CLAIMS:

1. A vector comprising a polynucleotide encoding an antibody or antibody fragment for use in a method of treatment of a disease or disorder of the central nervous system (CNS) in a subject, wherein the vector transduces or transfects cells of the blood brain barrier (BBB) and the transduced or transfected BBB cells express the antibody or antibody fragment resulting in delivery of the antibody or antibody fragment into the CNS.

2. The vector for use according to claim 1, wherein the antibody or antibody fragment is delivered into the brain parenchyma, optionally wherein the antibody or antibody fragment is secreted into the brain parenchyma.

3. The vector for use according to claim 1 or claim 2, wherein the vector transduces or transfects endothelial cells of the BBB.

4. The vector for use according to any one of claims 1 to 3, wherein the vector transduces or transfects pericytes or astrocytes of the BBB.

5. The vector for use according to any one of the preceding claims, wherein the vector comprises a wild-type viral vector or an engineered viral vector.

6. The vector for use according to any one of the preceding claims, wherein the vector comprises a neurotropic vector.

7. The vector for use according to any one of the preceding claims, wherein the vector expresses a peptide, small molecule, antibody or antibody fragment thereof, protein, nanoparticle, lipid, oligonucleotide, aptamer or cationic molecule on the vector surface that targets the vector to the cells of the BBB.

8. The vector for use according to any one of the preceding claims, wherein the vector comprises modifications on the vector surface that targets the vector to the cells of the BBB.

9. The vector for use according to any one of the preceding claims, wherein the vector comprises organic nanomaterials such as, liposomes, exosomes, dendrimers, micelles, inorganic nanomaterials such as gold nanoparticles, silica nanoparticles or carbon nanotubes.

10. The vector for use according to any one of the preceding claims, wherein the vector is selected from: adeno associated virus (AAV), adenovirus, retrovirus, rhinovirus, lentivirus, herpes simplex virus (HSV) or any virus-like particle.

11. The vector for use according to any one of the preceding claims, wherein the vector is an AAV selected from: AAV serotype 1 (AAV1), AAV serotype 2 (AAV2), AAV serotype 8 (AAV8), AAV serotype 9 (AAV9) and AAV serotype 10 (AAV10).

12. The vector for use according to any one of the preceding claims, wherein the vector is an engineered AAV vector, wherein optionally

    (i) the engineered AAV vector is an engineered AAV2 vector, preferably AAV-BR1; or

    (ii) the engineered AAV vector is an engineered AAV9 vector, such as AAV-S, AAV-F, AAV-PHP.eB, AAV9-PHP-V1; or

    (iii) the engineered AAV vector is an engineered AAV1 vector, such as AAV1RX, AAV1R6 or AAV1R7, or

    (iv) the engineered AAV vector is an engineered AAV10 vector.

13. The vector for use according to any one of the preceding claims, wherein the vector is an AAV-BR1 or an AAV9-PHP-V1.

14. The vector for use according to any one of the preceding claims, wherein the disease or disorder of the CNS is selected from diseases associated with amyloid-beta protein, TDP-43-proteinopathies, alpha-synucleinopathies, Tauopathies, trinucleotide repeat disorders including poly-glutamine disorders such as Huntington's disease, brain-related cancers and tumors, epilepsy, psychiatric diseases, neuroinflammatory diseases, neuromuscular diseases, viral-induced encephalitis and diseases characterized by microglial dysfunction.

15. The vector for use according to any one of the preceding claims, wherein the disease or disorder of the CNS is selected from: Frontotemporal dementia (FTD), amyotrophic lateral sclerosis (ALS), Alzheimer's disease (AD), Parkinson's disease (PD), Chronic Traumatic Encephalopathy (CTE), limbic-predominant age-related TDP-43 encephalopathy (LATE), and multiple sclerosis.

16. The vector for use according to any one of the preceding claims, wherein the antibody or antibody fragment is selected from an: anti-ErbB2, anti-TDP-43 (NI-205), anti-Abeta (such as bapineuzumab, solanezumab, lecanemab, aducanumab, donanemab, gantenerumab or crenezumab), anti-ApoE4 (Apolipoprotein E4) and anti-DDX3X (ATP-dependent RNA helicase), anti-Tau (tilavonemab, gosuranemab, zagotenemab, semorinemab, bepranemab, BIIB076, JNJ-63733657, Lu AF87908, PNT001, E-2814), anti-LINGO-1 (such as opicinumab), anti-alpha-aynuclein (cinpanemab, prasinezumab, MEDI-1341, Lu AF82422, BAN0805), anti-ASC (IC-100), anti-NLRP3, anti-C5 (ravulizumab, eculizumab), anti-C1q (ANX-005), anti-C3, anti-huntingtin (C-617, NI-302), anti-prion, anti-CD20 (such as ofatumumab, ocrelizumab, rituximab, BCD-132, ublituximab, BAT-4406F, AL-014) , anti-PD-1 (IBC-Ab002) or anti-VEGF-A (bevacizumab, ranibizumab, brolucizumab, faricimab, vanucizumab) antibody or antibody fragment.

