Claims

1. A method of preparing an antibody suitable for use in an equine comprising the steps of:

- providing a donor antibody from a species other than an equine, wherein the donor antibody has binding specificity for a target antigen present in equines;

- comparing each amino acid residue of the amino acid sequence of framework regions of the donor antibody with each amino acid residue present at a corresponding position in the amino acid sequence of framework regions of one or more equine antibodies to identify one or more amino acid residues within the amino acid sequence of the framework regions of the donor antibody that differ from one or more amino acid residues at the corresponding position within the amino acid sequence of framework regions of the one or more equine antibodies; and

- substituting the one or more identified amino acid residues in the donor antibody with the one or more amino acid residues present at the corresponding position in the one or more equine antibodies.

2. The method as claimed in claim 1 wherein the step of substituting the one or more identified amino acid residues comprises substituting the one or more identified amino acid residues with the one or more amino acid residues present at the corresponding position which have the highest homology to the one or more substituted amino acid residues.

3. The method as claimed in claim 1 or 2 wherein the method further comprises the step of replacing constant domains of the heavy chain and/or light chain of the donor antibody with constant domains of a heavy and/or light chain derived from an equine antibody.

4. The method as claimed in claim 3 wherein the constant domain of the heavy chain is replaced with a type HC2 equine constant domain.

5. The method as claimed in any one of claims 1 to 4 wherein the target antigen is nerve growth factor (NGF).

6. A neutralising antibody or an antigen binding fragment thereof which is capable of specifically binding to equine nerve growth factor (NGF) wherein the antibody or antibody binding fragment comprises a light chain variable region comprising the amino acid sequence of SEQ ID NO:1 or an amino acid sequence which has an identity of at least 85% thereto and/or a heavy chain variable region comprising the amino acid sequence of SEQ ID NO:2 or an amino acid sequence which has an identity of at least 85% thereto.

7. The antibody or antigen binding fragment thereof as claimed in claim 6 wherein the antibody is a chimeric antibody or an equinised antibody.

8. The antibody or antigen binding fragment thereof as claimed in claim 6 or claim 7 wherein the heavy chain constant domains are selected or modified by way of amino acid substitution or deletion such that said constant domains do not mediate downstream effector functions.

9. The antibody or antigen binding fragment thereof as claimed in claim 8 wherein the heavy chain is of the equine isotype HC2 or HC6.

10. The antibody or antigen binding fragment thereof as claimed in claim 9 wherein the heavy chain is of the equine isotype HC2.

11. The antibody or antigen binding fragment thereof as claimed in any one of claims 6 to 10 wherein the light chain comprises the amino acid sequence of SEQ ID NO:4, or an amino acid sequence which has an identity of at least 85% thereto.

12. The antibody or antigen binding fragment thereof as claimed in any one of claims 6 to 11 wherein the heavy chain comprises the amino acid sequence selected from the group consisting of SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7,

SEQ ID NO:8 and SEQ ID NO:9, or an amino acid sequence which has a sequence identity of at least 85% thereto.

13. The antibody or antigen binding fragment thereof as claimed in claim 12 wherein the heavy chain comprises the amino acid sequence of SEQ ID NO:5 or SEQ ID NO:6, or an amino acid sequence which has a sequence identity of at least 85% thereto.

14. An anti-equine NGF antibody, or equine NGF binding fragment thereof, the antibody or antibody binding fragment comprising a light chain variable region comprising at least one of:

an FR1 framework region consisting or comprising of the amino acid sequence of SEQ ID NO:10,

an FR2 framework region consisting or comprising of the amino acid sequence of SEQ ID NO:11,

an FR3 framework region consisting or comprising of the amino acid sequence of SEQ ID NO:12, and

an FR4 framework region consisting or comprising of the amino acid sequence of SEQ ID NO:13,

and/or a heavy chain variable region comprising at least one of:

an FR1 framework region consisting or comprising of the amino acid sequence of SEQ ID NO:14,

an FR2 framework region consisting or comprising of the amino acid sequence of SEQ ID NO:15,

an FR3 framework region consisting or comprising of the amino acid sequence of SEQ ID NO:16, and

an FR4 framework region consisting or comprising of the amino acid sequence of SEQ ID NO:17.

