multiple myeloma each year and almost 11,000 MM patients die each year. Despite advances in therapy, multiple myeloma remains an incurable disease, see Jemal A, *et al. CA Cancer J Clin.* 2008;58:71-96; Kyle RA, *et al. Mayo Clin Proc.* 2003;778:21-33; Bergsagel DE, *et al. Blood.* 1999, 94:1174-1182.

Summary

In a first aspect, the present invention refers to an isolated BCMA-binding antibody, or a BCMA-binding fragment thereof, a Vh-CDR1 comprising SEQ ID NO:4, a Vh-CDR2 comprising SEQ ID NO:5, a Vh-CDR3 comprising SEQ ID NO:6, a Vl-CDR1 comprising SEQ ID NO:106, a Vl-CDR2 comprising SEQ ID NO:107, and a Vl-CDR3 comprising SEQ ID NO:108. In a second aspect, the present invention refers to a pharmaceutical composition comprising the antibody or fragment of the present invention, a pharmaceutically acceptable diluent, carrier, solubilizer, emulsifier, and/or a preservative. In a third aspect, the present invention refers to a use of a composition of the present invention in the manufacture of a medicament for treating a disease, wherein the disease is selected from the group consisting of: B-cell cancers, multiple myeloma, malignant plasma cell neoplasms, Kahler's disease and Myelomatosis; Plasma cell leukemia; Plasmacytoma; B-cell prolymphocytic leukemia; Hairy cell leukemia; B-cell non-Hodgkin's lymphoma (NHL); Acute myeloid leukemia (AML); Chronic myeloid leukemia (CML); Acute lymphocytic leukemia (ALL); Chronic lymphocytic leukemia (CLL); Follicular lymphoma (including follicular non-Hodgkin's lymphoma types); Burkitt's lymphoma (Endemic Burkitt's lymphoma; Sporadic Burkitt's lymphoma); Marginal zone lymphoma (Mucosa-Associated Lymphoid Tissue; MALT / MALToma; Monocytoid B cell lymphoma; Splenic lymphoma with villous lymphocytes); Mantle cell lymphoma; Large cell lymphoma (Diffuse large cell; Diffuse Mixed Cell; Immunoblastic Lymphoma; Primary Mediastinal B Cell Lymphoma; Angiocentric Lymphoma - pulmonary B cell); Small lymphocytic lymphoma (SLL); Precursor B-lymphoblastic lymphoma; Myeloid leukemia (granulocytic; myelogenous; Acute myeloid leukemia; Chronic myeloid leukemia; Subacute myeloid leukemia; Myeloid sarcoma; Chloroma; Granulocytic sarcoma; Acute promyelocytic leukemia; Acute myelomonocytic leukemia); Waldenstrom's macroglobulinemia, and other B-cell lymphoma. In a fourth aspect, the present invention refers to an isolated polynucleotide, wherein said polynucleotide encodes the light chain, the heavy chain, or the light chain and the heavy chain of the antibody or fragment of the present invention. In a fifth aspect, the present invention refers to a plasmid, comprising the polynucleotide of the present invention. In a sixth aspect, the present invention refers to an isolated cell, comprising said plasmid of claim 17, wherein said cell is a prokaryotic cell; a eukaryotic cell; a mammalian cell; an insect cell; or a CHO cell. In a seventh aspect, the present invention refers to a method of making a BCMA-binding antibody, or a BCMA-binding fragment thereof, comprising incubating said isolated cell of the present invention under conditions that allow it to express said antibody or polypeptide. In an eight aspect, the present invention refers to an isolated monoclonal antibody

that specifically binds to SEQ ID NO:285 and SEQ ID NO:286, but does not specifically bind SEQ ID NO:351. In a ninth aspect, the present invention refers to an isolated monoclonal antibody that specifically binds to SEQ ID NO:352, but does not specifically bind SEQ ID NO:351. In a tenth aspect, the present invention refers to an isolated monoclonal antibody that binds a neutralizing determinant comprising amino acids 1 though 20 (inclusive) of SEQ ID NO: 285. In an eleventh aspect, the present invention refers to an isolated monoclonal antibody that binds a neutralizing determinant comprising amino acids 1 through 11 (inclusive) of SEQ ID NO: 285. In a twelve aspect, the present invention refers to an isolated BCMA-binding antibody or BCMA-binding fragment thereof, wherein said antibody interacts with Gly6, Gln7, Phe14, Asp15, Ser16, Leu17, and His19 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 0 to 3.4 Å (inclusive).

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 shows the amino acid sequence of human BCMA (SEQ ID NO:285) and cynomolgus (Macaca fascicularis) BCMA (SEQ ID NO:286).

FIGURE 2 is a schematic of one embodiment of an antibody drug conjugate showing the structures of an exemplary linker and toxin.

FIGURE 3 shows that BCMA mRNA is expressed on >99% of multiple myeloma patient samples.

FIGURES 4A and B are schematics of the monoclonal antibody generation, screening, and characterization for the two campaigns.

FIGURES 5A-C are data tables for the monoclonal antibody generation, screening, and characterization for the two campaigns.

FIGURE 6 shows binding of the 2A1 and 1E1 mAbs to the myeloma cell line H929.

FIGURE 7 shows the 2A1 mAb bound BCMA on various myeloma and B-cell lines.

FIGURE 8 is a graph of the ADCC activity for the 2A1 and 1E1 antibodies (EC_{50} of 11 ng/ml for 2A1 and 76 ng/ml for 1E1).

FIGURE 9 shows that the 2A1 antibody was readily internalized following binding to BCMA on H929 cells.

FIGURE 10 is various 2A1-MCC-DM1 ADCs analyzed by mass spectrometry.

FIGURE 11 depicts two different antibodies (2A1 and 1E) that were conjugated with different linkers and maytansine molecules and analyzed for their capacity to kill myeloma cells.

FIGURES 12A-F shows 2A1-MCC-DM1 ADC was tested against various multiple myeloma cell lines, including H929, U266, MMIR, MMIS, the EW36 B-cell lymphoma cell line, and the RAMOS Burkitt's lymphoma cell line.

FIGURE 13 graphically illustrates that various cell lines exposed to free DM1 are in fact killed by free DM1.

FIGURES 14A and B show the Tm for various 2A1 mAb covariance muteins.

FIGURE 15 is a graph showing the binding of various 2A1 mAb covariance muteins to H919 cells.

FIGURES 16A and B show that some 2A1 mutein antibodies retained comparable binding to BCMA relative to parental 2A1 (2A1WT), whereas the 2A1 covariance 3, 8, 9 and 11-19 antibodies had reduced binding to BCMA.

FIGURE 17 shows the comparative ADCC activity of various 2A1 mAb covariance muteins.

CLAIMS

We claim:

1. An isolated antibody, or BCMA-binding fragment thereof, selected from the group consisting of:

an antibody comprising the six CDRs of Ab-1;
an antibody comprising the six CDRs of Ab-2;
an antibody comprising the six CDRs of Ab-3;
an antibody comprising the six CDRs of Ab-4;
an antibody comprising the six CDRs of Ab-5;
an antibody comprising the six CDRs of Ab-6;
an antibody comprising the six CDRs of Ab-7;
an antibody comprising the six CDRs of Ab-8;
an antibody comprising the six CDRs of Ab-9;
an antibody comprising the six CDRs of Ab-10;
an antibody comprising the six CDRs of Ab-11;
an antibody comprising the six CDRs of Ab-12;
an antibody comprising the six CDRs of Ab-13;
an antibody comprising the six CDRs of Ab-14;
an antibody comprising the six CDRs of Ab-15;
an antibody comprising the six CDRs of Ab-16;
an antibody comprising the six CDRs of Ab-17;
an antibody comprising the six CDRs of Ab-18;
an antibody comprising the six CDRs of Ab-19;
an antibody comprising the six CDRs of Ab-20;
an antibody comprising the six CDRs of Ab-21;
an antibody comprising the six CDRs of Ab-22;
an antibody comprising the six CDRs of Ab-23;
an antibody comprising the six CDRs of Ab-24;
an antibody comprising the six CDRs of Ab-25;
an antibody comprising the six CDRs of Ab-26;
an antibody comprising the six CDRs of Ab-27;
an antibody comprising the six CDRs of Ab-28;
an antibody comprising the six CDRs of Ab-29;
an antibody comprising the six CDRs of Ab-30;
an antibody comprising the six CDRs of Ab-31;
an antibody comprising the six CDRs of Ab-32;
an antibody comprising the six CDRs of Ab-33;

an antibody comprising the six CDRs of Ab-34;
an antibody comprising the six CDRs of Ab-35;
an antibody comprising the six CDRs of Ab-36;
an antibody comprising the six CDRs of Ab-37; and
an antibody comprising the six CDRs of Ab-38.

2. The antibody or fragment of claim 1, wherein said antibody or fragment is selected from the group consisting of:
an antibody comprising the six CDRs of Ab-1;
an antibody comprising the six CDRs of Ab-2; and
an antibody comprising the six CDRs of Ab-3.

3. The antibody or fragment of claim 1 or 2, wherein said antibody or fragment is an antibody comprising the six CDRs of Ab-1.

4. The antibody or fragment of claims 1-3, wherein said CDRs of Ab-1 comprises a Vh-CDR1 comprising SEQ ID NO:4, a Vh-CDR2 comprising SEQ ID NO:5, a Vh-CDR3 comprising SEQ ID NO:6, a Vl-CDR1 comprising SEQ ID NO:106, a Vl-CDR2 comprising SEQ ID NO:107, and a Vl-CDR3 comprising SEQ ID NO:108; wherein said CDRs of Ab-2 comprise a Vh-CDR1 comprising SEQ ID NO:10, a Vh-CDR2 comprising SEQ ID NO:11, a Vh-CDR3 comprising SEQ ID NO:12, a Vl-CDR1 comprising SEQ ID NO:112, a Vl-CDR2 comprising SEQ ID NO:113, and a Vl-CDR3 comprising SEQ ID NO:114; wherein said CDRs of Ab-3 comprise a Vh-CDR1 comprising SEQ ID NO:16, a Vh-CDR2 comprising SEQ ID NO:17, a Vh-CDR3 comprising SEQ ID NO:18, a Vl-CDR1 comprising SEQ ID NO:118, a Vl-CDR2 comprising SEQ ID NO:119, and a Vl-CDR3 comprising SEQ ID NO:120; wherein said CDRs of Ab-4 comprise a Vh-CDR1 comprising SEQ ID NO:22, a Vh-CDR2 comprising SEQ ID NO:23, a Vh-CDR3 comprising SEQ ID NO:24, a Vl-CDR1 comprising SEQ ID NO:124, a Vl-CDR2 comprising SEQ ID NO:125, and a Vl-CDR3 comprising SEQ ID NO:126; wherein said CDRs of Ab-5 comprises a Vh-CDR1 comprising SEQ ID NO:28, a Vh-CDR2 comprising SEQ ID NO:29, a Vh-CDR3 comprising SEQ ID NO:30, a Vl-CDR1 comprising SEQ ID NO:130, a Vl-CDR2 comprising SEQ ID NO:131, and a Vl-CDR3 comprising SEQ ID NO:132; wherein said CDRs of Ab-6 comprise a Vh-CDR1 comprising SEQ ID NO:34, a Vh-CDR2 comprising SEQ ID NO:35, a Vh-CDR3 comprising SEQ ID NO:36, a Vl-CDR1 comprising SEQ ID NO:136, a Vl-CDR2 comprising SEQ ID NO:137, and a Vl-CDR3 comprising SEQ ID NO:138; wherein said CDRs of Ab-7 comprise a Vh-CDR1 comprising SEQ ID NO:40, a Vh-CDR2 comprising SEQ ID NO:41, a Vh-CDR3 comprising SEQ ID NO:42, a Vl-CDR1 comprising SEQ ID NO:142, a Vl-CDR2 comprising SEQ ID NO:143, and a Vl-CDR3 comprising SEQ ID NO:144; wherein said CDRs of Ab-8 comprise a Vh-CDR1 comprising SEQ ID NO:46, a

