

SUMMARY

[0006] In one aspect, the present invention refers to an antigen-binding protein that binds Six Trans-membrane Epithelial Antigen of the Prostate 1 (STEAP1) of SEQ ID NO: 2 and comprises heavy chain CDRs comprising amino acid sequences vhCDR1 SEQ ID NO: 14, vhCDR2 SEQ ID NO: 15 or vhCDR2 SEQ ID NO: 21, and vhCDR3 SEQ ID NO: 16; and light chain CDRs comprising amino acid sequences vlCDR1 SEQ ID NO: 11, vlCDR2 SEQ ID NO: 12, and vlCDR3 SEQ ID NO: 13. In another aspect, the present invention refers to an antigen-binding protein which binds a region of STEAP1 within amino acids 92-118 and amino acids 279-290 or a pharmaceutical composition comprising the antigen-binding protein of the present invention and a physiologically acceptable carrier. In yet another aspect, the present invention refers to the use of the pharmaceutical composition of the present invention in the preparation of a medicament for treating cancer in a subject in need thereof, wherein the cancer expresses STEAP1, optionally further comprising an anti-PD-1 antigen-binding protein to be administered to the subject. In still another aspect, the present invention refers to a polynucleotide comprising a nucleic acid sequence encoding the light chain variable domain and/or heavy chain variable domain of the antigen-binding protein of the present invention and an expression vector comprising the polynucleotide. In another aspect, the present invention refers to composition comprising a polynucleotide comprising a nucleic acid sequence encoding the light chain variable domain of the antigen-binding protein of the present invention and a polynucleotide comprising a nucleic acid sequence encoding the heavy chain variable domain of the antigen-binding protein of the present invention. In another aspect, the present invention refers to a method of making an antigen-binding protein, the method comprising contacting a host cell with the polynucleotide of the present invention or the composition of the present invention under conditions that allow expression of the light chain variable domain and the heavy chain variable domain. In another aspect, the present invention refers to a bispecific antigen-binding protein comprising the antigen-binding protein of the present invention. In still another aspect, the present invention refers to a heterodimeric antibody comprising a) a first monomer comprising a first heavy chain comprising: 1) a first variable heavy domain; 2) a first constant heavy chain comprising a first CH1 domain and a first Fc domain; 3) a scFv that binds human CD3 and comprises a scFv variable light domain, an scFv linker and a scFv variable heavy domain; wherein said scFv is covalently attached between the C-terminus of said CH1 domain and the N-terminus of said first Fc domain using domain linker(s); b) a second monomer comprising a second

heavy chain comprising a second variable heavy domain and a second constant heavy chain comprising a second Fc domain; and c) a common light chain comprising a variable light domain and a constant light domain; wherein said first variable heavy domain and said variable light domain bind human STEAP1, said second variable heavy domain and said variable light domain bind human STEAP1, and wherein the first variable heavy domain and the second variable heavy domain comprise heavy chain CDRs comprising amino acid sequences vhCDR1 SEQ ID NO: 14, vhCDR2 SEQ ID NO: 15 or SEQ ID NO: 21, and vhCDR3 SEQ ID NO: 16, and the variable light domain comprises light chain CDRs comprising amino acid sequences vlCDR1 SEQ ID NO: 11, vlCDR2 SEQ ID NO: 12, and vlCDR3 SEQ ID NO: 13. In yet another aspect, the present invention refers to a heterodimeric antibody comprising a first monomer comprising the sequence of SEQ ID NO: 19, a second monomer comprising the sequence of SEQ ID NO: 18, and a common light chain comprising the sequence of SEQ ID NO: 17. In another aspect, the present invention refers to a heterodimeric antibody comprising a first monomer comprising the sequence of SEQ ID NO: 202, a second monomer comprising the sequence of SEQ ID NO: 201, and a common light chain comprising the sequence of SEQ ID NO: 200. In yet another aspect, the present invention refers to a heterodimeric antibody comprising a first monomer comprising the sequence of SEQ ID NO: 207, a second monomer comprising the sequence of SEQ ID NO: 203, and a common light chain comprising the sequence of SEQ ID NO: 200. In another aspect, the present invention refers to a nucleic acid composition comprising: a) a first nucleic acid encoding the first monomer of the present invention; b) a second nucleic acid encoding the second monomer of any one of the present invention; and c) a third nucleic acid encoding the common light chain of the present invention. In another aspect, the present invention refers to a nucleic acid composition comprising a) a first expression vector comprising a first nucleic acid encoding the first monomer of the present invention; b) a second expression vector comprising a second nucleic acid encoding the second monomer of the present invention; and c) a third expression vector comprising a third nucleic acid encoding the common light chain of the present invention. In another aspect, the present invention refers to a host cell comprising the nucleic acid composition of the present invention. In yet another aspect, the present invention refers to a pharmaceutical composition comprising the heterodimeric antibody of the present invention. In yet another aspect, the present invention refers to the use of the heterodimeric antibody of the present invention or the pharmaceutical composition of the present invention in the preparation of a medicament for treating cancer in a subject in need thereof, wherein the cancer expresses STEAP1. The