15. The anti-equine NGF antibody or equine NGF binding fragment as claimed in claim 14 which comprises a light chain variable domain having an FR1 region of SEQ ID NO:10 which has been modified by one or more of the amino acid

substitutions selected from the group consisting of V, S7 is T, A9 is E, L11 is V, S12 is T or A, A13 is V, S14 is T, E17 is Q, T18 is R, T20 is E, I21 is I, L, M or V and E22 is K.

16. The anti-equine NGF antibody or equine NGF binding fragment as claimed in claim 14 which comprises a light chain variable domain having an FR1 region of SEQ ID NO:10 which has been modified by one or more of the amino acid substitutions selected from the group consisting of D1 is G, K or V, I2 is F, N, S or T, V3 is A, G, I or M, M4 is L, Q or V, T5 is A or I, S7 is F, A9 is D, P or S, S10 is F, L or T, L11 is S, S12 is E or V, A13 is L, Q or T, S14 is A or P, L15 is P or R, G16 is R, T18 is S, G or K, V19 is A, T20 is D or V, I21 is T and E22 is L, N, Q, R, S or T

17. The anti-equine NGF antibody or equine NGF binding fragment as claimed in any one of claims 14 to 16 which comprises a light chain variable domain having the FR2 region of SEQ ID NO:11 which has been modified by one or more of the amino acid substitutions selected from the group consisting of K5 is R, Q8 is E, S9 is A, K11 is R or E and L12 is R.

18. The anti-equine NGF antibody or equine NGF binding fragment as claimed in any one of claims 14 to 16 which comprises a light chain variable domain having the FR2 region of SEQ ID NO:11 which has been modified by one or more of the amino acid substitutions selected from the group consisting of Y2 is F or H, Q3 is R or S, Q4 is H, K, R or V, K5 is V, P6 is I, L or S, S9 is P, R, V or T, P10 is L, K11 is I or L, L12 is A, E, G, H, Q, or W, L13 is F, I, M or V, I14 is F, T, M or V and Y15 is A, C, D, E, F, G, H, Q, R, S, T or V.

19. The anti-equine NGF antibody or equine NGF binding fragment as claimed in any one of claims 14 to 18 which comprises a light chain variable domain having the FR3 region of SEQ ID NO:12 which has been modified by one or more of the amino acid substitutions selected from the group consisting of S4 is D, F6 is Y, D14 is E, Y15 is F, S16 is T, N20 is S, S24 is A, S29 is I, S or T and F31 is Y.

20. The anti-equine NGF antibody or equine NGF binding fragment as claimed in any one of claims 14 to 18 which comprises a light chain variable domain having the FR3 region of SEQ ID NO:12 which has been modified by one or more of the amino acid substitutions selected from the group consisting of G1 is D or F, V2 is A or F, P3 is L or S, S4 is A, E, G or L, F6 is L, S7 is C, F, G, N, R or T, G8 is A, S9 is D, E, G, K, R, T or W, G10 is A, R or V, S11 is A, F, T or Y, G12 is E or T, T13 is A, S or W, S16 is A or V, L17 is F or P, T18 is A, I, S or V, I19 is V, N20 is D, G or T, S21 is D, E, P, R or T, Q23 is E or R, S24 is E or T, E25 is A, D, G or T, D26 is N, V27 is A, L, E, G or S, A28 is G, S29 is D, E, F, L, M, N or V, Y30 is C and F31 is H, S, T, V or W.

21. The anti-equine NGF antibody or equine NGF binding fragment as claimed in any one of claims 14 to 20 which comprises a light chain variable domain having the FR4 region of SEQ ID NO:13 which has been modified by the amino acid substitution: L9 is I.

22. The anti-equine NGF antibody or equine NGF binding fragment as claimed in any one of claims 14 to 20 which comprises a light chain variable domain having the FR4 region of SEQ ID NO:13 which has been modified by one or more of the amino acid substitutions selected from the group consisting of F1 is I or L, Q3 is L, T5 is S, K6 is M, N or R, L7 is M or V, E8 is A, D or K, L9 is F, M or V and K10 is A, E, G, I, Q, R, T or V.

