WHAT IS CLAIMED IS:

1. A pharmaceutical composition comprising an oligonucleotide (ON) chelate complex, consisting of two or more ONs linked intermolecularly by a divalent cation, and at least one polypeptide.

2. A pharmaceutical composition comprising an antiviral ON chelate complex, consisting of two or more antiviral ONs linked intermolecularly by a divalent cation, and at least one antiviral polypeptide.

3. The pharmaceutical composition of claim 1 or 2, wherein the polypeptide is further pegylated.

4. The pharmaceutical composition of any one of claims 1-3, wherein said multivalent cation is an alkali earth metal with a 2+ charge state.

5. The pharmaceutical composition of any one of claims 1-4, wherein said divalent metal cation is a transition metal with a 2+ charge state.

6. The pharmaceutical composition of any one of claims 1-5, wherein said divalent metal cation is a lanthanide metal with a 2+ charge state.

7. The pharmaceutical composition of any one of claims 1-6, wherein said divalent metal cation is a post-transition metal with a 2+ charge state.

8. The pharmaceutical composition of any one of claims 1-7, wherein said divalent metal cation is calcium.

9. The pharmaceutical composition of any one of claims 1-7, wherein said divalent metal cation is magnesium.

10. The pharmaceutical composition of any one of claims 1-7, wherein said divalent metal cation is iron (2+), manganese, copper or zinc.

11. The pharmaceutical composition of any one of claims 1-7, wherein said divalent cation is comprised of two or more different divalent metal cations.

12. The pharmaceutical composition of any one of claims 1-7, wherein said divalent cation is comprised of calcium and magnesium.

13. The pharmaceutical composition of any one of claims 1-12, wherein said ON chelate complex comprises at least one double stranded ON.

14. The pharmaceutical composition of any one of claims 1-13, wherein said ON chelate complex comprises at least one ON with at least one phosphorothioate linkage.

15. The pharmaceutical composition of any one of claims 1-14, wherein said ON chelate complex comprises at least one fully phosphorothioated ON.

16. The pharmaceutical composition of any one of claims 1-15, wherein said ON chelate complex comprises at least one ON with one 2' modified ribose.

17. The pharmaceutical composition of any one of claims 1-16, wherein said ON chelate complex comprises at least one ON which has each ribose 2' O-methylated.

18. The pharmaceutical composition of any one of claims 1-17, wherein said ON chelate complex comprises at least one ON comprising at least one 5'methylcytosine.

19. The pharmaceutical composition of any one of claims 1-18, wherein said ON chelate complex comprises at least one ON in which each cytosine is further 5'methylcytosine.

20. The pharmaceutical composition of any one of claims 1-19, wherein said ON chelate complex comprises at least one ON in which every ribose is 2' O-methylated and in which each cytosine is further 5'methylcytosine.

21. The pharmaceutical composition of any one of claims 1-12, wherein said ON chelate complex comprises an oligonucleotide selected from SEQ ID NOs: 1-6 and 10-18.

22. The pharmaceutical composition of any one of claims 1-3, wherein said ON chelate complex comprises an oligonucleotide selected from SEQ ID NOs: 7-9.

23. The pharmaceutical composition of any one of claims 1-22, wherein the polypeptide is at least one of:

Thymosin α1;
Any α-interferon or pegylated derivatives thereof;
Any β-interferon or pegylated derivatives thereof;
Any γ-interferon or pegylated derivatives thereof;
Any λ-interferon or pegylated derivatives thereof;
Interferon α-2a or α-2b or α-N3;
Interferon β-1a or β-1b;
Interferon γ-1b;
Interferon λ1 or λ2 or λ3;
Pegylated interferon α-2a or α-2b or λ1 or λ2 or λ3;
Myrcludex B;
Any antiviral cytokine or pegylated derivatives thereof;
Thymic protein A; and
Any polypeptide shown to have antiviral activity or immunostimulatory activity.