Vh-CDR2 comprising SEQ ID NO:47, a Vh-CDR3 comprising SEQ ID NO:48, a Vl-CDR1 comprising SEQ ID NO:148, a Vl-CDR2 comprising SEQ ID NO:149, and a Vl-CDR3 comprising SEQ ID NO:150; wherein said CDRs of Ab-9 comprise a Vh-CDR1 comprising SEQ ID NO:52, a Vh-CDR2 comprising SEQ ID NO:53, a Vh-CDR3 comprising SEQ ID NO:54, a Vl-CDR1 comprising SEQ ID NO:154, a Vl-CDR2 comprising SEQ ID NO:155, and a Vl-CDR3 comprising SEQ ID NO:156; wherein said CDRs of Ab-10 comprise a Vh-CDR1 comprising SEQ ID NO:58, a Vh-CDR2 comprising SEQ ID NO:59, a Vh-CDR3 comprising SEQ ID NO:60, a Vl-CDR1 comprising SEQ ID NO:160, a Vl-CDR2 comprising SEQ ID NO:161, and a Vl-CDR3 comprising SEQ ID NO:162; wherein said CDRs of Ab-11 comprise a Vh-CDR1 comprising SEQ ID NO:64, a Vh-CDR2 comprising SEQ ID NO:65, a Vh-CDR3 comprising SEQ ID NO:66, a Vl-CDR1 comprising SEQ ID NO:166, a Vl-CDR2 comprising SEQ ID NO:167, and a Vl-CDR3 comprising SEQ ID NO:168; wherein said CDRs of Ab-12 comprise a Vh-CDR1 comprising SEQ ID NO:70, a Vh-CDR2 comprising SEQ ID NO:71, a Vh-CDR3 comprising SEQ ID NO:72, a Vl-CDR1 comprising SEQ ID NO:172, a Vl-CDR2 comprising SEQ ID NO:173, and a Vl-CDR3 comprising SEQ ID NO:174; wherein said CDRs of Ab-13 comprise a Vh-CDR1 comprising SEQ ID NO:76, a Vh-CDR2 comprising SEQ ID NO:77, a Vh-CDR3 comprising SEQ ID NO:78, a Vl-CDR1 comprising SEQ ID NO:178, a Vl-CDR2 comprising SEQ ID NO:179, and a Vl-CDR3 comprising SEQ ID NO:180; wherein said CDRs of Ab-14 comprise a Vh-CDR1 comprising SEQ ID NO:82, a Vh-CDR2 comprising SEQ ID NO:83, a Vh-CDR3 comprising SEQ ID NO:84, a Vl-CDR1 comprising SEQ ID NO:184, a Vl-CDR2 comprising SEQ ID NO:185, and aVl-CDR3 comprising SEQ ID NO:186; wherein said CDRs of Ab-15 comprise a Vh-CDR1 comprising SEQ ID NO:88, a Vh-CDR2 comprising SEQ ID NO:89, a Vh-CDR3 comprising SEQ ID NO:90, a Vl-CDR1 comprising SEQ ID NO:190, a Vl-CDR2 comprising SEQ ID NO:191, and a Vl-CDR3 comprising SEQ ID NO:192; wherein said CDRs of Ab-16 comprise a Vh-CDR1 comprising SEQ ID NO:94, a Vh-CDR2 comprising SEQ ID NO:95, a Vh-CDR3 comprising SEQ ID NO:96, a Vl-CDR1 comprising SEQ ID NO:196, a Vl-CDR2 comprising SEQ ID NO:197, and a Vl-CDR3 comprising SEQ ID NO:198; and wherein said CDRs of Ab-17 comprise a Vh-CDR1 comprising SEQ ID NO:100, a Vh-CDR2 comprising SEQ ID NO:101, a Vh-CDR3 comprising SEQ ID NO:102, a Vl-CDR1 comprising SEQ ID NO:202, a Vl-CDR2 comprising SEQ ID NO:203, and a Vl-CDR3 comprising SEQ ID NO:204.

5. The antibody or fragment of claims 1-4, wherein said CDRs of Ab-1 comprises a Vh-CDR1 comprising SEQ ID NO:4, a Vh-CDR2 comprising SEQ ID NO:5, a Vh-CDR3 comprising SEQ ID NO:6, a Vl-CDR1 comprising SEQ ID NO:106, a Vl-CDR2 comprising SEQ ID NO:107, and a Vl-CDR3 comprising SEQ ID NO:108; wherein said CDRs of Ab-2 comprise a Vh-CDR1 comprising SEQ ID NO:10, a Vh-CDR2 comprising SEQ ID NO:11, a Vh-CDR3 comprising SEQ ID NO:12, a Vl-CDR1 comprising SEQ ID NO:112, a Vl-CDR2 comprising SEQ ID NO:113, and a Vl-CDR3

comprising SEQ ID NO:114; and wherein said CDRs of Ab-3 comprise a Vh-CDR1 comprising SEQ ID NO:16, a Vh-CDR2 comprising SEQ ID NO:17, a Vh-CDR3 comprising SEQ ID NO:18, a Vl-CDR1 comprising SEQ ID NO:118, a Vl-CDR2 comprising SEQ ID NO:119, and a Vl-CDR3 comprising SEQ ID NO:120.

6. The antibody or fragment of claims 1-5, wherein said CDRs of Ab-1 comprises a Vh-CDR1 comprising SEQ ID NO:4, a Vh-CDR2 comprising SEQ ID NO:5, a Vh-CDR3 comprising SEQ ID NO:6, a Vl-CDR1 comprising SEQ ID NO:106, a Vl-CDR2 comprising SEQ ID NO:107, and a Vl-CDR3 comprising SEQ ID NO:108.

7. The antibody or fragment of claims 1-6, wherein said antibody or fragment comprises an Ab-1Vl domain comprising SEQ ID NO:240 and an Ab-1Vh domain comprising SEQ ID NO:206; wherein said antibody or fragment comprises an Ab-2Vl domain comprising SEQ ID NO:242 and an Ab-2Vh domain comprising SEQ ID NO:208; wherein said antibody or fragment comprises an Ab-3Vl domain comprising SEQ ID NO:244 and an Ab-3Vh domain comprising SEQ ID NO:210; wherein said antibody or fragment comprises an Ab-4Vl domain comprising SEQ ID NO:246 and an Ab-4Vh domain comprising SEQ ID NO:212; wherein said antibody or fragment comprises an Ab-5Vl domain comprising SEQ ID NO:248 and an Ab-5Vh domain comprising SEQ ID NO:214; wherein said antibody or fragment comprises an Ab-6Vl domain comprising SEQ ID NO:250 and an Ab-6Vh domain comprising SEQ ID NO:216; wherein said antibody or fragment comprises an Ab-7Vl domain comprising SEQ ID NO:252 and an Ab-7Vh domain comprising SEQ ID NO:218; wherein said antibody or fragment comprises an Ab-8Vl domain comprising SEQ ID NO:254 and an Ab-8Vh domain comprising SEQ ID NO:220; wherein said antibody or fragment comprises an Ab-9Vl domain comprising SEQ ID NO:256 and an Ab-9Vh domain comprising SEQ ID NO:222; wherein said antibody or fragment comprises an Ab-10Vl domain comprising SEQ ID NO:258 and an Ab-10Vh domain comprising SEQ ID NO:224; wherein said antibody or fragment comprises an Ab-11Vl domain comprising SEQ ID NO:260 and an Ab-11Vh domain comprising SEQ ID NO:226; wherein said antibody or fragment comprises an Ab-12Vl comprising SEQ ID NO:262 and an Ab-12Vh domain comprising SEQ ID NO:228; wherein said antibody or fragment comprises an Ab-13Vl domain comprising SEQ ID NO:264 and an Ab-13Vh domain comprising SEQ ID NO:230; wherein said antibody or fragment comprises an Ab-14Vl domain comprising SEQ ID NO:266 and an Ab-14Vh domain comprising SEQ ID NO:232; wherein said antibody or fragment comprises an Ab-15Vl domain comprising SEQ ID NO:268 and an Ab-15Vh domain comprising SEQ ID NO:234; wherein said antibody or fragment comprises an Ab-16Vl domain comprising SEQ ID NO:270 and an Ab-16Vh domain comprising SEQ ID NO:236; and wherein said antibody or fragment comprises an Ab-17Vl domain comprising SEQ ID NO:272 and an Ab-17Vh domain comprising SEQ ID NO:238) domain.

8. The antibody or fragment of claims 1-7, wherein said antibody or fragment comprises an Ab-1Vl domain comprising SEQ ID NO:240 and an Ab-1Vh domain comprising SEQ ID NO:206; wherein said antibody or fragment comprises an Ab-2Vl domain comprising SEQ ID NO:242 and an Ab-2Vh domain comprising SEQ ID NO:208; and wherein said antibody or fragment comprises an Ab-3Vl domain comprising SEQ ID NO:244 and an Ab-3Vh domain comprising SEQ ID NO:210.

9. The antibody or fragment of claims 1-8, wherein said antibody or fragment comprises an Ab-1Vl domain comprising SEQ ID NO:240 and an Ab-1Vh domain comprising SEQ ID NO:206.

10. The antibody or fragment of claims 1-9, wherein said antibody or fragment comprises an Ab-1 light chain comprising SEQ ID NO:280 and Ab-1 heavy chain comprising SEQ ID NO:274; wherein said antibody or fragment comprises an Ab-2 light chain comprising SEQ ID NO:282 and an Ab-2 heavy chain comprising SEQ ID NO:276; wherein said antibody or fragment comprises an Ab-3 light chain comprising SEQ ID NO:284 and an Ab-3 heavy chain comprising SEQ ID NO:278; wherein said antibody or fragment comprises two Ab-1 light chains comprising SEQ ID NO:280 and two Ab-1 heavy chains comprising SEQ ID NO:274; wherein said antibody or fragment comprises two Ab-2 light chains comprising SEQ ID NO:282 and two Ab-2 heavy chains comprising SEQ ID NO:276; and wherein said antibody or fragment comprises two Ab-3 light chains comprising SEQ ID NO:284 and two Ab-3 heavy chains comprising SEQ ID NO:278).

11. The antibody or fragment of claims 1-10, wherein said antibody or fragment comprises an Ab-1 light chain comprising SEQ ID NO:280 and Ab-1 heavy chain comprising SEQ ID NO:274; and wherein said antibody or fragment comprises two Ab-1 light chains comprising SEQ ID NO:280 and two Ab-1 heavy chains comprising SEQ ID NO:274.

12. The antibody or fragment of claims 1-11, wherein said antibody or fragment comprises two Ab-1 light chains comprising SEQ ID NO:280 and two Ab-1 heavy chains comprising SEQ ID NO:274.

13. The antibody or fragment of claims 1-12, wherein said antibody or fragment is human.

14. The antibody or fragment of claims 1-13, wherein said antibody or fragment is a human monoclonal antibody.

15. The antibody or fragment of claims 1-12, wherein said antibody or fragment is a chimeric monoclonal antibody.

16. The antibody or fragment of claims 1-15, wherein said antibody or fragment specifically binds human BCMA.

17. The antibody or fragment of claims 1-16, wherein said antibody or fragment specifically binds human BCMA and cross-reacts to cynomolgus BCMA.

18. The antibody or fragment of claims 1-17, wherein said antibody or fragment does not specifically bind to TACI or BAFF-R.

19. The antibody or fragment of claims 1-18, wherein said antibody or fragment binds BCMA on the surface of human myeloma cells.

20. The antibody or fragment of claims 1-19, wherein said antibody or fragment binds BCMA on the surface of human multiple myeloma cells.

21. The antibody or fragment of claims 1-20, wherein said antibody or fragment binds BCMA on the surface of human cells and is internalized by said cells.

22. The antibody or fragment of claims 1-21, wherein said antibody or fragment further comprises a linker.

23. The antibody or fragment of claims 1-22, wherein said antibody or fragment further comprises a drug or chemotherapeutic agent.

24. The antibody or fragment of claims 1-23, wherein said antibody or fragment further comprises a linker selected from the group consisting of: 6-maleimidocaproyl, maleimidopropanoyl, valine-citrulline, alanine-phenylalanine, p-aminobenzyloxycarbonyl, Mal-dPEG4-NHS, N-succinimidyl 4-(2-pyridylthio) pentanoate ("SPP"), N-succinimidyl 4-(N-maleimidomethyl) cyclohexane-1 carboxylate ("SMCC" or "MCC"), and N-succinimidyl (4-iodo-acetyl) aminobenzoate ("SIAB").

25. The antibody or fragment of claims 1-24, wherein said antibody or fragment further comprises a linker wherein said linker is N-succinimidyl 4-(N-maleimidomethyl) cyclohexane-1 carboxylate ("SMCC" or "MCC").

26. The antibody or fragment of claims 1-25, wherein said antibody or fragment further comprises a drug or chemotherapeutic agent selected from the group consisting of: thiotepa and cyclophosphamide (CYTOXAN.TM.); alkyl sulfonates such as busulfan, improsulfan and piposulfan; aziridines, such as benzodopa, carboquone, meturedopa, and uredopa; ethylenimines and methylamelamines including altretamine, triethylenemelamine, trietylenephosphoramide, triethylenethiophosphaoramide and trimethylolomelamine; acetogenins (especially bullatacin and bullatacinone); a camptothecin (including the synthetic analogue topotecan); bryostatin; callystatin; CC-1065 (including its adozelesin, carzelesin and bizelesin synthetic analogues); cryptophycins (particularly cryptophycin 1 and cryptophycin 8); dolastatin; duocarmycin (including the synthetic analogues, KW-2189 and CBI-TMI); eleutherobin; pancratistatin; a sarcodictyin; spongistatin; nitrogen mustards such as chlorambucil, chlomaphazine, cholophosphamide, estramustine, ifosfamide, mechlorethamine, mechlorethamine oxide hydrochloride, melphalan, novembichin, phenesterine, prednimustine, trofosfamide, uracil mustard; nitrosureas such as carmustine, chlorozotocin, fotemustine, lomustine, nimustine, ranimustine; antibiotics, such as the enediyne antibiotics (e.g. calicheamicin, especially calicheamicin .gamma1 and calicheamicin theta I, see, e.g., Angew Chem. Intl. Ed. Engl. 33:183-186 (1994); dynemicin, including dynemicin A; an esperamicin; as well as neocarzinostatin chromophore and related chromoprotein enediyne antiobiotic chromomophores), aclacinomysins, actinomycin, authramycin, azaserine, bleomycins, cactinomycin, carabicin, caminomycin, carzinophilin; chromomycins, dactinomycin, daunorubicin, detorubicin, 6-diazo-5-oxo-L-norleucine, doxorubicin (including morpholino-doxorubicin, cyanomorpholino-doxorubicin, 2-pyrrolino-doxorubicin and deoxydoxorubicin), epirubicin, esorubicin, idarubicin, marcellomycin, nitomycins, mycophenolic acid, nogalamycin, olivomycins, peplomycin, potfiromycin, puromycin, quelamycin, rodorubicin, streptonigrin, streptozocin, tubercidin, ubenimex, zinostatin, zorubicin; anti-metabolites, such as methotrexate and 5-fluorouracil (5-FU); folic acid analogues, such as denopterin, methotrexate, pteropterin, trimetrexate; purine analogs, such as fludarabine, 6-mercaptopurine, thiamiprine, thioguanine; pyrimidine analogs such as, ancitabine, azacitidine, 6-azauridine, carmofur, cytarabine, dideoxyuridine, doxifluridine, enocitabine, floxuridine, 5-FU; androgens, such as calusterone, dromostanolone propionate, epitiostanol, mepitiostane, testolactone; anti-adrenals, such as aminoglutethimide, mitotane, trilostane; folic acid replenisher, such as frolinic acid; aceglatone; aldophosphamide glycoside; aminolevulinic acid; amsacrine; bestrabucil; bisantrene; edatraxate; defofamine; demecolcine; diaziquone; elfomithine; elliptinium acetate; an epothilone; etoglucid; gallium nitrate; hydroxyurea; lentinan; lonidamine; maytansinoids, such as maytansine and ansamitocins; mitoguazone; mitoxantrone; mopidamol; nitracrine; pentostatin; phenamet; pirarubicin; podophyllinic acid; 2-ethylhydrazide; procarbazine; PSK.RTM.; razoxane; rhizoxin; sizofuran; spirogermanium; tenuazonic acid; triaziquone; 2,2',2''-trichlorotriethylamine; trichothecenes (especially T-2 toxin, verracurin A, roridin A and anguidine); urethan; vindesine; dacarbazine; mannomustine; mitobronitol; mitolactol; pipobroman; gacytosine;