disclosure also provides an antigen-binding protein that binds STEAP1 of SEQ ID NO: 2 and comprises: (a) heavy chain CDRs comprising amino acid sequences that differ by no more than 3, 2, or 1 amino acid from i) vhCDR1 SEQ ID NO: 14, vhCDR2 SEQ ID NO: 15 or vhCDR2 SEQ ID NO: 21, and vhCDR3 SEQ ID NO: 16, or ii) vhCDR1 SEQ ID NO: 33, vhCDR2 SEQ ID NO: 34, and vhCDR3 SEQ ID NO: 35; or (b) light chain CDRs comprising amino acid sequences that differ by no more than 3, 2, or 1 amino acid from i) vlCDR1 SEQ ID NO: 11, vlCDR2 SEQ ID NO: 12, and vlCDR3 SEQ ID NO: 13; or ii) vlCDR1 SEQ ID NO: 30, vlCDR2 SEQ ID NO: 31, and vlCDR3 SEQ ID NO: 32; or (c) a light chain variable domain comprising an amino acid sequence at least 90% identical to SEQ ID NO: 183 or SEQ ID NO: 186; or (d) a heavy chain variable domain comprising an amino acid sequence at least 90% identical to SEQ ID NO: 182, SEQ ID NO: 184, or SEQ ID NO: 185. In various aspectsexamples, the antigen-binding protein comprises a vhCDR1 comprising SEQ ID NO: 14, a vhCDR2 comprising SEQ ID NO: 15 or SEQ ID NO: 21, a vhCDR3 comprising SEQ ID NO: 16, a vlCDR1 comprising SEQ ID NO: 11, a vlCDR2 comprising SEQ ID NO: 12, and a vlCDR3 comprising SEQ ID NO: 13. Alternatively, the antigen-binding protein comprises a vhCDR1 comprising SEQ ID NO: 33, a vhCDR2 comprising SEQ ID NO: 34, a vhCDR3 comprising SEQ ID NO: 35, a vlCDR1 comprising SEQ ID NO: 30, a vlCDR2 comprising SEQ ID NO: 31, and a vlCDR3 comprising SEQ ID NO: 32. In various aspectsexamples, the antigen-binding protein comprises a variable heavy domain comprising SEQ ID NO: 182 or SEQ ID NO: 184 and a variable light domain comprising SEQ ID NO: 183; for example, the antigen-binding protein comprises a variable heavy domain comprising SEQ ID NO: 182 and a variable light domain comprising SEQ ID NO: 183, or variable heavy domain comprising SEQ ID NO: 184 and a variable light domain comprising SEQ ID NO: 183. Alternatively, the antigen-binding protein comprises a variable heavy domain comprising SEQ ID NO: 185 and a variable light domain comprising SEQ ID NO: 186. The disclosure further provides an antigen-binding protein comprising a heavy chain comprising SEQ ID NO: 201 and a light chain comprising SEQ ID NO: 200; or a heavy chain comprising SEQ ID NO: 203 and a light chain comprising SEQ ID NO: 200.

[0007] The disclosure further provides a heterodimeric antibody comprising a first monomer comprising a first heavy chain comprising: 1) a first variable heavy domain; 2) a first constant heavy chain comprising a first CH1 domain and a first Fc domain; and 3) a scFv that binds human CD3 and comprises a scFv variable light domain, an scFv linker, and a scFv