17. The vector for use according to any one of the preceding claims, wherein the vector is administered to the subject parenterally.

18. The vector for use according to claim 17, wherein the vector is administered to the subject by intravenous injection or intravenous infusion.

19. The vector for use according to any one of the preceding claims, wherein the polynucleotide comprises at least one promoter selected from a: cytomegalovirus (CMV) promoter, EF1A (Human Eukaryotic translation elongation factor 1 alpha 1), CAG (CMV early enhancer fused to modified chicken β-actin promoter), CBh (CMV early enhancer fused to modified chicken β-actin promoter), SV40 (Simian virus 40 enhancer/early promoter), GFAP (Human glial fibrillary acidic protein promoter), ATP1A2_1 (Na, K ATPase α2), CLDN_5 (Claudin 5), ADRB2_1 (Adrenoceptor beta 2), TNFRSF6B_1 (TNF receptor superfamily member 6b), PDYN_1 (prodynorphin), GH1_1 (Human growth hormone), OPALIN_1 (Opalin), SYN1_1 (Synapsin 1), CAMK2A_1 (Calcium/Calmodulin

Dependent Protein Kinase II alpha), NEFH_1 (neurofilament heavy polypeptide), NEUROD6_1 (neuronal differentiation factor 6) or OLIG2_1 (oligodendrocyte transcription factor 2), a CMV early enhancer fused to either GFAP, ATP1A2_1, CLDN_5, ADRB2_1, TNFRSF6B_1, PDYN_1, GH1_1. OPALIN_1, SYN1_1, CAMK2A_1, NEFH_1, NEUROD6_1 or OLIG2_1 promoter, preferably a cytomegalovirus (CMV) promoter or CBh promoter, and wherein the at least one promoter is operably linked to a sequence encoding an antibody or antibody fragment.

20. The vector for use according to claim 19, wherein the at least one promoter is selected from a: ATP1A2_1 (Na, K ATPase α2), CLDN_5 (Claudin 5), ADRB2_1 (Adrenoceptor beta 2) and TNFRSF6B_1 (TNF receptor superfamily member 6b), optionally wherein the at least one promoter is operably linked to an enhancer such as a CMV early enhancer.

21. A method for delivery of an antibody or antibody fragment to the BBB in a subject, the method comprising administering a vector comprising a polynucleotide encoding the antibody or antibody fragment to the subject, wherein the method results in transduction or transfection of cells of the BBB and the transduced or transfected cells express the antibody or antibody fragment.

22. A method for delivery of an antibody or antibody fragment to the CNS in a subject, the method comprising administering a vector comprising a polynucleotide encoding the antibody or antibody fragment to the subject, wherein the method results in transduction or transfection of cells of the BBB and the transduced or transfected cells express the antibody or antibody fragment resulting in delivery of the antibody or antibody fragment into the CNS.

23. A method for treating a disease or disorder of the CNS in a subject, the method comprising administering a vector comprising a polynucleotide encoding an antibody or antibody fragment to the subject, wherein the method results in transduction or transfection of cells of the BBB and the transduced or transfected cells express the antibody or antibody fragment resulting in delivery of the antibody or antibody fragment into the CNS.

24. Use of a vector comprising a polynucleotide encoding an antibody or antibody fragment for the manufacture of a medicament for the treatment of a disease or disorder of the CNS

in a subject, wherein the vector transduces or transfects cells of the blood brain barrier (BBB) and the transduced or transfected cells express the antibody or antibody fragment resulting in delivery of the antibody or antibody fragment into the CNS.

25. Use of a vector comprising a polynucleotide encoding an antibody or antibody fragment for delivery of the polynucleotide encoding the antibody or antibody fragment to the BBB of a subject wherein the vector transduces or transfects cells of the blood brain barrier (BBB) and the transduced or transfected cells express the antibody or antibody fragment resulting in delivery of the antibody or antibody fragment into the CNS.

26. The method or use according to any one of claims 21 to 25 further defined according to the features according to any one of claims 2 to 20.

27. A vector comprising an expression cassette comprising from 5' to 3': at least one promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and to a second gene encoding a heavy chain of the antibody or antibody fragment for use in a method of treatment of a disease or disorder of the central nervous system (CNS) in a subject, wherein the vector transduces or transfects cells of the blood brain barrier (BBB) or the CNS and the transduced or transfected cells express the antibody or antibody fragment resulting in delivery of the antibody or antibody fragment into the CNS.

