

WHAT IS CLAIMED IS:

1. An antibody that binds to human CD73, wherein the antibody comprises a variable heavy (VH) domain comprising VH complementarity determining region (CDR)1, VH CDR2, and VH CDR3, wherein:
the VH CDR1 comprises the amino acid sequence GYTFTSYG (SEQ ID NO:1);
the VH CDR2 comprises the amino acid sequence IYPGSGNT (SEQ ID NO:2); and
the VH CDR3 comprises the amino acid sequence ARYDYLGSSYGFDY (SEQ ID NO:3);
and
wherein the antibody comprises a variable light (VL) domain comprising VL CDR1, VL CDR2, and VL CDR3, wherein:
the VL CDR1 comprises the amino acid sequence QDVSTA (SEQ ID NO:4);
the VL CDR2 comprises the amino acid sequence SAS (SEQ ID NO:5); and
the VL CDR3 comprises the amino acid sequence QQHYNTPYT (SEQ ID NO:6).
2. The antibody of claim 1, wherein the VH domain comprises the amino acid sequence set forth in SEQ ID NO:22.
3. The antibody of claim 1, wherein the antibody comprises a heavy chain and wherein the heavy chain comprises the amino acid sequence set forth in SEQ ID NO:24.
4. The antibody of claim 1, wherein the VL domain comprises the amino acid sequence set forth in SEQ ID NO:23.
5. The antibody of claim 1, wherein the antibody comprises a light chain and wherein the light chain comprises the amino acid sequence set forth in SEQ ID NO:25.
6. The antibody of claim 1, wherein the VH domain is at least 80% identical to the amino acid sequence set forth in SEQ ID NO:22 and the VL domain is at least 80% identical to the amino acid sequence set forth in SEQ ID NO:23.
7. The antibody of claim 1, wherein the VH domain comprises the amino acid sequence set forth in SEQ ID NO:22 and the VL domain comprises the amino acid sequence set forth in SEQ ID NO:23.

8. The antibody of claim 1, wherein the antibody comprises a heavy chain and a light chain, and wherein the heavy chain comprises the amino acid sequence set forth in SEQ ID NO:24 and the light chain comprises the amino acid sequence set forth in SEQ ID NO:25.
9. An antibody that binds to human CD73, wherein the antibody binds to human CD73 at an epitope within amino acids 40-53 of SEQ ID NO:70.
10. An antibody that binds to human CD73 and competes for binding to human CD73 with an antibody that has a heavy chain comprising the amino acid sequence of SEQ ID NO:24 and a light chain comprising the amino acid sequence of SEQ ID NO:25.
11. The antibody of claim 1, 9, or 10, which is a humanized antibody.
12. The antibody of any one of claims 1 to 10, wherein the antibody is a bispecific antibody, single chain antibody, an Fab fragment, an F(ab')₂ fragment, an Fab' fragment, an Fsc fragment, an Fv fragment, an scFv, an sc(Fv)₂, or a diabody.
13. A nucleic acid or nucleic acids encoding the antibody of any one of claims 1 to 12.
14. An expression vector or expression vectors comprising the nucleic acid or nucleic acids of claim 13 operably linked to a promoter.
15. An isolated cell comprising the nucleic acid or nucleic acids of claim 13 or the expression vector or expression vectors of claim 14.
16. An isolated cell comprising a first expression vector comprising a first nucleic acid encoding a first polypeptide comprising the VH domain of the antibody of any one of claims 1 to 12 operably linked to a promoter, and a second expression vector comprising a second nucleic acid encoding a second polypeptide comprising the VL domain of the antibody of any one of claims 1 to 12 operably linked to a promoter.
17. An isolated cell that produces the antibody of any one of claims 1 to 12.

18. A method of making the antibody of any one of claims 1 to 12, comprising culturing the cell of claim 15 or 16 and isolating the antibody.
19. A pharmaceutical composition comprising the antibody of any one of claims 1 to 12 and a pharmaceutically acceptable carrier.
20. A method for treating a cancer in a human subject in need thereof, comprising administering to the human subject an effective amount of the antibody of any one of claims 1 to 12.
21. The method of claim 20, wherein the cancer has a high adenosine signature.
22. The method of claim 20 or 21, wherein the cancer is head and neck cancer, colorectal cancer, lung cancer, melanoma, ovarian, bladder, liver cancer, or renal cell carcinoma.
23. An antibody that binds to human CD73, wherein the antibody comprises a variable heavy (VH) domain comprising VH complementarity determining region (CDR)1, VH CDR2, and VH CDR3, wherein:
the VH CDR1 comprises the amino acid sequence GFTFSSYD (SEQ ID NO:34);
the VH CDR2 comprises the amino acid sequence MSYDGSNK (SEQ ID NO:35) or MSYEGSNK (SEQ ID NO:40); and
the VH CDR3 comprises the amino acid sequence ATEIAAKGDY (SEQ ID NO:36); and
wherein the antibody comprises a variable light (VL) domain comprising VL CDR1, VL CDR2, and VL CDR3, wherein:
the VL CDR1 comprises the amino acid sequence QGISNY (SEQ ID NO:37);
the VL CDR2 comprises the amino acid sequence AAS (SEQ ID NO:38); and
the VL CDR3 comprises the amino acid sequence QQSYSTPH (SEQ ID NO:39).
24. The antibody of claim 23, wherein:
the VH CDR1 comprises the amino acid sequence GFTFSSYD (SEQ ID NO:34);
the VH CDR2 comprises the amino acid sequence MSYDGSNK (SEQ ID NO:35);
the VH CDR3 comprises the amino acid sequence ATEIAAKGDY (SEQ ID NO:36);
the VL CDR1 comprises the amino acid sequence QGISNY (SEQ ID NO:37);
the VL CDR2 comprises the amino acid sequence AAS (SEQ ID NO:38); and

the VL CDR3 comprises the amino acid sequence QQSYSTPH (SEQ ID NO:39).

