WHAT IS CLAIMED IS:

1. A composition having less than 1 part in 4 by weight of a (N-1) product relative to a compound or a salt thereof, wherein the compound comprises a polynucleotide having a sequence of 10 or more nucleoside subunits and at least two of the nucleoside subunits are joined by a N3′→P5′ phosphoramidate inter-subunit linkage.

2. The composition of claim 1, wherein the N3′→P5′ phosphoramidate inter-subunit linkage is a N3′→P5′ thiophosphoramidate inter-subunit linkage having the structure:

3′—NH—P(S)(OR)—O—5’

wherein R is selected from the group consisting of hydrogen, an alkyl, a substituted alkyl, an aryl, a substituted aryl and a phosphate protecting group, or a salt thereof.

3. The composition of any one of claims 1-2, wherein the compound comprises a polynucleotide having a sequence of 10 or more nucleoside subunits complementary to the RNA component of human telomerase.

4. The composition of claim 3, wherein the polynucleotide comprises a sequence comprising 13 or more nucleoside subunits complementary to the RNA component of human telomerase.

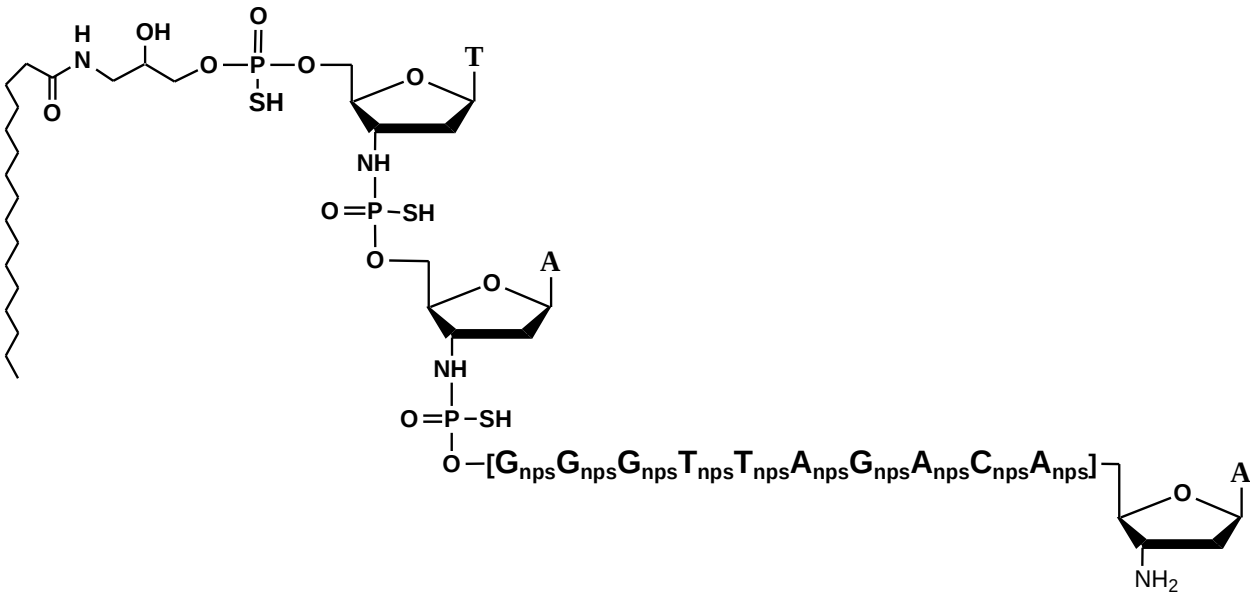
5. The composition of claim 3, wherein the polynucleotide comprises between 3 and 50 contiguous nucleoside subunits complementary to the RNA component of human telomerase.

6. The composition of any one of claims 3-5, wherein the nucleoside subunits complementary to the RNA component of human telomerase are all joined by N3′→P5′ phosphoramidate inter-subunit linkages.

7. The composition of any one of claims 1-6, wherein the polynucleotide comprises a sequence selected from the group consisting of: GTTAGGGTTAG (SEQ ID NO:4), TAGGGTTAGACAA (SEQ ID NO:3) and CAGTTAGGGTTAG (SEQ ID NO:5).

8. The composition of any one of claims 1-7, wherein the polynucleotide comprises a 3’amino or a 3’-hydroxyl terminal group.