variable heavy domain; wherein said scFv is covalently attached between the C-terminus of said CH1 domain and the N-terminus of said first Fc domain using domain linker(s). The heterodimeric antibody further comprises a second monomer comprising a second heavy chain comprising a second variable heavy domain and a second constant heavy chain comprising a second Fc domain; and a common light chain comprising a variable light domain and a constant light domain. The first variable heavy domain and the variable light domain bind human STEAP1, the second variable heavy domain and the variable light domain bind human STEAP1, and wherein (i) the first variable heavy domain and the second variable heavy domain comprise heavy chain CDRs comprising amino acid sequences that differ by no more than 3, 2, or 1 amino acid from vhCDR1 SEQ ID NO: 14, vhCDR2 SEQ ID NO: 15 or vhCDR2 SEQ ID NO: 21, and vhCDR3 SEQ ID NO: 16, and the variable light domain comprises light chain CDRs comprising amino acid sequences that differ by no more than 3, 2, or 1 amino acid from vlCDR1 SEQ ID NO: 11, vlCDR2 SEQ ID NO: 12, and vlCDR3 SEQ ID NO: 13; or (ii) the first variable heavy domain and the second variable heavy domain comprise heavy chain CDRs comprising amino acid sequences that differ by no more than 3, 2, or 1 amino acid from vhCDR1 SEQ ID NO: 33, vhCDR2 SEQ ID NO: 34, and vhCDR3 SEQ ID NO: 35, and the variable light domain comprises light chain CDRs comprising amino acid sequences that differ by no more than 3, 2, or 1 amino acid from vlCDR1 SEQ ID NO: 30, vlCDR2 SEQ ID NO: 31, and vlCDR3 SEQ ID NO: 32; or (iii) the first variable heavy domain and the second variable heavy domain comprise an amino acid sequence at least 90% identical to SEQ ID NO: 182 or SEQ ID NO: 184 and the variable light domain comprises an amino acid sequence at least 90% identical to SEQ ID NO: 183; or (iv) the first variable heavy domain and the second variable heavy domain comprise an amino acid sequence at least 90% identical to SEQ ID NO: 185 and the variable light domain comprises an amino acid sequence at least 90% identical to SEQ ID NO: 186. In various [aspectsexamples](#), the first variable heavy domain and the second variable heavy domain comprise CDR sequences: vhCDR1 comprising SEQ ID NO: 14, vhCDR2 comprising SEQ ID NO: 15 or SEQ ID NO: 21, and vhCDR3 comprising SEQ ID NO: 16; and the variable light domain comprises CDR sequences: vlCDR1 comprising SEQ ID NO: 11, vlCDR2 comprising SEQ ID NO: 12, and vlCDR3 comprising SEQ ID NO: 13. In various [examplesaspects](#), the first variable heavy domain and the second variable heavy domain comprise CDR sequences: vhCDR1 comprising SEQ ID NO: 33, vhCDR2 comprising SEQ ID NO: 34, and vhCDR3 comprising SEQ ID NO: 35; and the variable light domain comprises CDR sequences: vlCDR1 comprising SEQ ID NO: 30, vlCDR2 comprising SEQ ID NO: 31, and vlCDR3 comprising

SEQ ID NO: 32. In various aspectsexamples, the first variable heavy domain and the second variable heavy domain comprise SEQ ID NO: 182 or SEQ ID NO: 184 and the variable light domain comprises SEQ ID NO: 183 (e.g., SEQ ID NOs: 182 and 183 or SEQ ID NOs: 184 and 183), or the first variable heavy domain and the second variable heavy domain comprise SEQ ID NO: 185 and the variable light domain comprises SEQ ID NO: 186. The scFv comprises CDRs comprising: vhCDR1 comprising SEQ ID NO: 170, vhCDR2 comprising SEQ ID NO: 171, vhCDR3 comprising SEQ ID NO: 172, vlCDR1 comprising SEQ ID NO: 174, vlCDR2 comprising SEQ ID NO: 175, and vlCDR3 comprising SEQ ID NO: 176; or a variable heavy region and a variable light region of SEQ ID NO: 169 and SEQ ID NO: 173.

[0008] Methods of treating cancer, such as prostate cancer, comprising administering to a subject in need thereof the antigen-binding protein described herein also are provided.

[0009] The use of section headings herein is merely for the convenience of reading, and not intended to be limiting per se. The entire document is intended to be viewed as a unified disclosure, and it should be understood that all combinations of features described herein are contemplated.

[0010] Unless otherwise defined herein, scientific and technical terms used in connection with the present application shall have the meanings that are commonly understood by those of ordinary skill in the art. Further, unless otherwise required by context, singular terms shall include pluralities and plural terms shall include the singular. The terms "comprising," "having," "including," and "containing" are to be construed as open-ended terms unless otherwise noted. If aspects of the invention are described as "comprising" a feature, embodiments also are contemplated "consisting of" or "consisting essentially of" the feature. The use of any and all examples, or exemplary language (e.g., "such as") provided herein, is intended merely to better illustrate the disclosure and does not pose a limitation on the scope of the disclosure unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the disclosure. Other than in the operating examples, or where otherwise indicated, all numbers expressing quantities of ingredients or reaction conditions used herein should be understood as modified in all instances by the term "about" as that term would be interpreted by the person skilled in the relevant art.

