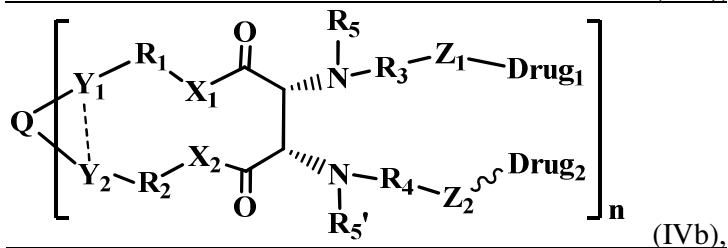
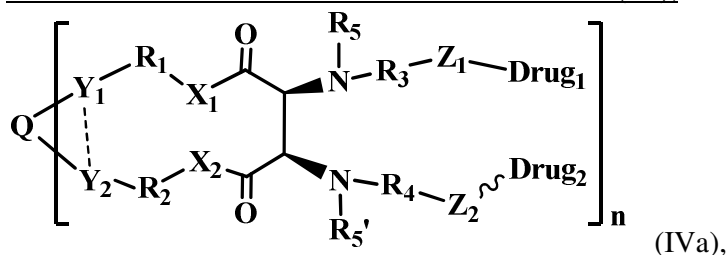
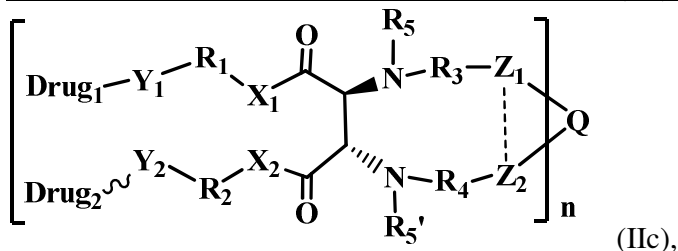
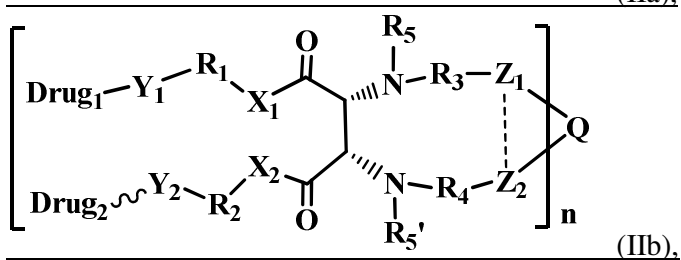
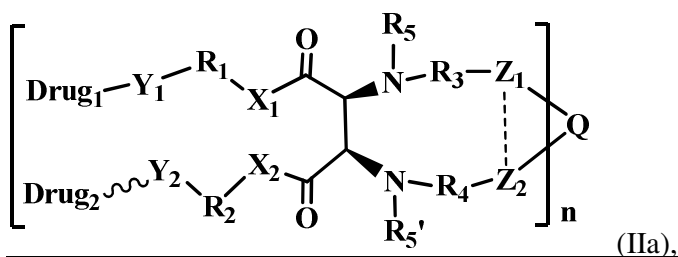
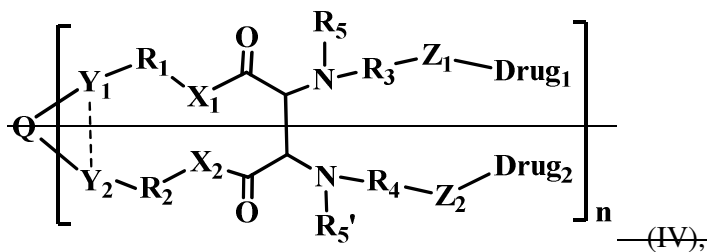
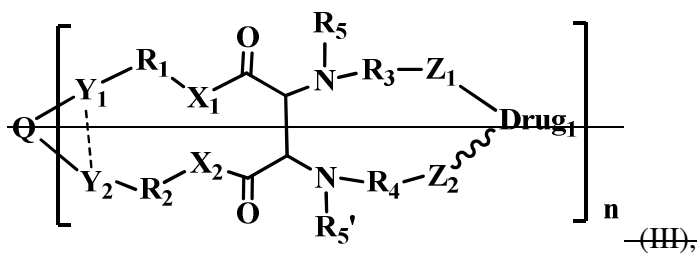
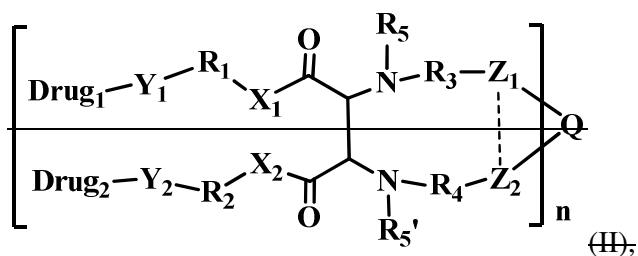
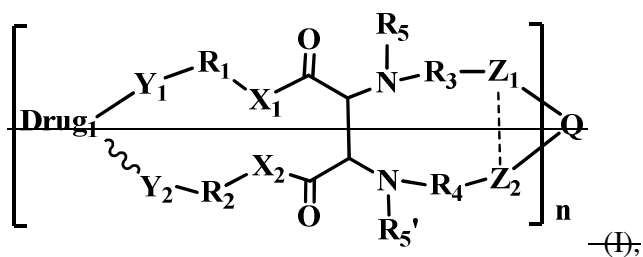
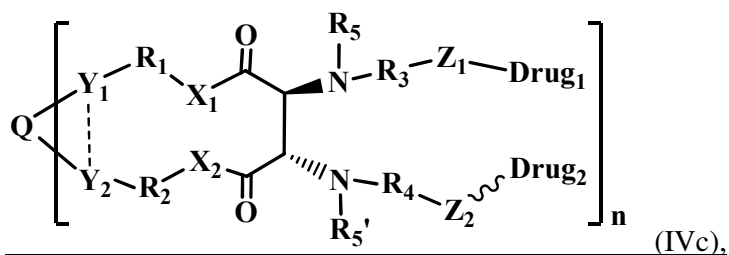