23. The anti-equine NGF antibody or equine NGF binding fragment as claimed in any one of claims 14 to 22 which comprises a heavy chain variable domain having the FR1 region of SEQ ID NO:14 which has been modified by the amino acid substitution N13 is K.

24. The anti-equine NGF antibody or equine NGF binding fragment as claimed in any one of claims 14 to 22 which comprises a heavy chain variable domain having the FR1 region of SEQ ID NO:14 which has been modified by one or more

of the amino acid substitutions selected from the group consisting of K5 is Q, G10 is D, L11 is Q, V12 is M, N13 is M or R, P14 is I or S, S15 is A or G, Q16 is E, T17 is A, S19 is T, T21 is S or V, T23 is A, F or S, V24 is I, S25 is T, G26 is AF27 is A, G, I, M, N Q or S, S28 is D, H, I, L, N or P, L29 is D, S, T or V and T30 is E, I, N or R.

25. The anti-equine NGF antibody or equine NGF binding fragment as claimed in any one of claims 14 to 24 which comprises a heavy chain variable domain having the FR2 region of SEQ ID NO:15 which has been modified by the amino acid substitution W12 is F.

26. The anti-equine NGF antibody or equine NGF binding fragment as claimed in any one of claims 14 to 24 which comprises a heavy chain variable domain having the FR2 region of SEQ ID NO:15 which has been modified by one or more of the amino acid substitutions selected from the group consisting of V2 is L, A5 is P, S or V, K8 is W, G9 is R, L10 is P or W, W12 is E, H, R, V or Y and G14 is A, D or S.

27. The anti-equine NGF antibody or equine NGF binding fragment as claimed in any one of claims 14 to 26 which comprises a heavy chain variable domain having the FR3 region of SEQ ID NO:16 which has been modified by one or more of the amino acid substitutions selected from the group consisting of T3 is S, R6 is K, F14 is Y, Q16 is T, M17 is L and R32 is G

28. The anti-equine NGF antibody or equine NGF binding fragment as claimed in any one of claims 14 to 26 which comprises a heavy chain variable domain having the FR3 region of SEQ ID NO:16 which has been modified by one or more of the amino acid substitutions selected from the group consisting of A2 can be C, G, I, T or V, T3 can be D, I, M N or R, I4 is V, T5 is I, L or S, R6 is E or S, D7 is E or N, T8 is A, E, I, P, S or Y, S9 is E, G, K or T, K10 is E, L, N, Q or R, S11 is G, K, N or R, Q12 is E, H or R, V13 is A, I, L, F or S, F14 is L, R,S, T or V, L15 is V, Q16 is I, M17 is V, N18 is D, K, R, S or T, S19 is D, E, G, K, M or T, L20 is M or V, T21

is S, S22 is D, E, G or R, E23 is D or G, T25 is A, A26 is S, V27 is D, Y29 is A, F, I or W, A31 is E, G, I, S, T or V and R32 is A, E, G, H, I, K or S.

29. The anti-equine NGF antibody or equine NGF binding fragment as claimed in any one of claims 14 to 28 which comprises a heavy chain variable domain having the FR4 region of SEQ ID NO:17 which has been modified by the amino acid substitution Q3 is P.

30. The anti-equine NGF antibody or equine NGF binding fragment as claimed in any one of claims 14 to 29 wherein the heavy chain is of the equine isotype HC2.

31. An antibody prepared according to the method of any one of claims 1 to 5, or a binding fragment thereof.

32. An antibody or binding fragment thereof which specifically binds to one or more equine soluble proteins wherein the antibody does not mediate downstream effector functions and wherein the antibody is purifiable by binding to Protein A.

33. The antibody or binding fragment as claimed in claim 32 wherein the antibody comprises a heavy chain having an equine HC2 isotype.

34. The antibody or binding fragment as claimed in claim 32 or 33 wherein the one or more soluble proteins is selected from the group consisting of CSF, interleukins, growth factors and neurotrophins.