[0011] Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range and each

WHAT IS CLAIMED IS:

1. An antigen-binding protein that binds [Six Trans-membrane Epithelial Antigen of the Prostate 1 \(STEAP1\)](#) of SEQ ID NO: 2 and comprises ~~:~~

~~—(a1)—~~ heavy chain CDRs comprising amino acid sequences ~~that differ by no more than 3, 2, or 1 amino acid from i)~~ vhCDR1 SEQ ID NO: 14, vhCDR2 SEQ ID NO: 15 or vhCDR2 SEQ ID NO: 21, and vhCDR3 SEQ ID NO: 16; ~~or ii) vhCDR1 SEQ ID NO: 33, vhCDR2 SEQ ID NO: 34, and vhCDR3 SEQ ID NO: 35;~~ and

~~(a2)—~~ light chain CDRs comprising amino acid sequences ~~that differ by no more than 3, 2, or 1 amino acid from i)~~ vlCDR1 SEQ ID NO: 11, vlCDR2 SEQ ID NO: 12, and vlCDR3 SEQ ID NO: 13; ~~or ii) vlCDR1 SEQ ID NO: 30, vlCDR2 SEQ ID NO: 31, and vlCDR3 SEQ ID NO: 32;~~
~~or~~

~~(b1)—a light chain variable domain comprising an amino acid sequence at least 90% identical to SEQ ID NO: 183 or SEQ ID NO: 186; and~~

~~(b2)—a heavy chain variable domain comprising an amino acid sequence at least 90% identical to SEQ ID NO: 182, SEQ ID NO: 184, or SEQ ID NO: 185.~~

~~2. The antigen-binding protein of claim 1, comprising CDR sequences~~

~~a) vhCDR1 comprising SEQ ID NO: 14, vhCDR2 comprising SEQ ID NO: 15 or SEQ ID NO: 21, and vhCDR3 comprising SEQ ID NO: 16; or~~

~~b) vhCDR1 comprising SEQ ID NO: 33, vhCDR2 comprising SEQ ID NO: 34, and vhCDR3 comprising SEQ ID NO: 35.~~

~~32.~~ The antigen-binding protein of ~~any one of~~ claims ~~1-2~~, comprising

vhCDR1 comprising SEQ ID NO: 14,

vhCDR2 comprising SEQ ID NO: 15,

vhCDR3 comprising SEQ ID NO: 16,

vlCDR1 comprising SEQ ID NO: 11,

vlCDR2 comprising SEQ ID NO: 12, and

vlCDR3 comprising SEQ ID NO: 13.

43. The antigen-binding protein of ~~any one of~~ claims 1-2, comprising

vhCDR1 comprising SEQ ID NO: ~~33~~14,

vhCDR2 comprising SEQ ID NO: ~~34~~21,

vhCDR3 comprising SEQ ID NO: ~~35~~16,

vlCDR1 comprising SEQ ID NO: ~~30~~11,

vlCDR2 comprising SEQ ID NO: ~~31~~12, and

vlCDR3 comprising SEQ ID NO: ~~32~~13.

54. The antigen-binding protein of ~~any one of~~ claims 1-2, comprising a ~~variable~~-heavy chain variable domain comprising a sequence at least 90% identical to SEQ ID NO: 182, ~~or~~ SEQ ID NO: 184, or SEQ ID NO: 185.

and a light chain variable domain comprising an amino acid sequence at least 90% identical to SEQ ID NO: 183.

65. The antigen-binding protein of ~~any one of~~ claims 1-2, comprising a heavy chain variable domain comprising SEQ ID NO: 184 and a ~~variable~~-light chain variable domain comprising SEQ ID NO: 183 ~~or SEQ ID NO: 186.~~

~~75~~6. The antigen-binding protein of ~~any one of~~ claims 1-2, comprising a ~~variable~~-heavy chain variable domain comprising SEQ ID NO: 182 and a ~~variable~~-light chain variable domain comprising SEQ ID NO: 183.