CLAIMS

What is claimed is:

1. A conjugate compound having stereoisomeric structure of containing 2,3-diaminosuccinyl group represented by having the Formula (IIa), (IIb), (IIc), (IVa), (IVb) and (IVc) below I), (II), (III) or (IV):





or their optical isomers, racemates, diastereomers or enantiomers;

wherein

“—” represents a single bond;

“~” is optionally either a single bond, or absent;

“- - -” is optionally either a single bond, or a double bond, or can optionally be absent;

n is 1 to 30 independently;

Q is a cell-binding agent/ molecule that links to R₃ and R₄ can be any kind presently known, or that become known, of a molecule that binds to, complexes with, or reacts with a moiety of a cell population sought to be therapeutically or otherwise biologically modified. The cell-binding agent/molecule is an immunotherapeutic protein, an antibody, a single chain antibody; an antibody fragment that binds to the target cell; a monoclonal antibody; a single chain monoclonal antibody; or a monoclonal antibody fragment that binds the target cell; a chimeric antibody; a chimeric antibody fragment that binds to the target cell; a domain antibody; a domain antibody fragment that binds to the target cell; adnectins that mimic antibodies; DARPin; a lymphokine; a hormone; a vitamin; a growth factor; a colony stimulating factor; or a nutrient-transport molecule (a transferrin); a binding peptides having over four aminoacids, or protein, or antibody, or small cell-binding molecule or ligand attached on albumin, polymers, dendrimers, liposomes, nanoparticles, vesicles, or (viral) capsids;

Drug₁ or/and Drug₂ are a cytotoxic molecule/agent that is a therapeutic drug /molecule/agent, or an immunotherapeutic protein/molecule, or a function molecule for enhancement of binding or stabilization of the cell-binding agent, or a cell-surface receptor binding ligand, or for inhibition of cell proliferation, or for monitoring, detection or study of a cell-binding molecule action. It can also be an analog, or prodrug, or a pharmaceutically acceptable salt, hydrate, or hydrated salt, or a crystalline structure, or an optical isomer, racemate, diastereomer or enantiomer, of immunotherapeutic compound, a chemotherapeutic compound, an antibody (probody) or an antibody (probody) fragment, or siRNA or DNA molecule, or a cell surface binding ligand;

X₁ and X₂ are the same or different, and independently selected from NH; NHNH; N(R₁); N(R₁)N(R₂); O; S; S-S, O-NH. O-N(R₁), CH₂-NH. CH₂-N(R₁), CH=NH. CH=N(R₁), S(O), S(O₂), P(O)(OH), S(O)NH, S(O₂)NH, P(O)(OH)NH, NHS(O)NH, NHS(O₂)NH, NHP(O)(OH)NH, N(R₁)S(O)N(R₂), N(R₁)S(O₂)N(R₂), N(R₁)P(O)(OH)N(R₂), OS(O)NH, OS(O₂)NH, OP(O)(OH)NH, C(O), C(NH), C(NR₁), C(O)NH, C(NH)NH, C(NR₁)NH, OC(O)NH, OC(NH)NH; OC(NR₁)NH, NHC(O)NH; NHC(NH)NH; NHC(NR₁)NH, C(O)NH, C(NH)NH, C(NR₁)NH, OC(O)N(R₁), OC(NH)N(R₁), OC(NR₁)N(R₁), NHC(O)N(R₁), NHC(NH)N(R₁), NHC(NR₁)N(R₁), N(R₁)C(O)N(R₁), N(R₁)C(NH)N(R₁), N(R₁)C(NR₁)N(R₁); or C₁-C₆ alkyl; C₂-C₈ alkenyl, heteroalkyl, alkylcycloalkyl, or heterocycloalkyl; C₃-C₈ aryl, Ar-alkyl, heterocyclic, carbocyclic, cycloalkyl, heteroalkylcycloalkyl, alkylcarbonyl, or heteroaryl;

