Claims

1. An isolated antibody, or an antigen binding fragment thereof, which specifically binds to BCMA, wherein the antibody comprises:

a VH region comprising a VH CDR1, VH CDR2, and VH CDR3 of the VH sequence shown in SEQ ID NO: 2, 3, 7, 8, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 37, 39, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 83, 87, 92, 95, 97, 99, 101, 104, 106, 110, 112, 114, 118, 120, 122, 125, 127, 363, or 365; and

a VL region comprising a VL CDR1, VL CDR2, and VL CDR3 of the VL sequence shown in SEQ ID NO: 1, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 34, 36, 38, 40, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 317, 80, 81, 82, 84, 85, 86, 88, 89, 90, 91, 93, 94, 96, 98, 100, 102, 103, 105, 107, 108, 109, 111, 113, 115, 116, 117, 119, 121, 123, 124, 126, 128, or 364.

2. The antibody or the antigen binding fragment of claim 1, wherein the VH region comprises (i) a VH CDR1 comprising SEQ ID NO:150, 151, 152, 156, or 157; (ii) a VH CDR2 comprising SEQ ID NO: 169, 154, 194, 159, 195, 196, 162, 158, 198, 177, 178, 199, 200, 201, 202, 203, 204, 206, 207, 208, 172, 203, or 204; and (iii) a VH CDR3 comprising SEQ ID NO: 155, 161, 197, 205, or 164; and wherein the VL region comprises (i) a VL CDR1 comprising SEQ ID NO: 209, 271, 273, 275, 251, 277, 260, 279, 245, 283, 285, 287, 290, 292, 235, 297, or 299; (ii) a VL CDR2 comprising SEQ ID NO: 221; and (iii) a VL CDR3 comprising SEQ ID NO: 225, 272, 274, 276, 278, 280, 281, 282, 284, 286, 288, 289, 291, 293, 294, 229, 296, 298, or 300.

3. The antibody or the antigen binding fragment of claim 2, wherein the VH region comprises (i) a VH CDR1 comprising SEQ ID NO: 151, 156, or 157; (ii) a VH CDR2 comprising SEQ ID NO: 158 or 159; and (iii) a VH CDR3 comprising SEQ ID NO: 155; and wherein the VL region comprises (i) a VL CDR1 comprising SEQ ID NO: 209; (ii) a VL CDR2 comprising SEQ ID NO: 221; and (iii) a VL CDR3 comprising SEQ ID NO: 225.

4. The antibody or the antigen binding fragment of claim 3, wherein the VH region comprises the sequence shown in SEQ ID NO: 112 or a variant with one or several conservative amino acid substitutions in residues that are not within a CDR and the VL region comprises the amino acid sequence shown in SEQ ID NO: 38 or a variant thereof with one or several amino acid substitutions in amino acids that are not within a CDR.

5. The antibody or the antigen binding fragment of claim 4, wherein the antibody comprises a light chain comprising the sequence shown in SEQ ID NO: 357 and a heavy chain comprising the sequence shown in SEQ ID NO: 358.

6. The antibody or the antigen binding fragment of claim 2, wherein the antibody comprises a VH region produced by the expression vector with ATCC Accession No. PTA-122094.

7. The antibody or the antigen binding fragment of claim 2, wherein the antibody comprises a VL region produced by the expression vector with ATCC Accession No. PTA-122093.

8. A pharmaceutical composition comprising a therapeutically effective amount of the antibody or antigen binding fragment of claim 1 and a pharmaceutically acceptable carrier.