35. The antibody or binding fragment as claimed in claim 34 wherein the one or more soluble proteins is NGF.

36. The antibody or binding fragment as claimed in any one of claims 6 to 35 which specifically binds to equine NGF with a binding affinity having an equilibrium dissociation constant (K_D) of $1x10^{-8}$ or less.

37. The antibody or binding fragment as claimed in any one of claims 6 to 36 wherein binding of the antibody or fragment to equine NGF inhibits the ability of equine NGF to bind to the p75 or the TrkA equine NGF receptors.

38. The antibody or binding fragment as claimed in any one of claims 6 to 37 wherein the antibody or binding fragment is not immunogenic in equines.

39. The antibody or binding fragment as claimed in any one of claims 6 to 38 wherein the antigen binding fragment is selected from the group consisting of a single chain Fv (scFv) antibody fragment, a Fab antibody fragment, a Fab' antibody fragment and a $F(ab')_2$ antibody fragment.

40. The antibody or binding fragment as claimed in any one of claims 6 to 39 wherein the antibody is a multispecific or multivalent antibody.

41. The antibody or binding fragment as claimed in any one of claims 6 to 40 wherein the antibody is a chimeric antibody or an equinised antibody.

42. A method for treating, inhibiting or ameliorating pain in an equine, the method comprising the steps of:

- providing a therapeutically effective amount of an anti-equine NGF antibody, or antigen binding fragment thereof, wherein the antibody is an equinised antibody, and
- administering the same to an equine in need thereof.

43. The method as claimed in claim 42 wherein the anti-equine NGF antibody is an antibody as claimed in any one of claims 6 to 41.

44. The method as claimed in claim 42 wherein the anti-equine NGF antibody comprises a light chain variable domain comprising the amino acid sequence of SEQ ID NO:1 or a sequence which has at least 85% identity thereto and/or a

heavy chain variable domain comprising the amino acid sequence of SEQ ID NO:2 or an amino acid sequence having at least 85% sequence homology thereto.

45. The method as claimed in claim 42 wherein the anti-equine NGF antibody comprises a light chain having the amino acid sequence of SEQ ID NO:4 or a sequence having a sequence identity of at least 85% thereto and/or a heavy chain which comprises an amino acid sequence selected from the group consisting of SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8 or SEQ ID NO:9 and an amino acid sequence having a sequence identity of at least 85% identity thereto.

46. The method as claimed in any one of claims 42 to 45 wherein the pain is selected from the group consisting of neuropathic pain, inflammatory pain, pruritic pain, peri-operative pain, post-operative pain and post-surgical pain.

47. The method as claimed in claim 46 wherein the post operative pain is selected from the group consisting of orthopaedic surgery and soft tissue surgery.

48. A method for the treatment of arthritis or an arthritic condition in an equine subject, said method comprising the steps of:

- providing a therapeutically effective amount of an anti-equine NGF antibody, or antigen binding fragment thereof, wherein the antibody is a equinised antibody, and
- administering the same to an equine in need thereof.

49. The method as claimed in claim 48 wherein the anti-equine NGF antibody is an antibody as claimed in any one of claims 6 to 41.

50. The method as claimed in claim 48 wherein the anti-equine NGF antibody comprises a light chain variable domain comprising the amino acid sequence of SEQ ID NO:1 or a sequence which has at least 85% identity thereto and/or a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO:2 or an amino acid sequence having at least 85% sequence homology thereto.

51. The method as claimed in claim 48 wherein the anti-equine NGF antibody comprises a light chain having the amino acid sequence of SEQ ID NO:4 or a sequence having a sequence identity of at least 85% thereto and/or a heavy chain which comprises, consists of or consists essentially of an amino acid sequence selected from the group consisting of SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8 or SEQ ID NO:9 and an amino acid sequence having a sequence identity of at least 85% thereto.

52. The method as claimed in any one of claims 48 to 51 wherein the arthritis or arthritic condition includes the conditions selected from the group consisting of immune mediated polyarthritis, rheumatoid arthritis and osteoarthritis.