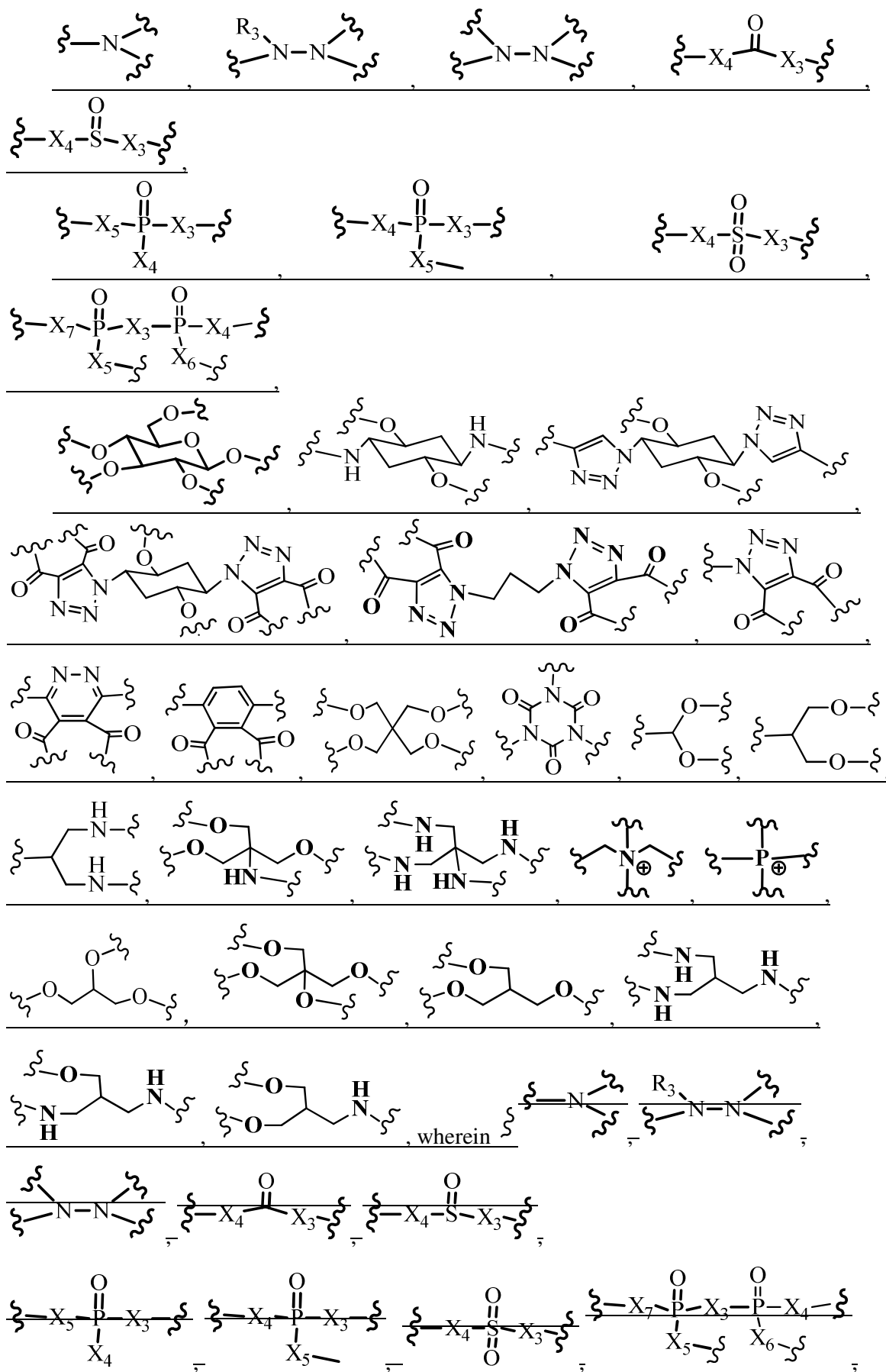
Y₁, Y₂, Z₁ and Z₂ are, the same or different, and independently a function group that link to a cell-binding molecule Q, or drug₁ or drug₂, in a form of a disulfide, ether, ester, thioether, thioester, peptide, hydrazone, carbamate, carbonate, amine (secondary, tertiary, or quarter), imine, cycloheteroalkane, heteroaromatic, alkylloxime or amide bond; Y₁, Y₂, Z₁ and Z₂ independently