25. The antibody of claim 24, wherein the VH domain comprises the amino acid sequence set forth in SEQ ID NO:62.

26. The antibody of claim 24, wherein the antibody comprises a heavy chain and wherein the heavy chain comprises the amino acid sequence set forth in SEQ ID NO:30.

27. The antibody of claim 24, wherein the VL domain comprises the amino acid sequence set forth in SEQ ID NO:61.

28. The antibody of claim 24, wherein the antibody comprises a light chain and wherein the light chain comprises the amino acid sequence set forth in SEQ ID NO:31.

29. The antibody of claim 24, wherein the VH domain is at least 80% identical to the amino acid sequence set forth in SEQ ID NO:62 and the VL domain is at least 80% identical to the amino acid sequence set forth in SEQ ID NO:61.

30. The antibody of claim 24, wherein the VH domain comprises the amino acid sequence set forth in SEQ ID NO:62 and the VL domain comprises the amino acid sequence set forth in SEQ ID NO:61.

31. The antibody of claim 24, wherein the antibody comprises a heavy chain and a light chain, and wherein the heavy chain comprises the amino acid sequence set forth in SEQ ID NO:30 and the light chain comprises the amino acid sequence set forth in SEQ ID NO:31.

32. The antibody of claim 23, wherein:
the VH CDR1 comprises the amino acid sequence GFTFSSYD (SEQ ID NO:34);
the VH CDR2 comprises the amino acid sequence MSYEGSNK (SEQ ID NO:40);
the VH CDR3 comprises the amino acid sequence ATEIAAKGDY (SEQ ID NO:36);
the VL CDR1 comprises the amino acid sequence QGISNY (SEQ ID NO:37);
the VL CDR2 comprises the amino acid sequence AAS (SEQ ID NO:38); and
the VL CDR3 comprises the amino acid sequence QQSYSTPH (SEQ ID NO:39).

33. The antibody of claim 32, wherein the VH domain comprises the amino acid sequence set forth in SEQ ID NO:63.
34. The antibody of claim 32, wherein the antibody comprises a heavy chain and wherein the heavy chain comprises the amino acid sequence set forth in SEQ ID NO:33.
35. The antibody of claim 32, wherein the VL domain comprises the amino acid sequence set forth in SEQ ID NO:61.
36. The antibody of claim 32, wherein the antibody comprises a light chain and wherein the light chain comprises the amino acid sequence set forth in SEQ ID NO:31.
37. The antibody of claim 32, wherein the VH domain is at least 80% identical to the amino acid sequence set forth in SEQ ID NO:63 and the VL domain is at least 80% identical to the amino acid sequence set forth in SEQ ID NO:61.
38. The antibody of claim 32, wherein the VH domain comprises the amino acid sequence set forth in SEQ ID NO:63 and the VL domain comprises the amino acid sequence set forth in SEQ ID NO:61.
39. The antibody of claim 32, wherein the antibody comprises a heavy chain and a light chain, and wherein the heavy chain comprises the amino acid sequence set forth in SEQ ID NO:33 and the light chain comprises the amino acid sequence set forth in SEQ ID NO:31.
40. An antibody that binds to human CD73, wherein the antibody binds to human CD73 at an epitope within amino acids 386-399 and 470-489 of SEQ ID NO:70.
41. An antibody that binds to human CD73 and competes for binding to human CD73 with an antibody that has a heavy chain comprising the amino acid sequence of SEQ ID NO:30 and a light chain comprising the amino acid sequence of SEQ ID NO:31.
42. An antibody that binds to human CD73 and competes for binding to human CD73 with an antibody that has a heavy chain comprising the amino acid sequence of SEQ ID NO:33 and a light chain comprising the amino acid sequence of SEQ ID NO:31.

43. The antibody of claim 23, 32, 40, 41 or 42, which is a humanized antibody.
44. The antibody of any one of claims 23 to 42, wherein the antibody is a bispecific antibody, single chain antibody, an Fab fragment, an F(ab')₂ fragment, an Fab' fragment, an Fsc fragment, an Fv fragment, an scFv, an sc(Fv)₂, or a diabody.
45. A nucleic acid or nucleic acids encoding the antibody thereof of any one of claims 23 to 44.
46. An expression vector or expression vectors comprising the nucleic acid or nucleic acids of claim 45 operably linked to a promoter.
47. An isolated cell comprising the nucleic acid or nucleic acids of claim 45 or the expression vector or expression vectors of claim 46.
48. An isolated cell comprising a first expression vector comprising a first nucleic acid encoding a first polypeptide comprising the VH domain of the antibody of any one of claims 23 to 44 operably linked to a promoter, and a second expression vector comprising a second nucleic acid encoding a second polypeptide comprising the VL domain of the antibody of any one of claims 23 to 44 operably linked to a promoter.
49. An isolated cell that produces the antibody of any one of claims 23 to 44.
50. A method of making the antibody of any one of claims 23 to 44, comprising culturing the cell of claim 47 or 48 and isolating the antibody.
51. A pharmaceutical composition comprising the antibody of any one of claims 23 to 44 and a pharmaceutically acceptable carrier.
52. A method for treating a cancer in a human subject in need thereof, comprising administering to the human subject an effective amount of the antibody of any one of claims 23 to 44.
53. The method of claim 52, wherein the cancer has a high adenosine signature.

54. The method of claim 52 or 53, wherein the cancer is head and neck cancer, colorectal cancer, lung cancer, melanoma, ovarian, bladder, liver cancer, or renal cell carcinoma.