We claim:

1. An anti-B7-H4 antibody, or antigen-binding fragment thereof, wherein the antibody, or antigen-binding fragment thereof, comprises a heavy chain variable region and a light chain variable region, wherein each of the heavy chain and the light chain variable regions comprise a CDR1, CDR2, and CDR3, and wherein:
    a. CDR1H comprises SEQ ID NO:16, CDR2H comprises SEQ ID NO:17, CDR3H comprises SEQ ID NO:18, and wherein:
        i. CDR1L comprises SEQ ID NO:20, CDR2L comprises SEQ ID NO:21, and CDR3L comprises SEQ ID NO:22; or
        ii. CDR1L comprises SEQ ID NO:66, CDR2L comprises SEQ ID NO:67, and CDR3L comprises SEQ ID NO:68; or
        iii. CDR1L comprises SEQ ID NO:70, CDR2L comprises SEQ ID NO:71, and CDR3L comprises SEQ ID NO:72; or
    b. CDR1H comprises SEQ ID NO:4, CDR2H comprises SEQ ID NO:5, CDR3H comprises SEQ ID NO:6, and wherein:
        i. CDR1L comprises SEQ ID NO: 8, CDR2L comprises SEQ ID NO: 9, and CDR3L comprises SEQ ID NO: 10;
        ii. CDR1L comprises SEQ ID NO: 77, CDR2L comprises SEQ ID NO: 78, and CDR3L comprises SEQ ID NO: 79; or
        iii. CDR1L comprises SEQ ID NO: 81, CDR2L comprises SEQ ID NO:82, and CDR3L comprises SEQ ID NO:83.

2. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of claim 1, wherein:
    (a) the heavy chain variable region comprises SEQ ID NO: 15, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO: 15; and wherein
        i. the light chain variable region comprises SEQ ID NO: x, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO: 19;

ii. the light chain variable region comprises SEQ ID NO: 65, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO: 65; or

iii. the light chain variable region comprises SEQ ID NO: 69, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO: 69; or

(b) the heavy chain variable region comprises SEQ ID NO: 3, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO: 3; and wherein:

i. the light chain variable region comprises SEQ ID NO: 7, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO: 7;

ii. the light chain variable region comprises SEQ ID NO: 76, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO: 76; or

iii. the light chain variable region comprises SEQ ID NO: 80, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO: 80.

3. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of claim 2, wherein:

(a) the heavy chain variable region comprises SEQ ID NO: 15 and wherein:

i. the light chain variable region comprises SEQ ID NO: 19;

ii. the light chain variable region comprises SEQ ID NO: 65; or

iii. the light chain variable region comprises SEQ ID NO: 69; or

(b) the heavy chain variable region comprises SEQ ID NO: 3 and wherein:

i. the light chain variable region comprises SEQ ID NO: 7;

ii. the light chain variable region comprises SEQ ID NO: 76; or

iii. the light chain variable region comprises SEQ ID NO: 80.

4. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of the preceding claims, wherein the antibody, or antigen-binding fragment thereof, binds to the IgV domain of human hB7-H4.

5. An anti-B7-H4 antibody, or antigen-binding fragment thereof, wherein the antibody, or antigen-binding fragment thereof, comprises a heavy chain variable region and a light chain variable region, wherein each of the heavy chain and the light chain variable regions comprise a CDR1, CDR2, and CDR3, and wherein CDR1H comprises SEQ ID NO:46, CDR2H comprises SEQ ID NO:47, CDR3H comprises SEQ ID NO:48 and wherein:
    (a) CDR1L comprises SEQ ID NO:50, CDR2L comprises SEQ ID NO:51, and CDR3L comprises SEQ ID NO:52;
    (b) CDR1L comprises SEQ ID NO:88, CDR2L comprises SEQ ID NO:89, and CDR3L comprises SEQ ID NO:90;
    (c) CDR1L comprises SEQ ID NO:92, CDR2L comprises SEQ ID NO:93, and CDR3L comprises SEQ ID NO:94;
    (d) CDR1L comprises SEQ ID NO:96, CDR2L comprises SEQ ID NO:97, and CDR3L comprises SEQ ID NO:98;
    (e) CDR1L comprises SEQ ID NO:100, CDR2L comprises SEQ ID NO:101, and CDR3L comprises SEQ ID NO:102;
    (f) CDR1L comprises SEQ ID NO:104, CDR2L comprises SEQ ID NO:105, and CDR3L comprises SEQ ID NO:106; or
    (g) CDR1L comprises SEQ ID NO:108, CDR2L comprises SEQ ID NO:109, and CDR3L comprises SEQ ID NO:110.

6. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of claim 5, wherein the heavy chain variable region comprises SEQ ID NO:45, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:45 and wherein:
    (a) the light chain variable region comprises SEQ ID NO:49, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:49;

(b) the light chain variable region comprises SEQ ID NO:87, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:87;

(c) the light chain variable region comprises SEQ ID NO:91, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:91;

(d) the light chain variable region comprises SEQ ID NO:95, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:95;

(e) the light chain variable region comprises SEQ ID NO:99, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:99;

(f) the light chain variable region comprises SEQ ID NO:103, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:103; or

(g) the light chain variable region comprises SEQ ID NO:107, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:107.

7. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of claim 6, wherein the heavy chain variable region comprises SEQ ID NO: 45 and wherein:

(a) the light chain variable region comprises SEQ ID NO:49;

(b) the light chain variable region comprises SEQ ID NO:87;

(c) the light chain variable region comprises SEQ ID NO:91;

(d) the light chain variable region comprises SEQ ID NO:95;

(e) the light chain variable region comprises SEQ ID NO:99;

(f) the light chain variable region comprises SEQ ID NO:103; or

(g) the light chain variable region comprises SEQ ID NO:107.

8. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of claims 5-7, wherein the antibody, or antigen-binding fragment thereof, binds to the IgC domain of human and murine hB7-H4.

9. An anti-B7-H4 antibody, or antigen-binding fragment thereof, wherein the antibody, or antigen-binding fragment thereof, comprises a heavy chain variable region and a light chain variable region, wherein each of the heavy chain and the light chain variable regions comprise a CDR1, CDR2, and CDR3, wherein CDR1H comprises SEQ ID NO:58, CDR2H comprises SEQ ID NO:59, CDR3H comprises SEQ ID NO:60, and wherein:
    (a) CDR1L comprises SEQ ID NO:62, CDR2L comprises SEQ ID NO:63, and CDR3L comprises SEQ ID NO:64;
    (b) CDR1L comprises SEQ ID NO:115, CDR2L comprises SEQ ID NO:116, and CDR3L comprises SEQ ID NO:117;
    (c) CDR1L comprises SEQ ID NO:119, CDR2L comprises SEQ ID NO:120, and CDR3L comprises SEQ ID NO:121;
    (d) CDR1L comprises SEQ ID NO:123, CDR2L comprises SEQ ID NO:124, and CDR3L comprises SEQ ID NO:125;
    (e) CDR1L comprises SEQ ID NO:127, CDR2L comprises SEQ ID NO:128, and CDR3L comprises SEQ ID NO:129; or
    (f) CDR1L comprises SEQ ID NO:131, CDR2L comprises SEQ ID NO:132, and CDR3L comprises SEQ ID NO:133.

10. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of claim 9, wherein the heavy chain variable region comprises SEQ ID NO:57, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:57 and wherein:
    (a) the light chain variable region comprises SEQ ID NO:61, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:61;

(b) the light chain variable region comprises SEQ ID NO:114, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:114;
(c) the light chain variable region comprises SEQ ID NO:118, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:118;
(d) the light chain variable region comprises SEQ ID NO:122, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:122;
(e) the light chain variable region comprises SEQ ID NO:126, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:126; or
(f) the light chain variable region comprises SEQ ID NO:130, or a sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:130.

11. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of claim 10, wherein the heavy chain variable region comprises SEQ ID NO:57 and wherein:
(a) the light chain variable region comprises SEQ ID NO:61;
(b) the light chain variable region comprises SEQ ID NO:114;
(c) the light chain variable region comprises SEQ ID NO:118;
(d) the light chain variable region comprises SEQ ID NO:122;
(e) the light chain variable region comprises SEQ ID NO:126; or
(f) the light chain variable region comprises SEQ ID NO:130.

12. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of claims 9-11, wherein the antibody, or antigen-binding fragment thereof, binds to the IgV domain of human and murine hB7-H4.

13. An anti-B7-H4 antibody, or antigen-binding fragment thereof, that binds to the same epitope on B7-H4 as the anti-B7-H4 antibody, or an antigen-binding fragment thereof of any one of the preceding claims.

14. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of the preceding claims, wherein the antibody or antigen-binding fragment is a chimeric antibody, a CDR-grafted antibody, or a humanized antibody or antigen-binding fragment thereof.

15. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of the preceding claims, wherein the antibody or antigen-binding fragment is a multispecific or a bispecific antibody or antigen-binding fragment thereof.

16. The anti-B7-H4 antibody or antigen-binding fragment thereof, of any one of the preceding claims, wherein the antibody or antigen-binding fragment is an scFv, Fv, Fab', Fab, $F(ab')_2$, or diabody.

17. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of the preceding claims, wherein the antibody is an IgG class immunoglobulin, optionally wherein the antibody or antigen-binding fragment has isotype IgG1.

18. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of the preceding claims, wherein the antibody or antigen-binding fragment is deglycosylated.

19. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of the preceding claims, wherein the antibody or antigen-binding fragment comprises a first and a second heavy chain constant region, and wherein the antibody, or antigen-binding fragment thereof, comprises at least one modification in the CH3 domains of the first and the second heavy chain constant region causing heterodimerization, optionally wherein the modification in the CH3 domain of first heavy chain constant region is different from the modification in the CH3 domain of the second heavy chain constant region and/or wherein the first heavy chain constant region comprises one or more amino acid substitutions selected from the group consisting of S354C, T366W, Y349C, T366S, L368A, and Y407V (Kabat EU index numbering) and wherein the second heavy chain constant region comprises one or more

amino acid substitutions selected from the group consisting of S354C, T366W, Y349C, T366S, L368A, and Y407V (Kabat EU index numbering) .

20. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of the preceding claims, wherein the first heavy chain constant region, the second heavy chain constant region, or both comprise amino acid substitutions M428L and N434S (Kabat EU index numbering).

21. A fusion protein comprising:
    (a) an anti-B7-H4 antibody, or antigen-binding fragment thereof;
    (b) an IL-15Rα sushi domain polypeptide comprising SEQ ID NO:167, or an amino acid sequence that at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:167; and
    (c) an IL-15 polypeptide comprising SEQ ID NO:166, or an amino acid sequence that is at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to SEQ ID NO:166.

22. The fusion protein of claim 21 wherein the B7H4 antibody comprises a heavy chain CDR1 (CDR1H), CDR2 (CDR2H) and CDR3 (CDR3H), and a light chain CDR1 (CDR1L), CDR2 (CDR2L) and CDR3 (CDR3L),
    (a) wherein CDR1H comprises SEQ ID NO:16, CDR2H comprises SEQ ID NO:17, CDR3H comprises SEQ ID NO:18, CDR1L comprises SEQ ID NO:70, CDR2L comprises SEQ ID NO:71, and CDR3L comprises SEQ ID NO:72;
    (b) wherein CDR1H comprises SEQ ID NO:172, CDR2H comprises SEQ ID NO:173, CDR3H comprises SEQ ID NO:174, CDR1L comprises SEQ ID NO:175, CDR2L comprises SEQ ID NO:176, and CDR3L comprises SEQ ID NO:177;
    (c) wherein CDR1H comprises SEQ ID NO:178, CDR2H comprises SEQ ID NO:179, CDR3H comprises SEQ ID NO:180, CDR1L comprises SEQ ID NO:181, CDR2L comprises SEQ ID NO:182, and CDR3L comprises SEQ ID NO:183; or

(d) wherein CDR1H comprises SEQ ID NO:184, CDR2H comprises SEQ ID NO:185, CDR3H comprises SEQ ID NO:186, CDR1L comprises SEQ ID NO:187, CDR2L comprises SEQ ID NO:188, and CDR3L comprises SEQ ID NO:189.

23. The fusion protein of claim 21 or 22, wherein the IL-15Rα sushi domain polypeptide comprises SEQ ID NO:167.

24. The fusion protein of any one of claims 21-23, wherein the IL-15 polypeptide comprises SEQ ID NO:166.

25. The fusion protein of any one of claims 21-24, wherein the IL-15Rα sushi domain polypeptide is fused to the N-terminus of the IL-15 polypeptide.

26. The fusion protein of any one of claims 21-25, wherein the anti-B7-H4 antibody, or antigen-binding fragment thereof, comprises a first and a second heavy chain constant region, and wherein the IL-15Rα sushi domain polypeptide and the IL-15 polypeptide are fused to the C-terminus of the first heavy chain constant region.

27. The fusion protein of claim 26, wherein the fusion protein comprises a linker joining (i) the IL-15Rα sushi domain polypeptide and the IL-15 polypeptide and (ii) the C-terminus of the constant region.

28. The fusion protein of claim 27, wherein the linker is between 25-35 amino acids long, optionally wherein the linker consists predominantly of Gly (G), Asn (N), Ser (S), Thr (T), Ala (A), Leu (L), and Gln (Q).

29. The fusion protein of claim 27 or 28, wherein the linker comprises SEQ ID NO:168.

30. The fusion protein of any one of claims 21-29, wherein the fusion protein comprises SEQ ID NO:169.

31. The fusion protein of any one of claims 26-30, wherein the first and the second heavy chain constant regions comprise at least one modification in the CH3 domains of the first and the second heavy chain constant region causing heterodimerization.