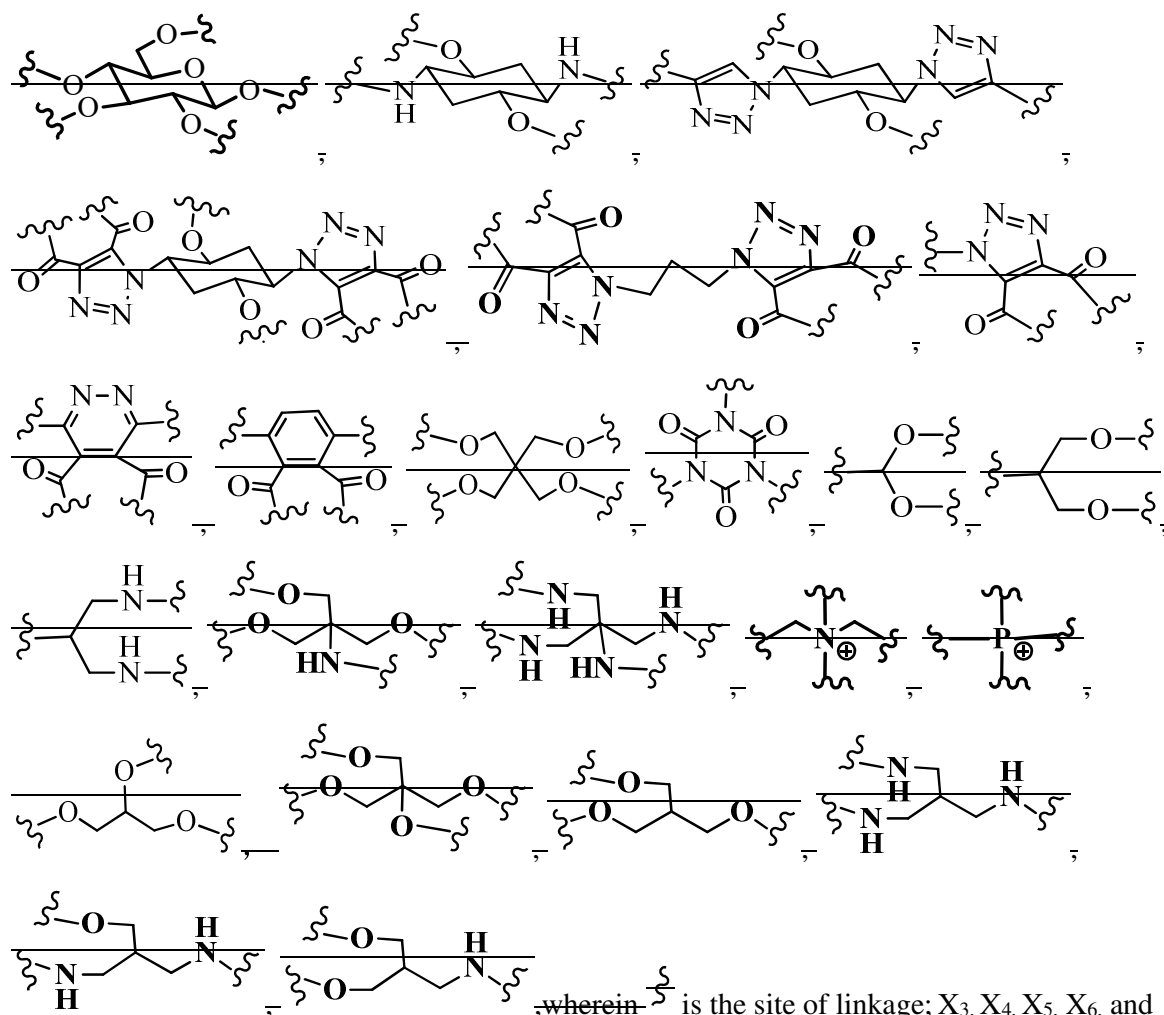
have the following structures: C(O)CH, C(O)C, C(O)CH₂, ArCH₂, C(O), NH, NHNH, N(R₁), N(R₁)N(R₂), O, S, S-S, O-NH, O-N(R₁), CH₂-NH, CH₂-N(R₁), CH=NH, CH=N(R₁), S(O), S(O₂), P(O)(OH), S(O)NH, S(O₂)NH, P(O)(OH)NH, NHS(O)NH, NHS(O₂)NH, NHP(O)(OH)NH, N(R₁)S(O)N(R₂), N(R₁)S(O₂)N(R₂), N(R₁)P(O)(OH)N(R₂), OS(O)NH, OS(O₂)NH, OP(O)(OH)NH, C(O), C(NH), C(NR₁), C(O)NH, C(NH)NH, C(NR₁)NH, OC(O)NH, OC(NH)NH; OC(NR₁)NH, NHC(O)NH; NHC(NH)NH; NHC(NR₁)NH, C(O)NH, C(NR₁)NH, OC(O)N(R₁), OC(NH)N(R₁), OC(NR₁)N(R₁), NHC(O)N(R₁), NHC(NH)N(R₁), NHC(NR₁)N(R₁), N(R₁)C(O)N(R₁), N(R₁)C(NH)N(R₁), N(R₁)C(NR₁)N(R₁); or C₁-C₈ alkyl, C₂-C₈ heteroalkyl, alkylcycloalkyl, heterocycloalkyl; C₃-C₈ aryl, Ar-alkyl, heterocyclic, carbocyclic, cycloalkyl, heteroalkylcycloalkyl, alkylcarbonyl, heteroaryl;

