CLAIMS

1. A ligand-drug conjugate, comprising a ligand unit targeting a tumor antigen or a non-tumor antigen, a conjugated payload unit, and a recovery unit capable of binding to a free payload released from the ligand-drug conjugate, wherein the payload unit comprises a payload and a linker;

preferably, the ligand unit and the recovery unit are directly connected or not directly connected to each other, or

preferably, a linker unit is contained between the ligand unit and the recovery unit; or

preferably, the ligand-drug conjugate further comprises an additional functional unit; or

preferably, the payload is conjugated to the ligand unit, and/or the recovery unit, and/or the linker unit, and/or the additional functional unit via the linker; or

preferably, the ligand unit comprises an antibody or an antigen-binding fragment, a receptor, a peptide, an oligopeptide, a peptidomimetic, a fusion protein, or an aptamer that specifically binds to the tumor antigen or the non-tumor antigen.

2. The ligand-drug conjugate according to claim 1, wherein the ligand unit comprises an antibody or an antigen-binding fragment, a receptor, a peptide, an oligopeptide, a peptidomimetic, a fusion protein, or an aptamer that specifically binds to the tumor antigen or the non-tumor antigen, and the antibody includes, but is not limited to, a monoclonal antibody, a bispecific antibody, a multispecific antibody, a nanobody (heavy chain antibody, HcAb), and an immunoglobulin new antigen receptor (IgNAR); the antigen-binding fragment includes, but is not limited to, an scFv, an Fab, an Fab', an $F(ab')_2$, an Fd, an Fv, a dAb, an sdAb, a VHH, and a Diabody; and the receptor includes, but is not limited to, a T cell receptor;

preferably, the antibody is selected from a murine antibody, a chimeric antibody, a humanized antibody, a fully human antibody, and an artificially engineered antibody; or

more preferably, the antibody further comprises a constant region of an immunoglobulin; or

even more preferably, the immunoglobulin is selected from the group consisting of human IgG1, IgG2, IgG3 and IgG4; or

preferably, the linker unit includes, but is not limited to, a peptide linker, an Fc domain or a

fragment thereof; preferably, the peptide linker is a flexible peptide linker; further preferably, the peptide linker comprises one or more amino acids; further preferably, the peptide linker comprises at least 5 amino acids; or the amino acid sequence of the peptide linker comprises (GGGGS)n, (VPGXG)n, (SG)n, (EAAAK)n, (G)n, (R)n, A(EAAAK)n ALEA(EAAAK)nA, A(EAAAK)nA, (AP)n, VSQTSKLTRAETVFPDV, PLGLWA, RVLAEA, EDVVCCSMSY, GGIEGRGS, TRHRQPRGWE, AGNRVRRSVG, GFLG, or LE, wherein n is equal to 1, 2, 3 or 4.

3. The ligand-drug conjugate according to any one of claims 1 to 2, wherein the tumor antigen or non-tumor antigen includes, but is not limited to, CD9, CD19, CD20, CD22, CD24, CD25, CD29, CD30, CD33, CD37, CD44, CD45, CD46, CD47, CD49b, CD51, CD52, CD56, CD73(NT5E), CD79b, CD123, CD133, CD138, CD157, CD166, DLL-3, CDH6, Tissue factor, EpCAM, PSMA, MUC1, MUC16, FOLR1, GPC3, ROR1, ROR2, PD-L1, ENPP3, TDGF1, MSLN, TIM-1, LRRC15, LIV-1(ZIP6), Claudin6, Claudin9, Claudin 18.2, Mesothelin, HER2(ErbB2), HER3(ErbB3), EGFR, c-MET, SLITRK6, KIT(CD117), STEAP1, NaPi2B(SLC34A2), SLC44A4, GPNMB, AXL, CD166, B7-H3(CD276), B7-H4(VTCN1), PTK7(CCK4), EFNA4, 5T4, NOTCH3, Nectin-4, TROP-2, GPR20, EphA2, LYPD3, FGFR2, FGFR3, FRα, CEACAMs, CAIX, P-cadherin(CDH3), CDH17, GD3, Cadherin 6, LAMP1, FLT3, BCMA, SLTRK6, Lewis Y, ASCT2, CA-IX, Cripto, DPEP3, Globo H, Ly6E, RNF43, DR5, CDCP1, CEACAM6, FUT3, GD2, CD26E, CD70, CD74, CD163, PRLR, TNFα, CXCR4, LXR, IL-6, CEACAM5, GPRC5D, HLA-DR, CTLA4(CD152), FAPα and IL2R; or

the antibody that specifically binds to the tumor antigen or the non-tumor antigen includes, but is not limited to, Alemtuzumab, Altumomab pentetate, Amivantamab, Atezolizumab, Inetetamab, Anetumab, Avelumab, Bectumomab, Bermekimab, Bevacizumab, Blinatumomab, Brentuximab vedotin, Catumaxomab, Cemiplimab, Cetuximab, Clivatuzumab, Daclizumab, Daratumumab, Denosumab, Dinutuximab beta, Dostarlimab, Durvalumab, Edrecolomab, Enfortumab vedotin, Epcoritamab, Epratuzumab, Etaracizumab, Glofitamab, Girentuximab, Ibritumomab, Inebilizumab, Inotuzumab ozogamicin, Ipilimumab, Isatuximab, Labetuzumab, Loncastuximab, Mogamulizumab, Loncastuximab tesirine, Mosunetuzumab, Nimotuzumab, Naratuximab, Naxitamab, Nivolumab, Ocrelizumab, Ofatumumab, Olaratumab, Oregovomab, Panitumumab, Pembrolizumab, Pertuzumab, Polatuzumab vedotin, Racotumomab, Ramucirumab, Rituximab, Sacituzumab govitecan, Teprotumumab, Tocilizumab, Tositumomab, Trastuzumab, Votumumab, Zalutumumab, Zanolimumab, and antigen-binding fragments and derivatives thereof; the peptide,

oligopeptide, fusion protein that specifically binds to a specific antigen includes, but is not limited to, a bicyclic peptide (Bicycle), angiopep-2, a linear peptide, a pH-sensitive peptide, SOR-C27, A6 peptide, SOR13, and variants and derivatives thereof; the aptamer that specifically binds to a specific antigen includes AS1411, sgc8, sgc4f, sgd5a, TC01, TD05, A9, A10, APT, Min.2, AIR-3A, E3, E07, Waz, P19, Zy1, and variants and derivatives thereof.

4. The ligand-drug conjugate according to any one of claims 1 to 3, wherein the ligand-drug conjugate is capable of specifically binding to the free payload, and molecular aggregation does not occur between the ligand-drug conjugates;

preferably, the recovery unit specifically binds to the free payload;

more preferably, the recovery unit comprises an antibody, an antigen-binding fragment, a receptor, a fusion protein, a peptide, an oligopeptide, a peptidomimetic, or an aptamer that specifically binds to the free payload;

even more preferably, the antibody that specifically binds to the free payload includes, but is not limited to, a monoclonal antibody, a bispecific antibody, a multispecific antibody, a nanobody (heavy chain antibody, HcAb), an immunoglobulin new antigen receptor (IgNAR); the antigen-binding fragment includes, but is not limited to, an scFv, an Fab, an Fab', an $F(ab')_2$, an Fd, an Fv, a dAb, an sdAb, a VHH, and a Diabody; and the receptor includes, but is not limited to, a T cell receptor;

still even more preferably, the antibody that specifically binds to the free payload is selected from the group consisting of a murine antibody, a chimeric antibody, a humanized antibody, a fully human antibody, and an artificially engineered antibody;

or

preferably, the recovery unit is capable of specifically binding to the free payload means that the equilibrium dissociation constant K_D(M) of the recovery unit to the free payload is less than 10^{-4}, or further less than 10^{-5}, or further less than 10^{-6}, or further less than 10^{-7}, or further less than 10^{-8}, or further less than 10^{-9};

more preferably, the recovery unit is capable of specifically binding to the free payload means that the equilibrium dissociation constant K_D(M) of the recovery unit to the free payload is less

than 10^{-7}, or further less than 10^{-8}, or further less than 10^{-9};

even more preferably, he recovery unit is capable of specifically binding to the free payload means that the equilibrium dissociation constant K_D(M) of the recovery unit to the free payload is less than 10^{-9};

or

preferably, the recovery unit does not bind to, or has a low affinity to, a payload in a conjugated state in the ligand-drug conjugate, and the low affinity also prevents the ligand-drug conjugate molecules from aggregating;

more preferably, the recovery unit specifically targets a non-exposed epitope on the conjugated payload unit;

or

prererably, a payload epitope masking unit capable of preventing the recovery unit from binding to the payload that remains conjugated to the ligand-drug conjugate is linked to the linker or the payload;

more preferably, the payload epitope masking unit does not interfere with the normal release of the payload after the ligand-drug conjugate enters a target cell;

or

preferably, the ligand-drug conjugate comprises one, two, or more recovery units; or

preferably, the recovery unit comprises:

(1) a VHH domain with CDR1-3 selected from amino acid sequences defined by:

CDR1-3 as set forth in SEQ ID NOs: 103, 104, and 105;

or (2) an amino acid sequence selected from the amino acid sequence as set forth in SEQ ID NO: 102;

or (3) an amino acid sequence selected from combinations of VH and VL defined as follows:

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 2, 3, and 4 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 6, YAS, and SEQ ID NO: 7 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 9, 10, and 11 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 6, FAS, and SEQ ID NO: 13 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 2, 3, and 4 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 6, YAS, and SEQ ID NO: 16 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 2, 3, and 20 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 6, YAS, and SEQ ID NO: 7 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 22, 23, and 24 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 26, WAS, and SEQ ID NO: 27 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 29, 30, and 31 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 33, KVS, and SEQ ID NO: 34 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 29, 36, and 37 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 33, KLS, and SEQ ID NO: 34 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 40, 41, and 42 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 44, KVS, and SEQ ID NO: 45 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 47, 48, and 42 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 50, KVS, and SEQ ID NO: 51 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 53, 54, and 55 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 57, DTS, and SEQ ID NO: 58 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 62, 63, and 64 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in

SEQ ID NO: 66, SAS, and SEQ ID NO: 67 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 69, 70, and 71 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 73, WAS, and SEQ ID NO: 74 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 76, 77, and 78 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 80, GAS, and SEQ ID NO: 81 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 83, 84, and 85 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 87, SAS, and SEQ ID NO: 67 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 89, 90, and 91 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 93, HGT, and SEQ ID NO: 94 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 76, 77, and 78 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 99, 77, and 100 respectively;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 1, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 5;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 8, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 12;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 14, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 15;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 17, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 18;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 19, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 18;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 21, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 25;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 28, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 32;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 35, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 38;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 39, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 43;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 46, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 49;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 52, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 56;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 59, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 60;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 61, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 65;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 68, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 72;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 75, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 79;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 82, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 86;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 88, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 92;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 95, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 96; and

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 97, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 98;

wherein the CDR1, CDR2 and CDR3 sequences, the HCDR1, HCDR2 and HCDR3 sequences, and the LCDR1, LCDR2 and LCDR3 sequences are obtained based on an IMGT

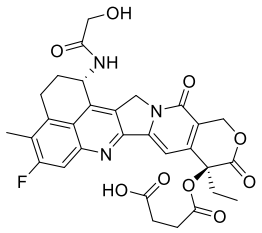
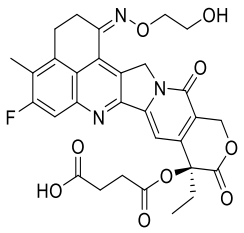
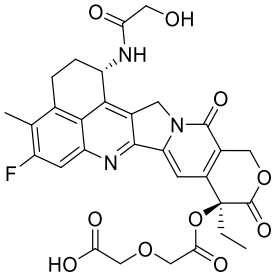
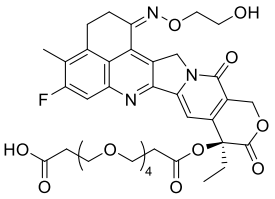
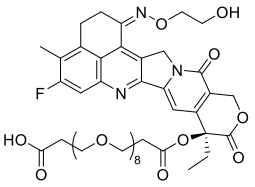
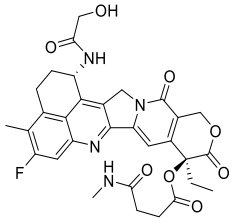
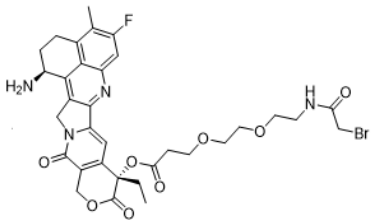
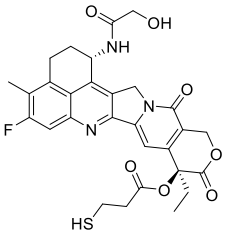
definition scheme;

or (4) a peptide comprising an amino acid sequence defined by SEQ ID NO: 106, SEQ ID NO: 107, SEQ ID NO: 108, SEQ ID NO: 109, SEQ ID NO: 110, SEQ ID NO: 111, SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 124, SEQ ID NO: 125, SEQ ID NO: 126, SEQ ID NO: 127, SEQ ID NO: 128, or SEQ ID NO: 129;

or (5) an aptamer comprising a nucleotide sequence defined by SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 133, SEQ ID NO: 134, SEQ ID NO: 135, SEQ ID NO: 136, SEQ ID NO: 137, SEQ ID NO: 138, SEQ ID NO: 139, SEQ ID NO: 140, SEQ ID NO: 141, SEQ ID NO: 142, SEQ ID NO: 143, SEQ ID NO: 144, SEQ ID NO: 145, SEQ ID NO: 146, SEQ ID NO: 147, SEQ ID NO: 148, SEQ ID NO: 149, SEQ ID NO: 150, SEQ ID NO: 151, SEQ ID NO: 152, SEQ ID NO: 153, SEQ ID NO: 154, SEQ ID NO: 155, SEQ ID NO: 156, SEQ ID NO: 157, SEQ ID NO: 158, SEQ ID NO: 159, SEQ ID NO: 160, SEQ ID NO: 161, or SEQ ID NO: 162.

5. The ligand-drug conjugate according to any one of claims 1 to 4, wherein the recovery unit is obtained by immunizing a non-human animal with a conjugate of a small molecule drug and a carrier protein or a biotin-small molecule drug conjugate, or obtained by screening with phage display technology, or obtained by screening with virtual technology, or obtained by screening with SELEX technology, or obtained by screening with hybridoma technology, or obtained by screening with nanobody technology, or obtained by yeast display technology, or obtained by single B cell cloning technology, or obtained by microfluidic technology, or obtained by surface plasmon resonance assisted screening technology;

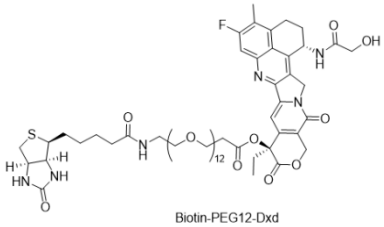
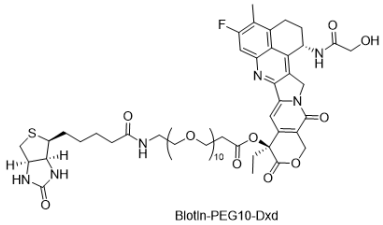
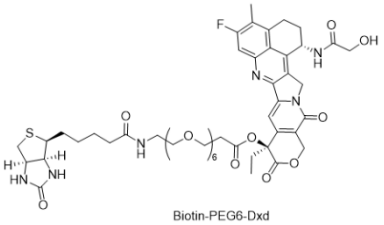
preferably, the small molecule drug includes, but is not limited to, MMAE, MMAD, DM1, DM2, DM4, eribulin, Exatecan, SN38, DXD, calicheamicin, pyrrolobenzodiazepine (PBD), indolinobenzodiazepine (IBD), duocarmycin, amanitin, Maaa-1181a, taxol, daunomycin, vinblastine, Doxorubicin, methotrexate, MMAF, ML022-Dxd, ML022-D633-004, ML026-Dxd, ML031-D633-004, ML037-D633-004, ML042-Dxd, ML047-DX8951, and MPA-Dxd;

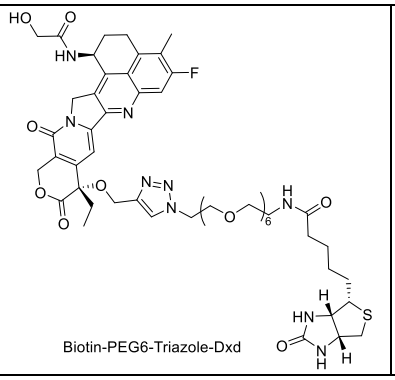
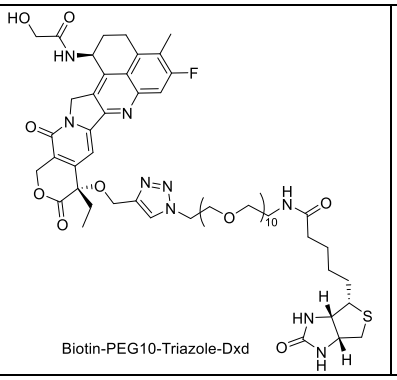
 ML022-Dxd	 ML022-D633-004	 ML026-Dxd
 ML031-D633-004	 ML037-D633-004	 ML042-Dxd
 ML047-DX8951	 MPA-Dxd	

or

preferably, the carrier protein includes, but is not limited to, KLH, BSA and OVA; or

preferably, the biotin-small molecule drug conjugate includes, but is not limited to, Biotin-PEG12-Dxd, Biotin-PEG10-Dxd, Biotin-PEG6-Dxd, Biotin-PEG6-Triazole-Dxd and Biotin-PEG10-Triazole-Dxd:

 Biotin-PEG12-Dxd	 Blotin-PEG10-Dxd	 Biotin-PEG6-Dxd

 Biotin-PEG6-Triazole-Dxd	 Biotin-PEG10-Triazole-Dxd	

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6. The ligand-drug conjugate according to any one of claims 1 to 5, wherein the conjugated payload includes a cytotoxic molecule, a nucleic acid, an immunostimulant, and a modulator;

preferably, the ligand-drug conjugate comprises one, two or more payloads;

more preferably, the number of payload is 1, 2, 3, 4, 5, 6, 7, 8 or more;

or

preferably, when two or more payloads are conjugated, the payloads may be the same or different;

or

preferably, the payload is conjugated to the ligand unit and/or the recovery unit and/or the linker unit and/or the additional functional unit via site-specific or random conjugation; or

preferably, the cytotoxic molecule includes, but is not limited to, a tubulin inhibitor, a DNA inhibitor, or other toxin molecules; the DNA inhibitor further includes a DNA damaging agent or a topoisomerase I inhibitor; or

preferably, the tubulin inhibitor further includes, but is not limited to, auristatins, maytansinoid derivatives, tubulysin, halichondrin, cryptophycins or EG5 inhibitors; or

more preferably, the auristatins further include, but are not limited to, auristatin F (AF), monomethyl auristatin D (MMAD), monomethyl auristatin E (MMAE), and monomethyl auristatin F (MMAF); the maytansinoid derivatives further include, but are not limited to, DM1, DM2, and DM4; the halichondrin further includes, but is not limited to, eribulin; or

preferably, the DNA damaging agent further includes, but is not limited to, calicheamicins, pyrrolobenzodiazepines (PBDs), indolinobenzodiazepines (IBDs), and duocarmycins; and the

topoisomerase I inhibitor further includes, but is not limited to, camptothecin derivatives; or

more preferably, the camptothecin derivatives further include, but are not limited to, Exatecan, SN38, and DXD; or

preferably, the other toxin molecules include, but are not limited to, amanitin, Maaa-1181a, taxol, daunomycin, vinblastine, Doxorubicin, methotrexate, and a radioisotope and/or a pharmaceutically acceptable salt thereof; or

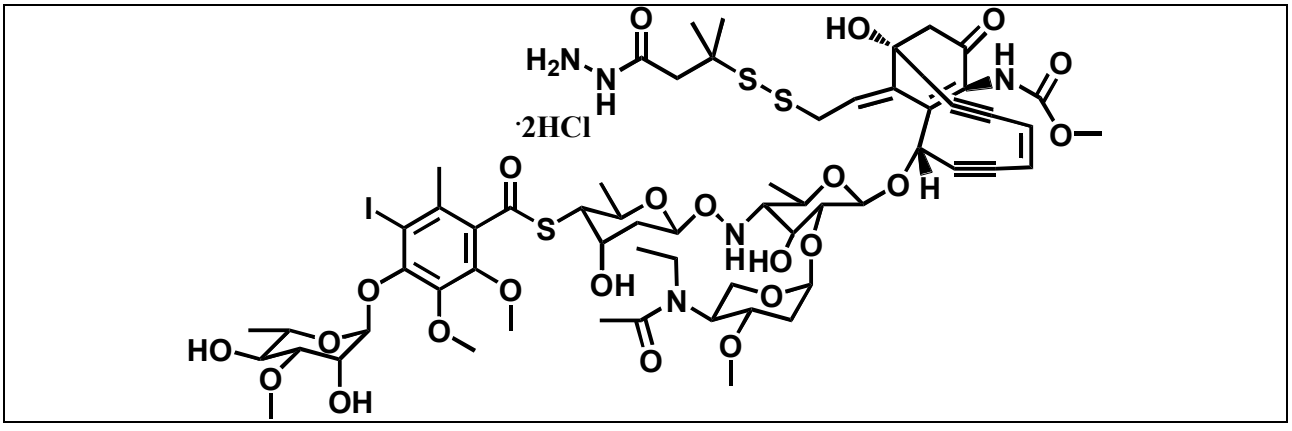
preferably. the nucleic acid used as the payload includes, but is not limited to, an antisense oligonucleotide (ASO), a small interfering RNA (siRNA), a microRNA (miRNA), a small activating RNA (saRNA), a messenger RNA (mRNA), and an oligonucleotide; or

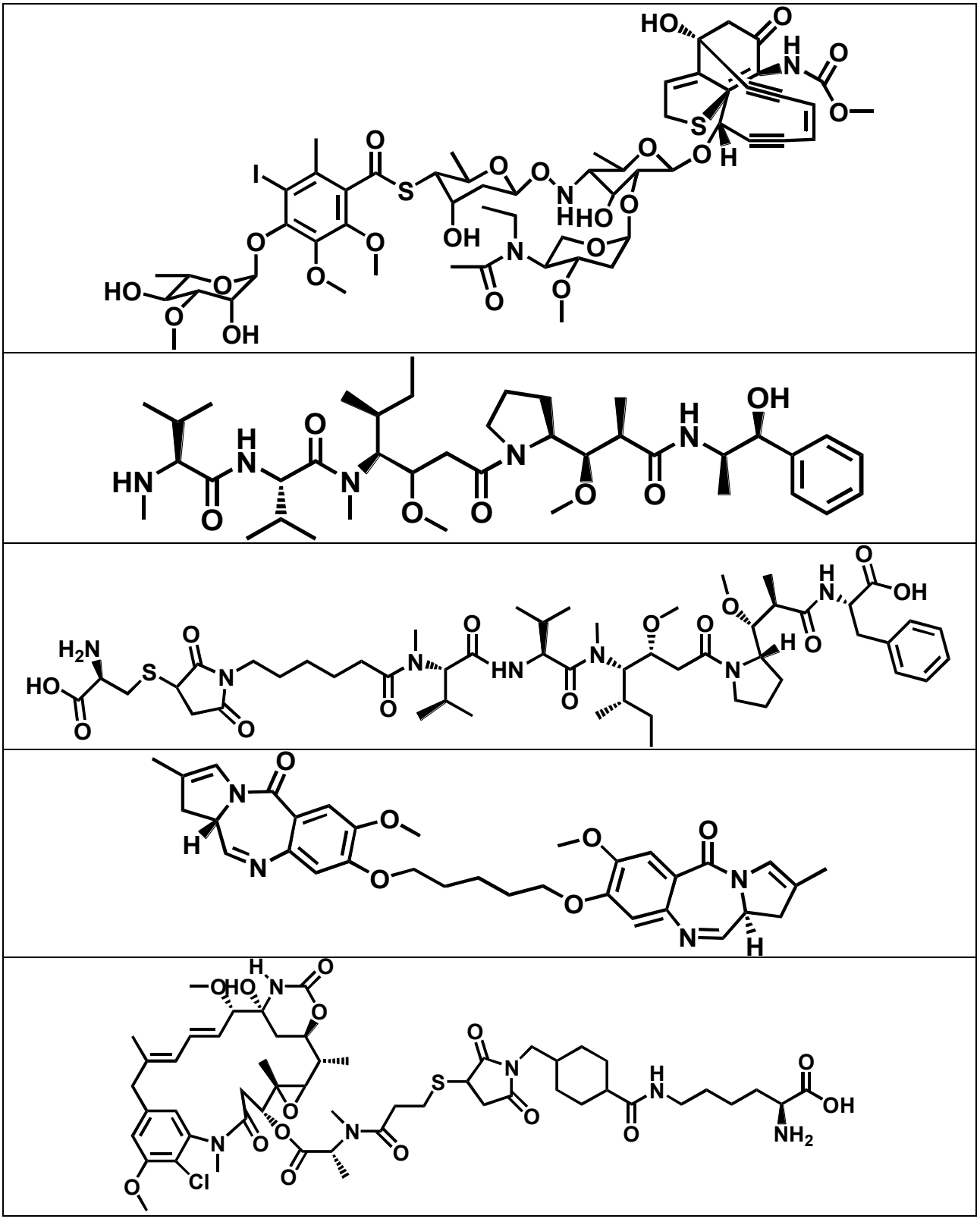
preferably. the nucleic acid used as the payload includes but is not limited to DMPK siRNA, Exon-44-skipping PMO, DUX4 siRNA, Exon-51-skipping PMO, DMPK ASO, DUX4 ASO, and CpG; or

