CLAIMS

1. An antibody or antibody fragment capable of specifically binding to a human CD73 polypeptide, wherein the antibody or antibody fragment comprises a heavy chain variable region (VH) comprising the amino acid sequence of SEQ ID NO: 42 (2H4+ chain), and a light chain variable region (VL) comprising an amino acid sequence selected from the group consisting of SEQ ID NOS: 43 (2L1 chain), 44 (2L2 chain), 45 (2L3 chain) and 46 (2L4 chain).

2. The antibody or antibody fragment of claim 1, wherein the antibody or antibody fragment comprises a heavy chain variable region (VH) comprising the amino acid sequence of SEQ ID NO: 42 (2H4+ chain), and a light chain variable region (VL) comprising the amino acid sequence of SEQ ID NO: 43 (2L1 chain).

3. The antibody or antibody fragment of claim 1, wherein the antibody or antibody fragment comprises a heavy chain comprising the amino acid sequence of SEQ ID NO: 47, and a light chain comprising the amino acid sequence of SEQ ID NO: 48.

4. An antibody or antibody fragment capable of specifically binding a human CD73 polypeptide, wherein the antibody or antibody fragment comprises a heavy chain variable region (VH) comprising the amino acid sequence of SEQ ID NO: 37 (H4+ chain), and a light chain variable region (VL) comprising an amino acid sequence selected from the group consisting of SEQ ID NOS: 33 (L1 chain), 34 (L2 chain), 35 (L3 chain) and 36 (L4 chain).

5. The antibody or antibody fragment of claim 4, wherein the antibody or antibody fragment comprises a heavy chain variable region (VH) comprising the amino acid sequence of SEQ ID NO: 37 (H4+ chain), and a light chain variable region (VL) comprising the amino acid sequence of SEQ ID NO: 33 (L1 chain).

6. The antibody or antibody fragment of claim 4, wherein the antibody or antibody fragment comprises a heavy chain comprising the amino acid sequence of SEQ ID NO: 38 and a light chain comprising the amino acid sequence of SEQ ID NO: 39.

7. The antibody or antibody fragment of any of the above claims, wherein the antibody or antibody fragment is capable of neutralizing the 5'-ectonucleotidase activity of a CD73 polypeptide.

8. An antibody or antibody fragment that is capable of specifically binding a human CD73 polypeptide at the surface of a cell and neutralizing the 5'-ectonucleotidase activity of the cell surface CD73 polypeptide, wherein the antibody or antibody fragment comprises a heavy chain variable region (VH) comprising an amino acid sequence at least 95% identical to the amino acid sequence of SEQ ID NOS: 42, and a light chain variable

region (VL) comprising an amino acid sequence at least 95% identical to an amino acid sequence selected from the group consisting of SEQ ID NOS: 43.

9. An antibody or antibody fragment that is capable of specifically binding a human CD73 polypeptide at the surface of a cell and neutralizing the 5'-ectonucleotidase activity of the cell surface CD73 polypeptide, wherein the antibody or antibody fragment comprises a heavy chain comprising an amino acid sequence at least 95% identical to the amino acid sequence of SEQ ID NOS: 47, and a light chain comprising an amino acid sequence at least 95%identical to an amino acid sequence selected from the group consisting of SEQ ID NOS: 48.

10. The antibody or antibody fragment of claims 8 or 9, wherein the VH comprises a CDR1, CDR2 and CDR3 having the respective amino acid sequences shown in SEQ ID NOS: 2, 3 and 4; and a the VL comprises a CDR1, CDR2 and CDR3 having the respective amino acid sequences shown in SEQ ID NOS: 5, 6 and 7.

11. The antibody or antibody fragment of any one of claims 8 to 10, wherein the VH comprises framework FR1, FR2 and FR3 amino acid sequences from the human IGHV1-3 gene and the VL comprises framework FR1, FR2 and FR3 amino acid sequences from the human IGKV1-33 gene.

12. The antibody or antibody fragment of any one of claims 8-11, wherein the VH comprises a CDR1, CDR2 and CDR3 having the respective amino acid sequences shown in SEQ ID NOS: 2, 8 and 9; and a the VL comprises a CDR1, CDR2 and CDR3 having the respective amino acid sequences shown in SEQ ID NOS: 10, 11 and 7.

13. The antibody or antibody fragment of claim 12, wherein the antibody or antibody fragment comprises a heavy chain variable region (VH) comprising an amino acid sequence at least 90%, 95%, 97%, 98% or 99% identical to the amino acid sequence of SEQ ID NOS: 37, and a light chain variable region (VL) comprising an amino acid sequence at least 90%, 95%, 97%, 98% or 99% identical to an amino acid sequence selected from the group consisting of SEQ ID NOS: 33.

14. The antibody or antibody fragment of claim 12, wherein the antibody or antibody fragment comprises a heavy chain comprising an amino acid sequence at least 90%, 95%, 97%, 98% or 99% identical to the amino acid sequence of SEQ ID NOS: 38, and a light chain comprising an amino acid sequence at least 90%, 95%, 97%, 98% or 99% identical to an amino acid sequence selected from the group consisting of SEQ ID NOS: 39.

