Claims

1. A pharmaceutical composition of a recombinant non-enveloped virus vector comprising:

(i) a recombinant non-enveloped virus vector,

(ii) a buffering agent,

(iii) hydroxypropyl beta cyclodextrin,

(iv) a surfactant,

(v) sodium chloride,

(vi) magnesium chloride,

(vii) water for injection.

2. The pharmaceutical composition according to claim 1, wherein the buffering agent is tris(hydroxymethyl)aminomethane and hydrochloric acid.

3. The pharmaceutical composition according to claim 2, wherein tris(hydroxymethyl)aminomethane is present at a concentration of 1.9 – 8.7 mg/ml.

4. The pharmaceutical composition according to claim 2, wherein hydrochloric acid is added to pH 6.0 – 8.0.

5. The pharmaceutical composition according to claim 1, wherein the buffering agent is L-histidine and L-arginine.

6. The pharmaceutical composition according to claim 5, wherein L-histidine is present at a concentration of 0.4 – 10.0 mg/ml.

7. The pharmaceutical composition according to claim 5, wherein L-arginine is present at a concentration of 0.05 – 10.0 mg/ml.

8. The pharmaceutical composition according to claim 1, wherein hydroxypropyl-beta-cyclodextrin is present at a concentration of 10.0 – 200.0 mg/ml.

9. The pharmaceutical composition according to claim 1, wherein the surfactant is present at a concentration of 0.01 – 2.0 mg/ml.

10. The pharmaceutical composition according to claim 1, wherein the surfactant is poloxamer 188.

11. The pharmaceutical composition according to claim 1, wherein sodium chloride is present at a concentration of 1.0 – 15.0 mg/ml.

12. The pharmaceutical composition according to claim 1, wherein magnesium chloride is present at a concentration of 0.05 – 1.0 mg/ml.

13. The pharmaceutical composition according to claim 1, wherein magnesium chloride is magnesium chloride hexahydrate.

14. The pharmaceutical composition according to claim 1, the composition further comprising disaccharide.

15. The pharmaceutical composition according to claim 14, wherein disaccharide is present at a concentration of 10.0 – 200.0 mg/ml.

16. The pharmaceutical composition according to claim 14, wherein disaccharide is trehalose.

17. The pharmaceutical composition according to claim 16, wherein trehalose is trehalose dihydrate.

18. The pharmaceutical composition according to claim 1, comprising:

(i)	a recombinant non-enveloped virus vector,	
(ii)	a buffering agent being	
	tris(hydroxymethyl)aminomethane	1.9 – 8.7 mg/ml and
	hydrochloric acid	to pH 6.0 – 8.0
	or	
	L-histidine	0.4 – 10.0 mg/ml
		and
	L-arginine	0.05 – 10.0 mg/ml,
(iii)	hydroxypropyl beta cyclodextrin	10.0 – 200.0 mg/ml,
(iv)	a surfactant	0.01 – 2.0 mg/ml,
(v)	sodium chloride	1.0 – 15.0 mg/ml,
(vi)	magnesium chloride	0.05 – 1.0 mg/ml,
(vii)	water for injection	to 1.0 ml.

19. The pharmaceutical composition according to claim 2, wherein tris(hydroxymethyl)aminomethane is present at a concentration of 1.9 – 3.0 mg/ml or at a concentration of 5.7 – 8.7 mg/ml.

20. The pharmaceutical composition according to claim 2, wherein tris(hydroxymethyl)aminomethane is present at a concentration of 2.42 mg/ml or

at a concentration of 7.26 mg/ml.

21. The pharmaceutical composition according to claim 2, wherein hydrochloric acid is added to pH 7.0 – 8.0.

22. The pharmaceutical composition according to claim 2, wherein hydrochloric acid is added to pH 7.5.

23. The pharmaceutical composition according to claim 5, wherein L-histidine is present at a concentration of 2.0 – 3.58 mg/ml or at a concentration of 6.0 – 10.0 mg/ml.

24. The pharmaceutical composition according to claim 5, wherein L-histidine is present at a concentration of 2.79 mg/ml or at a concentration of 8.37 mg/ml.

25. The pharmaceutical composition according to claim 5, wherein L-arginine is present at a concentration of 0.248 – 0.448 mg/ml or at a concentration of 0.744 – 1.344 mg/ml.

26. The pharmaceutical composition according to claim 5, wherein L-arginine is present at a concentration of 0.348 mg/ml or at a concentration of 1.044 mg/ml.