53. The method as claimed in any one of claims 48 to 52 wherein the treatment of the arthritis or arthritic condition comprises ameliorating, inhibiting, reducing, suppressing or delaying the onset of pain associated with, or attributable to, the arthritis or arthritic condition.

54. A method for the treatment of a condition caused by, associated with or resulting in the increased expression of equine NGF or increased sensitivity to NGF in an equine subject, said method comprising the steps of:

- providing a therapeutically effective amount of an anti-equine NGF antibody, or antigen binding fragment thereof, wherein the antibody is a equinised antibody, and
- administering the same to an equine in need thereof.

55. The method as claimed in claim 54 wherein the anti-equine NGF antibody is an antibody as claimed in any one of claims 6 to 41.

56. The method as claimed in claim 54 wherein the anti-equine NGF antibody comprises a light chain variable domain comprising the amino acid sequence of SEQ ID NO:1 or a sequence which has at least 85% identity thereto and/or a

heavy chain variable domain comprising the amino acid sequence of SEQ ID NO:2 or an amino acid sequence having at least 85% sequence homology thereto.

57. The method as claimed in claim 54 wherein the anti-equine NGF antibody comprises a light chain having the amino acid sequence of SEQ ID NO:4 or a sequence having a sequence identity of at least 85% thereto and/or a heavy chain which comprises, consists of or consists essentially of an amino acid sequence selected from the group consisting of SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8 or SEQ ID NO:9 and a sequence having an amino acid identity of at least 85% identity thereto.

58. A method for the treatment of a tumour induced to proliferate by NGF in an equine and conditions associated therewith, said method comprising the steps of:

- providing a therapeutically effective amount of an anti-equine NGF antibody, or antigen binding fragment thereof, wherein the antibody is a equinised antibody, and
- administering the same to an equine in need thereof.

59. The method as claimed in claim 58 wherein the anti-equine NGF antibody is an antibody as claimed in any one of claims 6 to 41.

60. The method as claimed in claim 58 wherein the anti-equine NGF antibody comprises a light chain variable domain comprising the amino acid sequence of SEQ ID NO:1 or a sequence which has at least 85% identity thereto and/or a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO:2 or an amino acid sequence having at least 85% sequence homology thereto.

61. The method as claimed in claim 58 wherein the anti-equine NGF antibody comprises a light chain having the amino acid sequence of SEQ ID NO:4 or a sequence having a sequence identity of at least 85% thereto and/or a heavy chain which comprises, consists of or consists essentially of an amino acid sequence selected from the group consisting of SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7,

SEQ ID NO:8 or SEQ ID NO:9 and an amino acid sequence having a sequence identity of at least 85% thereto.

62. The method as claimed in any one of claims 58 to 61 wherein the tumour is induced to proliferate by autocrine or paracrine NGF.

63. The method as claimed in claim 62 wherein the tumour is an osteosarcoma.

64. The method of any one of claims 42 to 63 further comprising the step of co-administering at least one further therapeutic agent.

65. The method as claimed in claim 64 wherein the at least one therapeutic agent is selected from a group consisting of an analgesic, an NSAID, an opioid, a corticosteroid and a steroid.

66. The method as claimed in claim 64 wherein the at least one therapeutic agent is selected from a group consisting of an antibiotic, an antifungal therapeutic agent, an antiprotozoal therapeutic agent and an antiviral therapeutic agent.

67. The method as claimed in claim 64 wherein the at least one therapeutic agent is selected from the group consisting of an inhibitor of a mediator of inflammation, a PGE-receptor antagonist, an immunosuppressive agent, cyclosporine, an anti-inflammatory glucocorticoid, an agent for use in the treatment of cognitive dysfunction or cognitive impairment, an anti-hypertensive, a compound used for the treatment of cardiovascular dysfunction, a diuretic, a vasodilator, a beta-adrenergic receptor antagonist, an angiotensin-II converting enzyme inhibitor, a calcium channel blocker, a HMG-CoA reductase inhibitor, , phenylbutazone, hyaluronic acid, polysulphated glycosaminoglycan, interleukin-1 receptor antagonist, IRAP, diclofenac and disease modifying osteoarthritic drugs.