24. The pharmaceutical composition of any one of claims 1-23, formulated for subcutaneous administration.

25. The pharmaceutical composition of any one of claims 1-23, formulated for intravenous infusion.

26. The pharmaceutical composition of any one of claims 1-23, formulated for at least one of the following routes of administration: aerosol inhalation, intraocular, oral ingestion, enteric, intramuscular injection, intraperitoneal injection, intrathecal injection, intrathecal infusion, intratracheal, intravenous injection and topically.

27. The pharmaceutical composition of any one of claims 1-26, wherein said ON chelate complex comprises at least one ON consisting of SEQ ID NO: 2.

28. The pharmaceutical composition of any one of claims 1-26, wherein said ON chelate complex comprises at least one ON consisting of SEQ ID NO: 11.

29. The pharmaceutical composition of any one of claims 1-26, wherein said wherein said ON chelate complex comprises at least one ON consisting of SEQ ID NO: 18.

30. The pharmaceutical composition of any one of claims 1-29, further comprising one or more of the following: entecavir, tenofovir disoproxil fumarate, telbuvidine, adefovir dipivoxil, lamivudine, ribavirin, telaprevir, boceprevir, GS-7977, tegobuvir, zanamivir, oseltamivir, ganciclovir, foscarnet, acyclovir, zidovudine, abacavir, lopinavir, ritonavir or efavirenz.

31. The pharmaceutical composition of any one of claims 1-30, further comprising a carrier.

32. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 3, and pegylated interferon α-2a.

33. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 18, and pegylated interferon α-2a.

34. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 11, and pegylated interferon α-2a.

35. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 3, and thymosin α1.

36. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 18, and thymosin α1.

37. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 11, and thymosin α1.

38. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 3, and interferon α-2b.

39. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 18, and interferon α-2b.

40. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 11, and interferon α-2b.

41. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 3, and pegylated thymosin α1.

42. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 18, and pegylated thymosin α1.

43. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 11, and pegylated thymosin α1.

44. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 3, and pegylated interferon α-2b.

45. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 18, and pegylated interferon α-2b.

46. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 11, and pegylated interferon α-2b.

47. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 3, and interferon λ1.

48. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 18, and interferon λ1.

49. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 11, and interferon λ1.

50. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 3, and pegylated interferon λ1.

51. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 18, and pegylated interferon λ1.

52. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 11, and pegylated interferon λ1.

53. A method for the preparation of the pharmaceutical composition of any one of claims 1-52, the method comprising:

a. dissolving at least one oligonucleotide (ON) sodium salt in a pharmaceutically acceptable aqueous excipient;
b. gradually adding a pharmaceutically acceptable divalent metal salt solution to the dissolved ON such that the ON chelate complex remains soluble;
c. dissolving one or more antiviral polypetides in a compatible, pharmaceutically acceptable aqueous excipient; and
d. gradually mixing the antiviral polypeptide solution with the ON chelate complex solution such that the solubility of said ON chelate complex and antiviral polypeptide is preserved.

54. A method for the preparation of the pharmaceutical composition of any one of claims 1-52, the method comprising:

a. dissolving at least one oligonucleotide (ON) sodium salt in a pharmaceutically acceptable aqueous excipient;
b. gradually adding at least one of a pharmaceutically acceptable calcium and / or magnesium salt solution to the dissolved ON such that the ON chelate complex remains soluble;
c. dissolving one or more antiviral polypetides in a compatible, pharmaceutically acceptable aqueous excipient; and
d. gradually mixing the antiviral polypeptide solution with the ON chelate complex solution such that the solubility of said ON chelate complex and antiviral polypeptide is preserved.

55. The method of claims 53 or 54, wherein the ON chelate complex solution and the polypeptide solution are combined just prior to the administration of the pharmaceutical composition.

56. The method of claims 53 or 54, wherein the ratio of divalent metal salt added to the dissolved ON is 0.1-50 mg per 100mg of oligonucleotide.