arabinoside ("Ara-C"); cyclophosphamide; thiotepa; taxoids, e.g. paclitaxel (TAXOL.TM., Bristol-Myers Squibb Oncology, Princeton, N.J.) and doxetaxel (TAXOTERE.RTM., Rhone-Poulenc Rorer, Antony, France); chlorambucil; gemcitabine; 6-thioguanine; mercaptopurine; methotrexate; platinum analogs such as cisplatin and carboplatin; vinblastine; platinum; etoposide (VP-16); ifosfamide; mitomycin C; mitoxantrone; vincristine; vinorelbine; navelbine; novantrone; teniposide; daunomycin; aminopterin; xeloda; ibandronate; CPT-11; topoisomerase inhibitor RFS 2000; difluoromethylomithine (DMFO); retinoic acid; capecitabine; tamoxifen, raloxifene, aromatase inhibiting 4(5)-imidazoles, 4-hydroxytamoxifen, trioxifene, keoxifene, LY117018, onapristone, and toremifene (Fareston); and anti-androgens, such as flutamide, nilutamide, bicalutamide, leuprolide, goserelin, Colchicine-site Binders (Curacin), Combretastatins (AVE806, Combretastatin A-4 prodrug (CA4P), Oxi-4503), Cryptophycins (LY355703), Discodermolide, Dolastatin and Analogs (Auristatin PHE, Dolastatin 10, ILX-651, Symplostatin 1, TZT-1027), Epothilones (BMS-247550, BMS-310705, EP0906, KOS-862, ZK-EPO), Eleutherobin, FR182877, Halichondrin B (E7389), Halimide (NPI-2352 and NPI-2358), Hemiasterlins (HTI-286), Laulimalide, Maytansinoids ("DM1," "DM3" or "DM4") (Bivatuzumab mertansine, Cantuzumab mertansine, huN901-DM1/BB-10901TAP, MLN591DM1, My9-6-DM1, Trastuzumab-DM1), PC-SPES, Peloruside A, Resveratrol, S-allylmercaptocysteine (SAMC), Spongistatins, Vitilevuamide, Molecular Motor-Kinesins (SB-715992), Designed Colchicine-Site Binders (A-289099, A-293620/A-318315, ABT-751/E7010, D-24851/D-64131, ZD6126), Other Novel Spindle Poisons (2-Methoxyestradiol (2-ME2), Bezimidazole Carbamates (ANG 600 series, Mebendazole), CP248/CP461, HMN-214, R440, SDX-103, T67/T607).

27. The antibody or fragment of claims 1-26, wherein said antibody or fragment further comprises a drug or chemotherapeutic agent selected from the group consisting of: Maytansinoids ("DM1," "DM3" or "DM4").

28. The antibody or fragment of claims 1-27, wherein said antibody or fragment further comprises DM1.

29. The antibody or fragment of claims 1-28, wherein said antibody or fragment has a drug to antibody ratio of between 1 and 10.

30. The antibody or fragment of claims 1-29, wherein said antibody or fragment has a drug to antibody ratio of between 2 and 5.

31. An isolated polypeptide, or BCMA-binding fragment thereof, selected from the group consisting of:
a polypeptide comprising the six CDRs of Ab-1;

a polypeptide comprising the six CDRs of Ab-2;
a polypeptide comprising the six CDRs of Ab-3;
a polypeptide comprising the six CDRs of Ab-4;
a polypeptide comprising the six CDRs of Ab-5;
a polypeptide comprising the six CDRs of Ab-6;
a polypeptide comprising the six CDRs of Ab-7;
a polypeptide comprising the six CDRs of Ab-8;
a polypeptide comprising the six CDRs of Ab-9;
a polypeptide comprising the six CDRs of Ab-10;
a polypeptide comprising the six CDRs of Ab-11;
a polypeptide comprising the six CDRs of Ab-12;
a polypeptide comprising the six CDRs of Ab-13;
a polypeptide comprising the six CDRs of Ab-14;
a polypeptide comprising the six CDRs of Ab-15;
a polypeptide comprising the six CDRs of Ab-16;
a polypeptide comprising the six CDRs of Ab-17;
a polypeptide comprising the six CDRs of Ab-18;
a polypeptide comprising the six CDRs of Ab-19;
a polypeptide comprising the six CDRs of Ab-20;
a polypeptide comprising the six CDRs of Ab-21;
a polypeptide comprising the six CDRs of Ab-22;
a polypeptide comprising the six CDRs of Ab-23;
a polypeptide comprising the six CDRs of Ab-24;
a polypeptide comprising the six CDRs of Ab-25;
a polypeptide comprising the six CDRs of Ab-26;
a polypeptide comprising the six CDRs of Ab-27;
a polypeptide comprising the six CDRs of Ab-28;
a polypeptide comprising the six CDRs of Ab-29;
a polypeptide comprising the six CDRs of Ab-30;
a polypeptide comprising the six CDRs of Ab-31;
a polypeptide comprising the six CDRs of Ab-32;
a polypeptide comprising the six CDRs of Ab-33;
a polypeptide comprising the six CDRs of Ab-34;
a polypeptide comprising the six CDRs of Ab-35;
a polypeptide comprising the six CDRs of Ab-36;
a polypeptide comprising the six CDRs of Ab-37; and
a polypeptide comprising the six CDRs of Ab-38.

32. The polypeptide or fragment of claim 31, wherein said polypeptide or fragment is selected from the group consisting of:
a polypeptide comprising the six CDRs of Ab-1;
a polypeptide comprising the six CDRs of Ab-2; and
a polypeptide comprising the six CDRs of Ab-3.

33. The polypeptide or fragment of claim 31-32, wherein said polypeptide or fragment is a polypeptide comprising the six CDRs of Ab-1.

34. The polypeptide or fragment of claims 31-33, wherein said CDRs comprises a Vh-CDR1 comprising SEQ ID NO:4, a Vh-CDR2 comprising SEQ ID NO:5, a Vh-CDR3 comprising SEQ ID NO:6, a Vl-CDR1 comprising SEQ ID NO:106, a Vl-CDR2 comprising SEQ ID NO:107, and a Vl-CDR3 comprising SEQ ID NO:108; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:10, a Vh-CDR2 comprising SEQ ID NO:11, a Vh-CDR3 comprising SEQ ID NO:12, a Vl-CDR1 comprising SEQ ID NO:112, a Vl-CDR2 comprising SEQ ID NO:113, and a Vl-CDR3 comprising SEQ ID NO:114; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:16, a Vh-CDR2 comprising SEQ ID NO:17, a Vh-CDR3 comprising SEQ ID NO:18, a Vl-CDR1 comprising SEQ ID NO:118, a Vl-CDR2 comprising SEQ ID NO:119, and a Vl-CDR3 comprising SEQ ID NO:120; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:22, a Vh-CDR2 comprising SEQ ID NO:23, a Vh-CDR3 comprising SEQ ID NO:24, a Vl-CDR1 comprising SEQ ID NO:124, a Vl-CDR2 comprising SEQ ID NO:125, and a Vl-CDR3 comprising SEQ ID NO:126; wherein said CDRs comprises a Vh-CDR1 comprising SEQ ID NO:28, a Vh-CDR2 comprising SEQ ID NO:29, a Vh-CDR3 comprising SEQ ID NO:30, a Vl-CDR1 comprising SEQ ID NO:130, a Vl-CDR2 comprising SEQ ID NO:131, and a Vl-CDR3 comprising SEQ ID NO:132; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:34, a Vh-CDR2 comprising SEQ ID NO:35, a Vh-CDR3 comprising SEQ ID NO:36, a Vl-CDR1 comprising SEQ ID NO:136, a Vl-CDR2 comprising SEQ ID NO:137, and a Vl-CDR3 comprising SEQ ID NO:138; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:40, a Vh-CDR2 comprising SEQ ID NO:41, a Vh-CDR3 comprising SEQ ID NO:42, a Vl-CDR1 comprising SEQ ID NO:142, a Vl-CDR2 comprising SEQ ID NO:143, and a Vl-CDR3 comprising SEQ ID NO:144; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:46, a Vh-CDR2 comprising SEQ ID NO:47, a Vh-CDR3 comprising SEQ ID NO:48, a Vl-CDR1 comprising SEQ ID NO:148, a Vl-CDR2 comprising SEQ ID NO:149, and a Vl-CDR3 comprising SEQ ID NO:150; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:52, a Vh-CDR2 comprising SEQ ID NO:53, a Vh-CDR3 comprising SEQ ID NO:54, a Vl-CDR1 comprising SEQ ID NO:154, a Vl-CDR2 comprising SEQ ID NO:155, and a Vl-CDR3 comprising SEQ ID NO:156; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:58, a Vh-CDR2 comprising SEQ

ID NO:59, a Vh-CDR3 comprising SEQ ID NO:60, a Vl-CDR1 comprising SEQ ID NO:160, a Vl-CDR2 comprising SEQ ID NO:161, and a Vl-CDR3 comprising SEQ ID NO:162; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:64, a Vh-CDR2 comprising SEQ ID NO:65, a Vh-CDR3 comprising SEQ ID NO:66, a Vl-CDR1 comprising SEQ ID NO:166, a Vl-CDR2 comprising SEQ ID NO:167, and a Vl-CDR3 comprising SEQ ID NO:168; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:70, a Vh-CDR2 comprising SEQ ID NO:71, a Vh-CDR3 comprising SEQ ID NO:72, a Vl-CDR1 comprising SEQ ID NO:172, a Vl-CDR2 comprising SEQ ID NO:173, and a Vl-CDR3 comprising SEQ ID NO:174; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:76, a Vh-CDR2 comprising SEQ ID NO:77, a Vh-CDR3 comprising SEQ ID NO:78, a Vl-CDR1 comprising SEQ ID NO:178, a Vl-CDR2 comprising SEQ ID NO:179, and a Vl-CDR3 comprising SEQ ID NO:180; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:82, a Vh-CDR2 comprising SEQ ID NO:83, a Vh-CDR3 comprising SEQ ID NO:84, a Vl-CDR1 comprising SEQ ID NO:184, a Vl-CDR2 comprising SEQ ID NO:185, and aVl-CDR3 comprising SEQ ID NO:186; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:88, a Vh-CDR2 comprising SEQ ID NO:89, a Vh-CDR3 comprising SEQ ID NO:90, a Vl-CDR1 comprising SEQ ID NO:190, a Vl-CDR2 comprising SEQ ID NO:191, and a Vl-CDR3 comprising SEQ ID NO:192; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:94, a Vh-CDR2 comprising SEQ ID NO:95, a Vh-CDR3 comprising SEQ ID NO:96, a Vl-CDR1 comprising SEQ ID NO:196, a Vl-CDR2 comprising SEQ ID NO:197, and a Vl-CDR3 comprising SEQ ID NO:198; and wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:100, a Vh-CDR2 comprising SEQ ID NO:101, a Vh-CDR3 comprising SEQ ID NO:102, a Vl-CDR1 comprising SEQ ID NO:202, a Vl-CDR2 comprising SEQ ID NO:203, and a Vl-CDR3 comprising SEQ ID NO:204.

35. The polypeptide or fragment of claims 31-34, wherein said CDRs comprises a Vh-CDR1 comprising SEQ ID NO:4, a Vh-CDR2 comprising SEQ ID NO:5, a Vh-CDR3 comprising SEQ ID NO:6, a Vl-CDR1 comprising SEQ ID NO:106, a Vl-CDR2 comprising SEQ ID NO:107, and a Vl-CDR3 comprising SEQ ID NO:108; wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:10, a Vh-CDR2 comprising SEQ ID NO:11, a Vh-CDR3 comprising SEQ ID NO:12, a Vl-CDR1 comprising SEQ ID NO:112, a Vl-CDR2 comprising SEQ ID NO:113, and a Vl-CDR3 comprising SEQ ID NO:114; and wherein said CDRs comprise a Vh-CDR1 comprising SEQ ID NO:16, a Vh-CDR2 comprising SEQ ID NO:17, a Vh-CDR3 comprising SEQ ID NO:18, a Vl-CDR1 comprising SEQ ID NO:118, a Vl-CDR2 comprising SEQ ID NO:119, and a Vl-CDR3 comprising SEQ ID NO:120.