28. A vector comprising an expression cassette comprising from 5' to 3': a first promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and a second promoter operably linked to a second gene encoding a heavy chain of the antibody or antibody fragment for use in a method of treatment of a disease or disorder of the central nervous system (CNS) in a subject, wherein the vector transduces or transfects cells of the blood brain barrier (BBB) or the CNS and the transduced or transfected cells express the antibody or antibody fragment resulting in delivery of the antibody or antibody fragment into the CNS.

29. The vector for use according to claim 27 or claim 28, wherein the antibody or antibody fragment is delivered into the brain parenchyma, optionally wherein the antibody or antibody fragment is secreted into the brain parenchyma.

30. The vector for use according to any one of claims 27 to 29, wherein the vector transduces or transfects cells of the CNS and the cells are selected from: brain endothelial cells, neurons, pericytes, astrocytes, oligodendrocytes, microglia and ependymal cells.

31. The vector for use according to any one of claims 27 to 30, wherein the vector transduces or transfects endothelial cells of the BBB.

32. The vector for use according to any one of claims 27 to 31, wherein the vector transduces or transfects pericytes or astrocytes of the BBB.

33. The vector for use according to any one of claims 27 to 32, wherein the antibody or antibody fragment is secreted into the CNS, preferably secreted into the brain parenchyma.

34. The vector for use according to any one of claims 27 to 33, wherein the vector comprises modifications on the vector surface that targets the vector to the cells of the BBB.

35. The vector for use according to any one of claims 27 to 34, wherein the vector expresses a peptide, small molecule, antibody or antibody fragment thereof, protein, nanoparticle, lipid, oligonucleotide, aptamer or cationic molecule on the vector surface that targets the vector to the cells of the BBB or the CNS.

36. The vector for use according to any one of claims 27 to 35, wherein the vector comprises a neurotropic vector.

37. The vector for use according to any one of claims 27 to 36, wherein the vector comprises organic nanomaterials such as, liposomes, exosomes, dendrimers, and micelles or inorganic nanomaterials such as gold nanoparticles, silica nanoparticles and carbon nanotubes.

38. The vector for use according to any one of claims 27 to 37, wherein the vector comprises a wild-type viral vector or an engineered viral vector.

39. The vector for use according to any one of claims 27 to 38, wherein the vector is selected from: adeno associated virus (AAV), adenovirus, retrovirus, rhinovirus, lentivirus, herpes simplex virus (HSV) or a virus-like particle.

40. The vector for use according to any one of claims 27 to 39, wherein the vector is an AAV selected from: AAV serotype 1 (AAV1), AAV serotype 2 (AAV2), AAV serotype 8 (AAV8), AAV serotype 9 (AAV9) and AAV serotype 10 (AAV10).

41. The vector for use according to any one of claims 27 to 40, wherein the vector is an engineered AAV vector, wherein optionally

(i) the engineered AAV vector is an engineered AAV2 vector, preferably AAV-BR1; or

(ii) the engineered AAV vector is an engineered AAV9 vector, such as AAV-S, AAV-F, AAV-PHP.eB, AAV9-PHP-V1; or

(iii) the engineered AAV vector is an engineered AAV1 vector, such as AAV1RX, AAV1R6 or AAV1R7, or

(iv) the engineered AAV vector is an engineered AAV10 vector.

42. The vector for use according to any one of claims 27 to 41, wherein the disease or disorder of the CNS is selected from diseases associated with amyloid-beta protein, TDP-43-proteinopathies, alpha-synucleinopathies, Tauopathies, trinucleotide repeat disorders including poly-glutamine disorders such as Huntington's disease, brain-related cancers and tumors, epilepsy, psychiatric diseases, neuroinflammatory diseases, neuromuscular diseases, viral-induced encephalitis and diseases characterized by microglial dysfunction.

43. The vector for use according to any one of claims 27 to 42, wherein the disease or disorder of the CNS is selected from: Frontotemporal dementia (FTD), amyotrophic lateral sclerosis (ALS), Alzheimer's disease (AD), Parkinson's disease (PD), Chronic Traumatic Encephalopathy (CTE), limbic-predominant age-related TDP-43 encephalopathy (LATE) and multiple sclerosis.