68. The method as claimed in any one of claims 42 to 67 wherein the antibody or antigen binding fragment is administered to the equine as at a dose ranging from about 0.01 mg/kg of body weight to about 10 mg/kg of body weight.

69. The method as claimed in any one of claims 42 to 67 wherein the antibody or antigen binding fragment is administered to the equine as at a dose ranging from about 0.03 mg/kg of body weight to about 3 mg/kg of body weight.

70. A pharmaceutical composition for treating pain or a condition resulting in or caused by pain in an equine, comprising a therapeutically effective amount of an anti-equine NGF equinised antibody or binding fragment thereof according to any one of claims 6 to 41 along with at least one pharmaceutically acceptable carrier, excipient or diluent.

71. The pharmaceutical composition as claimed in claim 70 further comprising at least one analgesic, NSAID, opioid, corticosteroid or steroid.

72. The pharmaceutical composition as claimed in claim 70 or 71 wherein the condition resulting in pain is selected from the group consisting of rheumatoid arthritis, inflammation, pruritis, osteoarthritis, acute pain, chronic pain, surgical pain and post-surgical pain.

73. An isolated nucleic acid that encodes an antibody or antigen binding fragment according to any one of claims 6 to 41.

74. An isolated nucleic acid which encodes the light chain variable domain of an anti-equine NGF equinised antibody or antibody fragment having the amino acid sequence of SEQ ID NO:1 or a light chain having the amino acid sequence of SEQ ID NO:4.

75. An isolated nucleic acid which encodes the heavy chain variable domain of an anti-equine NGF equinised antibody or antibody fragment having the amino

acid sequence of SEQ ID NO:2 or a heavy chain having the amino acid sequence selected from the group consisting of SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8 and SEQ ID NO:9.

76. The isolated nucleic acid as claimed in any one of claims 73 to 75 which is operably linked to one or more regulatory sequences.

77. An expression vector comprising a nucleic acid as claimed in any one of claims 73 to 75.

78. The expression vector as claimed in claim 77 further comprising one or more regulatory sequences.

79. The expression vector as claimed in claim 77 or 78 wherein the expression vector is a plasmid or a retroviral vector.

80. A host cell incorporating the expression vector as claimed in any one of claims 77 to 79.

81. A method for producing a equinised anti-equine NGF neutralising antibody, the method comprising the step of culturing a host cell as claimed in claim 80 to allow the cell to express a equinised anti-equine NGF neutralising antibody.

82. A method for treating, ameliorating or inhibiting pain in an equine, the method comprising the step of administering to the equine a therapeutically effective amount of a nucleic acid according to any of claims 73 to 75.

83. An antibody or antibody binding fragment according to any one of claims 6 to 41, a pharmaceutical composition according to any one of claims 70 to 72, a nucleic acid as claimed in any one of claims 73 to 76 or an expression vector as claimed in claims 77 to 79 for use in the treatment or prevention of pain in an equine.

84. The antibody or antibody binding fragment as claimed in claim 83 wherein the pain is selected from the group consisting of acute pain, chronic pain, peri-operative pain, post-operative pain, inflammatory pain, pruritic pain, pain resulting orthopaedic surgery, pain associated with soft tissue surgery, chronic pain associated with cancer or a cancerous condition and pain associated with or resulting from rheumatoid arthritis, immune mediated polyarthritis or osteoarthritis.

85. An antibody or antibody binding fragment according to any one of claims 6 to 41, a pharmaceutical composition according to any one of claims 70 to 72, a nucleic acid as claimed in any one of claims 73 to 76 or an expression vector as claimed in claims 77 to 79 for use in the treatment of arthritis.

86. The antibody as claimed in claim 85 wherein the arthritis is osteoarthritis, immune mediated polyarthritis or rheumatoid arthritis.