9. The composition of claim 7, wherein the compound has the structure:

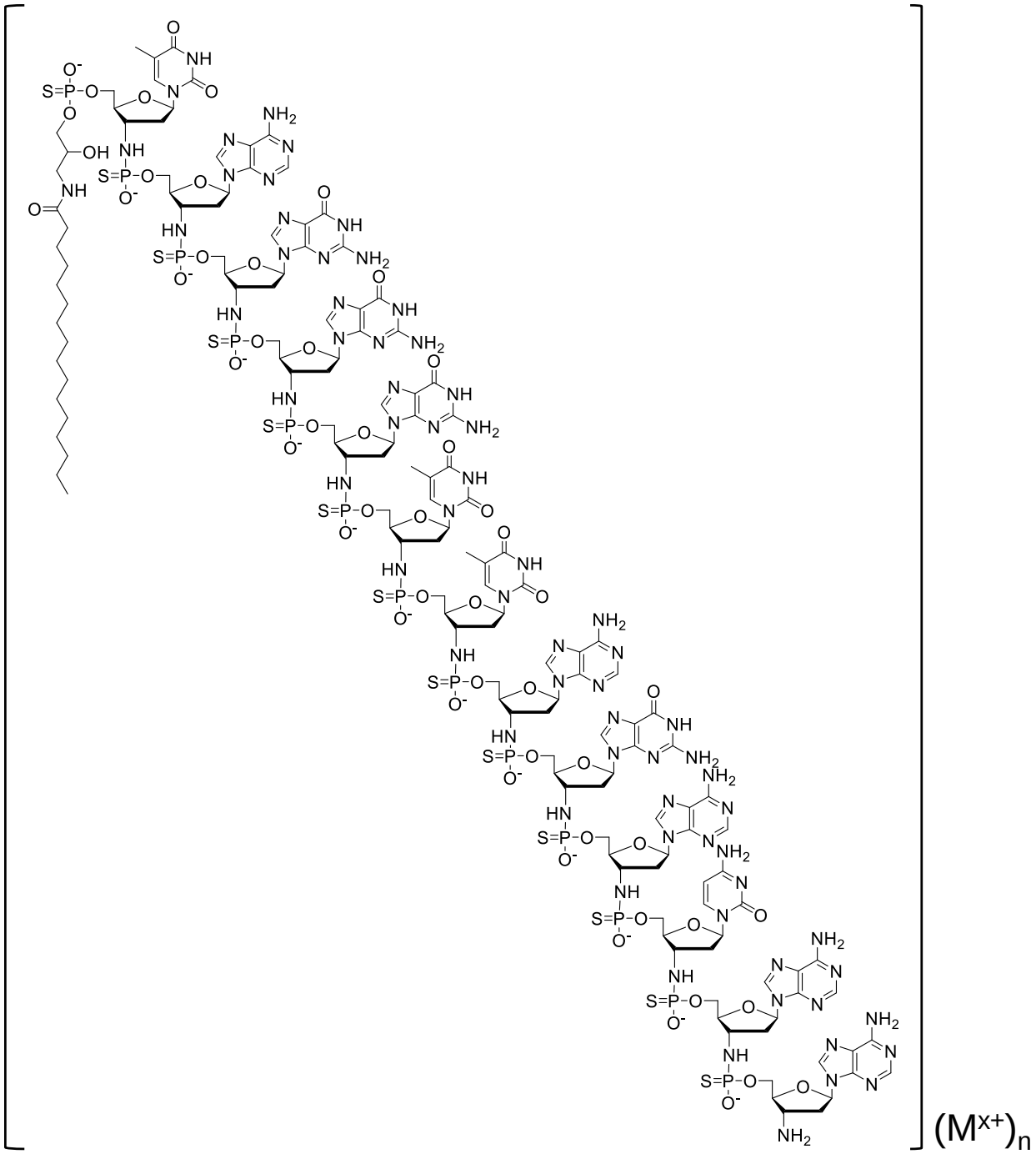


or a salt thereof;

wherein “nps” represents a thiophosphoramidate linkage —NH—P(═O)(SH)—O—, connecting the 3'-carbon of one nucleoside to the 5'-carbon of the adjacent nucleoside.