44. The vector for use according to any one of claims 27 to 43, wherein the antibody or antibody fragment is selected from an: anti-ErbB2, anti-TDP-43 (NI-205), anti-Abeta (such

as bapineuzumab, solanezumab, lecanemab, aducanumab, donanemab, gantenerumab or crenezumab), anti-ApoE4 (Apolipoprotein E4) and anti-DDX3X (ATP-dependent RNA helicase), anti-Tau (tilavonemab, gosuranemab, zagotenemab, semorinemab, bepranemab, BIIB076, JNJ-63733657, Lu AF87908, PNT001, E-2814), anti-LINGO-1 (such as opicinumab), anti-alpha-synuclein (cinpanemab, prasinezumab, MEDI-1341, Lu AF82422, BAN0805), anti-ASC (IC-100), anti-NLRP3, anti-C5 (ravulizumab, eculizumab), anti-C1q (ANX-005), anti-C3, anti-huntingtin (C-617, NI-302), anti-prion, anti-CD20 (such as ofatumumab, ocrelizumab, rituximab, BCD-132, ublituximab, BAT-4406F, AL-014) , anti-PD-1 (IBC-Ab002) or anti-VEGF-A (bevacizumab, ranibizumab, brolucizumab, faricimab, vanucizumab).

45. The vector for use according to any one of claims 27 to 44, wherein the vector is administered to the subject parenterally.

46. The vector for the use according to claim 45, wherein the vector is administered to the subject by intravenous injection or intravenous infusion.

47. The vector for the use according to claims 27 to 46, wherein the expression cassette further comprises either an internal ribosomal entry site (IRES) or furin-2A cleavage site after the first gene encoding the light chain of the antibody or antibody fragment and before the second gene encoding the heavy chain of the antibody or antibody fragment.

48. The vector for use according to claim 47, wherein the IRES is derived from encephalomyocarditis virus, and optionally comprises SEQ ID NO: 1 or SEQ ID NO: 8.

49. The vector for use according to any one of claims 27 to 48, wherein the first gene encoding the light chain of the antibody or antibody fragment further comprises a secretion peptide and/or the second gene encoding the heavy chain of the antibody or antibody fragment further comprises a secretion peptide.

50. The vector for use according to any one of claims 27 to 49, wherein the at least one promoter and/or the first promoter and/or the second promoter is selected from a: cytomegalovirus (CMV) promoter, EF1A (Human Eukaryotic translation elongation factor 1 alpha 1), CAG (CMV early enhancer fused to modified chicken β-actin promoter), CBh

(CMV early enhancer fused to modified chicken β-actin promoter), SV40 (Simian virus 40 enhancer/early promoter), GFAP (Human glial fibrillary acidic protein promoter), ATP1A2_1 (Na, K ATPase α2), CLDN_5 (Claudin 5), ADRB2_1 (Adrenoceptor beta 2), TNFRSF6B_1 (TNF receptor superfamily member 6b), PDYN_1 (prodynorphin), GH1_1 (Human growth hormone), OPALIN_1 (Opalin), SYN1_1 (Synapsin 1), CAMK2A_1 (Calcium/Calmodulin Dependent Protein Kinase II alpha), NEFH_1 (neurofilament heavy polypeptide), NEUROD6_1 (neuronal differentiation factor 6) or OLIG2_1 (oligodendrocyte transcription factor 2), a CBh, a CMV early enhancer fused to either GFAP, ATP1A2_1, CLDN_5, ADRB2_1, TNFRSF6B_1, PDYN_1, GH1_1. OPALIN_1, SYN1_1, CAMK2A_1, NEFH_1, NEUROD6_1 or OLIG2_1 promoter, preferably a cytomegalovirus (CMV) promoter or CBh promoter, and wherein the at least one promoter is operably linked to a sequence encoding an antibody or antibody fragment.

51. The vector for use according to claim 50, wherein the at least one promoter and/or the first promoter and/or the second promoter is selected from a: ATP1A2_1 (Na, K ATPase α2), CLDN_5 (Claudin 5), ADRB2_1 (Adrenoceptor beta 2) and TNFRSF6B_1 (TNF receptor superfamily member 6b) , optionally wherein the at least one promoter and/or the first promoter and/or the second promoter is operably linked to an enhancer such as a CMV early enhancer.

52. The vector for use according to any one of claims 27 to 51, wherein the expression cassette comprises a sequence selected from: SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6 SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9 or SEQ ID NO: 10 or a sequence having at least 80%, 85%, 90%, 95%, 97%, 98% or 99% identity therewith.

53. A method of reducing antibody or antibody fragment aggregation, improving antibody or antibody fragment maturation and/or quality, wherein the method comprises:

(i) transforming cells with an expression cassette comprising from 5' to 3': at least one promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and to a second gene encoding a heavy chain of the antibody or antibody fragment and wherein the expression cassette further comprises an internal ribosomal entry site (IRES) after the first gene encoding the light chain of the antibody or antibody fragment and

before the second gene encoding the heavy chain of the antibody or antibody fragment; or with an expression cassette comprising from 5' to 3': a first promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and a second promoter operably linked to a second gene encoding a heavy chain of the antibody or antibody fragment,; and

(ii) maintaining the transformed cells under conditions suitable for antibody or antibody fragment production.