36. The polypeptide or fragment of claims 31-35, wherein said CDRs comprises a Vh-CDR1 comprising SEQ ID NO:4, a Vh-CDR2 comprising SEQ ID NO:5, a Vh-CDR3 comprising SEQ ID

NO:6, a Vl-CDR1 comprising SEQ ID NO:106, a Vl-CDR2 comprising SEQ ID NO:107, and a Vl-CDR3 comprising SEQ ID NO:108.

37. The polypeptide or fragment of claims 31-36, wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:240 and an Vh domain comprising SEQ ID NO:206; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:242 and a Vh domain comprising SEQ ID NO:208; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:244 and a Vh domain comprising SEQ ID NO:210; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:246 and a Vh domain comprising SEQ ID NO:212; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:248 and a Vh domain comprising SEQ ID NO:214; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:250 and a Vh domain comprising SEQ ID NO:216; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:252 and a Vh domain comprising SEQ ID NO:218; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:254 and a Vh domain comprising SEQ ID NO:220; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:256 and a Vh domain comprising SEQ ID NO:222; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:258 and a Vh domain comprising SEQ ID NO:224; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:260 and a Vh domain comprising SEQ ID NO:226; wherein said polypeptide or fragment comprises a Vl comprising SEQ ID NO:262 and a Vh domain comprising SEQ ID NO:228; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:264 and a Vh domain comprising SEQ ID NO:230; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:266 and a Vh domain comprising SEQ ID NO:232; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:268 and a Vh domain comprising SEQ ID NO:234; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:270 and a Vh domain comprising SEQ ID NO:236; and wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:272 and a Vh domain comprising SEQ ID NO:238) domain.

38. The polypeptide or fragment of claims 31-37, wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:240 and a Vh domain comprising SEQ ID NO:206; wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:242 and a Vh domain comprising SEQ ID NO:208; and wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:244 and a Vh domain comprising SEQ ID NO:210.

39. The polypeptide or fragment of claims 31-38, wherein said polypeptide or fragment comprises a Vl domain comprising SEQ ID NO:240 and a Vh domain comprising SEQ ID NO:206.

40. The polypeptide or fragment of claims 31-39, wherein said polypeptide or fragment comprises an Ab-1 light chain comprising SEQ ID NO:280 and Ab-1 heavy chain comprising SEQ ID NO:274; wherein said polypeptide or fragment comprises an Ab-2 light chain comprising SEQ ID NO:282 and an Ab-2 heavy chain comprising SEQ ID NO:276; wherein said polypeptide or fragment comprises an Ab-3 light chain comprising SEQ ID NO:284 and an Ab-3 heavy chain comprising SEQ ID NO:278; wherein said polypeptide or fragment comprises two Ab-1 light chains comprising SEQ ID NO:280 and two Ab-1 heavy chains comprising SEQ ID NO:274; wherein said polypeptide or fragment comprises two Ab-2 light chains comprising SEQ ID NO:282 and two Ab-2 heavy chains comprising SEQ ID NO:276; and wherein said polypeptide or fragment comprises two Ab-3 light chains comprising SEQ ID NO:284 and two Ab-3 heavy chains comprising SEQ ID NO:278).

41. The polypeptide or fragment of claims 31-40, wherein said polypeptide or fragment comprises an Ab-1 light chain comprising SEQ ID NO:280 and Ab-1 heavy chain comprising SEQ ID NO:274; and wherein said polypeptide or fragment comprises two Ab-1 light chains comprising SEQ ID NO:280 and two Ab-1 heavy chains comprising SEQ ID NO:274.

42. The polypeptide or fragment of claims 31-41, wherein said polypeptide or fragment comprises two Ab-1 light chains comprising SEQ ID NO:280 and two Ab-1 heavy chains comprising SEQ ID NO:274.

43. The polypeptide or fragment of claims 31-42, wherein said polypeptide or fragment specifically binds human BCMA.

44. The polypeptide or fragment of claims 31-43, wherein said polypeptide or fragment specifically binds human BCMA and cross-reacts to cynomolgus BCMA.

45. The polypeptide or fragment of claims 31-44, wherein said polypeptide or fragment does not specifically bind to TACI or BAFF-R.

46. The polypeptide or fragment of claims 31-45, wherein said polypeptide or fragment binds BCMA on the surface of human myeloma cells.

47. The polypeptide or fragment of claims 31-46, wherein said polypeptide or fragment binds BCMA on the surface of human multiple myeloma cells.

48. The polypeptide or fragment of claims 31-47, wherein said polypeptide or fragment binds BCMA on the surface of human cells and is internalized by said cells.

49. The polypeptide or fragment of claims 31-48, wherein said polypeptide or fragment further comprises a linker.

50. The polypeptide or fragment of claims 31-49, wherein said polypeptide or fragment further comprises a drug or chemotherapeutic agent.

51. The polypeptide or fragment of claims 31-50, wherein said polypeptide or fragment further comprises a linker selected from the group consisting of: 6-maleimidocaproyl, maleimidopropanoyl, valine-citrulline, alanine-phenylalanine, p-aminobenzyloxycarbonyl, Mal-dPEG4-NHS, N-succinimidyl 4-(2-pyridylthio) pentanoate ("SPP"), N-succinimidyl 4-(N-maleimidomethyl) cyclohexane-1 carboxylate ("SMCC" or "MCC"), and N-succinimidyl (4-iodo-acetyl) aminobenzoate ("SIAB").

52. The polypeptide or fragment of claims 31-51, wherein said polypeptide or fragment further comprises a linker wherein said linker is N-succinimidyl 4-(N-maleimidomethyl) cyclohexane-1 carboxylate ("SMCC" or "MCC").

53. The polypeptide or fragment of claims 31-52, wherein said polypeptide or fragment further comprises a drug or chemotherapeutic agent selected from the group consisting of: thiotepa and cyclophosphamide (CYTOXAN.TM.); alkyl sulfonates such as busulfan, improsulfan and piposulfan; aziridines, such as benzodopa, carboquone, meturedopa, and uredopa; ethylenimines and methylamelamines including altretamine, triethylenemelamine, trietylenephosphoramide, triethylenethiophosphaoramide and trimethylolomelamine; acetogenins (especially bullatacin and bullatacinone); a camptothecin (including the synthetic analogue topotecan); bryostatin; callystatin; CC-1065 (including its adozelesin, carzelesin and bizelesin synthetic analogues); cryptophycins (particularly cryptophycin 1 and cryptophycin 8); dolastatin; duocarmycin (including the synthetic analogues, KW-2189 and CBI-TMI); eleutherobin; pancratistatin; a sarcodictyin; spongistatin; nitrogen mustards such as chlorambucil, chlomaphazine, cholophosphamide, estramustine, ifosfamide, mechlorethamine, mechlorethamine oxide hydrochloride, melphalan, novembichin, phenesterine, prednimustine, trofosfamide, uracil mustard; nitrosureas such as carmustine, chlorozotocin, fotemustine, lomustine, nimustine, ranimustine; antibiotics, such as the enediyne antibiotics (e.g. calicheamicin, especially calicheamicin .gamma1 and calicheamicin theta I, see, e.g., Angew Chem. Intl. Ed. Engl. 33:183-186 (1994); dynemicin, including dynemicin A; an esperamicin; as well as neocarzinostatin chromophore and related chromoprotein enediyne antiobiotic

chromomophores), aclacinomysins, actinomycin, authramycin, azaserine, bleomycins, cactinomycin, carabicin, caminomycin, carzinophilin; chromomycins, dactinomycin, daunorubicin, detorubicin, 6-diazo-5-oxo-L-norleucine, doxorubicin (including morpholino-doxorubicin, cyanomorpholino-doxorubicin, 2-pyrrolino-doxorubicin and deoxydoxorubicin), epirubicin, esorubicin, idarubicin, marcellomycin, nitomycins, mycophenolic acid, nogalamycin, olivomycins, peplomycin, potfiromycin, puromycin, quelamycin, rodorubicin, streptonigrin, streptozocin, tubercidin, ubenimex, zinostatin, zorubicin; anti-metabolites, such as methotrexate and 5-fluorouracil (5-FU); folic acid analogues, such as denopterin, methotrexate, pteropterin, trimetrexate; purine analogs, such as fludarabine, 6-mercaptopurine, thiamiprine, thioguanine; pyrimidine analogs such as, ancitabine, azacitidine, 6-azauridine, carmofur, cytarabine, dideoxyuridine, doxifluridine, enocitabine, floxuridine, 5-FU; androgens, such as calusterone, dromostanolone propionate, epitiostanol, mepitiostane, testolactone; anti-adrenals, such as aminoglutethimide, mitotane, trilostane; folic acid replenisher, such as frolinic acid; aceglatone; aldophosphamide glycoside; aminolevulinic acid; amsacrine; bestrabucil; bisantrene; edatraxate; defofamine; demecolcine; diaziquone; elfomithine; elliptinium acetate; an epothilone; etoglucid; gallium nitrate; hydroxyurea; lentinan; lonidamine; maytansinoids, such as maytansine and ansamitocins; mitoguazone; mitoxantrone; mopidamol; nitracrine; pentostatin; phenamet; pirarubicin; podophyllinic acid; 2-ethylhydrazide; procarbazine; PSK.RTM.; razoxane; rhizoxin; sizofuran; spirogermanium; tenuazonic acid; triaziquone; 2,2',2"-trichlorotriethylamine; trichothecenes (especially T-2 toxin, verracurin A, roridin A and anguidine); urethan; vindesine; dacarbazine; mannomustine; mitobronitol; mitolactol; pipobroman; gacytosine; arabinoside ("Ara-C"); cyclophosphamide; thiotepa; taxoids, e.g. paclitaxel (TAXOL.TM., Bristol-Myers Squibb Oncology, Princeton, N.J.) and doxetaxel (TAXOTERE.RTM., Rhone-Poulenc Rorer, Antony, France); chlorambucil; gemcitabine; 6-thioguanine; mercaptopurine; methotrexate; platinum analogs such as cisplatin and carboplatin; vinblastine; platinum; etoposide (VP-16); ifosfamide; mitomycin C; mitoxantrone; vincristine; vinorelbine; navelbine; novantrone; teniposide; daunomycin; aminopterin; xeloda; ibandronate; CPT-11; topoisomerase inhibitor RFS 2000; difluoromethylomithine (DMFO); retinoic acid; capecitabine; tamoxifen, raloxifene, aromatase inhibiting 4(5)-imidazoles, 4-hydroxytamoxifen, trioxifene, keoxifene, LY117018, onapristone, and toremifene (Fareston); and anti-androgens, such as flutamide, nilutamide, bicalutamide, leuprolide, goserelin, Colchicine-site Binders (Curacin), Combretastatins (AVE806, Combretastatin A-4 prodrug (CA4P), Oxi-4503), Cryptophycins (LY355703), Discodermolide, Dolastatin and Analogs (Auristatin PHE, Dolastatin 10, ILX-651, Symplostatin 1, TZT-1027), Epothilones (BMS-247550, BMS-310705, EP0906, KOS-862, ZK-EPO), Eleutherobin, FR182877, Halichondrin B (E7389), Halimide (NPI-2352 and NPI-2358), Hemiasterlins (HTI-286), Laulimalide, Maytansinoids ("DM1," "DM3" or "DM4") (Bivatuzumab mertansine, Cantuzumab mertansine, huN901-DM1/BB-10901TAP, MLN591DM1, My9-6-DM1, Trastuzumab-DM1), PC-SPES, Peloruside A, Resveratrol, S-allylmercaptocysteine (SAMC), Spongistatins, Vitilevuamide, Molecular Motor-Kinesins (SB-

715992), Designed Colchicine-Site Binders (A-289099, A-293620/A-318315, ABT-751/E7010, D-24851/D-64131, ZD6126), Other Novel Spindle Poisons (2-Methoxyestradiol (2-ME2), Bezimidazole Carbamates (ANG 600 series, Mebendazole), CP248/CP461, HMN-214, R440, SDX-103, T67/T607).

54. The polypeptide or fragment of claims 31-53, wherein said polypeptide or fragment further comprises a drug or chemotherapeutic agent selected from the group consisting of: Maytansinoids ("DM1," "DM3" or "DM4").

55. The polypeptide or fragment of claims 31-54, wherein said polypeptide or fragment further comprises DM1.

56. The polypeptide or fragment of claims 31-55, wherein said polypeptide or fragment has a drug to polypeptide ratio of between 1 and 10.

57. The polypeptide or fragment of claims 31-57, wherein said polypeptide or fragment has a drug to polypeptide ratio of between 2 and 5.

58. A composition comprising the antibody, polypeptide, or fragments thereof of any of claims 1-57.

59. A pharmaceutical composition comprising the antibody, polypeptide, or fragments thereof of any of claims 1-58.

60. The pharmaceutical composition of claim 59 further comprising a pharmaceutically acceptable diluent, carrier, solubilizer, emulsifier, and/or a preservative.