27. The pharmaceutical composition according to claim 1, wherein hydroxypropyl-beta-cyclodextrin is present at a concentration of 30.0 – 70.0 mg/ml or at a concentration of 90.0 – 200.0 mg/ml.

28. The pharmaceutical composition according to claim 1, wherein hydroxypropyl-beta-cyclodextrin is present at a concentration of 50.0 mg/ml or

at a concentration of 100.0 mg/ml.

29. The pharmaceutical composition according to claim 1, wherein the surfactant is present at a concentration of 0.01 – 0.1 mg/ml or at a concentration of 0.1 – 1.0 mg/ml, or at a concentration of 1.0 – 2.0 mg/ml.

30. The pharmaceutical composition according to claim 18, wherein the surfactant is present at a concentration of 0.05 mg/ml or

at a concentration of 0.5 mg/ml; or

at a concentration of 1.5 mg/ml.

31. The pharmaceutical composition according to claim 1, wherein the surfactant is poloxamer 188.

32. The pharmaceutical composition according to claim 1, wherein sodium chloride is present at a concentration of 1.0 – 6.0 mg/ml or at a concentration of 9.0 – 15.0 mg/ml.

33. The pharmaceutical composition according to claim 1, wherein sodium chloride is present at a concentration of 3.0 mg/ml; or

34. at a concentration of 4.38 mg/ml; or

35. at a concentration of 4.5 mg/ml; or

36. at a concentration of 6.0 mg/ml; or

at a concentration of 13.14 mg/ml.

37. The pharmaceutical composition according to claim 1, wherein magnesium chloride is present at a concentration of 0.15 – 0.50 mg/ml or at a concentration of 0.5 – 0.7 mg/ml.

38. The pharmaceutical composition according to claim 1, wherein magnesium chloride is present at a concentration of 0.203 mg/ml or

at a concentration of 0.609 mg/ml.

39. The pharmaceutical composition according to claim 1, wherein magnesium chloride is magnesium chloride hexahydrate.

40. The pharmaceutical composition according to claim 18, the composition further comprising disaccharide at a concentration of 10 – 200 mg/ml.

41. The pharmaceutical composition according to claim 14, wherein disaccharide is present at a concentration of 30.0 – 70.0 mg/ml or

at a concentration of 90.0 – 200.0 mg/ml.

42. The pharmaceutical composition according to claim 14, wherein disaccharide is present at a concentration of 25.0 mg/ml; or

43. at a concentration of 33.3 mg/ml; or

at a concentration of 50.0 mg/ml; or

at a concentration of 100.0 mg/ml.

44. The pharmaceutical composition according to claim 14, wherein disaccharide is trehalose.

45. The pharmaceutical composition according to claim 44, wherein trehalose is trehalose dihydrate.

46. The pharmaceutical composition according to claim 1, comprising:

(i)	a recombinant non-enveloped virus vector,	
(ii)	a buffering agent being	
	tris(hydroxymethyl)aminomethane	2.42 mg/ml and
	hydrochloric acid	to pH 6.0 – 8.0
	or	
	L-histidine	2.79 mg/ml and
	L-arginine	0.348 mg/ml,
(iii)	hydroxypropyl beta cyclodextrin	100.0 mg/ml,
(iv)	a surfactant being poloxamer 188	0.5 mg/ml,
(v)	sodium chloride	6.0 mg/ml,
(vi)	magnesium chloride	0.203 mg/ml,
(vii)	water for injection	to 1.0 ml.

47. The pharmaceutical composition according to claim 1, comprising:

(a)		
(i)	a recombinant non-enveloped virus vector,	
(ii)	a buffering agent being	
	tris(hydroxymethyl)aminomethane	2.42 mg/ml and

	hydrochloric acid	to pH 6.0 – 8.0
	or	
	L-histidine	2.79 mg/ml and
	L-arginine	0.348 mg/ml,
(iii)	hydroxypropyl beta cyclodextrin	100.0 mg/ml,
(iv)	a surfactant being poloxamer 188	0.5 mg/ml,
(v)	sodium chloride	4.5 mg/ml,
(vi)	magnesium chloride	0.203 mg/ml,
(vii)	water for injection	to 1.0 ml and
(viii)	further comprises a disaccharide being trehalose	25.0 mg/ml; or
(b)		
(i)	a recombinant non-enveloped virus vector,	
(ii)	a buffering agent being	
	tris(hydroxymethyl)aminomethane	2.42 mg/ml and
	hydrochloric acid	to pH 6.0 – 8.0
	or	
	L-histidine	2.79 mg/ml and
	L-arginine	0.348 mg/ml,
(iii)	hydroxypropyl beta cyclodextrin	100.0 mg/ml,
(iv)	a surfactant being poloxamer 188	0.5 mg/ml,
(v)	sodium chloride	3.0 mg/ml,
(vi)	magnesium chloride	0.203 mg/ml,
(vii)	water for injection	to 1.0 ml and
(viii)	further comprises a disaccharide being trehalose	50.0 mg/ml; or
(c)		
(i)	a recombinant non-enveloped virus vector,	
(ii)	a buffering agent being	
	tris(hydroxymethyl)aminomethane	2.42 mg/ml and
	hydrochloric acid	to pH 6.0 – 8.0
	or	
	L-histidine	2.79 mg/ml and
	L-arginine	0.348 mg/ml,
(iii)	hydroxypropyl beta cyclodextrin	33.3 mg/ml,
(iv)	a surfactant being poloxamer 188	0.5 mg/ml,