54. A method of increasing antibody or antibody fragment titer, wherein the method comprises:

(i) transforming cells with an expression cassette comprising from 5' to 3': at least one promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and to a second gene encoding a heavy chain of the antibody or antibody fragment and wherein the expression cassette further comprises either an internal ribosomal entry site (IRES) or self (e.g. furin-2A) cleavage site after the first gene encoding the light chain of the antibody or antibody fragment and before the second gene encoding the heavy chain of the antibody or antibody fragment; or with an expression cassette comprising from 5' to 3': a first promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and a second promoter operably linked to a second gene encoding a heavy chain of the antibody or antibody fragment; and

(ii) maintaining the transformed cells under conditions suitable for antibody or antibody fragment production.

55. A method of reducing unwanted antibody or antibody fragment immunogenicity and/or adverse effects associated with antibody or antibody fragment therapy, wherein the method comprises:

(i) transforming cells with an expression cassette comprising from 5' to 3': at least one promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and to a second gene encoding a heavy chain of the antibody or antibody fragment and wherein the expression cassette further comprises an internal ribosomal entry site (IRES) after the

first gene encoding the light chain of the antibody or antibody fragment and before the second gene encoding the heavy chain of the antibody or antibody fragment or with an expression cassette comprising from 5' to 3': a first promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and a second promoter operably linked to a second gene encoding a heavy chain of the antibody or antibody fragment; and

(ii) maintaining the transformed cells under conditions suitable for antibody or antibody fragment production.

56. The method according to any one of claims 53 to 55, wherein the antibody or antibody fragment are free of self-cleavage elements.

57. The method according to any one of claims 53 to 56 wherein the expression cassette is comprised in a vector and the method is as further defined according to the features according to any one of claims 29 to 52.

58. An antibody or antibody fragment obtained by the methods according to any one of claims 53 to 57.

59. A viral vector comprising an engineered AAV2 vector, preferably AAV-BR1 or an engineered AAV9 vector, such as AAV-S, AAV-F, AAV-PHP.eB or AAV9-PHP-V1 or an engineered AAV1 vector, such as AAV1RX, AAV1R6, AAV1R7 or an engineered AAV10 vector and wherein the engineered viral vector comprises an expression cassette comprising from 5' to 3': at least one promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and to a second gene encoding a heavy chain of the antibody or antibody fragment and further comprises an IRES after the first gene encoding the light chain of the antibody or antibody fragment and before the second gene encoding the heavy chain of the antibody or antibody fragment.

60. A viral vector comprising an engineered AAV2 vector, preferably AAV-BR1 or an engineered AAV9 vector, such as AAV-S, AAV-F, AAV-PHP.eB or AAV9-PHP-V1 or an engineered AAV1 vector, such as AAV1RX, AAV1R6 or AAV1R7 or an engineered AAV10 vector and wherein the engineered viral vector comprises an expression cassette

comprising: from 5' to 3': a first promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and a second promoter operably linked to a second gene encoding a heavy chain of the antibody or antibody fragment.

61. The engineered viral vector according to claim 59 or 60, wherein the engineered viral vector is AAV-BR1 or AAV9-PHP-V1.

62. The viral vector according to any one of claims 59 to 61, as further defined according to any one of claims 29 to 52.

CLAIMS

1. A vector comprising a polynucleotide encoding an antibody or antibody fragment for use in a method of treatment of a disease or disorder of the central nervous system (CNS) in a subject, in which the vector transduces or transfects cells of the blood brain barrier (BBB) and the transduced or transfected BBB cells express the antibody or antibody fragment resulting in delivery of the antibody or antibody fragment into the CNS.

2. A method for delivery of an antibody or antibody fragment to the BBB in a subject, the method comprising administering a vector comprising a polynucleotide encoding the antibody or antibody fragment to the subject, in which the method results in transduction or transfection of cells of the BBB and the transduced or transfected cells express the antibody or antibody fragment or a method for delivery of an antibody or antibody fragment to the CNS in a subject, the method comprising administering a vector comprising a polynucleotide encoding the antibody or antibody fragment to the subject, in which the method results in transduction or transfection of cells of the BBB and the transduced or transfected cells express the antibody or antibody fragment resulting in delivery of the antibody or antibody fragment into the CNS.