61. A method of treating a disease, comprising administering an effective amount of the compositions of any of claims 58-60, wherein the disease is selected from the group consisting of: B-cell cancers, multiple myeloma, malignant plasma cell neoplasms, Kahler's disease and Myelomatosis; Plasma cell leukemia; Plasmacytoma; B-cell prolymphocytic leukemia; Hairy cell leukemia; B-cell non-Hodgkin's lymphoma (NHL); Acute myeloid leukemia (AML); Chronic myeloid leukemia (CML); Acute lymphocytic leukemia (ALL); Chronic lymphocytic leukemia (CLL); Follicular lymphoma (including follicular non-Hodgkin's lymphoma types); Burkitt's lymphoma (Endemic Burkitt's lymphoma; Sporadic Burkitt's lymphoma); Marginal zone lymphoma (Mucosa-Associated Lymphoid Tissue; MALT / MALToma; Monocytoid B cell lymphoma; Splenic lymphoma with villous lymphocytes); Mantle cell lymphoma; Large cell lymphoma (Diffuse large cell; Diffuse Mixed Cell; Immunoblastic Lymphoma; Primary Mediastinal B Cell Lymphoma;

Angiocentric Lymphoma - pulmonary B cell); Small lymphocytic lymphoma (SLL); Precursor B-lymphoblastic lymphoma; Myeloid leukemia (granulocytic; myelogenous; Acute myeloid leukemia; Chronic myeloid leukemia; Subacute myeloid leukemia; Myeloid sarcoma; Chloroma; Granulocytic sarcoma; Acute promyelocytic leukemia; Acute myelomonocytic leukemia); Waldenstrom's macroglobulinemia, or other B-cell lymphoma.

62. The method of claim 61, wherein the disease is selected from the group consisting of: B-cell cancers, multiple myeloma, malignant plasma cell neoplasms, or other B-cell lymphoma.

63. The method of claim 62, wherein the disease is multiple myeloma.

64. The method of claims 61-63, further comprising administering one of more additional treatments selected from the group consisting of: chemotherapy, radiation therapy, surgery, proteasome inhibitors, corticosteroids, and stem cell transplants.

65. The method of claim 64, wherein the administering of said additional treatment is prior to, concurrent with, or subsequent to, or a combination of each, the administration of the compositions of any of claims 58-60.

66. The method of claims 62-65, wherein the compositions of any of claims 58-60 is administered parenterally.

67. An isolated polynucleotide, wherein said polynucleotide encodes the antibody or polypeptide of any of claims 1-21 and 31-48.

68. The polynucleotide of claim 67, wherein said polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:1, a Vh-CDR2 comprising SEQ ID NO:2, a Vh-CDR3 comprising SEQ ID NO:3, a Vl-CDR1 comprising SEQ ID NO:103, a Vl-CDR2 comprising SEQ ID NO:104, and a Vl-CDR3 comprising SEQ ID NO:105; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:7, a Vh-CDR2 comprising SEQ ID NO:8, a Vh-CDR3 comprising SEQ ID NO:9, a Vl-CDR1 comprising SEQ ID NO:109, a Vl-CDR2 comprising SEQ ID NO:110, and a Vl-CDR3 comprising SEQ ID NO:111; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:13, a Vh-CDR2 comprising SEQ ID NO:14, a Vh-CDR3 comprising SEQ ID NO:15, a Vl-CDR1 comprising SEQ ID NO:115, a Vl-CDR2 comprising SEQ ID NO:116, and a Vl-CDR3 comprising SEQ ID NO:117; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:19 comprising, a Vh-CDR2 comprising SEQ ID NO:20, a Vh-CDR3 comprising SEQ ID NO:21, a Vl-CDR1 comprising SEQ ID NO:121, a Vl-CDR2 comprising SEQ ID

NO:122, and a Vl-CDR3 comprising SEQ ID NO:123; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:25, a Vh-CDR2 comprising SEQ ID NO:26, a Vh-CDR3 comprising SEQ ID NO:27, a Vl-CDR1 comprising SEQ ID NO:127, a Vl-CDR2 comprising SEQ ID NO:128, and a Vl-CDR3 comprising SEQ ID NO:129; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:31, a Vh-CDR2 comprising SEQ ID NO:32, a Vh-CDR3 comprising SEQ ID NO:33, a Vl-CDR1 comprising SEQ ID NO:133, a Vl-CDR2 comprising SEQ ID NO:134, and a Vl-CDR3 comprising SEQ ID NO:135; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:37, a Vh-CDR2 comprising SEQ ID NO:38, a Vh-CDR3 comprising SEQ ID NO:39, a Vl-CDR1 comprising SEQ ID NO:139, a Vl-CDR2 comprising SEQ ID NO:140, and a Vl-CDR3 comprising SEQ ID NO:141; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:43, a Vh-CDR2 comprising SEQ ID NO:44, a Vh-CDR3 comprising SEQ ID NO:45, a Vl-CDR1 comprising SEQ ID NO:145, a Vl-CDR2 comprising SEQ ID NO:146, and a Vl-CDR3 comprising SEQ ID NO:147; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:49, a Vh-CDR2 comprising SEQ ID NO:50, a Vh-CDR3 comprising SEQ ID NO:51, a Vl-CDR1 comprising SEQ ID NO:151, a Vl-CDR2 comprising SEQ ID NO:152, and a Vl-CDR3 comprising SEQ ID NO:153; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:55, a Vh-CDR2 comprising SEQ ID NO:56, a Vh-CDR3 comprising SEQ ID NO:57, a Vl-CDR1 comprising SEQ ID NO:157, a Vl-CDR2 comprising SEQ ID NO:158, and a Vl-CDR3 comprising SEQ ID NO:159; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:61, a Vh-CDR2 comprising SEQ ID NO:62, a Vh-CDR3 comprising SEQ ID NO:63, a Vl-CDR1 comprising SEQ ID NO:163, a Vl-CDR2 comprising SEQ ID NO:164, and a Vl-CDR3 comprising SEQ ID NO:165; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:67, a Vh-CDR2 comprising SEQ ID NO:68, a Vh-CDR3 comprising SEQ ID NO:69, a Vl-CDR1 comprising SEQ ID NO:169, a Vl-CDR2 comprising SEQ ID NO:170, and a Vl-CDR3 comprising SEQ ID NO:171; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:73, a Vh-CDR2 comprising SEQ ID NO:74, a Vh-CDR3 comprising SEQ ID NO:75, a Vl-CDR1 comprising SEQ ID NO:175, a Vl-CDR2 comprising SEQ ID NO:176, and a Vl-CDR3 comprising SEQ ID NO:177; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:79, a Vh-CDR2 comprising SEQ ID NO:80, a Vh-CDR3 comprising SEQ ID NO:81, a Vl-CDR1 comprising SEQ ID NO:181, a Vl-CDR2 comprising SEQ ID NO:182, and a Vl-CDR3 comprising SEQ ID NO:183; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:85, a Vh-CDR2 comprising SEQ ID NO:86, a Vh-CDR3 comprising SEQ ID NO:87, a Vl-CDR1 comprising SEQ ID NO:187, a Vl-CDR2 comprising SEQ ID NO:188, and a Vl-CDR3 comprising SEQ ID NO:189; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:91, a Vh-CDR2 comprising SEQ ID NO:92, a Vh-CDR3 comprising SEQ ID NO:93, a Vl-CDR1 comprising SEQ ID NO:193, a Vl-CDR2 comprising SEQ ID NO:194, and a Vl-CDR3 comprising SEQ ID NO:195; and wherein the polynucleotide

sequence comprises a Vh-CDR1 comprising SEQ ID NO:97, a Vh-CDR2 comprising SEQ ID NO:98, a Vh-CDR3 comprising SEQ ID NO:99, a Vl-CDR1 comprising SEQ ID NO:199, a Vl-CDR2 comprising SEQ ID NO:200, and a Vl-CDR3 comprising SEQ ID NO:201.

69. The polynucleotide of claims 67-68, wherein said polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:1, a Vh-CDR2 comprising SEQ ID NO:2, a Vh-CDR3 comprising SEQ ID NO:3, a Vl-CDR1 comprising SEQ ID NO:103, a Vl-CDR2 comprising SEQ ID NO:104, and a Vl-CDR3 comprising SEQ ID NO:105; wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:7, a Vh-CDR2 comprising SEQ ID NO:8, a Vh-CDR3 comprising SEQ ID NO:9, a Vl-CDR1 comprising SEQ ID NO:109, a Vl-CDR2 comprising SEQ ID NO:110, and a Vl-CDR3 comprising SEQ ID NO:111; and wherein the polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:13, a Vh-CDR2 comprising SEQ ID NO:14, a Vh-CDR3 comprising SEQ ID NO:15, a Vl-CDR1 comprising SEQ ID NO:115, a Vl-CDR2 comprising SEQ ID NO:116, and a Vl-CDR3 comprising SEQ ID NO:117.

70. The polynucleotide of claims 67-69, wherein said polynucleotide sequence comprises a Vh-CDR1 comprising SEQ ID NO:1, a Vh-CDR2 comprising SEQ ID NO:2, a Vh-CDR3 comprising SEQ ID NO:3, a Vl-CDR1 comprising SEQ ID NO:103, a Vl-CDR2 comprising SEQ ID NO:104, and a Vl-CDR3 comprising SEQ ID NO:105.

71. The polynucleotide of claims 67-70, wherein said polynucleotide sequence comprises an Ab-1Vl comprising SEQ ID NO:239 and an Ab-1Vh comprising SEQ ID NO:205; wherein the polynucleotide sequence comprises an Ab-2Vl comprising SEQ ID NO:241 and an Ab-2Vh comprising SEQ ID NO:207; wherein the polynucleotide sequence comprises an Ab-3Vl comprising SEQ ID NO:243 and an Ab-3Vh comprising SEQ ID NO:209; wherein the polynucleotide sequence comprises an Ab-4Vl comprising SEQ ID NO:245 and an Ab-4Vh comprising SEQ ID NO:211; wherein the polynucleotide sequence comprises an Ab-5Vl comprising SEQ ID NO:247 and an Ab-5Vh comprising SEQ ID NO:213; wherein the polynucleotide sequence comprises an Ab-6Vl comprising SEQ ID NO:249 and an Ab-6Vh comprising SEQ ID NO:215; wherein the polynucleotide sequence comprises an Ab-7Vl comprising SEQ ID NO:251 and an Ab-7Vh comprising SEQ ID NO:217; wherein the polynucleotide sequence comprises an Ab-8Vl comprising SEQ ID NO:253 and an Ab-8Vh comprising SEQ ID NO:219; wherein the polynucleotide sequence comprises an Ab-9Vl comprising SEQ ID NO:255 and an Ab-9Vh comprising SEQ ID NO:221; wherein the polynucleotide sequence comprises an Ab-10Vl comprising SEQ ID NO:257 and an Ab-10Vh comprising SEQ ID NO:223; wherein the polynucleotide sequence comprises an Ab-11Vl comprising SEQ ID NO:259 and an Ab-11Vh comprising SEQ ID NO:225; wherein the polynucleotide sequence comprises an Ab-12Vl comprising SEQ ID NO:261 and an Ab-12Vh comprising SEQ ID NO:227; wherein the

polynucleotide sequence comprises an Ab-13Vl comprising SEQ ID NO:263 and an Ab-13Vh comprising SEQ ID NO:229; wherein the polynucleotide sequence comprises an Ab-14Vl comprising SEQ ID NO:265 and an Ab-14Vh comprising SEQ ID NO:231; wherein the polynucleotide sequence comprises an Ab-15Vl comprising SEQ ID NO:267 and an Ab-15Vh comprising SEQ ID NO:233; wherein the polynucleotide sequence comprises an Ab-16Vl comprising SEQ ID NO:269 and an Ab-16Vh comprising SEQ ID NO:235; and wherein the polynucleotide sequence comprises an Ab-17Vl comprising SEQ ID NO:271 and an Ab-17Vh comprising SEQ ID NO:237.

72. The polynucleotide of claims 67-71, wherein said polynucleotide sequence comprises an Ab-1Vl comprising SEQ ID NO:239 and an Ab-1Vh comprising SEQ ID NO:205; wherein the polynucleotide sequence comprises an Ab-2Vl comprising SEQ ID NO:241 and an Ab-2Vh comprising SEQ ID NO:207; and wherein the polynucleotide sequence comprises an Ab-3Vl comprising SEQ ID NO:243 and an Ab-3Vh comprising SEQ ID NO:209.

73. The polynucleotide of claims 67-72, wherein said polynucleotide sequence comprises an Ab-1Vl comprising SEQ ID NO:239 and an Ab-1Vh comprising SEQ ID NO:205.

74. The polynucleotide of claims 67-72, wherein said polynucleotide sequence comprises a light chain comprising SEQ ID NO:279 and a heavy chain comprising SEQ ID NO:273; wherein the polynucleotide sequence comprises a light chain comprising SEQ ID NO:281 and a heavy chain comprising SEQ ID NO:275; and wherein the polynucleotide sequence comprises a light chain comprising SEQ ID NO:283 and a heavy chain comprising SEQ ID NO:277.

75. A plasmid, comprising the polynucleotide of any of claims 67-72.

76. The plasmid of claim 75, wherein said plasmid comprises an expression vector.

77. An isolated cell, comprising said plasmid of claim 76, wherein said cell is selected from the group consisting of:

a. a prokaryotic cell;
b. a eukaryotic cell;
c. a mammalian cell;
d. an insect cell; and
e. a CHO cell.

78. A method of making the antibody or polypeptide of any of claims 1-21 and 31-48, comprising incubating said isolated cell of claim 77 under conditions that allow it to express said antibody or polypeptide.

79. An isolated antibody, comprising an antibody produced by the CHO cell of claim 77, wherein the antibody comprises a heavy chain encoded by a sequence comprising SEQ ID NO:273 and a light chain encoded by a sequence comprising SEQ ID NO:279.