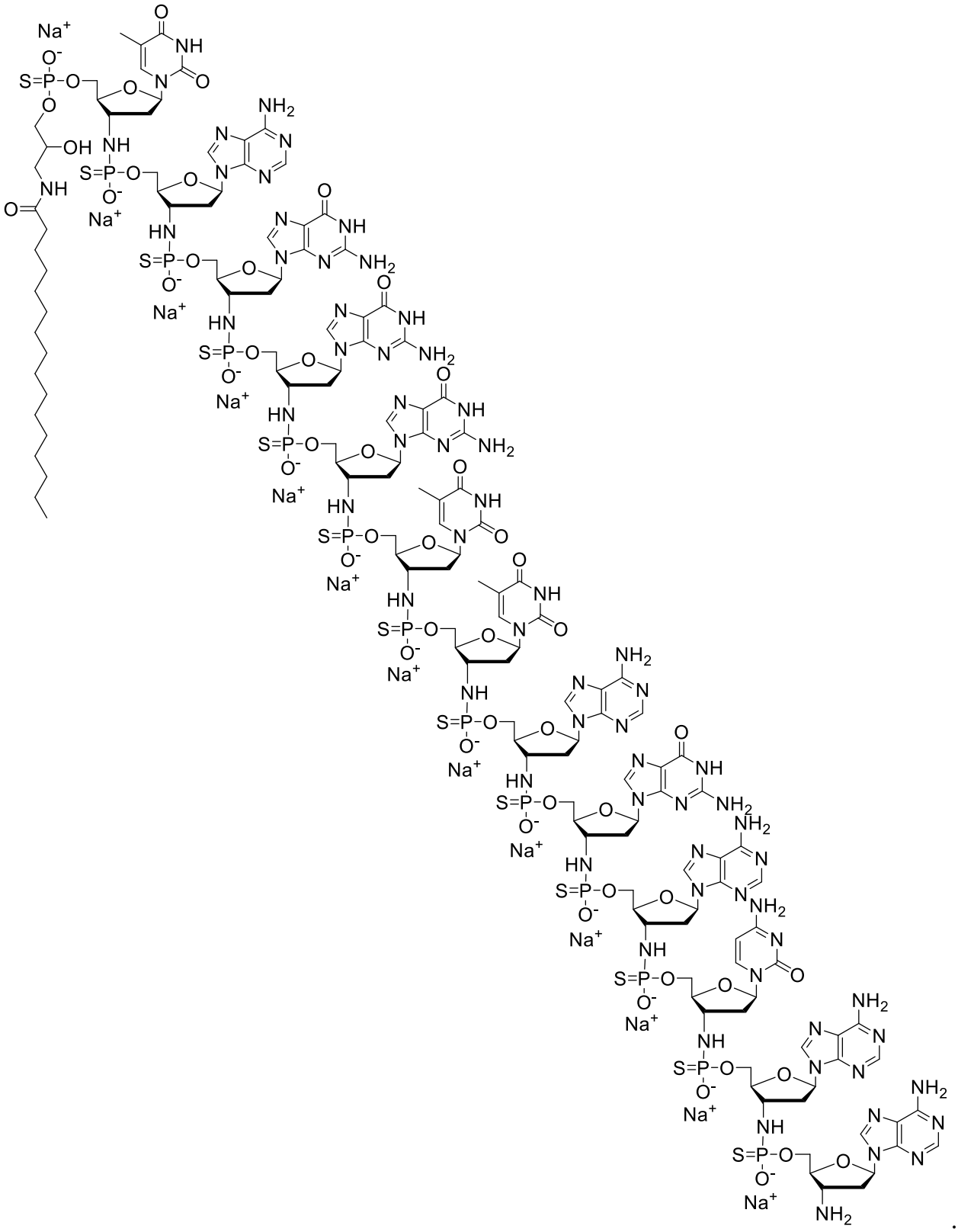
10. The composition of claim 9, wherein the salt is a pharmaceutically acceptable salt.

11. The composition of claim 7, wherein the compound has the structure:



wherein each M^{X+} is independently hydrogen or a counterion of a salt, each x is independently 1, 2 or 3 and n is an integer from 5 to 13.

12. The composition of claim 7, wherein the compound has the structure:



13. The composition of any one of claims 1-12, having less than 1 part in 6 by weight of a (N-1) product relative to the compound.