3. Use of a vector comprising a polynucleotide encoding an antibody or antibody fragment for the manufacture of a medicament for the treatment of a disease or disorder of the CNS in a subject, in which the vector transduces or transfects cells of the blood brain barrier (BBB) and the transduced or transfected cells express the antibody or antibody fragment resulting in delivery of the antibody or antibody fragment into the CNS.

4. Use of a vector comprising a polynucleotide encoding an antibody or antibody fragment for delivery of the polynucleotide encoding the antibody or antibody fragment to the BBB of a subject in which the vector transduces or transfects cells of the blood brain barrier (BBB) and the transduced or transfected cells express the antibody or antibody fragment resulting in delivery of the antibody or antibody fragment into the CNS.

5. A vector comprising an expression cassette comprising from 5’ to 3’:

(a) at least one promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and to a second gene encoding a heavy chain of the antibody or antibody fragment; or

(b) a first promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and a second promoter operably linked to a second gene encoding a heavy chain of the antibody or antibody fragment for use in a method of treatment of a disease or disorder of the central nervous system (CNS) in a subject, in which the vector transduces or transfects cells of the blood brain barrier (BBB) or the CNS and the transduced or transfected cells express the antibody or antibody fragment resulting in delivery of the antibody or antibody fragment into the CNS.

6. A vector for use according to Claim 1 or 5, a method according to Claim 2 or use of a vector according to Claim 3 or 4, in which the antibody or antibody fragment is delivered into the brain parenchyma, optionally in which the antibody or antibody fragment is secreted into the brain parenchyma.

7. A vector for use according to Claim 5 or 6, in which the vector transduces or transfects cells of the CNS and the cells are selected from: brain endothelial cells, neurons, pericytes, astrocytes, oligodendrocytes, microglia and ependymal cells.

8. A vector for use according to any of Claims 1 or 5 to 7, use of a vector according to any of Claims 3, 4 or 6, or a method according to Claim 2 or 6, in which the vector transduces or transfects endothelial cells of the BBB.

9. A vector for use according to any of Claims 1 or 5 to 8, use of a vector according to any of Claims 3, 4, 6 or 8, or a method according to any of Claims 2, 6 or 8, in which the vector transduces or transfects pericytes or astrocytes of the BBB.

10. A vector for use according to any of Claims 5 to 9, in which the antibody or antibody fragment is secreted into the CNS, preferably secreted into the brain parenchyma.

11. A vector for use according to any of Claims 1 or 5 to 10, use of a vector according to any of Claims 3, 4, 6, 8 or 9, or a method according to any of Claims 2, 6, 8 or 9, in which:

(i) the vector comprises modifications on the vector surface that targets the vector to the cells of the BBB; and/or

(ii) the vector expresses a peptide, small molecule, antibody or antibody fragment thereof, protein, nanoparticle, lipid, oligonucleotide, aptamer or cationic molecule on the vector surface that targets the vector to the cells of the BBB or the CNS; and/or

(iii) the vector comprises a neurotropic vector; and/or

(iv) the vector comprises organic nanomaterials such as, liposomes, exosomes, dendrimers, and micelles or inorganic nanomaterials such as gold nanoparticles, silica nanoparticles and carbon nanotubes.

12. A vector for use according to any of Claims 1 or 5 to 11, use of a vector according to any of Claims 3, 4, 6, 8, 9 or 11, or a method according to any of Claims 2, 6, 8, 9 or 11, in which the vector:

(i) comprises a wild-type viral vector or an engineered viral vector; and/or

(ii) is selected from: adeno associated virus (AAV), adenovirus, retrovirus, rhinovirus, lentivirus, herpes simplex virus (HSV) or a virus-like particle; and/or

(iii) is an AAV selected from: AAV serotype 1 (AAV1), AAV serotype 2 (AAV2), AAV serotype 8 (AAV8), AAV serotype 9 (AAV9) and AAV serotype 10 (AAV10).

13. A vector for use according to any of Claims 1 or 5 to 12, use of a vector according to any of Claims 3, 4, 6, 8, 9, 11 or 12, or a method according to any of Claims 2, 6, 8, 9, 11 or 12, in which the vector is an engineered AAV vector, in which optionally

(i) the engineered AAV vector is an engineered AAV2 vector, preferably AAV-BR1; or

(ii) the engineered AAV vector is an engineered AAV9 vector, such as AAV-S, AAV-F, AAV-PHP.eB, AAV9-PHP-V1; or

(iii) the engineered AAV vector is an engineered AAV1 vector, such as AAV1RX, AAV1R6 or AAV1R7, or

(iv) the engineered AAV vector is an engineered AAV10 vector.