57. The method of claims 53 or 54, wherein the final ON concentration is 0.1-200mg/ml.

58. The method of any one of claims 53-57, wherein the divalent metal salt is at least one of a chloride salt, a gluconate salt, a citrate salt, a lactate salt, a malate salt, an aspartate salt, a fumarate salt, an ascorbate salt, a benzoate salt, an erythorbate salt, a propionate salt, a sulfate salt or a bicarbonate salt.

59. The method of any one of claims 53-57, wherein the divalent metal salt solution contains at least one of calcium, magnesium, iron (2+), manganese, copper or zinc.

60. The method of any one of claims 53-59, wherein the ON used is selected from SEQ ID NO: 1-18.

61. The method of any one of claims 53-60, wherein the one or more polypeptides are selected from the group consisting of:

Thymosin α1;
Any α-interferon or pegylated derivatives thereof;
Any β-interferon or pegylated derivatives thereof;
Any γ-interferon or pegylated derivatives thereof;
Any λ-interferon or pegylated derivatives thereof;
Interferon α-2a or α-2b or α-N3;
Interferon β-1a or β-1b;
Interferon γ-1b;
Interferon λ1 or λ2 or λ3;
Pegylated interferon α-2a or α-2b or λ1 or λ2 or λ3;
Myrcludex B;
Any antiviral cytokine or pegylated derivatives thereof;
Thymic protein A; and
Any polypeptide shown to have antiviral activity or immunostimulatory activity.

62. A kit comprising the pharmaceutical compositions of any one of claims 1-52.

63. The kit of claim 62, wherein the ON chelate complex and the at least one polypeptide are formulated separately.

64. The kit of claim 63, wherein the ON chelate complex and the at least one polypeptide are formulated for a co-administration by the same or different routes of administration.

WHAT IS CLAIMED IS:

1. A pharmaceutical composition comprising an oligonucleotide (ON) chelate complex, consisting of two or more ONs linked intermolecularly by a divalent cation, and at least one polypeptide.

2. A pharmaceutical composition comprising an antiviral ON chelate complex, consisting of two or more antiviral ONs linked intermolecularly by a divalent cation, and at least one antiviral polypeptide.

3. The pharmaceutical composition of claim 1 or 2, wherein the polypeptide is further pegylated.

4. The pharmaceutical composition of any one of claims 1-3, wherein said multivalent cation is an alkali earth metal with a 2+ charge state.

5. The pharmaceutical composition of any one of claims 1-4, wherein said divalent metal cation is a transition metal with a 2+ charge state.

6. The pharmaceutical composition of any one of claims 1-5, wherein said divalent metal cation is a lanthanide metal with a 2+ charge state.

7. The pharmaceutical composition of any one of claims 1-6, wherein said divalent metal cation is a post-transition metal with a 2+ charge state.

8. The pharmaceutical composition of any one of claims 1-7, wherein said divalent metal cation is calcium.

9. The pharmaceutical composition of any one of claims 1-7, wherein said divalent metal cation is magnesium.

10. The pharmaceutical composition of any one of claims 1-7, wherein said divalent metal cation is iron (2+), manganese, copper or zinc.

11. The pharmaceutical composition of any one of claims 1-7, wherein said divalent cation is comprised of two or more different divalent metal cations.

12. The pharmaceutical composition of any one of claims 1-7, wherein said divalent cation is comprised of calcium and magnesium.

13. The pharmaceutical composition of any one of claims 1-12, wherein said ON chelate complex comprises at least one double stranded ON.

14. The pharmaceutical composition of any one of claims 1-13, wherein said ON chelate complex comprises at least one ON with at least one phosphorothioate linkage.

15. The pharmaceutical composition of any one of claims 1-14, wherein said ON chelate complex comprises at least one fully phosphorothioated ON.

16. The pharmaceutical composition of any one of claims 1-15, wherein said ON chelate complex comprises at least one ON with one 2’ modified ribose.

17. The pharmaceutical composition of any one of claims 1-16, wherein said ON chelate complex comprises at least one ON which has each ribose 2’ O-methylated.