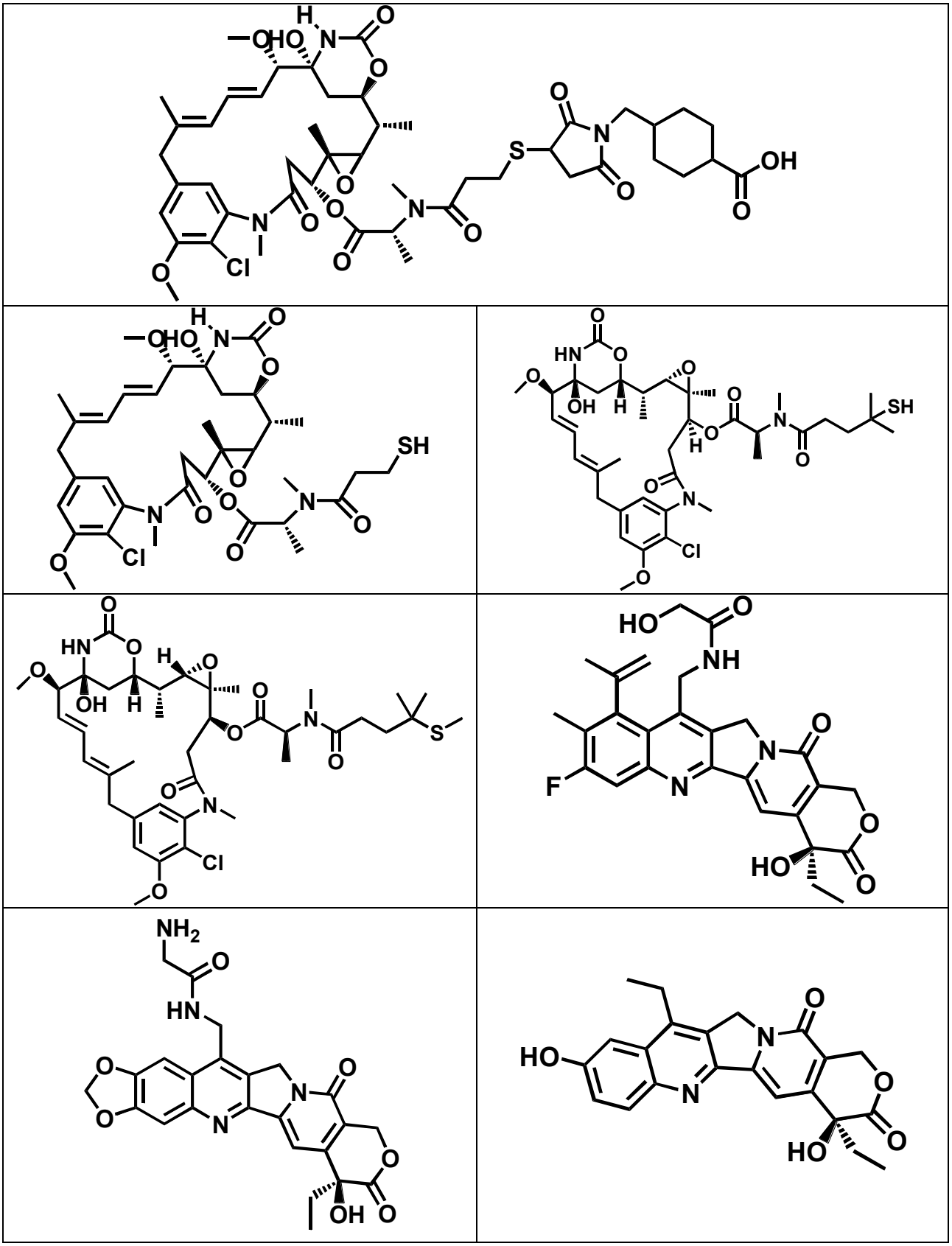
preferably, the immunostimulant used as the payload includes but is not limited to a TLR7 agonist, a TLR8 agonist, a TLR9 agonist, a TGF-β inhibitor, a TNIK inhibitor, and a STING agonist; or

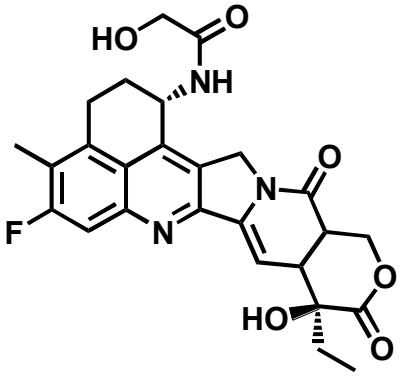
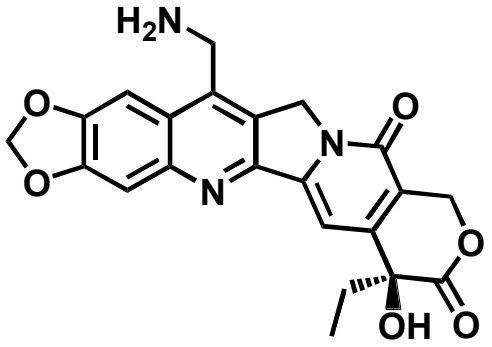
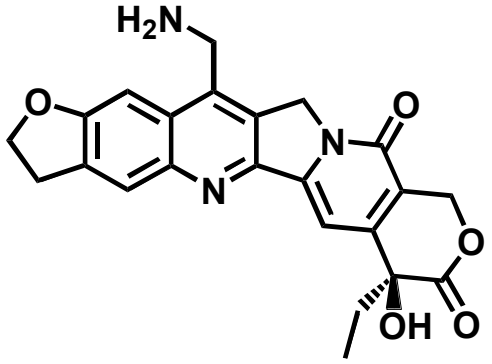
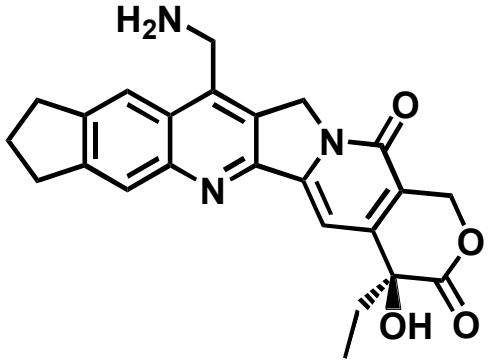
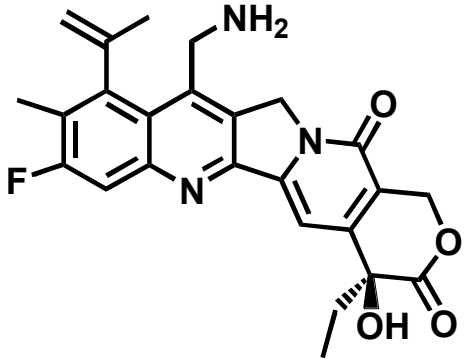
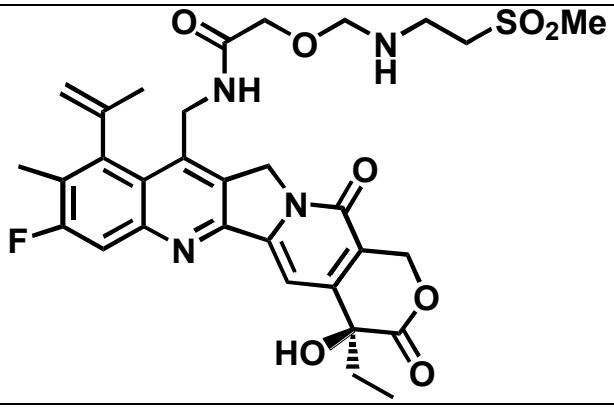
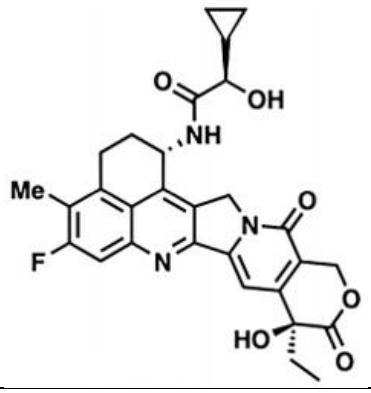
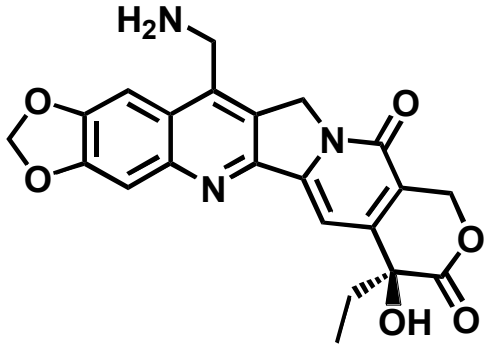
preferably, the modulator used as the payload includes but is not limited to a glucocorticoid receptor modulator, an antibiotic, a kinase inhibitor, a liver X receptor (LXR) agonist, a phosphodiesterase (PDE4) inhibitor, and a bisphosphonate; or

