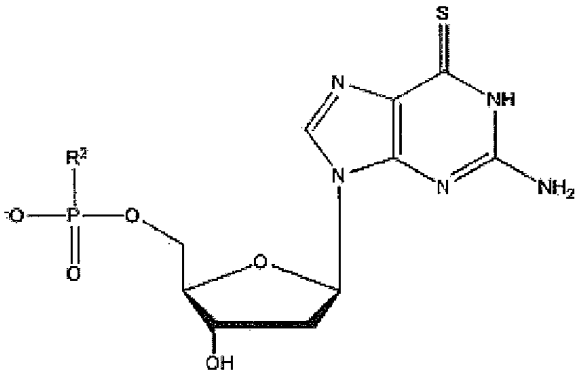
[0015] Other embodiments of the present disclosure comprise a method of treatment comprising administering an effective amount of 6-mercaptopurine ribonucleoside analogue according to the present disclosure and administering a second pharmaceutical composition comprising another anti-cancer agent. Administration can occur simultaneously, in sequential stages, or be administered stages wherein the stages at least partially overlap in time or are spaced apart by an certain interval of time. The multiple anti-cancer agent treatment can provide an additive effect or further a synergistic enhancement of the anticancer activity of one or both of the anti-cancer agents.

In an aspect, there is provided a pharmaceutical composition for use in treating a telomerase-expressing cell characterized by over-activation of a telomerase in a subject with a lung cancer, a colon cancer, a cervical cancer, or a hyperproliferative disease, comprising: (a) a

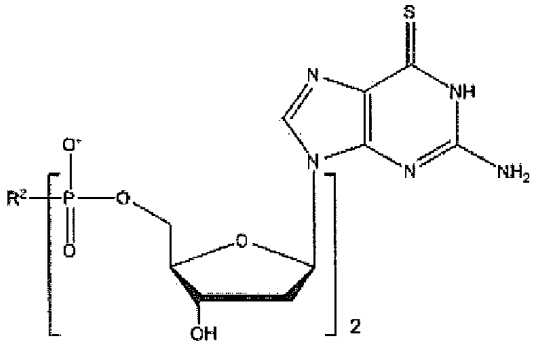
first amount of a 6-mercaptopurine deoxyribonucleoside analogue selected from the group consisting of:



,



and

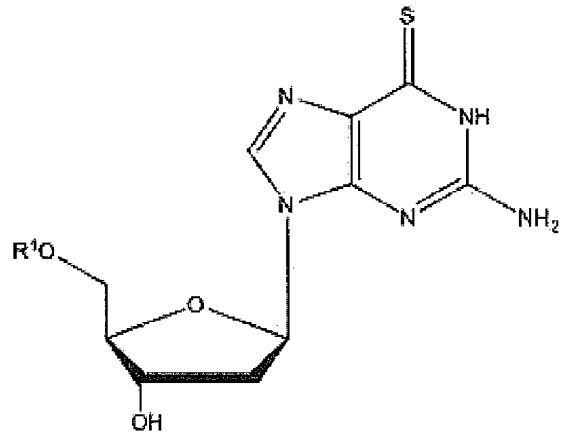


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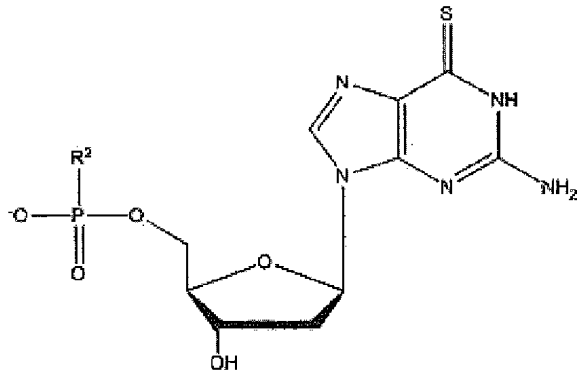
wherein R^1 is H or $-C(O)(CH_2)_nCH_3$ where n = 6-16, and pharmaceutically acceptable salts or polymorphs thereof; and where R^2 is spermidine and pharmaceutically acceptable salts or polymorphs thereof; and (b) a second amount of a telomerase inhibitor; wherein the first amount and the second amount together comprise an amount effective to reduce stability of telomere length and to induce cell death in the telomerase-expressing cell; and wherein the

amount effective to reduce stability of telomere length and induce cell death in the telomerase expressing cell is more effective than the first amount alone or the effect of the second amount alone.