15. The antibody or antibody fragment of any one of claims 8-11, wherein the VH comprises a CDR1, CDR2 and CDR3 having the respective amino acid sequences shown in SEQ ID NOS: 2, 12 and 13; and a the VL comprises a CDR1, CDR2 and CDR3 having the respective amino acid sequences shown in SEQ ID NOS: 14, 15 and 7.

16. The antibody or antibody fragment of claim 15, wherein the antibody or antibody fragment comprises a heavy chain variable region (VH) comprising an amino acid sequence at least 90%, 95%, 97%, 98% or 99% identical to the amino acid sequence of SEQ ID NOS: 42, and a light chain variable region (VL) comprising an amino acid sequence at least 90%, 95%, 97%, 98% or 99% identical to an amino acid sequence selected from the group consisting of SEQ ID NOS: 43.

17. The antibody or antibody fragment of claim 15, wherein the antibody or antibody fragment comprises a heavy chain comprising an amino acid sequence at least 90%, 95%, 97%, 98% or 99% identical to the amino acid sequence of SEQ ID NOS: 47, and a light chain comprising an amino acid sequence at least 90%, 95%, 97%, 98% or 99% identical to an amino acid sequence selected from the group consisting of SEQ ID NOS: 48.

18. The antibody or antibody fragment of any one of the above claims, wherein: the amino acid at Kabat heavy chain position 2 is an isoleucine.

19. The antibody or antibody fragment of any one of the above claims, wherein the amino acid at Kabat heavy chain position 30 is an alanine.

20. The antibody or antibody fragment of any one of the above claims, wherein the amino acid at Kabat heavy chain position 48 is an isoleucine.

21. The antibody or antibody fragment of any one of the above claims, wherein the amino acid at Kabat heavy chain position 69 is a leucine.

22. The antibody or antibody fragment of any one of the above claims, wherein the amino acid at Kabat heavy chain position 73 is a lysine.

23. The antibody or antibody fragment of any one of the above claims, wherein the heavy chain comprises an isoleucine residue at Kabat position 2, an alanine at position 30, an isoleucine at position 48, a leucine at position 69 and a lysine at position 73.

24. The antibody or antibody fragment of any one of the above claims, wherein amino acid at Kabat light chain position 67 is a tyrosine.

25. The antibody or antibody fragment of any one of the above claims, wherein the amino acid at Kabat light chain position 60 is serine or aspartic acid.

26. The antibody or antibody fragment of any one of the above claims, wherein the amino acid at Kabat light chain position 2 is valine or isoleucine.

27. The antibody or antibody fragment of any one of the above claims, wherein the amino acid at Kabat light chain position 87 is tyrosine or phenylalanine.

28. The antibody or antibody fragment of any one of the above claims, wherein the light chain comprises a tyrosine residue at Kabat position 67, a serine at position 60, an isoleucine at position 2, and a tyrosine at position 87.

29. The antibody or antibody fragment of any one of the above claims, wherein the amino acid at Kabat heavy chain position 28 is threonine (T), the amino acid at Kabat heavy chain position 66 is arginine (R), the amino acid at Kabat heavy chain position 67 is valine (V), and the amino acid at Kabat heavy chain position 71 is arginine (R).

30. The antibody or antibody fragment of any of the above claims, wherein the antibody or antibody fragment specifically binds to a human CD73 polypeptide at the surface of a cell and that is capable of neutralizing the 5'-ectonucleotidase activity thereof, wherein the antibody or antibody fragment inhibits the activity of the human CD73 polypeptide without detectably reducing binding between the CD73 polypeptide and a substrate thereof.

31. The antibody or antibody fragment of any one of the above claims wherein the antibody or antibody fragment has reduced binding to a mutant CD73 polypeptide comprising the mutation K136A and/or the mutations A99S, E129A, K133A, E134N, and A135S (with reference to SEQ ID NO: 1), relative to binding between the antibody or antibody fragment and a wild-type CD73 polypeptide comprising the amino acid sequence of SEQ ID NO: 1.

32. The antibody or antibody fragment of any one of the above claims, wherein the antibody or antibody fragment comprises an Fc domain of human origin that is modified to reduce binding between the Fc domain and a human Fcγ receptor.

33. The antibody or antibody fragment of any one of the above claims, wherein the antibody or antibody fragment comprises a human IgG1 Fc domain comprising amino acid substitutions at residues 234, 235 and 331 or comprising amino acid substitutions at residues 234, 235 and 322 (EU numbering according to Kabat).

34. The antibody of any of the above claims, wherein the antibody is a full-length antibody.

35. The antibody or antibody fragment of any of the above claims, wherein the antibody is an antibody fragment.

36. A pharmaceutical composition comprising an antibody or antibody fragment according to any one of the above claims, and a pharmaceutically acceptable carrier.

37. A kit comprising the antibody or antibody fragment of any one of the above claims, optionally further comprising a labeled secondary antibody that specifically recognizes the antibody or antibody fragment of any one of the above claims.

