

What is claimed is:

1. Humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, comprising a variable heavy (VH) domain comprising
a CDR H1 sequence according to SEQ ID No. 1,
a CDR H2 sequence selected from any of the sequences according to SEQ ID No. 2, SEQ ID No. 7, SEQ ID No. 9, and SEQ ID No. 11,
a CDR H3 sequence according to SEQ ID No. 3,
and a variable light (VL) domain comprising
a CDR L1 sequence selected from any of the sequences according to SEQ ID No. 4, SEQ ID No. 8, and SEQ ID No. 10,
a CDR L2 sequence selected from any of the sequences according to SEQ ID No. 5 and SEQ ID No. 12, and
a CDR L3 sequence according to SEQ ID No. 6,
but not comprising the combination of a CDR H1 sequence according to SEQ ID No. 1, a CDR H2 sequence according to SEQ ID No. 2, a CDR H3 sequence according to SEQ ID No. 3, a CDR L1 sequence according to SEQ ID No. 4, a CDR L2 sequence according to SEQ ID No. 5, and a CDR L3 sequence according to SEQ ID 6,
that binds to the extracellular domain of prostate specific membrane antigen (PSMA).
2. Humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, according to claim 1, comprising a VH domain having at least 90%, preferably 95%, sequence homology to a sequence selected from any of the sequences according to SEQ ID No. 13, SEQ ID No. 15, SEQ ID No. 17, and SEQ ID No. 19.
3. Humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, according to claim 1, comprising a VH domain sequence selected from any of the sequences according to SEQ ID No. 13, SEQ ID No. 15, SEQ ID No. 17, and SEQ ID No. 19.
4. Humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, according to claim 1, comprising a VL domain having at least 90%, preferably 95%,

sequence homology to a sequence selected from any of the sequences according to SEQ ID No. 14, SEQ ID No. 16, SEQ ID No. 18, and SEQ ID No. 20.

5. Humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, according to claim 1, comprising a VL domain sequence selected from any of the sequences according to SEQ ID No. 14, SEQ ID No. 16, SEQ ID No. 18, and SEQ ID No. 20.
6. Humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, according to claim 1 comprising
the VH domain sequence according to SEQ ID No. 13 and a VL domain sequence
selected from any of the sequences according to SEQ ID No. 14, SEQ ID No. 16, SEQ ID No. 18, and SEQ ID No. 20, or
the VH domain sequence according to SEQ ID No. 15 and a VL domain sequence
selected from any of the sequences according to SEQ ID No. 14, SEQ ID No. 16, SEQ ID No. 18, and SEQ ID No. 20, or
the VH domain sequence according to SEQ ID No. 17 and a VL domain sequence
selected from any of the sequences according to SEQ ID No. 14, SEQ ID No. 16, SEQ ID No. 18, and SEQ ID No. 20, or
the VH domain sequence according to SEQ ID No. 19 and a VL domain sequence
selected from any of the sequences according to SEQ ID No. 14, SEQ ID No. 16, SEQ ID No. 18, and SEQ ID No. 20.
7. Humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, according to claim 3, wherein the heavy chain comprises any of the sequences SEQ ID No. 21, SEQ ID No. 23, SEQ ID No. 25, or SEQ ID No. 27.
8. Humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, according to claim 5, wherein the light chain comprises any of the sequences SEQ ID Nos. 22, SEQ ID No. 24, SEQ ID No. 26, or SEQ ID No. 28.
9. Humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, comprising at least one heavy chain comprising any of the sequences SEQ ID Nos.

21, 23, 25 or 27, and at least one light chain comprising any of the sequences SEQ ID Nos. 22, 24, 26 or 28.

10. Humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, comprising at least one heavy chain comprising SEQ ID No. 27 and at least one light chain comprising SEQ ID No. 28.
11. Humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, according to any of the aforementioned claims, binding to the extracellular domain of PSMA with an affinity of $EC_{50} < 0.4 \mu\text{g/ml}$.
12. Humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, according to any of the aforementioned claims, wherein said prostate specific membrane antigen is human prostate specific membrane antigen.
13. Humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, according to any of the aforementioned claims, wherein the antibody is of the isotype IgG.
14. Humanized antigen-binding fragment according to any of the aforementioned claims, wherein the antibody fragment is selected from the group consisting of a variable domain (Fv), a Fab fragment and an F(ab)₂ fragment, or, wherein the antigen-binding portion is a single-chain Fv (scFv).
15. An antibody-drug conjugate (ADC) comprising the humanized antibody, or an antigen-binding fragment or antigen-binding portion thereof, according to any of the aforementioned claims, conjugated to a therapeutic agent, optionally via a linker moiety.
16. A pharmaceutical formulation comprising a humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, according to any of the aforementioned claims, together with at least a pharmaceutically acceptable carrier, wherein the formulation is suitable for at least intravenous, intramuscular or subcutaneous administration.

17. Use of the humanized antibody, or antigen-binding fragment or antigen-binding portion thereof, according to any of the claims 1-14, or the pharmaceutical formulation according to claim 16, for the manufacture of a medicament for the treatment of prostate cancer.
18. A nucleic acid encoding for a humanized antibody, an antigen-binding fragment or antigen-binding portion thereof, according to any of claims 1-14.
19. A host cell capable of producing a humanized antibody, an antigen-binding fragment or antigen-binding portion thereof, according to any of claims 1-14, wherein the host cell is a mammalian cell.
20. A host cell according to claim 19, wherein the mammalian cell is a CHO cell line.