80. A pharmaceutical composition, comprising the antibody of claim 79.

81. An isolated monoclonal antibody, comprising a monoclonal antibody that specifically binds to SEQ ID NO:285 and SEQ ID NO:286, but does not specifically bind SEQ ID NO:351.

82. The antibody of claim 81, wherein said antibody is a human monoclonal antibody.

83. The antibody of claim 82, wherein said antibody is an IgG.

84. An isolated monoclonal antibody, comprising a monoclonal antibody that specifically binds to SEQ ID NO:352, but does not specifically bind SEQ ID NO:351.

85. The antibody of claim 84, wherein said antibody is a human monoclonal antibody.

86. The antibody of claim 85, wherein said antibody is an IgG.

87. The antibody of claim 85, wherein said antibody is an IgG1.

88. The antibody of any of claims 81 to 87, wherein said antibody specifically binds SEQ ID NO:352 with a Kd of between 1 nM and .01 nM, and binds SEQ ID NO:351 with a Kd of greater than 10 nM.

89. The antibody of any of claims 81 to 88, wherein said antibody specifically binds SEQ ID NO:352 with a Kd of about 0.16 nM, and binds SEQ ID NO:351 with a Kd of greater than 10 nM.

90. An isolated monoclonal antibody, comprising a monoclonal antibody that binds a neutralizing determinant comprising amino acids 1 though 20 (inclusive) of SEQ ID NO: 285.

91. The antibody of claim 90, wherein said antibody is a human monoclonal antibody.

92. The antibody of claim 91, wherein said antibody is an IgG.

93. The antibody of claim 92, wherein said antibody is an IgG1.

94. An isolated monoclonal antibody, comprising a monoclonal antibody that binds a neutralizing determinant comprising amino acids 1 through 11 (inclusive) of SEQ ID NO: 285.

95. The antibody of claim 94, wherein said antibody is a human monoclonal antibody.

96. The antibody of claim 95, wherein said antibody is an IgG.

97. The antibody of claim 96, wherein said antibody is an IgG1.

98. The antibody of any of claims 90 to 97, wherein said antibody binds SEQ ID NO: 285 with a Kd of less than or equal to 1 nM.

99. The antibody of any of claims 90 to 98, wherein said antibody binds SEQ ID NO: 352 with a Kd of about 0.16 nM ± 0.1 nM as measured in a biosensor assay.

100. The antibody of any of claims 90 to 97, wherein said antibody binds SEQ ID NO: 285 expressed on the surface of H929 cells with an EC50 of less than or equal to 10 nM.

101. The antibody of any of claims 90 to 97, wherein said antibody binds SEQ ID NO: 285 expressed on the surface of H929 cells with an EC50 of less than or equal to 10 nM.

102. The antibody of any of claims 90 to 97 and 101, wherein said antibody binds SEQ ID NO: 285 expressed on the surface of H929 cells with an EC50 of about 1.2 nM by FACS analysis.

103. The antibody of any of claims 90 to 97, wherein said antibody binds SEQ ID NO: 285 with a Kd of less than or equal to 1 nM, and wherein said antibody binds SEQ ID NO: 285 expressed on the surface of H929 cells with an EC50 of less than or equal to 10 nM.

104. The antibody of any of claims 90 to 97 and 103, wherein said antibody binds SEQ ID NO: 352 with a Kd of about 0.16 nM as measured in a biosensor assay described in Example 16, and wherein said antibody binds SEQ ID NO: 285 expressed on the surface of H929 cells with an EC50 of about 1.2 nM byFACS analysis.

105. The antibody of any of claims 1-3 and 31-33, wherein the six CDRs are determined by any one of the AHo, Kabat, or Clothia numbering systems.

106. The antibody of any of claims 1-14, wherein the antibody is a human monoclonal IgG antibody.

107. The antibody of any of claims 1-14 and 106, wherein the antibody is a human monoclonal IgG1 antibody.

108. An isolated monoclonal antibody or fragment thereof, wherein said antibody or fragment thereof specifically binds to human BCMA of SEQ ID NO:285 and inhibits the biological activity of APRIL, and wherein said antibody competitively inhibits the binding of a human IgG1 monoclonal antibody comprising a Vh-CDR1 comprising SEQ ID NO:4, a Vh-CDR2 comprising SEQ ID NO:5, a Vh-CDR3 comprising SEQ ID NO:6, a Vl-CDR1 comprising SEQ ID NO:106, a Vl-CDR2 comprising SEQ ID NO:107, and a Vl-CDR3 comprising SEQ ID NO:108, and wherein said antibody has a Kd for human BCMA between 1 and .01 nM (inclusive).

109. The antibody or fragment thereof of claim 108, wherein said antibody or fragment thereof is human, and wherein said human IgG1 monoclonal antibody comprises Vh domain comprising SEQ ID NO:206 and Vl domain comprising SEQ ID NO:240.

110. The antibody or fragment thereof of claims 108 or 109, wherein said antibody or fragment thereof is human, and wherein said human IgG1 monoclonal antibody comprises a heavy chain comprising SEQ ID NO:274 and a light chain comprising SEQ ID NO:280.

111. The antibody or fragment thereof of claims 108 to 110, wherein said human IgG1 monoclonal antibody interacts with Gly6, Gln7, Phe14, Asp15, Ser16, Leu17, and His19 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 0 to 3.4 Å (inclusive).

112. The antibody or fragment thereof of claim 111, wherein said human IgG1 monoclonal antibody interacts with Gly6, Gln7, Cys8, Tyr,13, Phe14, Asp15, Ser16, Leu17, Leu18, His19, and Ala20 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 3.4 to 5.0 Å (inclusive).

113. The antibody or fragment thereof of claim 112, wherein said human IgG1 monoclonal antibody interacts with Ala5, Gly6, Gln7, Cys8, Tyr,13, Phe14, Asp15, Ser16, Leu17, Leu18, His19,

Ala20, Ile22, Leu26, Arg27, Pro33, Pro34, Leu35, and Leu36 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 3.4 to 5.0 Å (inclusive).

114. The antibody or fragment thereof of claim 113, wherein said human IgG1 monoclonal antibody forms a hydrogen bond with Gln7, Asp15, Ser16, Leu17, and His19 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 0 to 3.4 Å (inclusive).

115. An isolated monoclonal antibody or fragment thereof, wherein said antibody or fragment thereof is a human IgG monoclonal that specifically binds human BCMA of SEQ ID NO:285 and inhibits the biological activity of APRIL, and wherein said antibody comprises a Vh domain that is at least 90% identical to SEQ ID NO:206 and a Vl domain that is at least 90% identical to SEQ ID NO:240.

116. The antibody or fragment thereof of claim 115, wherein said antibody or fragment thereof comprises a heavy chain that is at least 90% identical to SEQ ID NO:274 and a light chain that is at least 90% identical to SEQ ID NO:280.

117. The antibody of or fragment thereof claim 115, wherein antibody or fragment thereof comprises a heavy chain variable domain that is at least 95% identical to SEQ ID NO:206 and a light chain variable domain that is at least 95% identical to SEQ ID NO:240.

118. The antibody of claim 117, wherein said antibody comprises a heavy chain that is at least 95% identical to SEQ ID NO:274 and a light chain that is at least 95% identical to SEQ ID NO:280.

119. The antibody or fragment thereof of claims 115 to 118, wherein said antibody or fragment thereof comprises Asn32, Thr33, Asn35, Asn51, Trp92, Asp94, and Trp99 of a Vl domain and Arg52, Ser101, and Tyr103 of a Vh domain.

120. The antibody or fragment thereof of claims 115 to 119, wherein said antibody or fragment thereof comprises Ser26, Ser31, Asn32, Thr33, Val34, Asn35, Leu47, Phe50, Asn51, Tyr52, His53, Gln54, Lys67, Trp92, Asp93, Asp94, Asn97, and Trp99 of a Vl domain and Ala33, Ser35, Val50, Arg52, Tyr56, Ser101, Gly102, Tyr103, Trp107, Pro109, Phe110, and Asp111 of a Vh domain.

121. The antibody or fragment thereof of claims 108 to 120, wherein said antibody or fragment thereof has a Kd for human BCMA of 0.16 nM ± 0.1 nM (inclusive).

122. An isolated monoclonal antibody or Fab fragment thereof, wherein said antibody or Fab fragment thereof specifically binds to the same epitope on human BCMA of SEQ ID NO:285 as a human IgG1 monoclonal antibody comprising a Vh domain comprising SEQ ID NO:206 and a Vl domain comprising SEQ ID NO:240, and wherein said antibody or Fab fragment thereof inhibits the biological activity of APRIL.

123. The antibody or Fab fragment thereof of claim 122, wherein said human IgG1 monoclonal antibody comprises a heavy chain comprising SEQ ID NO:274 and a light chain comprising SEQ ID NO:280.

124. The antibody or Fab fragment thereof of claims 122 or 123, wherein said epitope is defined by x-ray crystallography.

125. The antibody or Fab fragment thereof of claim 124, wherein said epitope is defined by x-ray crystallography and a contact distance analysis of 0 to 3.4 Å (inclusive).

126. The antibody or Fab fragment thereof of claim 125, wherein said epitope is defined by x-ray crystallography and a contact distance analysis of 3.4 to 5.0 Å (inclusive).

127. The antibody or Fab fragment thereof of claims 125 or 126, wherein said antibody or Fab fragment thereof covers a surface area of human BCMA of SEQ ID NO:285 of 1,964 $Å^2 \pm 5\%$ and has a shape complementarity of 0.70 ± 0.03.

128. The antibody or Fab fragment thereof of claims 122 to 127, wherein said monoclonal antibody or Fab fragment thereof is human.

129. The antibody or Fab fragment thereof of claim 128, wherein said monoclonal antibody or Fab fragment thereof is human IgG.

130. The antibody or Fab fragment thereof of claim 129, wherein said monoclonal antibody or Fab fragment thereof is human IgG1.

131. The antibody or Fab fragment thereof of claims 122 to 130, wherein said antibody or Fab fragment thereof does not specifically bind rat BCMA of SEQ ID NO:351 and has a Kd for said rat BCMA of greater than 10 nM.

132. The antibody or Fab fragment thereof of claims 122 to 131, wherein said antibody or Fab fragment thereof has a Kd for human BCMA between 1 and .01 nM (inclusive).

133. The antibody or Fab fragment thereof of claim 132, wherein said antibody or Fab fragment thereof has a Kd for human BCMA of 0.16 nM ± 0.1 nM (inclusive).

134. The antibody or Fab fragment thereof of claim 133, wherein said antibody or Fab fragment thereof also specifically binds a fragment of human BCMA consisting amino acids 1-20 (inclusive) of SEQ ID NO:285.

135. An isolated monoclonal antibody or Fab fragment thereof, wherein said antibody or Fab fragment thereof specifically binds human BCMA and interacts with Gly6, Gln7, Phe14, Asp15, Ser16, Leu17, and His19 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 0 to 3.4 Å (inclusive), and wherein said antibody or Fab fragment thereof inhibits the biological activity of APRIL.

136. The antibody or Fab fragment thereof of claim 135, wherein said antibody or Fab fragment thereof interacts with Gly6, Gln7, Cys8, Tyr,13, Phe14, Asp15, Ser16, Leu17, Leu18, His19, and Ala20 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 3.4 to 5.0 Å (inclusive).

137. The antibody or Fab fragment thereof of claim 136, wherein said antibody or Fab fragment thereof interacts with Ala5, Gly6, Gln7, Cys8, Tyr13, Phe14, Asp15, Ser16, Leu17, Leu18, His19, Ala20, Ile22, Leu26, Arg27, Pro33, Pro34, Leu35, and Leu36 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 3.4 to 5.0 Å (inclusive).

138. The antibody or Fab fragment thereof of claim 137, wherein said antibody or Fab fragment thereof forms a hydrogen bond with Gln7, Asp15, Ser16, Leu17, and His19 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 0 to 3.4 Å (inclusive).

139. The antibody or Fab fragment thereof of any of claims 135 to 138, wherein said monoclonal antibody or Fab fragment thereof is human.

140. The antibody or Fab fragment thereof of claim 139, wherein said monoclonal antibody or Fab fragment thereof is human IgG.

141. The antibody or Fab fragment thereof of claim 140, wherein said monoclonal antibody or Fab fragment thereof is human IgG1.

142. The antibody or Fab fragment thereof of claims 135 to 141, wherein said antibody or Fab fragment thereof has a Kd for human BCMA between 1 and .01 nM (inclusive).

143. The antibody or Fab fragment thereof of claim 142, wherein said antibody or Fab fragment thereof has a Kd for human BCMA of 0.16 nM ± 0.1 nM (inclusive).

144. An isolated monoclonal antibody or Fab fragment thereof, wherein said antibody or Fab fragment thereof specifically binds to human BCMA of SEQ ID NO:360 and thereby changes the solvent accessible surface area on said human BMCA by greater than 50% at amino acid residues Gly6, Gln7, Tyr13, Phe14, Asp15, Ser16, Leu17, Leu18, His19, Ala20, Ile22, Arg27, Pro34, and Leu35 of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 0 to 3.4 Å (inclusive), and wherein said antibody or Fab fragment thereof inhibits the biological activity of APRIL.

145. The antibody or Fab fragment thereof of claim 144, wherein said monoclonal antibody or Fab fragment thereof is human.

146. The antibody or Fab fragment thereof of claim 145, wherein said monoclonal antibody or Fab fragment thereof is human IgG.

147. The antibody or Fab fragment thereof of claim 146, wherein said monoclonal antibody or Fab fragment thereof is human IgG1.

148. The antibody or Fab fragment thereof of claims 144 to 147, wherein said antibody or Fab fragment thereof has a Kd for human BCMA between 1 and .01 nM (inclusive).