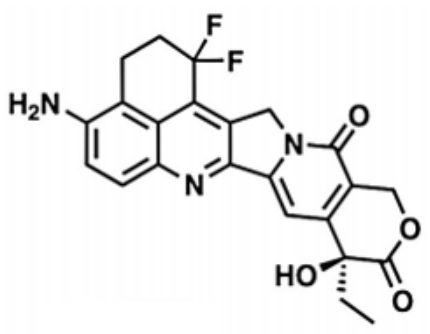
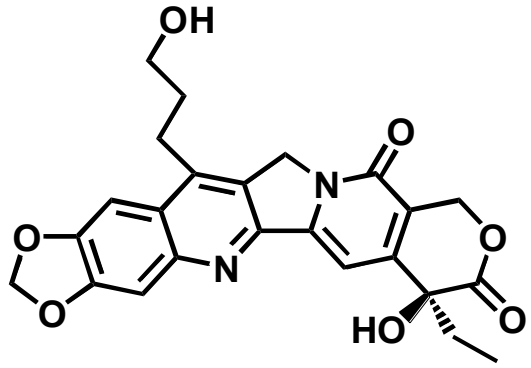
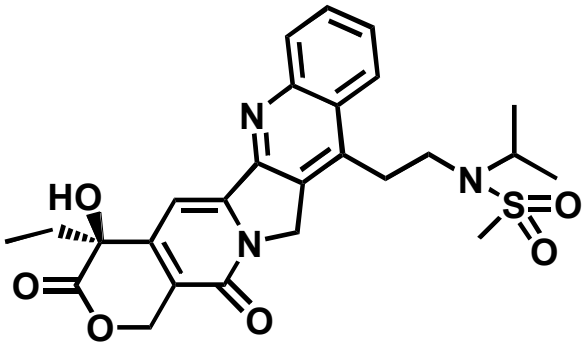
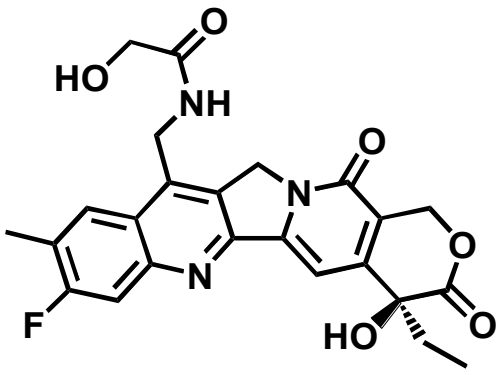
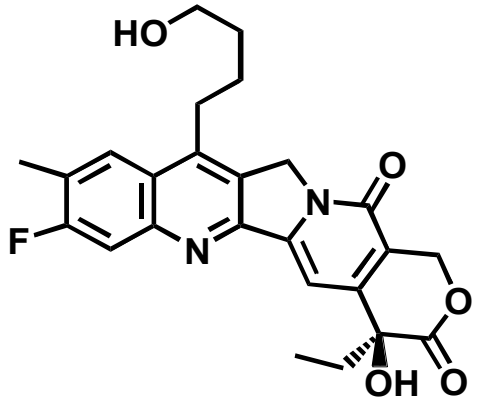
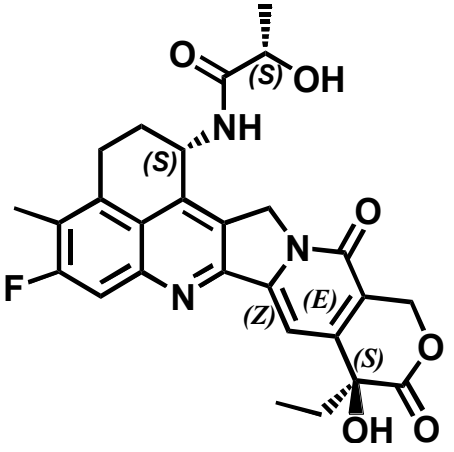
the free payload has a structure selected from the group consisting of the following structure, and an isomer or a deuterated form thereof:

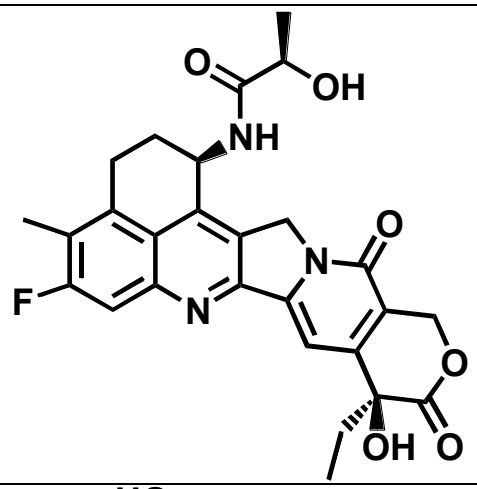
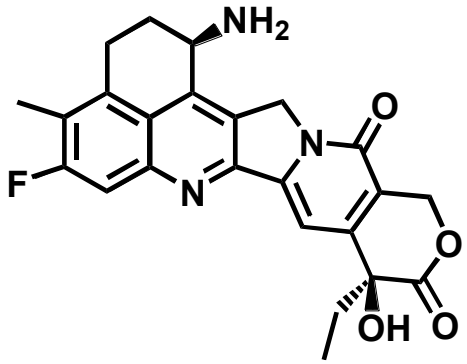
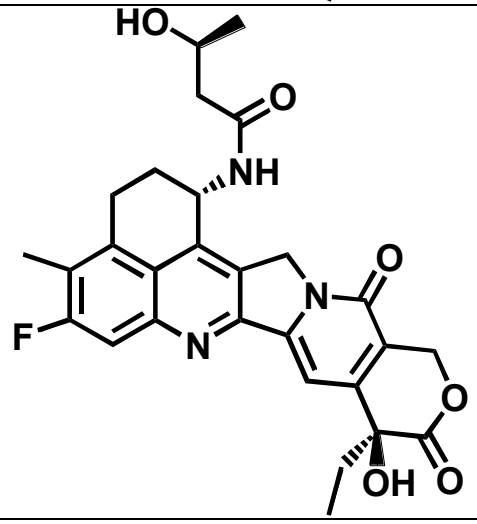
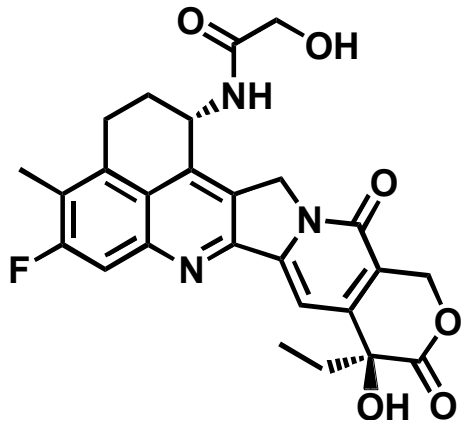
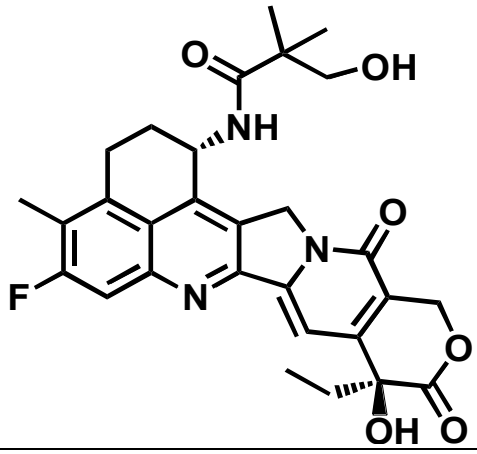
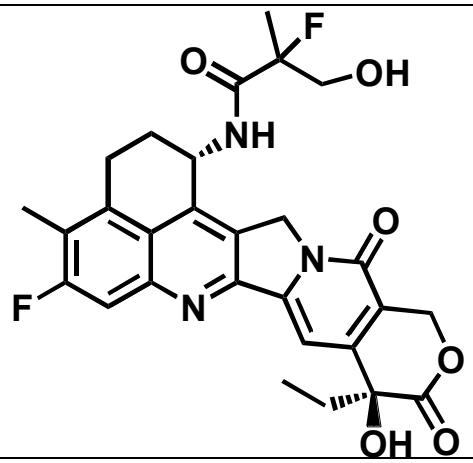