~~8. An antigen-binding protein that cross-blocks the binding of a reference antigen-binding protein of any one of claims 1-7 to STEAP1 or which is cross-blocked from binding to STEAP1 by a reference antigen-binding protein any one of claims 1-7.~~

~~9. The antigen-binding protein of claim 8, wherein the cross-blocking is detected by surface plasmon resonance or ELISA.~~

~~10. The antigen-binding protein of claim 8, which does not bind extracellular loop 2 of STEAP1.~~

~~11. The antigen-binding protein of claim 8, which preferentially mediates T cell dependent killing of cells with a surface density of STEAP1 of greater than 10,000 STEAP receptors per cell.~~

127. An antigen-binding protein which binds a region of STEAP1 within amino acids 92-118 and amino acids 279-290.

138. The antigen-binding protein of any one of claims 1-127, wherein the antigen-binding protein is an antibody.

149. The antigen-binding protein of claim 138, which is a monoclonal antibody, a chimeric antibody, or a humanized antibody.

1510. The antigen-binding protein of any one of claims 1-147, wherein the antigen-binding protein is an antigen-binding antibody fragment.

1611. The antigen-binding protein of any one of claims 1-127, comprising a single chain antibody, a diabody, a triabody, a tetrabody, or a domain antibody.

1712. A pharmaceutical composition comprising the antigen-binding protein of any one of claims 1-1611 and a physiologically acceptable carrier.

1813. The pharmaceutical composition of claim 1712, further comprising an anti-PD-1 antigen-binding protein comprising a vhCDR1 comprising the amino acid sequence set forth in SEQ ID NO: 189, a vhCDR2 comprising the amino acid sequence set forth in SEQ ID NO: 190, a vhCDR3 comprising the amino acid sequence set forth in SEQ ID NO: 191, a vlCDR1 comprising the amino acid sequence set forth in SEQ ID NO: 192, a vhCDR2 comprising the

amino acid sequence set forth in SEQ ID NO: 193, and a vl CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 194.

~~19~~14. Use of the pharmaceutical composition of claim ~~17~~12 or claim ~~18~~13 in the preparation of a medicament for treating cancer in a subject in need thereof, [wherein the cancer expresses STEAP1](#).

~~20~~15. [Use of the pharmaceutical composition of claim 12 in the preparation of a medicament for treating cancer which expresses STEAP1](#)~~The use of claim 19~~, further comprising an anti-PD-1 antigen-binding protein to be administered to the subject.

~~16~~21. Use of the antigen-binding protein of any one of claims 1-~~16~~11 in the preparation of a medicament for treating cancer in a subject in need thereof, [wherein the cancer expresses STEAP1](#).

~~22~~17. The use of claim ~~21~~16, wherein the medicament is for administering an effective amount of the anti-STEAP1 antigen-binding protein in association with an effective amount of an anti-PD-1 antigen-binding protein.

~~23~~18. A polynucleotide comprising a nucleic acid sequence encoding the light chain variable domain and/or heavy chain variable domain of the antigen-binding protein of any one of claims 1-~~23~~18.

~~24~~19. An expression vector comprising the polynucleotide of claim ~~23~~18.

~~25~~20. A composition comprising a polynucleotide comprising a nucleic acid sequence encoding the light chain variable domain of the antigen-binding protein of any one of claims 1-~~25~~20 and a polynucleotide comprising a nucleic acid sequence encoding the heavy chain variable domain of the antigen-binding protein of any one of claims 1-~~25~~20.

2126. A method of making an antigen-binding protein, the method comprising contacting a host cell with the polynucleotide of claim 1823 or the composition of claim 2025 under conditions that allow expression of the light chain variable domain and the heavy chain variable domain.

2227. A bispecific antigen-binding protein comprising the antigen-binding protein of any one of claims 1-712.

2328. The bispecific antigen-binding protein of claim 2227, which binds STEAP1 and CD3.

2429. The bispecific antigen-binding protein of claim 2328, comprising a CD3 binding domain comprising CDR sequences of SEQ ID NOs: 170-172 and 174-176.

2530. A heterodimeric antibody comprising:

a) a first monomer comprising a first heavy chain comprising:

1) a first variable heavy domain;

2) a first constant heavy chain comprising a first CH1 domain and a first Fc domain;

3) a scFv that binds human CD3 and comprises a scFv variable light domain, an scFv linker and a scFv variable heavy domain; wherein said scFv is covalently attached between the C-terminus of said CH1 domain and the N-terminus of said first Fc domain using domain linker(s);

b) a second monomer comprising a second heavy chain comprising a second variable heavy domain and a second constant heavy chain comprising a second Fc domain; and

c) a common light chain comprising a variable light domain and a constant light domain;

wherein said first variable heavy domain and said variable light domain bind human STEAP1, said second variable heavy domain and said variable light domain bind human STEAP1, and

wherein

—(i)—the first variable heavy domain and the second variable heavy domain comprise heavy chain CDRs comprising amino acid sequences ~~that differ by no more than 3, 2, or 1 amino acid from~~ (a) vhCDR1 SEQ ID NO: 14, (b) vhCDR2 SEQ ID NO: 15 or SEQ ID NO:

21, and ~~(3)~~ vhCDR3 SEQ ID NO: 16, and the variable light domain comprises light chain CDRs comprising amino acid sequences ~~that differ by no more than 3, 2, or 1 amino acid from~~ vlCDR1 SEQ ID NO: 11, vlCDR2 SEQ ID NO: 12, and vlCDR3 SEQ ID NO: 13; ~~or~~

~~(ii) — the first variable heavy domain and the second variable heavy domain comprise heavy chain CDRs comprising amino acid sequences that differ by no more than 3, 2, or 1 amino acid from vhCDR1 SEQ ID NO: 33, vhCDR2 SEQ ID NO: 34, and vhCDR3 SEQ ID NO: 35, and the variable light domain comprises light chain CDRs comprising amino acid sequences that differ by no more than 3, 2, or 1 amino acid from vlCDR1 SEQ ID NO: 30, vlCDR2 SEQ ID NO: 31, and vlCDR3 SEQ ID NO: 32; or~~

26. The heterodimeric antibody of claim 25, wherein ~~(iii)~~ — the first variable heavy domain and the second variable heavy domain comprise an amino acid sequence at least 90% identical to SEQ ID NO: 182 or 184 and the variable light domain comprises an amino acid sequence at least 90% identical to SEQ ID NO: 183.

~~31. The heterodimeric antibody of claim 30, wherein the first monomer comprises amino acid substitutions E233P, L235V, G236A, S267K, R292C, N297G, V302C, E357Q, and S364K; the second monomer comprises the amino acid substitutions N208D, E233P, L235V, G236A, S267K, R292C, Q295E, N297G, V302C, L368D, K370S, N384D, Q418E, and N421D; and both monomers comprise a deletion at position 234.~~

3227. The heterodimeric antibody of claim ~~30-25~~ or claim ~~31-26~~, wherein said scFv comprises ~~(ai)~~ — a variable heavy domain comprising heavy chain CDRs comprising amino acid sequences ~~that differ by no more than 3, 2, or 1 amino acid from~~ vhCDR1 SEQ ID NO: 170, vhCDR2 SEQ ID NO: 171, and vhCDR3 SEQ ID NO: 172, and a variable light domain comprising light chain CDRs comprising amino acid sequences ~~that differ by no more than 3, 2, or 1 amino acid from~~ vlCDR1 SEQ ID NO: 174, vlCDR2 SEQ ID NO: 175, and vlCDR3 SEQ ID NO: 176; ~~or~~

~~— (bii) — a variable heavy domain comprising an amino acid sequence at least 90% identical to SEQ ID NO: 169 and a variable light domain comprising an amino acid sequence at least 90% identical to SEQ ID NO: 173.~~

~~3328~~. The heterodimeric antibody of claim ~~30 or claim 3227~~, wherein said scFv comprises a variable heavy domain comprising an amino acid sequence at least 90% identical to SEQ ID NO:169 and a variable light domain comprising an amino acid sequence at least 90% identical to SEQ ID NO: 173~~CDRs comprising vhCDR1 comprising SEQ ID NO: 170, vhCDR2 comprising SEQ ID NO: 171, vhCDR3 comprising SEQ ID NO: 172, vlCDR1 comprising SEQ ID NO:174, vlCDR2 comprising SEQ ID NO: 175, and vlCDR3 comprising SEQ ID NO: 176.~~

~~3429~~. The heterodimeric antibody of any one of claims ~~3025-3227~~, wherein said scFv comprises a variable heavy region and a variable light region of SEQ ID NO:169 and SEQ ID NO:173.

~~3530~~. The heterodimeric antibody of any one of claims ~~3025-3429~~, wherein said scFv has a charged scFv linker.

~~3631~~. The heterodimeric antibody of claim ~~3530~~, wherein the charged scFv linker has a positive charge from 3 to 8 and is selected from the group consisting of SEQ ID NOs: 143 to 153.

~~3732~~. The heterodimeric antibody of claim ~~3530~~, wherein the scFv linker comprises SEQ ID NO: 152.

~~3833~~. The heterodimeric antibody of any one of claims ~~3025-3429~~, wherein said scFv comprises the sequence of SEQ ID NO: 44.