14. A vector for use according to any of Claims 1 or 5 to 13 or use of a vector according to any of Claims 3, 6, 8, 9 or 11 to 13, in which the disease or disorder of the CNS is selected from:

(i) diseases associated with amyloid-beta protein, TDP-43-proteinopathies, alpha-synucleinopathies, Tauopathies, trinucleotide repeat disorders including poly-glutamine disorders such as Huntington’s disease, brain-related cancers and tumors, epilepsy,

psychiatric diseases, neuroinflammatory diseases, neuromuscular diseases, viral-induced encephalitis and diseases characterized by microglial dysfunction; and/or

(ii) Frontotemporal dementia (FTD), amyotrophic lateral sclerosis (ALS), Alzheimer's disease (AD), Parkinson's disease (PD), Chronic Traumatic Encephalopathy (CTE), limbic-predominant age-related TDP-43 encephalopathy (LATE) and multiple sclerosis.

15. A vector for use according to any of Claims 1 or 5 to 14, use of a vector according to any of Claims 3, 4, 6, 8, 9 or 11 to 14, or a method according to any of Claims 2, 6, 8, 9 or 11 to 13, in which the antibody or antibody fragment is selected from an: anti-ErbB2, anti-TDP-43 (NI-205), anti-Abeta (such as bapineuzumab, solanezumab, lecanemab, aducanumab, donanemab, gantenerumab or crenezumab), anti-ApoE4 (Apolipoprotein E4) and anti-DDX3X (ATP-dependent RNA helicase), anti-Tau (tilavonemab, gosuranemab, zagotenemab, semorinemab, bepranemab, BIIB076, JNJ-63733657, Lu AF87908, PNT001, E-2814), anti-LINGO-1 (such as opicinumab), anti-alpha-synuclein (cinpanemab, prasinezumab, MEDI-1341, Lu AF82422, BAN0805), anti-ASC (IC-100), anti-NLRP3, anti-C5 (ravulizumab, eculizumab), anti-C1q (ANX-005), anti-C3, anti-huntingtin (C-617, NI-302), anti-prion, anti-CD20 (such as ofatumumab, ocrelizumab, rituximab, BCD-132, ublituximab, BAT-4406F, AL-014) , anti-PD-1 (IBC-Ab002) or anti-VEGF-A (bevacizumab, ranibizumab, brolucizumab, faricimab, vanucizumab).

16. A vector for use according to any of Claims 1 or 5 to 15, use of a vector according to any of Claims 3, 4, 6, 8, 9 or 11 to 15, or a method according to any of Claims 2, 6, 8, 9, 11 to 13 or 15, in which the vector is administered to the subject parenterally, optionally in which the vector is administered to the subject by intravenous injection or intravenous infusion.

17. A vector for use according to any of Claims 5 to 16, in which the expression cassette further comprises either an internal ribosomal entry site (IRES) or furin-2A cleavage site after the first gene encoding the light chain of the antibody or antibody fragment and before the second gene encoding the heavy chain of the antibody or antibody fragment, optionally in which the IRES is derived from encephalomyocarditis virus, and optionally comprises SEQ ID NO: 1 or SEQ ID NO: 8.

18. A vector for use according to any of Claims 5 to 17, in which the first gene encoding the light chain of the antibody or antibody fragment further comprises a secretion peptide and/or

the second gene encoding the heavy chain of the antibody or antibody fragment further comprises a secretion peptide.

19. A vector for use according to any of Claims 5 to 18, in which the at least one promoter and/or the first promoter and/or the second promoter is selected from a: cytomegalovirus (CMV) promoter, EF1A (Human Eukaryotic translation elongation factor 1 alpha 1), CAG (CMV early enhancer fused to modified chicken β-actin promoter), CBh (CMV early enhancer fused to modified chicken β-actin promoter), SV40 (Simian virus 40 enhancer/early promoter), GFAP (Human glial fibrillary acidic protein promoter), ATP1A2_1 (Na, K ATPase α2), CLDN_5 (Claudin 5), ADRB2_1 (Adrenoceptor beta 2), TNFRSF6B_1 (TNF receptor superfamily member 6b), PDYN_1 (prodynorphin), GH1_1 (Human growth hormone), OPALIN_1 (Opalin), SYN1_1 (Synapsin 1), CAMK2A_1 (Calcium/Calmodulin Dependent Protein Kinase II alpha), NEFH_1 (neurofilament heavy polypeptide), NEUROD6_1 (neuronal differentiation factor 6) or OLIG2_1 (oligodendrocyte transcription factor 2), a CMV early enhancer fused to either GFAP, ATP1A2_1, CLDN_5, ADRB2_1, TNFRSF6B_1, PDYN_1, GH1_1. OPALIN_1, SYN1_1, CAMK2A_1, NEFH_1, NEUROD6_1 or OLIG2_1 promoter, preferably a cytomegalovirus (CMV) promoter or CBh promoter, and in which the at least one promoter is operably linked to a sequence encoding an antibody or antibody fragment, optionally in which the at least one promoter and/or the first promoter and/or the second promoter is selected from a: ATP1A2_1 (Na, K ATPase α2), CLDN_5 (Claudin 5), ADRB2_1 (Adrenoceptor beta 2) and TNFRSF6B_1 (TNF receptor superfamily member 6b) , optionally in which the at least one promoter and/or the first promoter and/or the second promoter is operably linked to an enhancer such as a CMV early enhancer.