87. An antibody or antibody binding fragment according to any one of claims 6 to 41, a pharmaceutical composition according to any one of claims 70 to 72, a nucleic acid as claimed in any one of claims 73 to 76 or an expression vector as claimed in claims 77 to 79 for use in the treatment of a tumour induced to proliferate by NGF in an equine and conditions associated therewith.

88. The antibody as claimed in claim 87 wherein the tumour is an osteosarcoma.

89. Use of an antibody or antibody binding fragment according to any one of claims 6 to 41, a pharmaceutical composition according to any one of claims 70 to 72, a nucleic acid as claimed in any one of claims 73 to 76 or an expression vector as claimed in claims 77 to 79 in the preparation of a medicament for the treatment or prevention of pain in an equine.

90. Use of the antibody or antibody binding fragment as claimed in claim 89 wherein the pain is selected from the group consisting of: acute pain, chronic pain, peri-operative pain, post-operative pain, inflammatory pain, pruritic pain, pain resulting orthopaedic surgery, pain associated with soft tissue surgery, pain resulting from ovariohysterectomy procedures, chronic pain associated with cancer or a cancerous condition and pain associated with or resulting from rheumatoid arthritis, immune mediated polyarthritis or osteoarthritis.

91. Use of an antibody or antibody binding fragment according to any one of claims 6 to 41, a pharmaceutical composition according to any one of claims 70 to 72, a nucleic acid as claimed in any one of claims 73 to 76 or an expression vector as claimed in claims 77 to 79 in the preparation of a medicament for the treatment, inhibition amelioration or prevention of arthritis in an equine.

92. Use of the antibody or antibody binding fragment as claimed in claim 91 wherein the arthritis is osteoarthritis, immune mediated polyarthritis or rheumatoid arthritis.

93. Use of an antibody or antibody binding fragment according to any one of claims 6 to 41, a pharmaceutical composition according to any one of claims 70 to 72, a nucleic acid as claimed in any one of claims 73 to 76 or an expression vector as claimed in claims 77 to 79 in the preparation of a medicament for the treatment of a tumour induced to proliferate by NGF in an equine and conditions associated therewith.

94. Use of the antibody or antibody binding fragment as claimed in claim 93 wherein the tumour is an osteosarcoma.

95. A cell line or a derivative or progeny cell thereof that produces anti-equine NGF neutralising monoclonal antibodies or fragments thereof according to any one of claims 6 to 41.

96. A kit for the treatment of pain in equines, or for the treatment of a condition associated with pain, or for the treatment, amelioration or inhibition of pain associated with osteoarthritis, inflammation, pruritis, immune mediated polyarthritis or rheumatoid arthritis comprising an anti-equine NGF antibody or binding fragment according to any one of claims 6 to 41 and instructions for use of the same.

97. A diagnostic kit comprising an anti-equine NGF antibody or binding fragment according to any one of claims 6 to 41 for use in the detection of the anti-feline NGF monoclonal antibody or binding fragment.

Claims

1. A method of preparing an antibody suitable for use in an equine comprising the steps of:

- providing a donor antibody from a species other than an equine, wherein the donor antibody has binding specificity for a target antigen present in equines;

- comparing each amino acid residue of the amino acid sequence of framework regions of the donor antibody with each amino acid residue present at a corresponding position in the amino acid sequence of framework regions of one or more equine antibodies to identify one or more amino acid residues within the amino acid sequence of the framework regions of the donor antibody that differ from one or more amino acid residues at the corresponding position within the amino acid sequence of framework regions of the one or more equine antibodies; and

- substituting the one or more identified amino acid residues in the donor antibody with the one or more amino acid residues present at the corresponding position in the one or more equine antibodies to produce a modified antibody

wherein the modified antibody does not contain any amino acid in any position within the framework regions which would be foreign at the position in equines; and

wherein the modified antibody is capable of specifically binding to equine nerve growth factor (NGF) and inhibiting the ability of equine NGF to bind to the p75 or TrkA equine NGF receptor.