32. The fusion protein of claim 31, wherein the modification in the CH3 domain of first heavy chain constant region is different from the modification in the CH3 domain of the second heavy chain constant region, optionally wherein the first heavy chain constant region comprises one or more amino acid substitutions selected from the group consisting of S354C, T366W, Y349C, T366S, L368A, and Y407V (Kabat EU index numbering).

33. The fusion proteins of any one of claims 21-31, wherein the first heavy chain constant region, the second heavy chain constant region, or both comprise amino acid substitutions M428L and N434S (Kabat EU index numbering).

34. The fusion protein of any one of claims 21-30, wherein the fusion protein comprises not more than one IL-15Rα sushi domain polypeptide and not more than one IL-15 polypeptide.

35. The fusion protein of any one of claims 21-34, wherein the anti-B7-H4 antibody, or antigen-binding fragment thereof, is the anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of claims 1-13.

36. A fusion protein comprising:
    (a) a light chain comprising SEQ ID NO:69 and/or SEQ ID NO:145;
    (b) a first heavy chain comprising SEQ ID NO:150 or SEQ ID NO:151; and
    (c) a second heavy chain comprising SEQ ID NO:157 or SEQ ID NO:158.

37. A fusion protein comprising:
    (a) a light chain comprising SEQ ID NO:118 and/or SEQ ID NO:144;
    (b) a first heavy chain comprising SEQ ID NO:148 or SEQ ID NO:149; and
    (c) a second heavy chain comprising SEQ ID NO:155 or SEQ ID NO:156.

38. A fusion protein comprising:
    (a) a light chain comprising SEQ ID NO:145
    (b) a first heavy chain comprising SEQ ID NO:150
    (c) c. a second heavy chain comprising SEQ ID NO:157.

39. A nucleic acid sequence encoding the anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of claims 1-20 or the fusion protein of any one of claims 21-38.

40. A vector comprising the nucleic acid of claim 39.

41. A cell comprising the nucleic acid of claim 39 or the vector of claim 40.

42. A cell expressing the anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of claims 1-20 or the fusion protein of any one of claims 21-38.

43. A T cell expressing an anti-B7-H4 binding protein comprising the anti-B7-H4 antibody, or antigen-binding fragment thereof, or the heavy and light variable chains of the anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of claims 1-20.

44. The anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of claims 1-20 or the fusion protein of any one of claims 21-38, wherein the antibody or antigen-binding fragment or the fusion protein is conjugated to one or more of a cytotoxin, a fluorescent label, and an imaging agent.

45. A pharmaceutical composition comprising (i) anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of claims 1-20 or the fusion protein of any one of claims 21-38 and (ii) a pharmaceutically acceptable carrier.

46. A method of producing an anti-B7-H4 antibody, or antigen-binding fragment thereof, or a fusion protein, the method comprising culturing the cell of claim 41 under conditions so that the anti-B7-H4 antibody, or antigen-binding fragment thereof, or fusion protein is produced.

47. A method of stimulating the immune system in a subject in need thereof, the method comprising administering to the subject an effective amount of the anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of claims 1-20 or the fusion protein of any one of claims 21-38.

48. A method of treating cancer in a subject in need thereof, the method comprising administering to the subject an effective amount of the anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of claims 1-20 or the fusion protein of any one of claims 21-38 .

49. The method of claim 48, wherein the cancer is ovarian cancer, melanoma, pancreatic cancer, thyroid cancer, lung cancer, colorectal cancer, squamous cancer, prostate cancer, breast cancer, optionally wherein the breast cancer is triple-negative breast cancer, bladder cancer, or gastric cancer.

50. The method of any one of claims 47-49, the method further comprising administering an additional therapeutic agent or additional therapy.

51. The method of claim 50,
    (a) wherein the additional therapeutic agent is selected from the group consisting of a cancer vaccine, a checkpoint inhibitor, an antibody to a tumor-specific antigen, Bacillus Calmette-Guerin vaccine, a cytotoxin, an interleukin 6 receptor (IL-6R) inhibitor, an interleukin 4 receptor (IL-4R) inhibitor, an IL-10 inhibitor, IL-2, IL-7, IL-21, IL-15, an antibody-drug conjugate, an anti-inflammatory drug, and a dietary supplement, optionally wherein the checkpoint inhibitor is a CTLA-4, a PD-1, a PD-L1, or a PD-L2 inhibitor;
    (b) wherein the additional therapeutic agent is an inhibitor of LAG3, TIGIT, LAP, Podoplanin, Protein C receptor, ICOS, GITR, CD226 or CD160; or
    (c) wherein the additional therapy is chemotherapy, radiotherapy, or surgery.

52. A method of detecting B7-H4 in a sample, the method comprising contacting the sample with the anti-B7-H4 antibody, or antigen-binding fragment thereof, of any one of claims 1-20 or the fusion protein of any one of claims 21-38.