(v)	sodium chloride	4.38 mg/ml,
(vi)	magnesium chloride	0.203 mg/ml,
(vii)	water for injection	to 1.0 ml and
(viii)	further comprises a disaccharide being trehalose	33.3 mg/ml; or
(d)		
(i)	a recombinant non-enveloped virus vector,	
(ii)	a buffering agent being	
	tris(hydroxymethyl)aminomethane	7.26 mg/ml and
	hydrochloric acid	to pH 6.0 – 8.0
	or	
	L-histidine	8.37 mg/ml and
	L-arginine	1.044 mg/ml,
(iii)	hydroxypropyl beta cyclodextrin	100.0 mg/ml,
(iv)	a surfactant being poloxamer 188	1.5 mg/ml,
(v)	sodium chloride	13.14 mg/ml,
(vi)	magnesium chloride	0.609 mg/ml,
(vii)	water for injection	to 1.0 ml and
(viii)	further comprises a disaccharide being trehalose	100.0 mg/ml.

48. The pharmaceutical composition according to claim 47, wherein trehalose is trehalose dihydrate.

49. The pharmaceutical composition according to claim 46, wherein magnesium chloride is magnesium chloride hexahydrate.

50. The pharmaceutical composition according to claim 46, wherein hydrochloric acid is added to pH 7.5.

51. The pharmaceutical composition according to claim 1, wherein the recombinant non-enveloped virus vector is present at a concentration of $1.0*10^{9}$ – $1.0*10^{14}$ viral genomes/ml.

52. The pharmaceutical composition according to claim 1, wherein the recombinant non-enveloped virus vector is present at a concentration of $1.0*10^{9}$ – $1.0*10^{13}$ viral genomes/ml.

53. The pharmaceutical composition according to claim 1, wherein the recombinant non-enveloped virus vector is present at a concentration of $(1.0 \pm 0.5)*10^{9}$ viral genomes/ml, $(1.0 \pm 0.5)*10^{10}$ viral genomes/ml, $(1.0 \pm 0.5)*10^{11}$ viral genomes/ml, $(1.0 \pm 0.5)*10^{12}$ viral genomes/ml, $(1.0 \pm 0.5)*10^{13}$ viral genomes/ml или $(1.0 \pm 0.5)*10^{14}$ viral genomes/ml.

54. The pharmaceutical composition according to claim 1, wherein the recombinant non-enveloped virus vector is a rAAV vector.

55. The pharmaceutical composition according to claim 54, wherein the rAAV vector comprises a capside of AAV5 serotype or AAV9 serotype.

56. The pharmaceutical composition according to claim 55, wherein the capsid of AAV5 serotype or AAV9 serotype may be a modified capsid.

57. The pharmaceutical composition according to any one of claims 1-56, the composition being suitable for lyophilization.

58. A lyophilized pharmaceutical composition of a recombinant non-enveloped virus vector produced by lyophilization of the pharmaceutical composition according to any one of claims 1-57.

59. The lyophilized pharmaceutical composition according to claim 58, the composition being intended for preparing an injectable solution.

60. The lyophilized pharmaceutical composition according to claim 58, the composition being intended for preparing a solution for intramuscular, intravenous or subcutaneous administration.

61. The lyophilized pharmaceutical composition according to claim 58, wherein the lyophilized pharmaceutical composition is present in a vial.

62. The lyophilized pharmaceutical composition according to claim 58, wherein the vial is a glass or polymer vial.

63. A lyophilized pharmaceutical composition of a recombinant non-enveloped virus vector, said composition following being reconstituted in an aqueous solvent comprises:

(i) a recombinant non-enveloped virus vector,

(ii) a buffering agent,

(iii) hydroxypropyl beta cyclodextrin,

(iv) a surfactant,

(v) sodium chloride,

(vi) magnesium chloride,

(vii) water for injection.