~~3934~~. The heterodimeric antibody of any one of claims ~~3025-3833~~, wherein the first variable heavy domain and the second variable heavy domain comprise CDR sequences vhCDR1 comprising SEQ ID NO: 14, vhCDR2 comprising SEQ ID NO: 15, vhCDR3 comprising SEQ ID NO: 16, and wherein the variable light domain comprises CDR sequences vlCDR1 comprising SEQ ID NO: 11, vlCDR2 comprising SEQ ID NO: 12, and vlCDR3 comprising SEQ ID NO: 13.

~~4035~~. The heterodimeric antibody of any of claims ~~3025-3833~~, wherein the first variable heavy domain and the second variable heavy domain comprise SEQ ID NO: 182 and the variable light domain comprises SEQ ID NO: 183.

36. The heterodimeric antibody of any one of claims 25-33, wherein the first variable heavy domain and the second variable heavy domain comprise CDR sequences vhCDR1 comprising SEQ ID NO: 14, vhCDR2 comprising SEQ ID NO: 21, vhCDR3 comprising SEQ ID NO: 16, and wherein the variable light domain comprises CDR sequences vlCDR1 comprising SEQ ID NO: 11, vlCDR2 comprising SEQ ID NO: 12, and vlCDR3 comprising SEQ ID NO: 13.

37. The heterodimeric antibody of any of claims 25-33, wherein the first variable heavy domain and the second variable heavy domain comprise SEQ ID NO: 184 and the variable light domain comprises SEQ ID NO: 183.

~~4138.~~ The heterodimeric antibody of any one of ~~claims 39-25-33~~ comprising the amino acid substitution N67Q and/or a substitution at one or more of positions 292, 297, or 302 in the first and/or second monomer.

39. The heterodimeric antibody of any one of claims 25-35, wherein the first monomer comprises amino acid substitutions E233P, L235V, G236A, S267K, R292C, N297G, V302C, E357Q, and S364K; the second monomer comprises the amino acid substitutions N208D, E233P, L235V, G236A, S267K, R292C, Q295E, N297G, V302C, L368D, K370S, N384D, Q418E, and N421D; and both monomers comprise a deletion at position 234.

~~4240.~~ The A heterodimeric antibody ~~of claim 30, wherein the~~ comprising a first monomer ~~comprises comprising~~ the sequence of SEQ ID NO: 19, ~~the a~~ second monomer ~~comprises comprising~~ the sequence of SEQ ID NO: 18, and ~~the a~~ common light chain ~~comprises comprising~~ the sequence of SEQ ID NO: 17.

~~4341.~~ The A heterodimeric antibody ~~of claim 30, wherein comprising the a~~ first monomer ~~comprises comprising~~ the sequence of SEQ ID NO: 202, ~~the a~~ second monomer ~~comprises~~

comprising the sequence of SEQ ID NO: 201, and ~~the a~~ common light chain ~~comprises~~
comprising the sequence of SEQ ID NO: 200.

42. A heterodimeric antibody comprising a first monomer comprising the sequence of SEQ ID NO: 207, a second monomer comprising the sequence of SEQ ID NO: 203, and a common light chain comprising the sequence of SEQ ID NO: 200.

4443. A nucleic acid composition comprising:

a) a first nucleic acid encoding the first monomer of any one of claims ~~3025-4342~~;

b) a second nucleic acid encoding the second monomer of any one of claims ~~3025-4342~~;

and

c) a third nucleic acid encoding the common light chain of any one of claims ~~3025-4342~~.

~~4544.~~ A nucleic acid composition comprising:

a) a first expression vector comprising a first nucleic acid encoding the first monomer of any one of claims ~~3025-4342~~;

b) a second expression vector comprising a second nucleic acid encoding the second monomer of any one of claims ~~3025-43402~~; and

c) a third expression vector comprising a third nucleic acid encoding the common light chain of any one of claims ~~3025-43402~~.

~~4645.~~ A host cell comprising the nucleic acid composition of claim ~~4443~~ or claim ~~4544~~.

~~4746.~~ A pharmaceutical composition comprising the heterodimeric antibody of any one of claims ~~2530-4342~~.

~~4847.~~ The heterodimeric antibody of any one of claims ~~3025-4342~~ or the pharmaceutical composition of claim ~~4744~~ for use in treating a subject in need thereof.

~~49~~48. Use of the heterodimeric antibody of any one of claims ~~30~~25-~~43~~42 or the pharmaceutical composition of claim ~~47~~44 in the preparation of a medicament for treating cancer in a subject in need thereof, wherein the cancer expresses STEAP1.