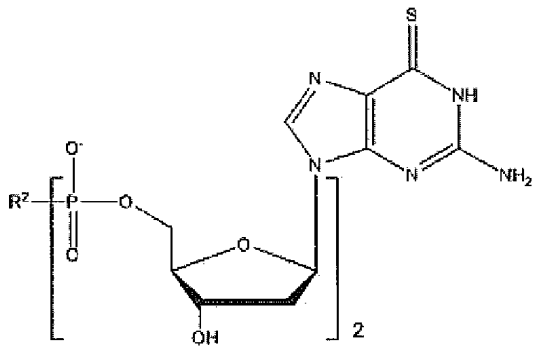
In another aspect, there is provided the use of a pharmaceutical composition for the manufacture of a medicament for treating a telomerase-expressing cell characterized by over-activation of a telomerase in a subject with a lung cancer, a colon cancer, a cervical cancer, or a hyperproliferative disease , the pharmaceutical composition comprising: (a) a first amount of a 6-mercaptopurine deoxyribonucleoside selected from the group consisting of:



,



and



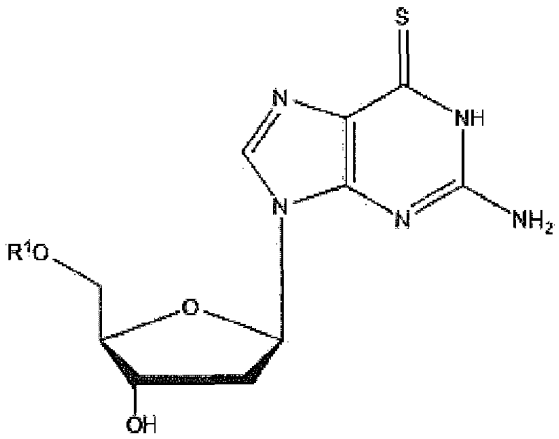
wherein R^1 is H or $-C(O)(CH_2)_nCH_3$ where n = 6-16, and pharmaceutically acceptable salts or polymorphs thereof; and where R^2 is spermidine and pharmaceutically acceptable salts or polymorphs thereof; and (b) a second amount of a telomerase inhibitor; wherein the first amount and the second amount together comprise an amount effective to reduce stability of telomere length and to induce cell death in the telomerase-expressing cell; and wherein the amount effective to reduce stability of telomere length and induce cell death in the telomerase expressing cell is more effective than the first amount alone or the effect of the second amount alone.

[0016] Embodiments discussed in the context of methods or compositions of the disclosure can be employed with respect to any other method or composition described herein. Thus, an embodiment pertaining to one method or composition may be applied to

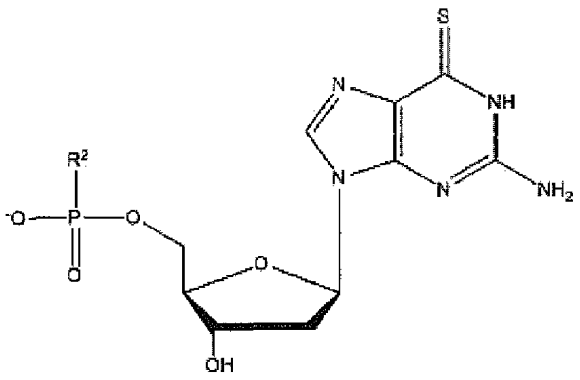
CLAIMS

1. A pharmaceutical composition for use in treating a telomerase-expressing cell characterized by over-activation of a telomerase in a subject with a lung cancer, a colon cancer, a cervical cancer, or a hyperproliferative disease, comprising:

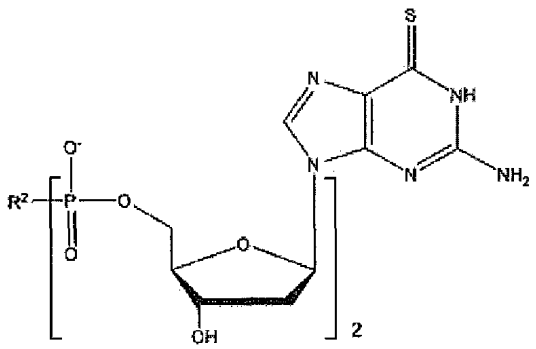
(a) a first amount of a 6-mercaptopurine deoxyribonucleoside analogue selected from the group consisting of:



,



and



,

wherein R^1 is H or $-C(O)(CH_2)_nCH_3$ where n = 6-16, and pharmaceutically acceptable salts or polymorphs thereof; and

where R^2 is spermidine and pharmaceutically acceptable salts or polymorphs thereof; and

(b) a second amount of a telomerase inhibitor;

wherein the first amount and the second amount together comprise an amount effective to reduce stability of telomere length and to induce cell death in the telomerase-expressing cell; and

wherein the amount effective to reduce stability of telomere length and induce cell death in the telomerase expressing cell is more effective than the first amount alone or the effect of the second amount alone.

2. The pharmaceutical composition of claim 1, wherein when R^1 is H, the 6-mercaptopurine deoxyribonucleoside analogue is 6-thio-2'-deoxyguanosine.

3. The pharmaceutical composition of claim 1 or claim 2, wherein the first amount of the 6-mercaptopurine deoxyribonucleoside analogue is 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.

4. The pharmaceutical composition of any one of claim 1 to 3, wherein the telomerase inhibitor is imetelstat sodium (GRN163L).

5. The pharmaceutical composition of any one of claim 1 to 4, wherein the first amount is to be administered in a first stage of treatment and the second amount is to be administered in a second stage of treatment, wherein the second amount is to be administered in a first stage of treatment and the first amount is to be delivered in a second stage of treatment, or wherein the first amount and the second amount are to be administered on the same day or simultaneously.