R₁, R₂, R₃, and R₄ are, the same or different, independently selected from O, NH, S, NHNH, N(R₅), N(R₃)N(R₃'), polyethyleneoxy unit of formula (OCH₂CH₂)_pOR₅, or (OCH₂CH(CH₃))_pOR₅, or NH(CH₂CH₂O)_pR₅, or NH(CH₂CH(CH₃)O)_pR₅, or N[(CH₂CH₂O)_pR₅]-[(CH₂CH₂O)_pR₅'], or (OCH₂CH₂)_pCOOR₅, or CH₂CH₂(OCH₂CH₂)_pCOOR₅, wherein p and p' are independently an integer selected from 0 to about 1000, or combination thereof; C₁-C₈ alkyl; C₂-C₈ heteroalkyl, alkylcycloalkyl, heterocycloalkyl, esters, ether, or amide; C₃-C₈ aryl, Ar-alkyl, heterocyclic, carbocyclic, cycloalkyl, heteroalkylcycloalkyl, alkylcarbonyl, or heteroaryl; or 1~24 amino acids; wherein R₅ and R₅' are independently H; C₁-C₈ alkyl; C₂-C₈ heteroalkyl, alkylcycloalkyl, or heterocycloalkyl; C₃-C₈ aryl, Ar-alkyl, heterocyclic; C₂-C₈ carbon atoms of esters, ether, or amide; or 1~24 amino acids;

~~or~~ R₁, R₂, R₃, and R₄ may optionally be composed of one or more linker components of 6-maleimidocaproyl ("MC"), maleimidopropanoyl ("MP"), valine-citrulline ("val-cit" or "vc"), alanine-phenylalanine ("ala-phe" or "af"), p-aminobenzyloxycarbonyl ("PAB"), 4-thiopentanoate ("SPP"), 4-(N-maleimidomethyl)cyclohexane-1 carboxylate ("MCC"), (4-acetyl)amino-benzoate ("SIAB"), 4-thio-butyrate (SPDB), 4-thio-2-hydroxysulfonyl-butyrate (2-Sulfo-SPDB), or natural or unnatural peptides having 1~8 natural or unnatural amino acid unites. The natural amino acid is preferably selected from aspartic acid, glutamic acid, arginine, histidine, lysine, serine, threonine, asparagine, glutamine, cysteine, selenocysteine, tyrosine, phenylalanine, glycine, proline, tryptophan, and alanine;

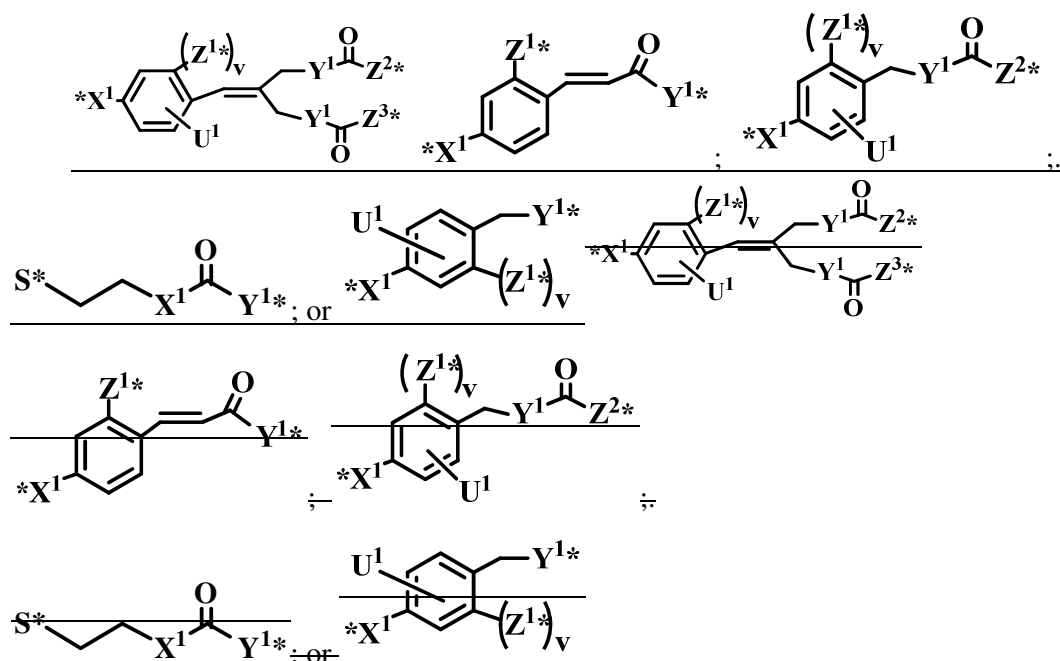
~~or~~ R₁, R₂, R₃, and R₄ may independently contain one or more of the following hydrophilic structures:





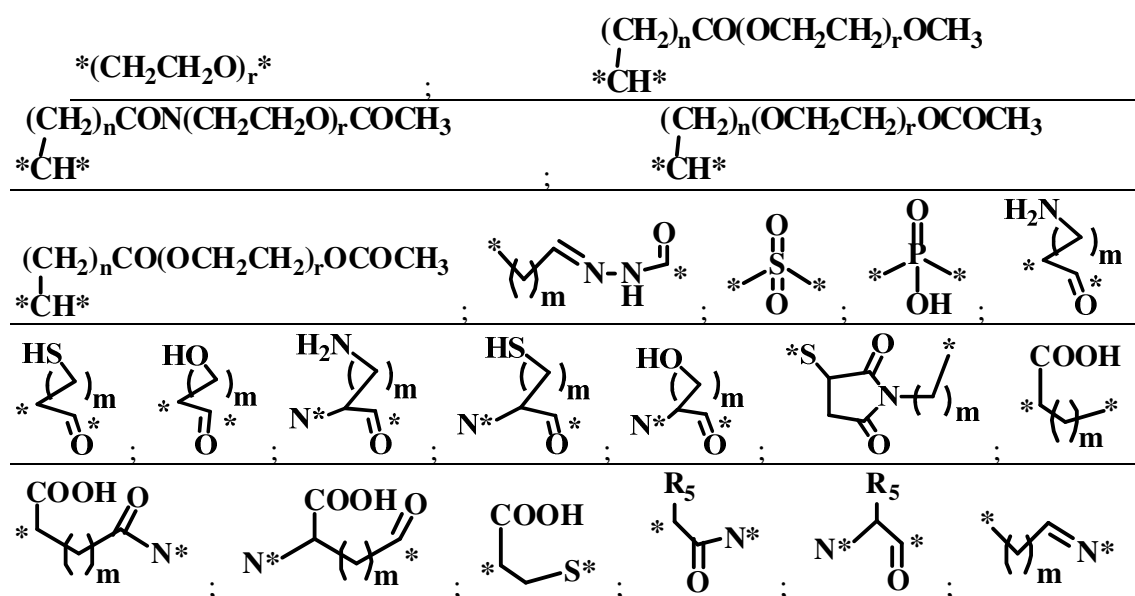
or R_1 , R_2 , R_3 , R_4 , Y_1 , Y_2 , Z_1 , and Z_2 are independently contain a self-immolative or a non-self-immolative component, peptidic units, a hydrazone bond, a disulfide, an ester, an oxime, an amide, or a thioether bond; wherein the self-immolative unit includes, aromatic compounds that are electronically similar to the para-aminobenzylcarbamoyl (PAB) groups such as 2-aminoimidazol-5-methanol derivatives, heterocyclic PAB analogs, beta-glucuronide, and ortho or para-aminobenzylacetals;

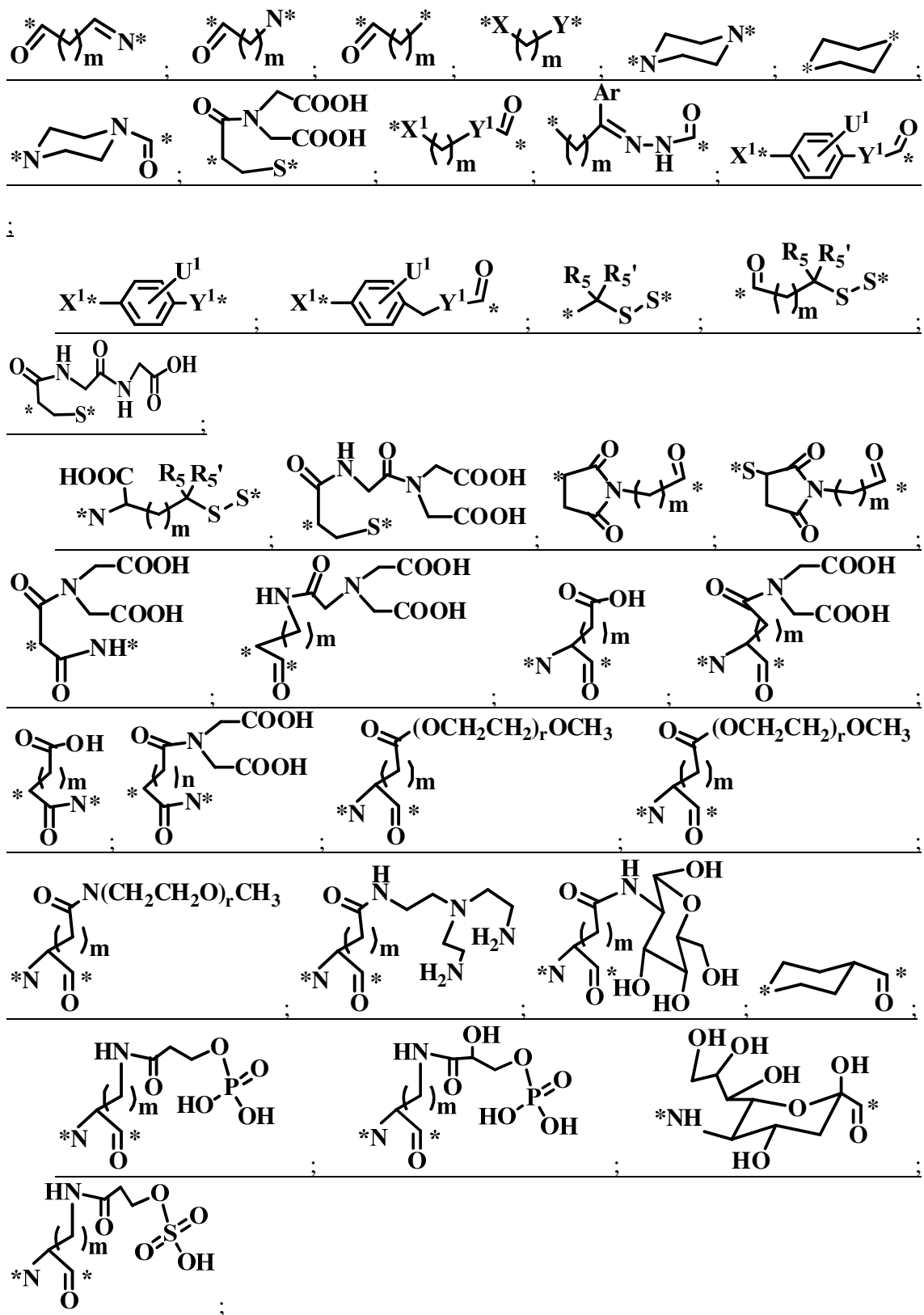
the self-immolative linker component may have one of the following structures:

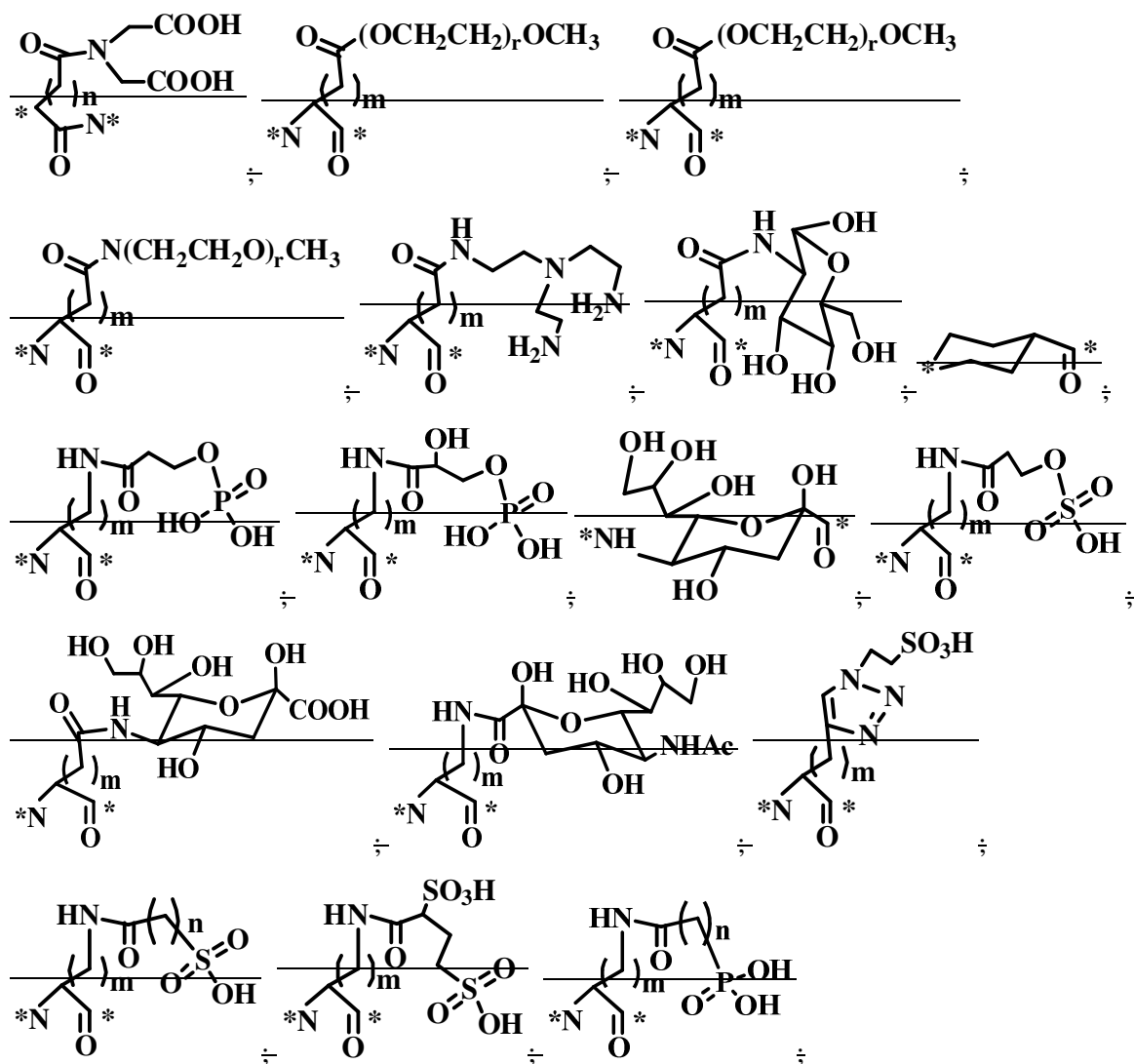


wherein the (*) atom is the point of attachment of additional spacer or releasable linker units, or the cytotoxic agent, and/or the binding molecule (CBA); X^1 , Y^1 , Z^2 and Z^3 are independently NH, O, or S; Z^1 is independently H, NHR_5 , OR_1 , SR_5 , COX_1R_5 , wherein X_1 and R_5 are defined above; v is 0 or 1; U^1 is independently H, OH, $C_1\sim C_6$ alkyl, $(OCH_2CH_2)_n$, F, Cl, Br, I, OR_5 , SR_5 , NR_5R_5' , $N=NR_5$, $N=R_5$, NR_5R_5' , NO_2 , SOR_5R_5' , SO_2R_5 , SO_3R_5 , OSO_3R_5 , PR_5R_5' , POR_5R_5' , $PO_2R_5R_5'$, $OPO(OR_5)(OR_5')$, or $OCH_2PO(OR_5)(OR_5')$, wherein R_5 and R_5' are independently selected from H, $C_1\sim C_8$ alkyl; $C_2\sim C_8$ alkenyl, alkynyl, heteroalkyl, or amino acid; $C_3\sim C_8$ aryl, heterocyclic, carbocyclic, cycloalkyl, heterocycloalkyl, heteroaralkyl, alkylcarbonyl, or glycoside; or pharmaceutical cation salts;

the non-self-immolative linker component is one of the following structures:

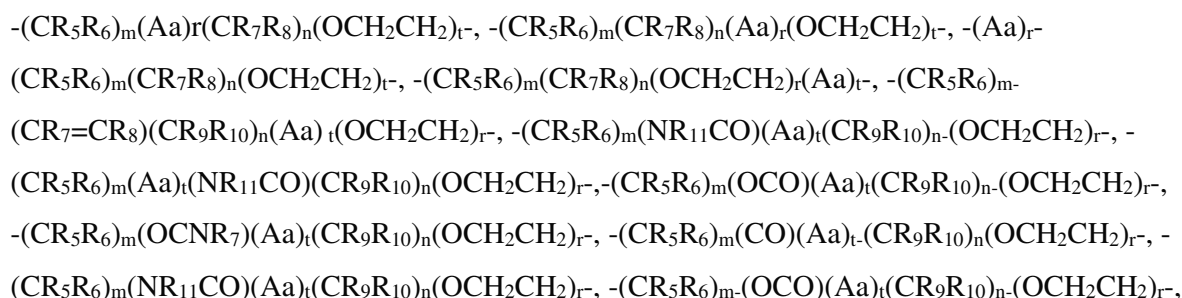