64. The lyophilized pharmaceutical composition of a recombinant non-enveloped virus vector according to claim 63, said composition following being reconstituted in an aqueous solvent comprises:

(i) a recombinant non-enveloped virus vector,

(ii) a buffering agent being

tris(hydroxymethyl)aminomethane	1.9 – 3.0 mg/ml and
hydrochloric acid	to pH 6.0 – 8.0

or

	L-histidine	0.4 – 10.0 mg/ml and
	L-arginine	0.05 – 10.0 mg/ml,
(iii)	hydroxypropyl beta cyclodextrin	20.0 – 100.0 mg/ml,
(iv)	a surfactant	0.01 – 1.0 mg/ml,
(v)	sodium chloride	1.0 – 6.0 mg/ml,
(vi)	magnesium chloride	0.05 – 1.0 mg/ml,
(vii)	water for injection	to 1.0 ml.

65. The lyophilized pharmaceutical composition according to claim 63, wherein tris(hydroxylmethyl)aminomethane is present at a concentration of 2.42 mg/ml.

66. The lyophilized pharmaceutical composition according to claim 63, wherein hydrochloric acid is added to pH 7.5.

67. The lyophilized pharmaceutical composition according to claim 63, wherein L-histidine is present at a concentration of 2.79 mg/ml; or

68. at a concentration of 0.348 mg/ml.

69. The lyophilized pharmaceutical composition according to claim 63, wherein hydroxypropyl-beta-cyclodextrin is present at a concentration of 33.3 mg/ml; or

at a concentration of 100.0 mg/ml.

70. The lyophilized pharmaceutical composition according to claim 63, wherein the surfactant is present at a concentration of 0.05 mg/ml; or

at a concentration of 0.5 mg/ml.

71. The lyophilized pharmaceutical composition according to claim 63, wherein the surfactant is poloxamer 188.

72. The lyophilized pharmaceutical composition according to claim 63, wherein sodium chloride is present at a concentration of 3.0 mg/ml; or

at a concentration of 4.38 mg/ml; or

at a concentration of 4.5 mg/ml; or

at a concentration of 6.0 mg/ml.

73. The lyophilized pharmaceutical composition according to claim 63, wherein magnesium chloride is present at a concentration of 0.203 mg/ml.

74. The lyophilized pharmaceutical composition according to claim 63, wherein magnesium chloride is magnesium chloride hexahydrate.

75. The lyophilized pharmaceutical composition according to claim 63, the composition further comprising disaccharide.

76. The lyophilized pharmaceutical composition according to claim 75, wherein disaccharide is present at a concentration of 20 – 100 mg/ml.

77. The lyophilized pharmaceutical composition according to claim 75, wherein disaccharide is present at a concentration of 25.0 mg/ml; or

at a concentration of 33.3 mg/ml; or

at a concentration of 50.0 mg/ml.

78. The lyophilized pharmaceutical composition according to claim 75, wherein disaccharide is trehalose.

79. The lyophilized pharmaceutical composition according to claim 78, wherein trehalose is trehalose dihydrate.

80. The lyophilized pharmaceutical composition according to claim 63, wherein the recombinant non-enveloped virus vector is present at a concentration of $1.0*10^{9}$ – $1.0*10^{14}$ viral genomes/ml.

81. The lyophilized pharmaceutical composition according to claim 63, wherein the recombinant non-enveloped virus vector is present at a concentration of $1.0*10^{9}$ – $1.0*10^{13}$ viral genomes/ml.

82. The lyophilized pharmaceutical composition according to claim 63, wherein the recombinant non-enveloped virus vector is present at a concentration of $(1.0 \pm 0.5)*10^{11}$ viral genomes/ml, $(1.0 \pm 0.5)*10^{10}$ viral genomes/ml, $(1.0 \pm 0.5)*10^{11}$ viral genomes/ml, $(1.0 \pm 0.5)*10^{12}$ viral genomes/ml, $(1.0 \pm 0.5)*10^{13}$ viral genomes/ml или $(1.0 \pm 0.5)*10^{14}$ viral genomes/ml.

83. The lyophilized pharmaceutical composition according to claim 63, wherein the recombinant non-enveloped virus vector is a rAAV vector.

84. The lyophilized pharmaceutical composition according to claim 83, wherein the rAAV vector comprises a capsid of AAV5 serotype or AAV9 serotype.

85. The lyophilized pharmaceutical composition according to claim 84, wherein the capsid of AAV5 serotype or AAV9 serotype may be a modified capsid.