14. The composition of claim 13, having less than 1 part in 10 by weight of a (N-1) product relative to the compound.

15. The composition of claim 14, having less than 1 part in 20 by weight of a (N-1) product relative to the compound.

16. The composition of any one of claims 1-15, having less that 1 part in 4 by weight of any (N-x) product relative to the compound.

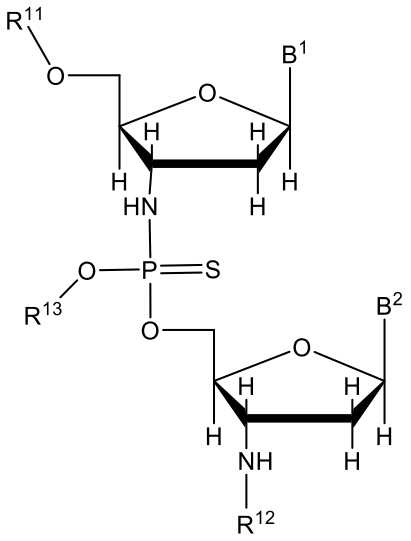
17. The composition of any one of claim 16, having less that 40 parts in 100 by total weight of (N-x) polynucleotide-containing products relative to the compound.

18. The composition of any one of claims 1-12, having the following profile of (N-x) polynucleotide-containing products:

less that 1 part in 4 by weight of a (N-1) product relative to the compound;

at least 10 parts in 100 by weight of (N-2) and (N-3) products relative to the compound.

19. A dinucleotide thiophosphoramidate compound described by Formula (II):



Formula (II)

wherein:

B^1 and B^2 are each independently a purine, a protected purine, a pyrimidine or a protected pyrimidine, or an analog thereof;

R^{11} is hydrogen, a protecting group or a phosphoramidite group; and

R^{12} and R^{13} are each independently hydrogen or a protecting group; or a salt thereof.

20. The compound of claim 19, wherein B^1 and B^2 are each independently selected from protected adenine, protected cytosine, protected guanine, thymine and uracil.

21. The compound of claim 20, wherein B^1 and B^2 are each independently selected from A(Bz), A(DMF), C(Bz), G(isobutyryl), T and U.

22. The compound of claim 19, wherein R^{11} is a 5'-phosphoramidite; R^{12} is a protecting group and R^{13} is a protecting group.

23. The compound of claim 21, wherein B^1 is A(Bz) or A(DMF) and B^2 is A(Bz) or A(DMF).

24. The compound of claim 21, wherein B^1 is A(Bz) or A(DMF) and B^2 is C(Bz).

25. The compound of claim 21, wherein B^1 is A(Bz) or A(DMF) and B^2 is G(isobutyryl).

26. The compound of claim 21, wherein B^1 is A(Bz) or A(DMF) and B^2 is T.

27. The compound of claim 21, wherein B^1 is A(Bz) or A(DMF) and B^2 is U.

28. The compound of claim 21, wherein B^1 is C(Bz) and B^2 is A(Bz) or A(DMF).

29. The compound of claim 21, wherein B^1 is C(Bz) and B^2 is C(Bz).

30. The compound of claim 21, wherein B^1 is C(Bz) and B^2 is G(isobutyryl).

31. The compound of claim 21, wherein B^1 is C(Bz) and B^2 is T.

32. The compound of claim 21, wherein B^1 is C(Bz) and B^2 is U.

33. The compound of claim 21, wherein B^1 is G(isobutyryl) and B^2 is A(Bz) or A(DMF).

34. The compound of claim 21, wherein B^1 is G(isobutyryl) and B^2 is C(Bz).

35. The compound of claim 21, wherein B^1 is G(isobutyryl) and B^2 is G(isobutyryl).

36. The compound of claim 21, wherein B^1 is G(isobutyryl) and B^2 is T.

37. The compound of claim 21, wherein B^1 is G(isobutyryl) and B^2 is U.

38. The compound of claim 21, wherein B^1 is T or U and B^2 is A(Bz) or A(DMF).

39. The compound of claim 21, wherein B^1 is T or U and B^2 is C(Bz).

40. The compound of claim 21, wherein B^1 is T or U and B^2 is G(isobutyryl).

41. The compound of claim 21, wherein B^1 is T or U and B^2 is T.

42. The compound of claim 21, wherein B^1 is T or U and B^2 is U.