18. The pharmaceutical composition of any one of claims 1-17, wherein said ON chelate complex comprises at least one ON comprising at least one 5’methylcytosine.

19. The pharmaceutical composition of any one of claims 1-18, wherein said ON chelate complex comprises at least one ON in which each cytosine is further 5’methylcytosine.

20. The pharmaceutical composition of any one of claims 1-19, wherein said ON chelate complex comprises at least one ON in which every ribose is 2' O-methylated and in which each cytosine is further 5'methylcytosine.

21. The pharmaceutical composition of any one of claims 1-12, wherein said ON chelate complex comprises an oligonucleotide selected from SEQ ID NOs: 1-6 and 10-20.

22. The pharmaceutical composition of any one of claims 1-3, wherein said ON chelate complex comprises an oligonucleotide selected from SEQ ID NOs: 7-9.

23. The pharmaceutical composition of any one of claims 1-22, wherein the polypeptide is at least one of:

Thymosin α1;
Any α-interferon or pegylated derivatives thereof;
Any β-interferon or pegylated derivatives thereof;
Any γ-interferon or pegylated derivatives thereof;
Any λ-interferon or pegylated derivatives thereof;
Interferon α-2a or α-2b or α-N3;
Interferon β-1a or β-1b;
Interferon γ-1b;
Interferon λ1 or λ2 or λ3;
Pegylated interferon α-2a or α-2b or λ1 or λ2 or λ3;
Myrcludex B;
Any antiviral cytokine or pegylated derivatives thereof;
Thymic protein A; and
Any polypeptide shown to have antiviral activity or immunostimulatory activity.

24. The pharmaceutical composition of any one of claims 1-23, formulated for subcutaneous administration.

25. The pharmaceutical composition of any one of claims 1-23, formulated for intravenous infusion.

26. The pharmaceutical composition of any one of claims 1-23, formulated for at least one of the following routes of administration: aerosol inhalation, intraocular, oral

ingestion, enteric, intramuscular injection, intraperitoneal injection, intrathecal injection, intrathecal infusion, intratracheal, intravenous injection and topically.

27. The pharmaceutical composition of any one of claims 1-26, wherein said ON chelate complex comprises at least one ON consisting of SEQ ID NO: 2.

28. The pharmaceutical composition of any one of claims 1-26, wherein said ON chelate complex comprises at least one ON consisting of SEQ ID NO: 11.

29. The pharmaceutical composition of any one of claims 1-26, wherein said wherein said ON chelate complex comprises at least one ON consisting of SEQ ID NO: 18.

30. The pharmaceutical composition of any one of claims 1-26, wherein said wherein said ON chelate complex comprises at least one ON consisting of SEQ ID NO: 19.

31. The pharmaceutical composition of any one of claims 1-30, further comprising one or more of the following: entecavir, tenofovir disoproxil fumarate, telbuvidine, adefovir dipivoxil, lamivudine, ribavirin, telaprevir, boceprevir, GS-7977, tegobuvir, zanamivir, oseltamivir, ganciclovir, foscarnet, acyclovir, zidovudine, abacavir, lopinavir, ritonavir or efavirenz.

32. The pharmaceutical composition of any one of claims 1-31, further comprising a carrier.

33. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 3, and pegylated interferon α-2a.

34. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 18, and pegylated interferon α-2a.

35. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 11, and pegylated interferon α-2a.

36. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 3, and thymosin α1.

37. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 18, and thymosin α1.

38. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 11, and thymosin α1.

39. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 3, and interferon α-2b.

40. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 18, and interferon α-2b.

41. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 11, and interferon α-2b.

42. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 3, and pegylated thymosin α1.

43. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 18, and pegylated thymosin α1.

44. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 11, and pegylated thymosin α1.

45. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 3, and pegylated interferon α-2b.

46. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 18, and pegylated interferon α-2b.

47. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 11, and pegylated interferon α-2b.

48. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 3, and interferon λ1.

49. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 18, and interferon λ1.

50. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 11, and interferon λ1.

51. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 3, and pegylated interferon λ1.

52. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 18, and pegylated interferon λ1.

53. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 11, and pegylated interferon λ1.

54. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 19, and pegylated interferon α-2a.

55. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 19, and thymosin α1.

56. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 19, and interferon α-2b.

57. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 19, and pegylated thymosin α1.

58. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 19, and pegylated interferon α-2b.

59. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 19, and interferon λ1.

60. A pharmaceutical composition comprising an ON chelate complex comprising an oligonucleotide consisting of SEQ ID NO: 19, and pegylated interferon λ1.

61. A method for the preparation of the pharmaceutical composition of any one of claims 1-60, the method comprising:

a. dissolving at least one oligonucleotide (ON) sodium salt in a pharmaceutically acceptable aqueous excipient;
b. gradually adding a pharmaceutically acceptable divalent metal salt solution to the dissolved ON such that the ON chelate complex remains soluble;
c. dissolving one or more antiviral polypetides in a compatible, pharmaceutically acceptable aqueous excipient; and
d. gradually mixing the antiviral polypeptide solution with the ON chelate complex solution such that the solubility of said ON chelate complex and antiviral polypeptide is preserved.

62. A method for the preparation of the pharmaceutical composition of any one of claims 1-60, the method comprising:

a. dissolving at least one oligonucleotide (ON) sodium salt in a pharmaceutically acceptable aqueous excipient;
b. gradually adding at least one of a pharmaceutically acceptable calcium and / or magnesium salt solution to the dissolved ON such that the ON chelate complex remains soluble;
c. dissolving one or more antiviral polypetides in a compatible, pharmaceutically acceptable aqueous excipient; and

d. gradually mixing the antiviral polypeptide solution with the ON chelate complex solution such that the solubility of said ON chelate complex and antiviral polypeptide is preserved.

63. The method of claims 61 or 62, wherein the ON chelate complex solution and the polypeptide solution are combined just prior to the administration of the pharmaceutical composition.

64. The method of claims 61 or 62, wherein the ratio of divalent metal salt added to the dissolved ON is 0.1-50 mg per 100mg of oligonucleotide.

65. The method of claims 61 or 62, wherein the final ON concentration is 0.1-200mg/ml.

66. The method of any one of claims 61-65, wherein the divalent metal salt is at least one of a chloride salt, a gluconate salt, a citrate salt, a lactate salt, a malate salt, an aspartate salt, a fumarate salt, an ascorbate salt, a benzoate salt, an erythorbate salt, a propionate salt, a sulfate salt or a bicarbonate salt.

67. The method of any one of claims 61-65, wherein the divalent metal salt solution contains at least one of calcium, magnesium, iron (2+), manganese, copper or zinc.

68. The method of any one of claims 61-67, wherein the ON used is selected from SEQ ID NO: 1-20.

69. The method of any one of claims 61-68, wherein the one or more polypeptides are selected from the group consisting of:

Thymosin α1;
Any α-interferon or pegylated derivatives thereof;
Any β-interferon or pegylated derivatives thereof;
Any γ-interferon or pegylated derivatives thereof;

Any λ-interferon or pegylated derivatives thereof;

Interferon α-2a or α-2b or α-N3;

Interferon β-1a or β-1b;

Interferon γ-1b;

Interferon λ1 or λ2 or λ3;

Pegylated interferon α-2a or α-2b or λ1 or λ2 or λ3;

Myrcludex B;

Any antiviral cytokine or pegylated derivatives thereof;

Thymic protein A; and

Any polypeptide shown to have antiviral activity or immunostimulatory activity.

70. A kit comprising the pharmaceutical compositions of any one of claims 1-60.

71. The kit of claim 70, wherein the ON chelate complex and the at least one polypeptide are formulated separately.

72. The kit of claim 71, wherein the ON chelate complex and the at least one polypeptide are formulated for a co-administration by the same or different routes of administration.