49. The heterodimeric antibody or the pharmaceutical composition for use of claim ~~48~~47, or the use of claim ~~49~~48, further comprising an anti-PD-1 antigen-binding protein to be administered to the subject.

50. The use, or the heterodimeric antibody or the pharmaceutical composition for use of any one of claims ~~20~~15, ~~22~~17, and ~~50~~49, wherein the anti-PD1 antigen-binding protein comprises a vhCDR1 comprising the amino acid sequence set forth in SEQ ID NO: 189, a vhCDR2 comprising the amino acid sequence set forth in SEQ ID NO: 190, a vhCDR3 comprising the amino acid sequence set forth in SEQ ID NO: 191, a vlCDR1 comprising the amino acid sequence set forth in SEQ ID NO: 192, a vhCDR2 comprising the amino acid sequence set forth in SEQ ID NO: 193, and a vl CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 194.

51. The use, or the heterodimeric antibody or the pharmaceutical composition for use of claim ~~51~~49, wherein the anti-PD1 antigen-binding protein comprises a heavy chain variable domain comprising an amino acid sequence at least 90% identical to the amino acid sequence of SEQ ID NO: 195 and a light chain variable domain comprising an amino acid sequence at least 90% identical to the amino acid sequence of SEQ ID NO: 196.

52. The use, or the heterodimeric antibody or the pharmaceutical composition for use of claim ~~51~~52, wherein the anti-PD1 antigen-binding protein comprises a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO: 195 and a light chain variable domain comprising the amino acid sequence of SEQ ID NO: 196.

53. The use, or the heterodimeric antibody or the pharmaceutical composition for use of any one of claims ~~50~~51-~~52~~53, wherein the anti-PD-1 antigen-binding protein is an antigen-binding antibody fragment.

5455. The use, or the heterodimeric antibody or the pharmaceutical composition for use of any one of claims 5051-5253, wherein the anti-PD-1 antigen-binding protein is an antibody.

5556. The use, or the heterodimeric antibody or the pharmaceutical composition for use of any one of claims 5051-5352, wherein the anti-PD-1 antigen-binding protein is a monoclonal antibody, a chimeric antibody, or a humanized antibody.

5657. The use, or the heterodimeric antibody or the pharmaceutical composition for use of any one of claims 5051-5556, wherein the anti-PD1 antigen-binding protein comprises a heavy chain comprising the amino acid sequence of SEQ ID NO: 197 and a light chain comprising the amino acid sequence of SEQ ID NO: 198.

5758. The use, or the heterodimeric antibody or the pharmaceutical composition for use of any one of claims 5051-5556, wherein the anti-PD1 antigen-binding protein comprises a heavy chain comprising the amino acid sequence of SEQ ID NO: 208 and a light chain comprising the amino acid sequence of SEQ ID NO: 209.

58. The use, or the heterodimeric antibody for use or the pharmaceutical composition for use of any one of claims 15, 17, or 49, wherein the anti-PD1 antigen-binding protein is pembrolizumab.

59. The use, or the heterodimeric antibody or the pharmaceutical composition for use of any one of claims 15, 17, or 49-58, wherein the anti-PD1 antigen binding agent is to be administered before the antigen-binding protein that binds STEAP1 or the heterodimeric antibody.

60. The use, or the heterodimeric antibody or the pharmaceutical composition for use of any one of claims 15, 17, or 49-58, wherein the anti-PD1 antigen binding agent is to be administered concurrently with the antigen-binding protein that binds STEAP1 or the heterodimeric antibody.

61. The use, or the heterodimeric antibody or the pharmaceutical composition for use of any one of claims 15, 17, or 49-58, wherein the anti-PD1 antigen binding agent is to be administered after the antigen-binding protein that binds STEAP1 or the heterodimeric antibody.

62. The use, or the heterodimeric antibody or the pharmaceutical composition for use of any one of claims 14, 16, 47, or 48, wherein the subject is also to be administered an effective amount of abiraterone acetate or enzalutamide.

63. The use, or the heterodimeric antibody or the pharmaceutical composition for use of any one of claims 14-17 or 47-62, wherein the antigen-binding protein that binds STEAP1 or the heterodimeric antibody is to be administered subcutaneously.

6459. The use, or the heterodimeric antibody or the pharmaceutical composition for use of any one of claims 4849-6358, wherein the cancer is prostate cancer.

6560. The use, or the heterodimeric antibody or the pharmaceutical composition for use of any one of claims 4849-5863, wherein the cancer is Ewing sarcoma.