149. The antibody or Fab fragment thereof of claim 148, wherein said antibody or Fab fragment thereof has a Kd for human BCMA of 0.16 nM ± 0.1 nM (inclusive).

150. The antibody or Fab fragment thereof of claim 149, wherein said antibody or Fab fragment thereof also specifically binds a fragment of human BCMA consisting amino acids 1-20 (inclusive) of SEQ ID NO:285.

151. An isolated monoclonal antibody or fragment thereof, wherein said antibody or fragment thereof specifically binds to human BCMA of SEQ ID NO:285 and inhibits the biological activity of APRIL, and wherein said antibody competitively inhibits the binding of a human IgG1 monoclonal antibody comprising a Vh-CDR1 comprising SEQ ID NO:10, a Vh-CDR2 comprising SEQ ID NO:11, a Vh-CDR3 comprising SEQ ID NO:12, a Vl-CDR1 comprising SEQ ID NO:112, a Vl-CDR2 comprising SEQ ID NO:113, and a Vl-CDR3 comprising SEQ ID NO:114, wherein said antibody has a Kd for human BCMA of 0.75 to 1.11 nM ± 0.1 nM (inclusive).

152. The antibody or fragment thereof of claim 151, wherein said antibody or fragment thereof is human, and wherein said human IgG1 monoclonal antibody comprises Vh domain comprising SEQ ID NO:208 and Vl comprising SEQ ID NO:242.

153. The antibody or fragment thereof of claims 151 or 152, wherein said antibody or fragment thereof is human, and wherein said human IgG1 monoclonal antibody comprises a heavy chain comprising SEQ ID NO:276 and a light chain comprising SEQ ID NO:282.

154. The antibody or fragment thereof of claims 151 to 153, wherein said human IgG1 monoclonal antibody interacts with Gly6, Gln7, Tyr13, Ser16, Leu17, His19, Arg27, and Leu35 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 0 to 3.4 Å (inclusive).

155. The antibody or fragment thereof of claim 154, wherein said human IgG1 monoclonal antibody interacts with Ala5, Gly6, Gln7, Tyr13, Phe14, Asp15, Ser16, Leu17, Leu18, and His19 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 3.4 to 5.0 Å (inclusive).

156. The antibody or fragment thereof of claims 155, wherein said human IgG1 monoclonal antibody interacts with Ala5, Gly6, Gln7, Tyr13, Phe14, Asp15, Ser16, Leu17, Leu18, His19, Arg27, Ser30, Thr32, Pro33, Pro34, and Leu35 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 3.4 to 5.0 Å (inclusive).

157. The antibody or fragment thereof of claim 156, wherein said human IgG1 monoclonal antibody forms a hydrogen bond with Gln7, Ser16, and His19 and a salt bridge at Arg27 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 0 to 3.4 Å (inclusive).

158. An isolated monoclonal antibody or fragment thereof, wherein said antibody or fragment thereof is a human IgG monoclonal that specifically binds human BCMA of SEQ ID NO:285 and inhibits the biological activity of APRIL, and wherein said antibody comprises a Vh domain that is at least 90% identical to SEQ ID NO:208 and a Vl domain that is at least 90% identical to SEQ ID NO:242.

159. The antibody or fragment thereof of claim 158, wherein said antibody or fragment thereof comprises a heavy chain that is at least 90% identical to SEQ ID NO:276 and a light chain that is at least 90% identical to SEQ ID NO:282.

160. The antibody of or fragment thereof claim 158, wherein antibody or fragment thereof comprises a Vh domain that is at least 95% identical to SEQ ID NO:208 and a Vl domain that is at least 95% identical to SEQ ID NO:242.

161. The antibody of claim 160, wherein said antibody comprises a heavy chain that is at least 95% identical to SEQ ID NO:276 and a light chain that is at least 95% identical to SEQ ID NO:282.

162. The antibody or fragment thereof of claims 158 to 161, wherein said antibody or fragment thereof comprises Tyr37, Ala96, Leu97, and Arg101 of a Vl domain and Ser31, Val53, Asp56, Asp98, Gly105, and Trp107 of a Vh domain.

163. The antibody or fragment thereof of claims 158 to 162, wherein said antibody or fragment thereof comprises His31, Asn33, Tyr37, Ala96, Leu97, Gln98, Pro99, and Arg101 of a light chain variable domain and Thr28, Ser30, Ser31, Ala33, Asn35, Ala50, Ile51, Ser52, Val53, Gly54, Gly55, Asp56, Tyr58, Arg71, Asp98, Val100, Met102, Gly105, Val106, Trp107, Tyr108, and Tyr109 of a heavy chain variable domain.

164. The antibody or fragment thereof of claims 158 to 163, wherein said antibody or fragment thereof has a Kd for human BCMA of 0.75 to 1.11 nM ± 0.1 nM (inclusive).

165. An isolated monoclonal antibody or Fab fragment thereof, wherein said antibody or Fab fragment thereof specifically binds to the same epitope on human BCMA of SEQ ID NO:285 as a human IgG1 monoclonal antibody comprising a Vh domain comprising SEQ ID NO:208 and a Vl domain comprising SEQ ID NO:242, and wherein said antibody or Fab fragment thereof inhibits the biological activity of APRIL.

166. The antibody or Fab fragment thereof of claim 165, wherein said human IgG1 monoclonal antibody comprises a heavy chain comprising SEQ ID NO:276 and a light chain comprising SEQ ID NO:282.

167. The antibody or Fab fragment thereof of claims 165 or 166, wherein said epitope is defined by x-ray crystallography.

168. The antibody or Fab fragment thereof of claim 167, wherein said epitope is defined by x-ray crystallography and a contact distance analysis of 0 to 3.4 Å (inclusive).

169. The antibody or Fab fragment thereof of claim 168, wherein said epitope is defined by x-ray crystallography and a contact distance analysis of 3.4 to 5.0 Å (inclusive).

170. The antibody or Fab fragment thereof of claims 168 or 169, wherein said antibody or Fab fragment thereof covers a surface area of human BCMA of SEQ ID NO:285 of 1,669 $Å^2 \pm 5\%$ and has a shape complementarity of 0.71 ± 0.03.

171. The antibody of any of claims 168 to 170, wherein said monoclonal antibody or Fab fragment thereof is human.

172. The antibody or Fab fragment thereof of claim 171, wherein said monoclonal antibody or Fab fragment thereof is human IgG.

173. The antibody or Fab fragment thereof of claim 172, wherein said monoclonal antibody or Fab fragment thereof is human IgG1.

174. The antibody or Fab fragment thereof of any of claims 165 to 173, wherein said antibody or Fab fragment thereof has a Kd for huBCMA of SEQ ID NO:285 of 0.75 to 1.11 nM ± 0.1 nM (inclusive).

175. An isolated monoclonal antibody or Fab fragment thereof, wherein said antibody or Fab fragment thereof specifically binds human BCMA and interacts with Gly6, Gln7, Tyr13, Ser16, Leu17, His19, Arg27, and Leu35 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 0 to 3.4 Å (inclusive), and wherein said antibody or Fab fragment thereof inhibits the biological activity of APRIL.

176. The antibody of claim 175, wherein said antibody or Fab fragment thereof interacts with Ala5, Gly6, Gln7, Tyr13, Phe14, Asp15, Ser16, Leu17, Leu18, and His19 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 3.4 to 5.0 Å (inclusive).

177. The antibody of claims 175 or 176, wherein said antibody or Fab fragment thereof interacts with Ala5, Gly6, Gln7, Tyr13, Phe14, Asp15, Ser16, Leu17, Leu18, His19, Arg27, Ser30, Thr32, Pro33, Pro34, and Leu35 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 3.4 to 5.0 Å (inclusive).

178. The antibody of claims 175 to 177, wherein said antibody or Fab fragment thereof forms a hydrogen bond with Gln7, Ser16, and His19 and a salt bridge at Arg27 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 0 to 3.4 Å (inclusive).

179. The antibody or Fab fragment thereof of claims 175 to 178, wherein said monoclonal antibody or Fab fragment thereof is human.

180. The antibody or Fab fragment thereof of claim 179, wherein said monoclonal antibody or Fab fragment thereof is human IgG.

181. The antibody or Fab fragment thereof of claim 180, wherein said monoclonal antibody or Fab fragment thereof is human IgG1.

182. The antibody or Fab fragment thereof of claims 175 to 181, wherein said monoclonal antibody or Fab fragment thereof has a Kd for human BCMA of 0.75 to 1.11 nM ± 0.1 nM (inclusive).

183. An isolated monoclonal antibody or Fab fragment thereof, wherein said antibody or Fab fragment thereof specifically binds to human BCMA of SEQ ID NO:360 and thereby changes the solvent accessible surface area on said human BMCA by greater than 50% at amino acid residues Gly6, Tyr13, Phe14, Asp15, Ser16, Leu17, His19, Thr32, Pro34, and Leu35 of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 0 to 3.4 Å (inclusive), and wherein said antibody or Fab fragment thereof inhibits the biological activity of APRIL.

184. The antibody or Fab fragment thereof of claim 183, wherein said monoclonal antibody or Fab fragment thereof is human.

185. The antibody or Fab fragment thereof of claim 184, wherein said monoclonal antibody or Fab fragment thereof is human IgG.

186. The antibody or Fab fragment thereof of claim 185, wherein said monoclonal antibody or Fab fragment thereof is human IgG1.

187. The antibody of claims 183 to 186, wherein said antibody or Fab fragment thereof has a Kd for human BCMA of 0.75 to 1.11 nM ± 0.1 nM (inclusive).

188. The antibody or fragment thereof of any of claims 108 to 187, further comprising a linker.

189. The antibody or fragment thereof of claim 188, further comprising a drug or chemotherapeutic agent.

190. The antibody or fragment of claim 189, wherein said polypeptide or fragment further comprises a linker selected from the group consisting of: 6-maleimidocaproyl, maleimidopropanoyl, valine-citrulline, alanine-phenylalanine, p-aminobenzyloxycarbonyl, Mal-dPEG4-NHS, N-succinimidyl 4-(2-pyridylthio) pentanoate ("SPP"), N-succinimidyl 4-(N-maleimidomethyl) cyclohexane-1 carboxylate ("SMCC" or "MCC"), and N-succinimidyl (4-iodo-acetyl) aminobenzoate ("SIAB").

191. The antibody or fragment of claim 190, wherein said linker is N-succinimidyl 4-(N-maleimidomethyl) cyclohexane-1 carboxylate.

192. The antibody or fragment of claims 188 to 191, wherein said antibody or fragment further comprises a drug or chemotherapeutic agent selected from the group consisting of: thiotepa and cyclophosphamide (CYTOXAN.TM.); alkyl sulfonates such as busulfan, improsulfan and piposulfan; aziridines, such as benzodopa, carboquone, meturedopa, and uredopa; ethylenimines and methylamelamines including altretamine, triethylenemelamine, trietylenephosphoramide, triethylenethiophosphaoramide and trimethylolomelamine; acetogenins (especially bullatacin and bullatacinone); a camptothecin (including the synthetic analogue topotecan); bryostatin; callystatin; CC-1065 (including its adozelesin, carzelesin and bizelesin synthetic analogues); cryptophycins (particularly cryptophycin 1 and cryptophycin 8); dolastatin; duocarmycin (including the synthetic analogues, KW-2189 and CBI-TMI); eleutherobin; pancratistatin; a sarcodictyin; spongistatin; nitrogen mustards such as chlorambucil, chlomaphazine, cholophosphamide, estramustine, ifosfamide, mechlorethamine, mechlorethamine oxide hydrochloride, melphalan, novembichin, phenesterine, prednimustine, trofosfamide, uracil mustard; nitrosureas such as carmustine,