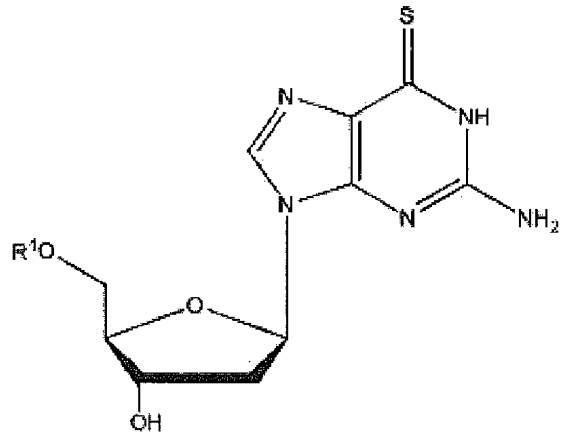
6. The pharmaceutical composition of any one of claims 1 to 5, wherein the first amount is to be administered at least twice per week for at least 2 weeks, at least 4 weeks, at least 6 weeks, at least 8 weeks, or at least 12 weeks.

7. The pharmaceutical composition of any one of claims 1 to 6, wherein the pharmaceutical composition is to be injected or administered orally.

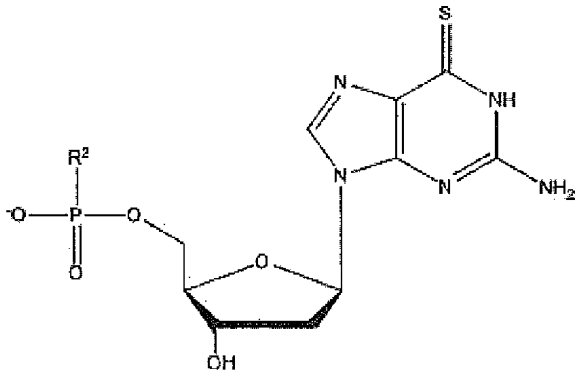
8. The pharmaceutical composition of any one of claims 1 to 7, wherein the amount effective to reduce stability of telomere length and to induce cell death in the telomerase-expressing cell effects a reduction in size of a tumor comprising the telomerase-expressing tumor cell or a reduction in the growth rate of the tumor comprising the telomerase-expressing tumor cell.

9. Use of a pharmaceutical composition for the manufacture of a medicament for treating a telomerase-expressing cell characterized by over-activation of a telomerase in a subject with a lung cancer, a colon cancer, a cervical cancer, or a hyperproliferative disease , the pharmaceutical composition comprising:

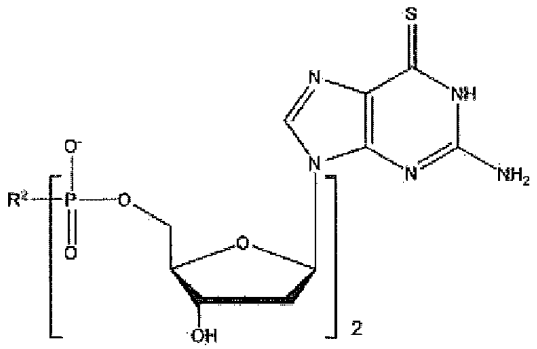
(a) a first amount of a 6-mercaptopurine deoxyribonucleoside selected from the group consisting of:



,



and



wherein R^1 is H or $-C(O)(CH_2)_nCH_3$ where n = 6-16, and pharmaceutically acceptable salts or polymorphs thereof; and

where R^2 is spermidine and pharmaceutically acceptable salts or polymorphs thereof; and

(b) a second amount of a telomerase inhibitor;

wherein the first amount and the second amount together comprise an amount effective to reduce stability of telomere length and to induce cell death in the telomerase-expressing cell; and

wherein the amount effective to reduce stability of telomere length and induce cell death in the telomerase expressing cell is more effective than the first amount alone or the effect of the second amount alone.

10. The use of claim 9, wherein when R^1 is H, the 6-mercaptopurine deoxyribonucleoside analogue is 6-thio-2'-deoxyguanosine.

11. The use of claim 9 or claim 10, wherein the first amount of the 6-mercaptopurine deoxyribonucleoside analogue is 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.

12. The use of any one of claim 9 to 11, wherein the telomerase inhibitor is imetelstat sodium (GRN163L).

13. The use of any one of claim 9 to 12, wherein the first amount is administered in a first stage of treatment and the second amount is administered in a second stage of treatment, wherein the second amount is administered in a first stage of treatment and the first amount is delivered in a second stage of treatment, or wherein the first amount and the second amount are administered on the same day or simultaneously.

14. The use of any one of claims 9 to 13, wherein the first amount 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.

15. The use of any one of claims 9 to 14, wherein the pharmaceutical composition can be injected or administered orally.

16. The use of any one of claims 9 to 15, wherein the amount effective to reduce stability of telomere length and to induce cell death in the telomerase-expressing cell effects a reduction in size of a tumor comprising the telomerase-expressing tumor cell or a reduction in the growth rate of the tumor comprising the telomerase-expressing tumor cell.