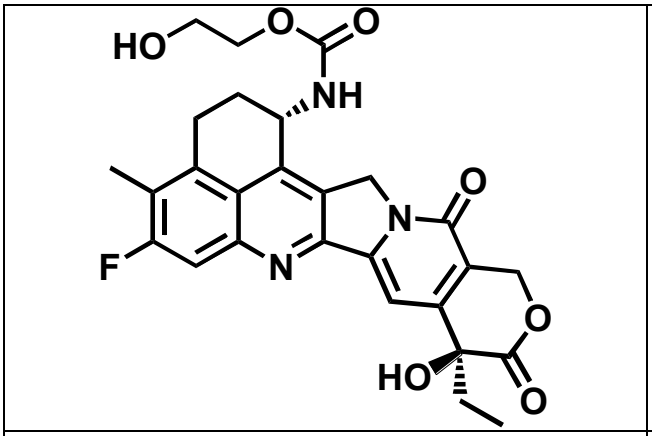


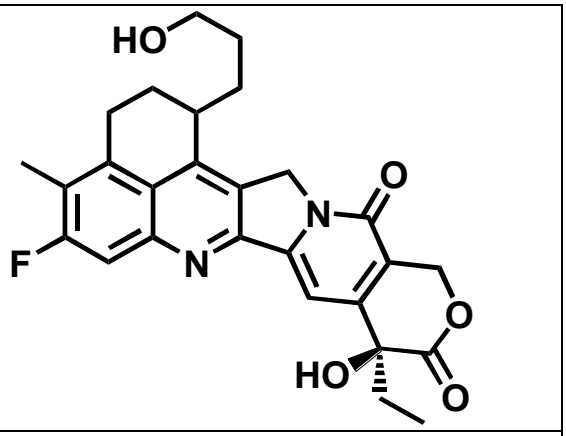


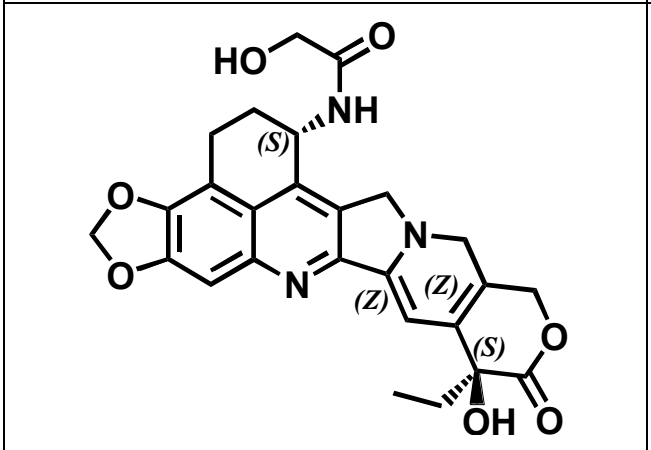
	
	
	
	

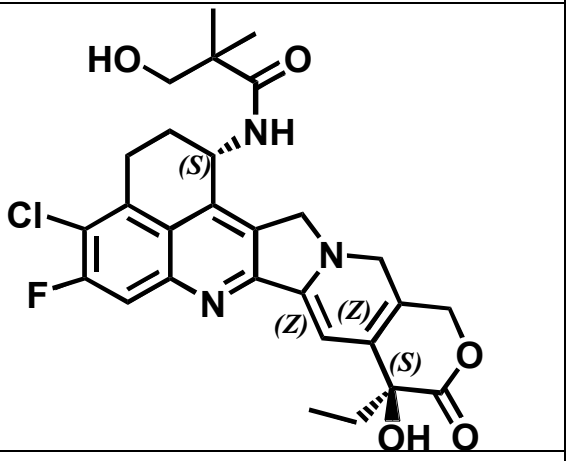
	
	
	

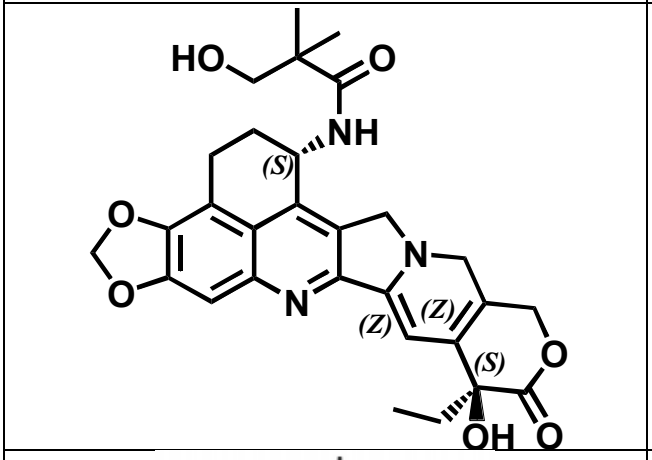
	
	
	

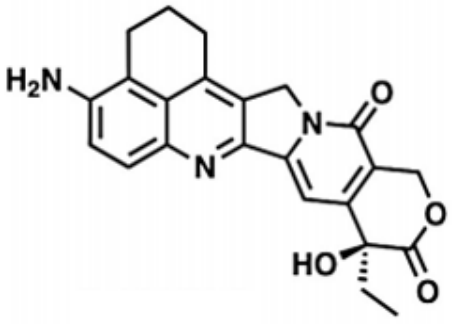


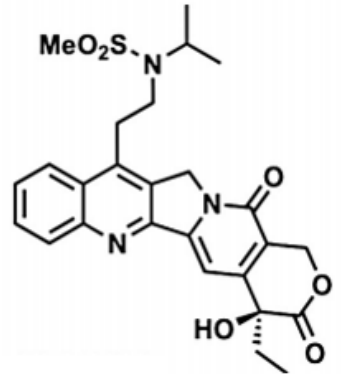


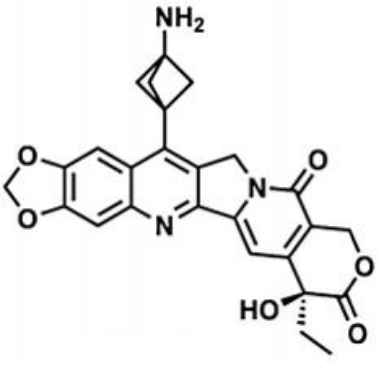


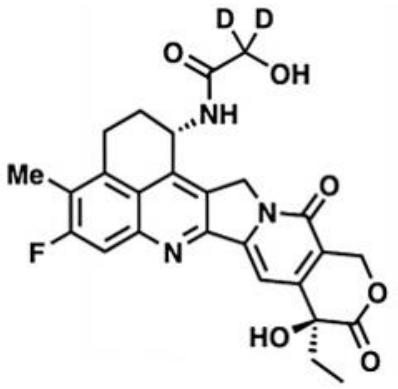
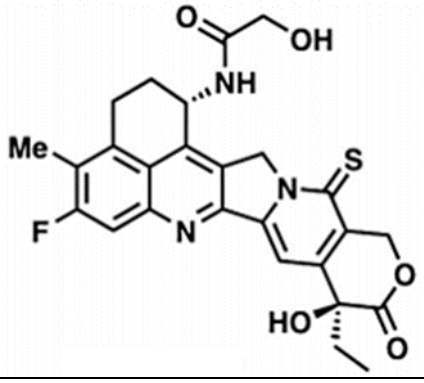










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7. A pharmaceutically acceptable salt, a deuterated form, or a solvate of the ligand-drug conjugate according to claims 1 to 6.

8. A pharmaceutical composition comprising the ligand-drug conjugate according to any one of claims 1 to 6 or the salt, deuterated form, or solvate according to claim 7, and a pharmaceutically acceptable excipient.

9. Use of a recovery unit capable of binding to a free payload released from a ligand-drug conjugate in the preparation of a ligand-drug conjugate comprising a free payload recovery unit;

preferably, the recovery unit comprises an antibody or an antigen-binding fragment, a receptor, a fusion protein, a peptide, an oligopeptide, a peptidomimetic, or an aptamer that specifically binds to the free payload; or

more prererably, the antibody that specifically binds to the free payload includes, but is not limited to, a monoclonal antibody, a bispecific antibody, a multispecific antibody, a nanobody (heavy chain antibody, HcAb), and an immunoglobulin new antigen receptor (IgNAR); the antigen-binding fragment includes, but is not limited to, an scFv, an Fab, an Fab', an $F(ab')_2$, an Fd, an Fv, a dAb, an Fd, an sdAb, a VHH, and a Diabody; and the receptor includes, but is not limited to, a T cell receptor;

even more prererably, the antibody that specifically binds to the free payload is selected from the group consisting of a murine antibody, a chimeric antibody, a humanized antibody, a fully human antibody, and an artificially engineered antibody; or

preferably, the recovery unit is capable of specifically binding to the free payload means that the equilibrium dissociation constant K_D(M) of the recovery unit to the free payload is less than 10^{-4},

or further less than 10^{-5}, or further less than 10^{-6}, or further less than 10^{-7}, or further less than 10^{-8}, or further less than 10^{-9}; or

preferably, the recovery unit is capable of specifically binding to the free payload means that the equilibrium dissociation constant K_D(M) of the recovery unit to the free payload is less than 10^{-7}, or further less than 10^{-8}, or further less than 10^{-9}; or

preferably, the recovery unit is capable of specifically binding to the free payload means that the equilibrium dissociation constant K_D(M) of the recovery unit to the free payload is less than 10^{-9}; or

preferably, the recovery unit does not bind to, or has a low affinity to, a payload in a conjugated state in the ligand-drug conjugate, and the low affinity also prevents the ligand-drug conjugate molecules from aggregating; or

preferably, the recovery unit comprises:

(1) a VHH domain with CDR1-3 selected from amino acid sequences defined by:

CDR1-3 as set forth in SEQ ID NOs: 103, 104, and 105;

or (2) an amino acid sequence selected from the amino acid sequence as set forth in SEQ ID NO: 102;

or (3) an amino acid sequence selected from combinations of VH and VL defined as follows:

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 2, 3, and 4 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 6, YAS, and SEQ ID NO: 7 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 9, 10, and 11 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 6, FAS, and SEQ ID NO: 13 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 2, 3, and 4 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 6, YAS, and SEQ ID NO: 16 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 2, 3, and 20 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in

SEQ ID NO: 6, YAS, and SEQ ID NO: 7 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 22, 23, and 24 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 26, WAS, and SEQ ID NO: 27 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 29, 30, and 31 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 33, KVS, and SEQ ID NO: 34 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 29, 36, and 37 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 33, KLS, and SEQ ID NO: 34 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 40, 41, and 42 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 44, KVS, and SEQ ID NO: 45 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 47, 48, and 42 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 50, KVS, and SEQ ID NO: 51 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 53, 54, and 55 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 57, DTS, and SEQ ID NO: 58 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 62, 63, and 64 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 66, SAS, and SEQ ID NO: 67 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 69, 70, and 71 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 73, WAS, and SEQ ID NO: 74 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 76, 77, and 78 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 80, GAS, and SEQ ID NO: 81 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 83, 84,

and 85 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 87, SAS, and SEQ ID NO: 67 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 89, 90, and 91 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 93, HGT, and SEQ ID NO: 94 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 76, 77, and 78 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 99, 77, and 100 respectively;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 1, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 5;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 8, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 12;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 14, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 15;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 17, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 18;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 19, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 18;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 21, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 25;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 28, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 32;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 35, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 38;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 39, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 43;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 46, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 49;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 52, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 56;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 59, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 60;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 61, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 65;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 68, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 72;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 75, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 79;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 82, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 86;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 88, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 92;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 95, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 96; and

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 97, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 98;

wherein the CDR1, CDR2 and CDR3 sequences, the HCDR1, HCDR2 and HCDR3 sequences, and the LCDR1, LCDR2 and LCDR3 sequences are obtained based on an IMGT definition scheme;

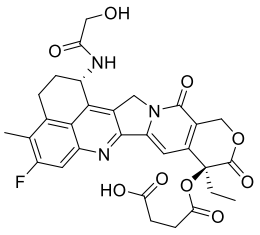
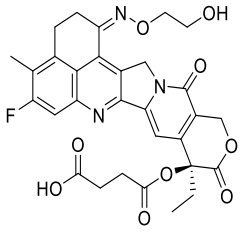
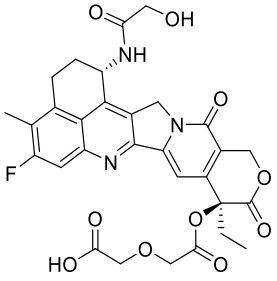
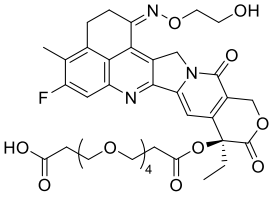
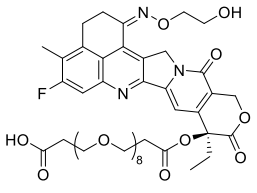
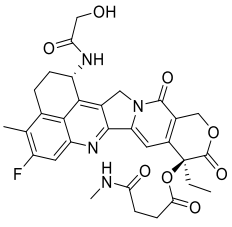
or (4) a peptide comprising an amino acid sequence defined by SEQ ID NO: 106, SEQ ID NO: 107, SEQ ID NO: 108, SEQ ID NO: 109, SEQ ID NO: 110, SEQ ID NO: 111, SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 124, SEQ ID NO: 125, SEQ ID NO: 126, SEQ ID NO: 127, SEQ ID NO: 128, or SEQ ID NO: 129;

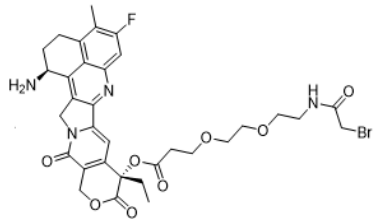
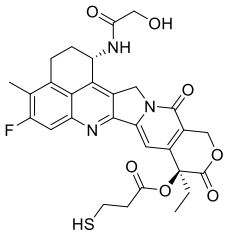
or (5) an aptamer comprising a nucleotide sequence defined by SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 133, SEQ ID NO: 134, SEQ ID NO: 135, SEQ ID NO: 136, SEQ ID NO:

137, SEQ ID NO: 138, SEQ ID NO: 139, SEQ ID NO: 140, SEQ ID NO: 141, SEQ ID NO: 142, SEQ ID NO: 143, SEQ ID NO: 144, SEQ ID NO: 145, SEQ ID NO: 146, SEQ ID NO: 147, SEQ ID NO: 148, SEQ ID NO: 149, SEQ ID NO: 150, SEQ ID NO: 151, SEQ ID NO: 152, SEQ ID NO: 153, SEQ ID NO: 154, SEQ ID NO: 155, SEQ ID NO: 156, SEQ ID NO: 157, SEQ ID NO: 158, SEQ ID NO: 159, SEQ ID NO: 160, SEQ ID NO: 161, or SEQ ID NO: 162; or

preferably, the recovery unit is obtained by immunizing a non-human animal with a conjugate of a small molecule drug and a carrier protein or a biotin-small molecule drug conjugate, or obtained by screening with phage display technology, or obtained by screening with virtual technology, or obtained by screening with SELEX technology, or obtained by screening with hybridoma technology, or obtained by screening with nanobody technology, or obtained by yeast display technology, or obtained by single B cell cloning technology, or obtained by microfluidic technology, or obtained by surface plasmon resonance assisted screening technology; or

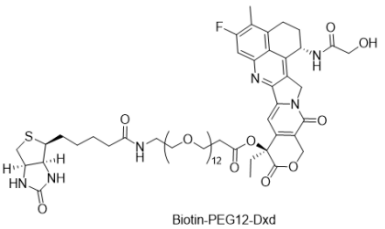
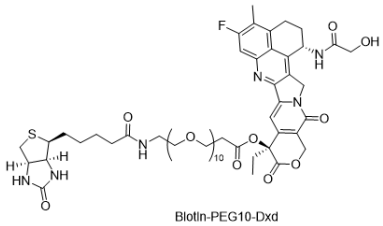
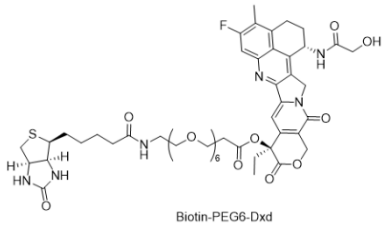
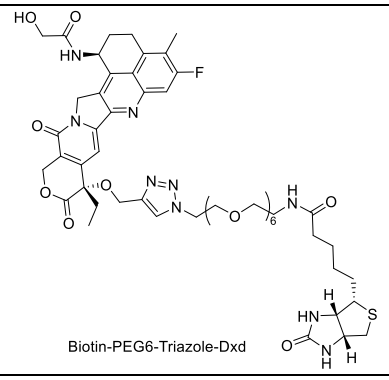
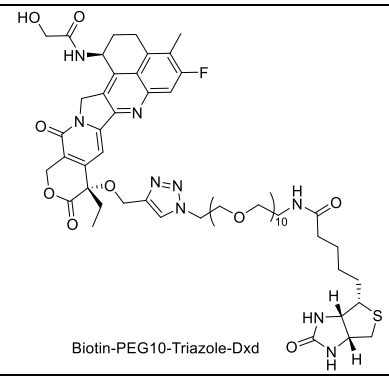
more preferably, the small molecule drug includes, but is not limited to, MMAE, MMAD, DM1, DM2, DM4, eribulin, Exatecan, SN38, DXD, calicheamicin, pyrrolobenzodiazepine (PBD), indolinobenzodiazepine (IBD), duocarmycin, amanitin, Maaa-1181a, taxol, daunomycin, vinblastine, Doxorubicin, methotrexate, MMAF, ML022-Dxd, ML022-D633-004, ML026-Dxd, ML031-D633-004, ML037-D633-004, ML042-Dxd, ML047-DX8951, MPA-Dxd, and PEG12-Dxd;

 ML022-Dxd	 ML022-D633-004	 ML026-Dxd
 ML031-D633-004	 ML037-D633-004	 ML042-Dxd

 ML047-DX8951	 MPA-Dxd	

preferably, the carrier protein includes, but is not limited to, KLH, BSA and OVA; or

preferably, the biotin-small molecule drug conjugate includes, but is not limited to, Biotin-PEG12-Dxd, Biotin-PEG10-Dxd, Biotin-PEG6-Dxd, Biotin-PEG6-Triazole-Dxd and Biotin-PEG10-Triazole-Dxd:

 Biotin-PEG12-Dxd	 Biotin-PEG10-Dxd	 Biotin-PEG6-Dxd
 Biotin-PEG6-Triazole-Dxd	 Biotin-PEG10-Triazole-Dxd	

;

or

preferably, a payload epitope masking unit capable of preventing the recovery unit from binding to the payload that remains conjugated to the ligand-drug conjugate is linked to the linker or the payload;

more preferably, the payload epitope masking unit does not interfere with the normal release of the payload after the ligand-drug conjugate enters a target cell.