2. An antibody or an antigen binding fragment thereof which is capable of specifically binding to equine nerve growth factor (NGF) and inhibiting the ability of equine NGF to bind to the p75 or TrkA equine NGF receptor, wherein the antibody or antigen binding fragment comprises a light chain variable region comprising the amino acid sequence of SEQ ID NO:1 or an amino acid sequence which has an identity of at least 85% thereto and a heavy chain variable region comprising the amino acid sequence of SEQ ID NO:2 or an amino acid sequence which has an identity of at least 85% thereto; wherein the antibody or antigen binding fragment

thereof does not contain any amino acid in any position within the framework regions which would be foreign at the position in equines.

3. The antibody or antigen binding fragment thereof as claimed in claim 2, wherein the light chain comprises the amino acid sequence of SEQ ID NO:4, or an amino acid sequence which has an identity of at least 85% thereto and wherein the heavy chain comprises the amino acid sequence selected from the group consisting of SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8 and SEQ ID NO:9, or an amino acid sequence which has a sequence identity of at least 85% thereto.

4. The antibody or antigen binding fragment thereof as claimed in claim 2, wherein the light chain variable region comprises the amino acid sequence of SEQ ID NO:1 and the heavy chain variable region comprises the amino acid sequence of SEQ ID NO:2.

5. The antibody or antigen binding fragment thereof as claimed in claim 2, wherein the light chain variable region comprising the amino acid sequence of SEQ ID NO:1, or an amino acid sequence which has an identity of at least 85% thereto, further comprises the amino acid substitution S85V.

6. An antibody or an antigen binding fragment thereof which is capable of specifically binding to equine nerve growth factor (NGF) and inhibiting the ability of equine NGF to bind to the p75 or TrkA equine NGF receptor, wherein the antibody or antigen binding fragment comprises a light chain variable region comprising:

an FR1 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:10 or an amino acid sequence which has a sequence identity of at least 85% thereto,

an FR2 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:11 or an amino acid sequence which has a sequence identity of at least 85% thereto,

an FR3 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:12 or an amino acid sequence which has a sequence identity of at least 85% thereto, and

an FR4 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:13 or an amino acid sequence which has a sequence identity of at least 85% thereto,

and a heavy chain variable region comprising:

an FR1 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:14 or an amino acid sequence which has a sequence identity of at least 85% thereto,

an FR2 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:15 or an amino acid sequence which has a sequence identity of at least 85% thereto,

an FR3 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:16 or an amino acid sequence which has a sequence identity of at least 85% thereto, and

an FR4 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:17 or an amino acid sequence which has a sequence identity of at least 85% thereto;

wherein the antibody or antigen binding fragment thereof does not contain any amino acid in any position within the framework regions which would be foreign at the position in equines.

7. The antibody or antigen binding fragment thereof as claimed in claim 6, wherein the light chain variable region comprises:

an FR1 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:10,

an FR2 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:11,

an FR3 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:12 and further comprising the amino acid substitution S29V, and

an FR4 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:13,

and the heavy chain variable region comprises:

an FR1 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:14,

an FR2 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:15,

an FR3 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:16, and

an FR4 framework region consisting of or comprising the amino acid sequence of SEQ ID NO:17.

8. The antibody or antigen binding fragment thereof as claimed in claim 2 or claim 6, comprising a heavy chain constant domain selected or modified by way of amino acid substitution or deletion such that said constant domain does not mediate downstream effector functions.

9. The antibody or antigen binding fragment thereof as claimed in claim 8, wherein the heavy chain is of the equine isotype HC2 or HC6.

10. A pharmaceutical composition comprising the antibody or antigen binding fragment thereof as claimed in any one of claims 2 to 9 along with at least one pharmaceutically acceptable carrier, excipient or diluent.

11. The antibody or antigen binding fragment thereof as claimed in any one of claims 2 to 9 for use in the treatment of pain in equines, or for the treatment of a condition associated with pain, or for the treatment of a tumour induced to proliferate by NGF in an equine and conditions associated therewith.

12. A kit comprising an antibody or antigen binding fragment as claimed in any one of claims 2 to 9 and instructions for use of the same in the treatment of pain in equines, or for the treatment of a condition associated with pain, or for the

treatment of a tumour induced to proliferate by NGF in an equine and conditions associated therewith.