chlorozotocin, fotemustine, lomustine, nimustine, ranimustine; antibiotics, such as the enediyne antibiotics (e.g. calicheamicin, especially calicheamicin .gamma1 and calicheamicin theta I, see, e.g., Angew Chem. Intl. Ed. Engl. 33:183-186 (1994); dynemicin, including dynemicin A; an esperamicin; as well as neocarzinostatin chromophore and related chromoprotein enediyne antiobiotic chromomophores), aclacinomysins, actinomycin, authramycin, azaserine, bleomycins, cactinomycin, carabicin, caminomycin, carzinophilin; chromomycins, dactinomycin, daunorubicin, detorubicin, 6-diazo-5-oxo-L-norleucine, doxorubicin (including morpholino-doxorubicin, cyanomorpholino-doxorubicin, 2-pyrrolino-doxorubicin and deoxydoxorubicin), epirubicin, esorubicin, idarubicin, marcellomycin, nitomycins, mycophenolic acid, nogalamycin, olivomycins, peplomycin, potfiromycin, puromycin, quelamycin, rodorubicin, streptonigrin, streptozocin, tubercidin, ubenimex, zinostatin, zorubicin; anti-metabolites, such as methotrexate and 5-fluorouracil (5-FU); folic acid analogues, such as denopterin, methotrexate, pteropterin, trimetrexate; purine analogs, such as fludarabine, 6-mercaptopurine, thiamiprine, thioguanine; pyrimidine analogs such as, ancitabine, azacitidine, 6-azauridine, carmofur, cytarabine, dideoxyuridine, doxifluridine, enocitabine, floxuridine, 5-FU; androgens, such as calusterone, dromostanolone propionate, epitiostanol, mepitiostane, testolactone; anti-adrenals, such as aminoglutethimide, mitotane, trilostane; folic acid replenisher, such as frolinic acid; aceglatone; aldophosphamide glycoside; aminolevulinic acid; amsacrine; bestrabucil; bisantrene; edatraxate; defofamine; demecolcine; diaziquone; elfomithine; elliptinium acetate; an epothilone; etoglucid; gallium nitrate; hydroxyurea; lentinan; lonidamine; maytansinoids, such as maytansine and ansamitocins; mitoguazone; mitoxantrone; mopidamol; nitracrine; pentostatin; phenamet; pirarubicin; podophyllinic acid; 2-ethylhydrazide; procarbazine; PSK.RTM.; razoxane; rhizoxin; sizofuran; spirogermanium; tenuazonic acid; triaziquone; 2,2',2''-trichlorotriethylamine; trichothecenes (especially T-2 toxin, verracurin A, roridin A and anguidine); urethan; vindesine; dacarbazine; mannomustine; mitobronitol; mitolactol; pipobroman; gacytosine; arabinoside ("Ara-C"); cyclophosphamide; thiotepa; taxoids, e.g. paclitaxel (TAXOL.TM., Bristol-Myers Squibb Oncology, Princeton, N.J.) and doxetaxel (TAXOTERE.RTM., Rhone-Poulenc Rorer, Antony, France); chlorambucil; gemcitabine; 6-thioguanine; mercaptopurine; methotrexate; platinum analogs such as cisplatin and carboplatin; vinblastine; platinum; etoposide (VP-16); ifosfamide; mitomycin C; mitoxantrone; vincristine; vinorelbine; navelbine; novantrone; teniposide; daunomycin; aminopterin; xeloda; ibandronate; CPT-11; topoisomerase inhibitor RFS 2000; difluoromethylomithine (DMFO); retinoic acid; capecitabine; tamoxifen, raloxifene, aromatase inhibiting 4(5)-imidazoles, 4-hydroxytamoxifen, trioxifene, keoxifene, LY117018, onapristone, and toremifene (Fareston); and anti-androgens, such as flutamide, nilutamide, bicalutamide, leuprolide, goserelin, Colchicine-site Binders (Curacin), Combretastatins (AVE806, Combretastatin A-4 prodrug (CA4P), Oxi-4503), Cryptophycins (LY355703), Discodermolide, Dolastatin and Analogs (Auristatin PHE, Dolastatin 10, ILX-651, Symplostatin 1, TZT-1027), Epothilones (BMS-247550, BMS-310705, EP0906, KOS-862, ZK-EPO), Eleutherobin, FR182877, Halichondrin B (E7389), Halimide (NPI-

2352 and NPI-2358), Hemiasterlins (HTI-286), Laulimalide, Maytansinoids ("DM1," "DM3" or "DM4") (Bivatuzumab mertansine, Cantuzumab mertansine, huN901-DM1/BB-10901TAP, MLN591DM1, My9-6-DM1, Trastuzumab-DM1), PC-SPES, Peloruside A, Resveratrol, S-allylmercaptocysteine (SAMC), Spongistatins, Vitilevuamide, Molecular Motor-Kinesins (SB-715992), Designed Colchicine-Site Binders (A-289099, A-293620/A-318315, ABT-751/E7010, D-24851/D-64131, ZD6126), Other Novel Spindle Poisons (2-Methoxyestradiol (2-ME2), Bezimidazole Carbamates (ANG 600 series, Mebendazole), CP248/CP461, HMN-214, R440, SDX-103, T67/T607).

193. The antibody or fragment of claim 192, wherein drug or chemotherapeutic agent is selected from the group consisting of: Maytansinoids ("DM1," "DM3" or "DM4").

194. The antibody or fragment of claim 193, wherein said drug or chemotherapeutic agent is DM1.

195. The antibody or fragment of claims 193 or 194, wherein said antibody or fragment has a drug to antibody/antibody fragment ratio of between 1 and 10, inclusive.

196. The antibody or fragment of claims 195, wherein said antibody or fragment has a drug to antibody/antibody fragment ratio of between 2 and 5, inclusive.

197. A composition, comprising the antibody or fragments thereof of any of claims 108 to 196.

198. A pharmaceutical composition, comprising the antibody or fragments thereof of any of claims 108 to 196.

199. The pharmaceutical composition of claim 198, comprising a pharmaceutically acceptable diluent, carrier, solubilizer, emulsifier, and/or a preservative.

200. A method of treating a disease, comprising administering an effective amount of the compositions of any of claims 197 to 199, wherein the disease is selected from the group consisting of: B-cell cancers, multiple myeloma, malignant plasma cell neoplasms, Kahler's disease and Myelomatosis; Plasma cell leukemia; Plasmacytoma; B-cell prolymphocytic leukemia; Hairy cell leukemia; B-cell non-Hodgkin's lymphoma (NHL); Acute myeloid leukemia (AML); Chronic myeloid leukemia (CML); Acute lymphocytic leukemia (ALL); Chronic lymphocytic leukemia (CLL); Follicular lymphoma (including follicular non-Hodgkin's lymphoma types); Burkitt's lymphoma (Endemic Burkitt's lymphoma; Sporadic Burkitt's lymphoma); Marginal zone lymphoma (Mucosa-Associated Lymphoid Tissue; MALT / MALToma; Monocytoid B cell lymphoma; Splenic lymphoma with villous lymphocytes); Mantle cell lymphoma; Large cell lymphoma (Diffuse large

cell; Diffuse Mixed Cell; Immunoblastic Lymphoma; Primary Mediastinal B Cell Lymphoma; Angiocentric Lymphoma - pulmonary B cell); Small lymphocytic lymphoma (SLL); Precursor B-lymphoblastic lymphoma; Myeloid leukemia (granulocytic; myelogenous; Acute myeloid leukemia; Chronic myeloid leukemia; Subacute myeloid leukemia; Myeloid sarcoma; Chloroma; Granulocytic sarcoma; Acute promyelocytic leukemia; Acute myelomonocytic leukemia); Waldenstrom's macroglobulinemia, or other B-cell lymphoma.

201. The method of claim 200, wherein the disease is selected from the group consisting of: B-cell cancers, multiple myeloma, malignant plasma cell neoplasms, or other B-cell lymphoma.

202. The method of claim 201, wherein the disease is multiple myeloma.

203. The method of any of claims 200 to 202, further comprising administering one of more additional treatments selected from the group consisting of: chemotherapy, radiation therapy, surgery, proteasome inhibitors, corticosteroids, and stem cell transplants.

204. The method of claim 203, wherein the administering of said additional treatment is prior, concurrent, or subsequent, or a combination of each, to the administration of the compositions of any of claims 197 to 199.

We claim:

1. An isolated BCMA-binding antibody, or a BCMA-binding fragment thereof, a Vh-CDR1 comprising SEQ ID NO:4, a Vh-CDR2 comprising SEQ ID NO:5, a Vh-CDR3 comprising SEQ ID NO:6, a Vl-CDR1 comprising SEQ ID NO:106, a Vl-CDR2 comprising SEQ ID NO:107, and a Vl-CDR3 comprising SEQ ID NO:108.

2. The antibody or fragment of claim 1, wherein said antibody or fragment comprises an Ab-1Vl domain comprising SEQ ID NO:240 and an Ab-1Vh domain comprising SEQ ID NO:206.

3. The antibody or fragment of claim 1, wherein said antibody or fragment comprises two Ab-1 light chains comprising SEQ ID NO:280 and two Ab-1 heavy chains comprising SEQ ID NO:274.

4. The antibody or fragment of claim 1, wherein said antibody or fragment:
   a. is human;
   b. is chimeric;
   c. is monoclonal;
   d. specifically binds human BCMA and cross-reacts to cynomolgus BCMA;
   e. does not specifically bind to TACI or BAFF-R;
   f. binds BCMA on the surface of human myeloma cells;
   g. binds BCMA on the surface of human multiple myeloma cells; or
   h. binds BCMA on the surface of human cells and is internalized by said cells.

5. The antibody or fragment of claim 1, wherein said antibody or fragment further comprises a linker wherein said linker is N-succinimidyl 4-(N-maleimidomethyl) cyclohexane-1 carboxylate.

6. The antibody or fragment of claim 1, wherein said antibody or fragment further comprises DM1, DM3 or DM4.

7. The antibody or fragment of claim 1, wherein said antibody or fragment is covalently bound to a linker, and said linker is covalently bound to a drug, wherein said linker is N-succinimidyl 4-(N-maleimidomethyl) cyclohexane-1 carboxylate and said drug is DM1, DM3, or DM4.

8. The antibody or fragment of claim 7, wherein said antibody or fragment has a drug to antibody ratio of between 1 and 10.

9. The antibody or fragment of claim 8, wherein said antibody or fragment has a drug to antibody ratio of between 2 and 5.

10. A pharmaceutical composition comprising the antibody or fragment of claim 1, a pharmaceutically acceptable diluent, carrier, solubilizer, emulsifier, and/or a preservative.

11. Use of a composition of claim 10 in the manufacture of a medicament for treating a disease, wherein the disease is selected from the group consisting of: B-cell cancers, multiple myeloma, malignant plasma cell neoplasms, Kahler's disease and Myelomatosis; Plasma cell leukemia; Plasmacytoma; B-cell prolymphocytic leukemia; Hairy cell leukemia; B-cell non-Hodgkin's lymphoma (NHL); Acute myeloid leukemia (AML); Chronic myeloid leukemia (CML); Acute lymphocytic leukemia (ALL); Chronic lymphocytic leukemia (CLL); Follicular lymphoma (including follicular non-Hodgkin's lymphoma types); Burkitt's lymphoma (Endemic Burkitt's lymphoma; Sporadic Burkitt's lymphoma); Marginal zone lymphoma (Mucosa-Associated Lymphoid Tissue; MALT / MALToma; Monocytoid B cell lymphoma; Splenic lymphoma with villous lymphocytes); Mantle cell lymphoma; Large cell lymphoma (Diffuse large cell; Diffuse Mixed Cell; Immunoblastic Lymphoma; Primary Mediastinal B Cell Lymphoma; Angiocentric Lymphoma - pulmonary B cell); Small lymphocytic lymphoma (SLL); Precursor B-lymphoblastic lymphoma; Myeloid leukemia (granulocytic; myelogenous; Acute myeloid leukemia; Chronic myeloid leukemia; Subacute myeloid leukemia; Myeloid sarcoma; Chloroma; Granulocytic sarcoma; Acute promyelocytic leukemia; Acute myelomonocytic leukemia); Waldenstrom's macroglobulinemia, and other B-cell lymphoma.

12. The use of claim 11, further comprising administering one of more additional treatments selected from the group consisting of: chemotherapy, radiation therapy, surgery, proteasome inhibitors, corticosteroids, and stem cell transplants.

13. An isolated polynucleotide, wherein said polynucleotide encodes the light chain, the heavy chain, or the light chain and the heavy chain of the antibody or fragment of claim 1.

14. The polynucleotide of claim 13, wherein said polynucleotide sequence comprises:

a. a Vh-CDR1 comprising SEQ ID NO:1, a Vh-CDR2 comprising SEQ ID NO:2, and a Vh-CDR3 comprising SEQ ID NO:3;; and/or

b. a Vl-CDR1 comprising SEQ ID NO:103, a Vl-CDR2 comprising SEQ ID NO:104, and a Vl-CDR3 comprising SEQ ID NO:105.

15. The polynucleotide of claim 13, wherein said polynucleotide sequence comprises an Ab-1Vl comprising SEQ ID NO:239 and/or an Ab-1Vh comprising SEQ ID NO:205.

16. The polynucleotide of claim 13, wherein said polynucleotide sequence comprises a light chain comprising SEQ ID NO:279 and/or a heavy chain comprising SEQ ID NO:273.

17. A plasmid, comprising the polynucleotide of claim 13.

18. The plasmid of claim 13, wherein said plasmid is an expression vector.

19. An isolated cell, comprising said plasmid of claim 17, wherein said cell is:

a. a prokaryotic cell;

b. a eukaryotic cell;

c. a mammalian cell;

d. an insect cell; ~~and~~ or

e. a CHO cell.

20. A method of making a BCMA-binding antibody, or a BCMA-binding fragment thereof, comprising incubating said isolated cell of claim 19 under conditions that allow it to express said antibody or polypeptide.

21. An isolated monoclonal antibody that specifically binds to SEQ ID NO:285 and SEQ ID NO:286, but does not specifically bind SEQ ID NO:351.

22. An isolated monoclonal antibody that specifically binds to SEQ ID NO:352, but does not specifically bind SEQ ID NO:351.

23. An isolated monoclonal antibody that binds a neutralizing determinant comprising amino acids 1 though 20 (inclusive) of SEQ ID NO: 285.

24. An isolated monoclonal antibody that binds a neutralizing determinant comprising amino acids 1 through 11 (inclusive) of SEQ ID NO: 285.

25. An isolated BCMA-binding antibody or BCMA-binding fragment thereof, wherein said antibody interacts with Gly6, Gln7, Phe14, Asp15, Ser16, Leu17, and His19 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 0 to 3.4 Å (inclusive).

26. The antibody or fragment thereof of claim 25, wherein said antibody interacts with Gly6, Gln7, Cys8, Tyr,13, Phe14, Asp15, Ser16, Leu17, Leu18, His19, and Ala20 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 3.4 to 5.0 Å (inclusive).

27. The antibody or fragment thereof of claim 25, wherein said antibody forms a hydrogen bond with Gln7, Asp15, Ser16, Leu17, and His19 of human BCMA of SEQ ID NO:360 as defined by x-ray crystallography at a contact distance resolution of 0 to 3.4 Å (inclusive).