WHAT IS CLAIMED IS:

1. A method of inhibiting the growth of epidermal growth factor receptor (EGFR)-expressing tumor cells that are resistant or refractory to EGFR therapy, said methodcomprising contacting said tumor cells with an effective amount of an EGFR antibody immunoconjugate.

2. The method of claim 1, wherein said therapy comprised administration of an EGFR antibody or an EGFR kinase inhibitor.

3. The method of claims 1 or 2, wherein the EGFR therapy to which the cells are resistant is selected from the group consisting of: erlotinib, gefitinib, lapatinib, BIB2992, cetuximab, panitumumab, zalutumumab, necitumumab, and nimotuzumab.

4. The method of any of claims 1-3, wherein at least one of the tumor cells: (1) contains one or more mutations in an EGFR-encoding gene; (2) contains one or more mutations in a PIK3CA, RAS, or PTEN encoding gene; (3) has an activated MET or IGF1R pathway; (4) has mesenchymal histology or has undergone epithelial-mesenchymal transition; or (5) has ERBB2 gene amplification or increased production of HER2 protein.

5. The method of claim 4, wherein the mutated EGFR gene comprises a EGFRvIII or T790M mutation.

6. The method of claim 4, wherein said at least one tumor cell contains one or more mutations in a PIK3CA, RAS, or PTEN encoding genes.

7. The method of claim 4, wherein the MET or IGF1R pathway is activated.

8. A method of treating cancer in a patient comprising administering an effective amount of an EGFR antibody immunoconjugate to inhibit growth of the tumor cells in said patient, wherein at least one of the tumor cells: (1) contains one or more mutations in an EGFR-encoding gene; (2) contains one or more mutations in a PIK3CA, RAS, or PTEN encoding gene; (3) has an activated MET or IGF1R pathway; (4) has mesenchymal histology or has undergone epithelial-mesenchymal transition; or (5) has ERBB2 gene amplification or increased production of HER2 protein.

9. A method of treating cancer in a patient comprising:

(a) identifying tumor cells from said patient that (1) contain one or more mutations in an EGFR-encoding gene; (2) contain one or more mutations in a PIK3CA, RAS, or PTEN encoding gene; (3) have an activated MET or IGF1R pathway; or (4) have mesenchymal histology or have undergone epithelial-mesenchymal transition; and

(b) administering an effective amount of an EGFR antibody immunoconjugate to said patient.

10. The method of claims 8 or 9, wherein said cancer is a squamous cell cancer, lung cancer, head and neck cancer, or an EGFR-positive cancer.

11. The method of claims 1-4, or 7-9, wherein said MET activation is caused by MET gene amplification.

12. The method of any of claims 8-11, wherein said patient previously failed or is currently failing an EGFR therapy.

13. The method of claim 12, wherein said therapy comprised administration of an EGFR antibody or an EGFR kinase inhibitor.

14. The method of claim 13, wherein said EGFR antibody is cetuximab or panitumumab.

15. The method of claim 13, wherein said EGFR kinase inhibitor is erlotinib or gefitinib.

16. A method of treating cancer in a patient comprising administering an effective amount of an EGFR antibody immunoconjugate to inhibit growth of the tumor cells in said patient, wherein at least one of the tumor cells is resistant to therapy comprising an anaplastic lymphoma kinase (ALK) inhibitor.

17. A method of treating cancer in a patient comprising:

(a) identifying tumor cells from said patient that are resistant to at least one ALK inhibitor; and

(b) administering an effective amount of an EGFR antibody immunoconjugate to said patient.

18. The method of claims 16 or 17, wherein at least one of the tumor cells contains an EML4-ALK translocation.

19. The method of any one of claims 16-18, wherein the cancer is non-small cell lung cancer.

20. The method of any of claims 16-19, wherein the ALK inhibitor is crizotinib.

21. The method of any of claims 1-20, wherein said immunoconjugate has the formula (A) - (L) - (C), wherein:

(A) is an antibody or antigen binding fragment thereof that specifically binds EGFR;
(L) is a linker; and
(C) is a cytotoxic agent; and
wherein said linker (L) links (A) to (C).

22. The method of claim 21, wherein said EGFR antibody comprises the heavy chain variable region of SEQ ID NO:1 and the light chain variable region of SEQ ID NOs:2 or 3.

23. The method of claim 22, wherein said linker is selected from the group consisting of a cleavable linker, a non-cleavable linker, a hydrophilic linker, and a dicarboxylic acid based linker.

24. The method of claim 23, wherein said linker is a non-cleavable linker.

25. The method of claim 21, wherein said linker is selected from the group consisting: N-succinimidyl 4-(2-pyridyldithio)pentanoate (SPP); N-succinimidyl 4-(2-pyridyldithio)butanoate (SPDB) or N-succinimidyl 4-(2-pyridyldithio)-2-sulfobutanoate (sulfo-SPDB); N-succinimidyl 4-(maleimidomethyl) cyclohexanecarboxylate (SMCC); N-sulfosuccinimidyl 4-(maleimidomethyl) cyclohexanecarboxylate (sulfoSMCC); N-succinimidyl-4-(iodoacetyl)-aminobenzoate (SIAB); N-succinimidyl-[(N-maleimidopropionamido)-tetraethyleneglycol] ester (NHS-PEG4-maleimide); N-(beta-maleimidopropyloxy)succinimide ester (BMPS); and gamma-maleimidobutyric acid N-succinimidyl ester (GMBS).

26. The method of claim 21, wherein said cytotoxic agent is selected from the group consisting of a maytansinoid, maytansinoid analog, doxorubicin, a modified doxorubicin, benzodiazepine, taxoid, CC-1065, CC-1065 analog, duocarmycin, duocarmycin analog, calicheamicin, dolastatin, dolastatin analog, auristatin, tomaymycin derivative, and leptomycin derivative or a prodrug of the agent.

27. The method of claim 26, wherein said cytotoxic agent is a maytansinoid.

28. The method of claim 27, wherein said cytotoxic agent is N(2')-deacetyl-N(2')-(3-mercapto-1-oxopropyl)-maytansine (DM1) or N(2')-deacetyl-N2-(4-mercapto-4-methyl-1-oxopentyl)-maytansine (DM4).

29. The method of any of claims 1-28, wherein the EGFR antibody immunoconjugate comprises an antibody which comprises the heavy chain variable region of SEQ ID NO:1 and the light chain variable region of SEQ ID NOs:2 or 3; the linker SMCC; and the maytansinoid DM1.

30. The method of any of claims 1-29, wherein the EGFR antibody immunoconjugate is administered with an anti-neoplastic agent.

31. The method of claim 30, wherein the EGFR antibody immunoconjugate is administered simultaneously with the anti-neoplastic agent.

32. The method of claim 30, wherein the EGFR antibody immunoconjugate and anti-neoplastic agent are administered in any temporal order.

33. The method of any of claims 8-32, wherein said patient is a human.