20. A vector for use according to any of Claims 5 to 19, in which the expression cassette comprises a sequence selected from: SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6 SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9 or SEQ ID NO: 10 or a sequence having at least 80%, 85%, 90%, 95%, 97%, 98% or 99% identity therewith.

21. A method of reducing antibody or antibody fragment aggregation, improving antibody or antibody fragment maturation and/or quality, in which the method comprises:

(i) transforming cells with an expression cassette comprising from 5’ to 3’: at least one promoter operably linked to a first gene encoding a light chain of an antibody or

antibody fragment and to a second gene encoding a heavy chain of the antibody or antibody fragment and in which the expression cassette further comprises an internal ribosomal entry site (IRES) after the first gene encoding the light chain of the antibody or antibody fragment and before the second gene encoding the heavy chain of the antibody or antibody fragment; or with an expression cassette comprising from 5' to 3': a first promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and a second promoter operably linked to a second gene encoding a heavy chain of the antibody or antibody fragment,; and

(ii) maintaining the transformed cells under conditions suitable for antibody or antibody fragment production.

22. A method of increasing antibody or antibody fragment titer, in which the method comprises:

(i) transforming cells with an expression cassette comprising from 5' to 3': at least one promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and to a second gene encoding a heavy chain of the antibody or antibody fragment and in which the expression cassette further comprises either an internal ribosomal entry site (IRES) or self (e.g. furin-2A) cleavage site after the first gene encoding the light chain of the antibody or antibody fragment and before the second gene encoding the heavy chain of the antibody or antibody fragment; or with an expression cassette comprising from 5' to 3': a first promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and a second promoter operably linked to a second gene encoding a heavy chain of the antibody or antibody fragment; and

(ii) maintaining the transformed cells under conditions suitable for antibody or antibody fragment production.

23. A method of reducing unwanted antibody or antibody fragment immunogenicity and/or adverse effects associated with antibody or antibody fragment therapy, in which the method comprises:

(i) transforming cells with an expression cassette comprising from 5' to 3': at least one promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and to a second gene encoding a heavy chain of the antibody or

antibody fragment and in which the expression cassette further comprises an internal ribosomal entry site (IRES) after the first gene encoding the light chain of the antibody or antibody fragment and before the second gene encoding the heavy chain of the antibody or antibody fragment or with an expression cassette comprising from 5' to 3': a first promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and a second promoter operably linked to a second gene encoding a heavy chain of the antibody or antibody fragment; and

(ii) maintaining the transformed cells under conditions suitable for antibody or antibody fragment production.

24. A method according to Claim 21, 22 or 23, in which the antibody or antibody fragment are free of self-cleavage elements.

25. A method according to any of Claims 21 to 24, in which the expression cassette is comprised in a vector and the method is as further defined according to the features according to any of Claims 6 to 20.

26. An antibody or antibody fragment obtained by a method according to any of Claims 21 to 25.

27. A viral vector comprising an engineered AAV2 vector, preferably AAV-BR1 or an engineered AAV9 vector, such as AAV-S, AAV-F, AAV-PHP.eB or AAV9-PHP-V1 or an engineered AAV1 vector, such as AAV1RX, AAV1R6, AAV1R7 or an engineered AAV10 vector and in which the engineered viral vector comprises an expression cassette comprising from 5' to 3':

(a) at least one promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and to a second gene encoding a heavy chain of the antibody or antibody fragment and further comprises an IRES after the first gene encoding the light chain of the antibody or antibody fragment and before the second gene encoding the heavy chain of the antibody or antibody fragment; or

(b) a first promoter operably linked to a first gene encoding a light chain of an antibody or antibody fragment and a second promoter operably linked to a second gene encoding a heavy chain of the antibody or antibody fragment;

optionally in which the engineered viral vector is AAV-BR1 or AAV9-PHP-V1.

28. A viral vector according to Claim 27, as further defined according to any of Claims 6 to 20.