38. A nucleic acid or set of nucleic acids encoding a heavy and/or light chain of an antibody or antibody fragment of any one of claims 1 to 35.

39. A recombinant host cell producing the antibody or antibody fragment of any one of claims 1 to 35.

40. A method for the treatment or prevention of a disease in a patient in need thereof, the method comprising administering to said patient an effective amount of an antibody, antibody fragment or a composition of any one of claims 1-36.

41. The method of claim 40, wherein said disease is cancer or infectious disease.

42. The method of any one of claims 40 or 41, wherein the disease or cancer is a leukemia, bladder cancer, glioma, glioblastoma, ovarian cancer, melanoma, prostate cancer, thyroid cancer, stomach cancer, esophageal cancer, pancreatic cancer or a breast cancer.

CLAIMS

1. An antibody or antibody fragment capable of specifically binding to a human CD73 polypeptide, in which the antibody or antibody fragment comprises a heavy chain variable region (VH) comprising the amino acid sequence of SEQ ID NO: 42 (2H4+ chain), and a light chain variable region (VL) comprising an amino acid sequence selected from the group consisting of SEQ ID NOS: 43 (2L1 chain), 44 (2L2 chain), 45 (2L3 chain) and 46 (2L4 chain).

2. An antibody or antibody fragment according to Claim 1, in which the antibody or antibody fragment comprises a heavy chain variable region (VH) comprising the amino acid sequence of SEQ ID NO: 42 (2H4+ chain) and a light chain variable region (VL) comprising the amino acid sequence of SEQ ID NO: 43 (2L1 chain).

3. An antibody or antibody fragment according to Claim 1, in which the antibody or antibody fragment comprises a heavy chain comprising the amino acid sequence of SEQ ID NO: 47 and a light chain comprising the amino acid sequence of SEQ ID NO: 48.

4. An antibody or antibody fragment according to any preceding claim, in which the antibody or antibody fragment is capable of neutralizing the 5'-ectonucleotidase activity of a CD73 polypeptide.

5. An antibody or antibody fragment according to any preceding claim, in which the antibody or antibody fragment comprises a heavy chain comprising an amino acid sequence at least 95% identical to the amino acid sequence of SEQ ID No: 47 and a light chain comprising an amino acid sequence at least 95% identical to the amino acid sequence of SEQ ID No: 48.

6. An antibody or antibody fragment according to any preceding claim, in which the antibody or antibody fragment specifically binds to a human CD73 polypeptide at the surface of a cell and that is capable of neutralizing the 5'-ectonucleotidase activity thereof, in which the antibody or antibody fragment inhibits the activity of the human CD73 polypeptide without detectably reducing binding between the CD73 polypeptide and a substrate thereof.

7. An antibody or antibody fragment according to any preceding claim, in which the antibody or antibody fragment has reduced binding to a mutant CD73 polypeptide comprising the mutation K136A and/or the mutations A99S, E129A, K133A, E134N, and A135S (with

reference to SEQ ID NO: 1), relative to binding between the antibody or antibody fragment and a wild-type CD73 polypeptide comprising the amino acid sequence of SEQ ID NO: 1.

8. An antibody or antibody fragment according to any preceding claim, in which the antibody or antibody fragment comprises an Fc domain of human origin that is modified to reduce binding between the Fc domain and a human Fcγ receptor.

9. An antibody or antibody fragment according to any preceding claim, in which the antibody or antibody fragment comprises a human IgG1 Fc domain comprising amino acid substitutions at residues 234, 235 and 331 or comprising amino acid substitutions at residues 234, 235 and 322 (EU numbering according to Kabat).

10. An antibody or antibody fragment according to any preceding claim, which is a full-length antibody.

11. An antibody or antibody fragment according to any preceding claim, which is an antibody fragment.

12. A pharmaceutical composition comprising an antibody or antibody fragment according to any preceding claim and a pharmaceutically acceptable carrier.

13. A kit comprising an antibody or antibody fragment according to any of Claims 1 to 11, optionally further comprising a labeled secondary antibody that specifically recognizes the antibody or antibody fragment according to any preceding claim.

14. A nucleic acid or set of nucleic acids encoding a heavy and light chain of an antibody or antibody fragment according to any of Claims 1 to 11.

15. A recombinant host cell producing an antibody or antibody fragment according to any of Claims 1 to 11.

16. An antibody or antibody fragment according to any of Claims 1 to 11 for use in the treatment or prevention of a disease in a patient.

17. An antibody or antibody fragment for use according to Claim 16, in which the disease is cancer or infectious disease.

18. Use of an antibody or antibody fragment according to any of Claims 1 to 11 in the preparation of a medicament for the treatment or prevention of cancer or infectious disease.

19. An antibody or antibody fragment for use according to Claim 17 or use according to Claim 18, in which the cancer is a leukemia, bladder cancer, glioma, glioblastoma, ovarian cancer, melanoma, prostate cancer, thyroid cancer, stomach cancer, esophageal cancer, pancreatic cancer or a breast cancer.