CLAIMS

1. A recombinant antibody or an a4-binding fragment thereof comprising the variable light chain framework sequence from IGKV4-1 and the variable heavy chain framework sequence from IGHV I -f and having each of heavy and light chain CDRs derived from murine antibody HP1/2 or from murine antibody 21.6, wherein:

(i) the variable light chain framework comprises non-human residues at one or more of framework positions 1, 67, 73 and 87 according to the Kabat numbering scheme;

(ii) the variable heavy chain framework comprises non-human residues at one or more of framework positions 67, 76, 80 and 94 according to the Kabat numbering scheme; or

(iii) both (i) and (ii).

2. The recombinant antibody or a4-binding fragment thereof of claim 1, wherein the variable light chain framework comprises non-human residues at one or more of framework positions 1, 67, 73 and 87 according to the Kabat numbering scheme.

3. The recombinant antibody or a4-binding fragment thereof of claim 1 or claim 2, wherein the variable heavy chain framework comprises non-human residues at one or more of framework positions 67, 76, 80 and 94 according to the Kabat numbering scheme.

4. The recombinant antibody or a4-binding fragment thereof of any one of claims 1 to 3, wherein the variable light chain framework comprises non-human residues at one or more of framework positions 1, 67, 73 and 87 according to the Kabat numbering scheme and the variable heavy chain framework comprises non-human residues at one or more of framework positions 67, 76, 80 and 94 according to the Kabat numbering scheme.

5. The recombinant antibody or a4-binding fragment thereof of any one of claims 1 to 4, wherein the CDRs are derived from murine antibody HP1/2.

6. The recombinant antibody or a4-binding fragment thereof of any one of claims 1 to 4, wherein the CDRs are derived from murine antibody 21.6.

7. The recombinant antibody or a4-binding fragment thereof of any one of claims 1 to 4, wherein the heavy chain variable region further comprises a non-human residue at framework position 24 according to the Kabat numbering scheme.

8. The recombinant antibody or a4-binding fragment thereof of claim 7, wherein the heavy chain variable region comprises non-human residues at framework positions 24 and 94 according to the Kabat numbering scheme.

9. The recombinant antibody or a4-binding fragment thereof of claim 8, wherein the heavy chain variable region comprises non-human residues at framework positions 24, 67, 76, 80 and 94 according to the Kabat numbering scheme.

10. The recombinant antibody or a4-binding fragment thereof of claim 1, wherein the light chain variable region comprises non-human residues at one or more of framework positions 1 and 87 according to the Kabat numbering scheme.

11. The recombinant antibody or a4-binding fragment thereof of claim 1, wherein the light chain variable region comprises non-human residues at one or more of framework positions 1, 67 and 87 according to the Kabat numbering scheme.

12. The recombinant antibody or a4-binding fragment thereof of claim 1, wherein the light chain variable region comprises non-human residues at one or more of framework positions 1, 73 and 87 according to the Kabat numbering scheme.

13. The recombinant antibody or a4-binding fragment thereof of claim 8, wherein the light chain variable region comprises non-human residues at framework positions 1 and 87 according to the Kabat numbering scheme, and wherein the heavy chain variable region comprises nonhuman residues at framework positions 24 and 94 according to the Kabat numbering scheme.

14. The recombinant antibody or a4-binding fragment thereof of claim 8, wherein the light chain variable region comprises non-human residues at framework positions 1, 67 and 87 according to the Kabat numbering scheme, and wherein the heavy chain variable region comprises non-human residues at framework positions 24 and 94 according to the Kabat numbering scheme.

15. The recombinant antibody or a4-binding fragment thereof of claim 1, wherein the heavy chain variable region comprises the sequence of SEQ ID NOs:4 or 5.

16. The recombinant antibody or a4-binding fragment thereof of claim 2, wherein the heavy chain variable region comprises the sequence of SEQ ID NO:3.

17. The recombinant antibody or a4-binding fragment thereof of claim 1, wherein the light chain variable region comprises the sequence of SEQ ID NOs:9 or 10,

18. The recombinant antibody or a4-binding fragment thereof of claim 3, wherein the light chain variable region comprises the sequence of SEQ ID NO:8.

19. The recombinant antibody or a4-binding fragment thereof of any one of claims 1 to 4, wherein the recombinant antibody or a4-binding fragment thereof binds VLA-4.

20. A vector comprising DNA encoding an antibody heavy chain or an a4-binding fragment thereof comprising the variable heavy chain framework sequence from IGHV1-f and having heavy chain CDRs derived from murine antibody HP1/2 or from murine antibody 21.6, wherein the variable heavy chain framework comprises non-human residues at one or more of framework positions 67, 76, 80 and 94 according to the Kabat numbering scheme.

21. The vector of claim 20 comprising the sequences of SEQ ID NOs:4 or 5.

22. A vector comprising DNA encoding an antibody light chain or an a4-binding fragment thereof comprising the variable light chain framework sequence from IGKV4-land having light chain CDRs derived from murine antibody HP1/2 or from murine antibody 21,6, wherein the variable light chain framework comprises non-human residues at one or more of framework positions 1, 67, 73 and 87 according to the Kabat numbering scheme.

23. The vector of claims 22 comprising SEQ ID NOs:9 or 10.

24. A method of making a recombinant anti-a4 antibody or an a4-binding fragment thereof, said method comprising:

(a) providing a host cell comprising a DNA sequence encoding an antibody heavy chain or an a4-binding fragment thereof, wherein the DNA sequence comprises the sequence of the variable heavy chain framework sequence from IGHV1-f and having heavy chain CDRs derived from murine antibody HP1/2 or from murine antibody 21.6, and a DNA sequence encoding an antibody light chain or an a4-binding fragment thereof, wherein the DNA sequence comprises the sequence of the variable light chain framework sequence from IGKV4-land having light chain CDRs derived from murine antibody HP1/2 or from murine antibody 21.6, wherein:

(i) the variable light chain framework comprises non-human residues at one or more of framework positions 1, 67, 73 and 87 according to the Kabat numbering scheme;

(ii) the variable heavy chain framework comprises non-human residues at one or more of framework positions 67, 76, 80 and 94 according to the Kabat numbering scheme; or

(iii) both (i) and (ii); and

(b) culturing the cell to produce the recombinant anti-a4 antibody or the a4-binding fragment thereof.

25. Use of the recombinant antibody or a4-binding fragment thereof of any one of claims 1 to 19 in the manufacture of a medicament for treating a patient.

26. The use of claim 25, wherein the patient has a cancer.

27. The use of claim 26, wherein the cancer is a solid tumor, a hematological malignancy, a multiple myeloma or acute myelogenous leukemia (AML).

28. The use of claim 25, wherein the patient has an inflammatory disorder.

29. The use of claim 25, wherein the patient has multiple sclerosis, asthma, rheumatoid arthritis, diabetes, optic neuritis or Crohn's disease.

30. The use of claim 25, wherein the patient has an acute disorder.

31. The use of claim 25, wherein the patient has a spinal cord injury or traumatic brain injury.

32. The use of any one of claims 25 to 31, wherein the medicament further comprises a second therapeutic agent.

33. The use of claim 32, wherein the second therapeutic agent is a thrombolytic agent, a chemotherapeutic agent, a neuroprotective agent, an anti-inflammatory agent, a steroid, a cytokine or a growth factor.