10. A method for producing the ligand-drug conjugate according to any one of claims 1 to 6, comprising steps of:

1)screening to obtain an antibody, an antigen-binding fragment, a receptor, a fusion protein, a peptide, an oligopeptide, a peptidomimetic or an aptamer that specifically binds to the payload;

2)producing a ligand-drug conjugate using the screened antibody, antigen-binding fragment, receptor, fusion protein, peptide, oligopeptide, peptidomimetic or aptamer that specifically binds to the payload as a recovery unit;

3)detecting whether the screened antibody, antigen-binding fragment, receptor, fusion protein, peptide, oligopeptide, peptidomimetic or aptamer binds to the produced ligand-drug conjugate, and if not, a target ligand-drug conjugate is obtained; or detecting whether the antibody, antigen-binding fragment, receptor, fusion protein, peptide, oligopeptide, peptidomimetic, or aptamer binds to the produced drug-linker, and if not, a target ligand-drug conjugate is obtained;

4)if the screened antibody, antigen-binding fragment, receptor, fusion protein, peptide, oligopeptide, peptidomimetic or aptamer binds to the produced ligand-drug conjugate or the drug-linker, or molecular aggregation occurs between the produced ligand-drug conjugates or between the produced drug-linkers, then:

A. further modifying or replacing the antibody, antigen-binding fragment, receptor, fusion protein, peptide, oligopeptide, peptidomimetic or aptamer in the recovery unit until the obtained ligand-drug conjugates or drug-linkers do not aggregate and do not bind to the target ligand-drug conjugate or drug-linker; and/or

B．screening a payload epitope masking unit capable of being linked to the linker or payload of the ligand-drug conjugate, wherein the linked payload epitope masking unit is capable of preventing the screened antibody, antigen-binding fragment, receptor, fusion protein, peptide, oligopeptide, peptidomimetic or aptamer from binding to the ligand-drug conjugate and does not affect the normal release of the payload after the ligand-drug conjugate enters a cell; and after a suitable payload epitope masking unit is screened, producing a target ligand-drug conjugate.

11. The ligand-drug conjugate according to any one of claims 1 to 6, or the pharmaceutically acceptable salt, the deuterated form, or the solvate of the ligand-drug conjugate according to

claim 7; or the pharmaceutical composition according to claim 8, for use in treating or preventing a disease;

preferably, the disease is a tumor.

12. An immunogen for screening the recovery unit of claim 1;

preferably, the immunogen includes, but is not limited to, MMAF, ML022-Dxd, ML022-D633-004, ML026-Dxd, ML031-D633-004, ML037-D633-004, ML042-Dxd, ML047-DX8951, MPA-Dxd, Biotin-PEG12-Dxd, Biotin-PEG10-Dxd, Biotin-PEG6-Dxd, Biotin-PEG6-Triazole-Dxd, or Biotin-PEG10-Triazole-Dxd, and a conjugate of a carrier protein with MMAF, ML022-Dxd, ML022-D633-004, ML026-Dxd, ML031-D633-004, ML037-D633-004, ML042-Dxd, ML047-DX8951, or MPA-Dxd; or

preferably, the carrier protein includes, but is not limited to, KLH, BSA, and OVA.

13. A payload recovery unit that can specifically bind to a free payload of a ligand-drug conjugate, comprising:

(1) a VHH domain with CDR1-3 selected from amino acid sequences defined by:

CDR1-3 as set forth in SEQ ID NOs: 103, 104, and 105;

or (2) an amino acid sequence selected from the amino acid sequence as set forth in SEQ ID NO: 102;

or (3) an amino acid sequence selected from combinations of VH and VL defined as follows:

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 2, 3, and 4 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 6, YAS, and SEQ ID NO: 7 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 9, 10, and 11 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 6, FAS, and SEQ ID NO: 13 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 2, 3, and 4 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 6, YAS, and SEQ ID NO: 16 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 2, 3,

and 20 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 6, YAS, and SEQ ID NO: 7 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 22, 23, and 24 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 26, WAS, and SEQ ID NO: 27 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 29, 30, and 31 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 33, KVS, and SEQ ID NO: 34 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 29, 36, and 37 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 33, KLS, and SEQ ID NO: 34 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 40, 41, and 42 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 44, KVS, and SEQ ID NO: 45 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 47, 48, and 42 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 50, KVS, and SEQ ID NO: 51 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 53, 54, and 55 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 57, DTS, and SEQ ID NO: 58 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 62, 63, and 64 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 66, SAS, and SEQ ID NO: 67 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 69, 70, and 71 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 73, WAS, and SEQ ID NO: 74 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 76, 77, and 78 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 80, GAS, and SEQ ID NO: 81 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 83, 84, and 85 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 87, SAS, and SEQ ID NO: 67 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 89, 90, and 91 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NO: 93, HGT, and SEQ ID NO: 94 respectively;

a VH comprising HCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 76, 77, and 78 respectively, and a VL comprising LCDR1-3 with amino acid sequences as set forth in SEQ ID NOs: 99, 77, and 100 respectively;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 1, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 5;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 8, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 12;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 14, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 15;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 17, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 18;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 19, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 18;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 21, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 25;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 28, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 32;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 35, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 38;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 39, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 43;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 46, and a VL

comprising an amino acid sequence as set forth in SEQ ID NO: 49;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 52, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 56;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 59, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 60;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 61, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 65;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 68, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 72;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 75, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 79;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 82, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 86;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 88, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 92;

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 95, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 96; and

a VH comprising an amino acid sequence as set forth in SEQ ID NO: 97, and a VL comprising an amino acid sequence as set forth in SEQ ID NO: 98;

wherein the CDR1, CDR2 and CDR3 sequences, the HCDR1, HCDR2 and HCDR3 sequences, and the LCDR1, LCDR2 and LCDR3 sequences are obtained based on an IMGT definition scheme;

or (4) a peptide comprising an amino acid sequence defined by SEQ ID NO: 106, SEQ ID NO: 107, SEQ ID NO: 108, SEQ ID NO: 109, SEQ ID NO: 110, SEQ ID NO: 111, SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 124, SEQ ID NO: 125, SEQ ID NO: 126, SEQ ID NO: 127, SEQ ID NO: 128, or SEQ ID NO: 129;

or (5) an aptamer comprising a nucleotide sequence defined by SEQ ID NO: 131, SEQ ID NO:

132, SEQ ID NO: 133, SEQ ID NO: 134, SEQ ID NO: 135, SEQ ID NO: 136, SEQ ID NO: 137, SEQ ID NO: 138, SEQ ID NO: 139, SEQ ID NO: 140, SEQ ID NO: 141, SEQ ID NO: 142, SEQ ID NO: 143, SEQ ID NO: 144, SEQ ID NO: 145, SEQ ID NO: 146, SEQ ID NO: 147, SEQ ID NO: 148, SEQ ID NO: 149, SEQ ID NO: 150, SEQ ID NO: 151, SEQ ID NO: 152, SEQ ID NO: 153, SEQ ID NO: 154, SEQ ID NO: 155, SEQ ID NO: 156, SEQ ID NO: 157, SEQ ID NO: 158, SEQ ID NO: 159, SEQ ID NO: 160, SEQ ID NO: 161, or SEQ ID NO: 162.

14. The payload recovery unit according to claim 13for use in reducing toxicity of ligand-drug conjugate;

preferably, the ligand-drug conjugate and the payload recovery unit can be administered simultaneously or sequentially.

15. A nucleic acid comprising a sequence encoding the amino acid sequence of the payload recovery unit according to claim 13.

16. A vector comprising the nucleic acid according to claim 15;

preferably, the vector is an expression vector.

17. A cell comprising the vector according to claim 16;

preferably, the cell is selected from the group consisting of a CHO cell, a COS cell, an HEK-293 cell, an NS0 cell, a PER.C6® cell, and an Sp2/0 cell.