wherein the (*) atom is the point of attachment of additional spacer or releasable linkers, the cytotoxic agents, and/or the binding molecules; X^1 , Y^1 , U^1 , R_5 , R_5' are defined as above; r is 0~100; m and n are 0~20 independently;

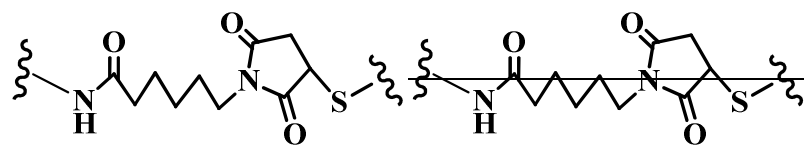
or R_1 , R_2 , R_3 , and R_4 may independently contain a releasable linker component which includes at least one bond that can be broken under physiological conditions, such as a pH-labile, acid-labile, base-labile, oxidatively labile, metabolically labile, biochemically labile or enzyme-labile bond having one of the following structures:



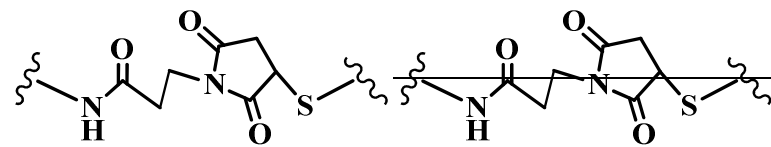
$-(\text{CR}_5\text{R}_6)_m(\text{OCNR}_7)(\text{Aa})_t(\text{CR}_9\text{R}_{10})_n(\text{OCH}_2\text{CH}_2)_r$, $-(\text{CR}_5\text{R}_6)_m(\text{CO})(\text{Aa})_t(\text{CR}_9\text{R}_{10})_n(\text{OCH}_2\text{CH}_2)_r$, $-(\text{CR}_5\text{R}_6)_m$ -phenyl-CO(Aa)_t(CR₇R₈)_n-, $-(\text{CR}_5\text{R}_6)_m$ -furyl-CO(Aa)_t(CR₇R₈)_n-, $-(\text{CR}_5\text{R}_6)_m$ -oxazolyl-CO(Aa)_t(CR₇R₈)_n-, $-(\text{CR}_5\text{R}_6)_m$ -thiazolyl-CO(Aa)_t(CR₇R₈)_n-, $-(\text{CR}_5\text{R}_6)_m$ -thienyl-CO(CR₇R₈)_n-, $-(\text{CR}_5\text{R}_6)_m$ -imidazolyl-CO-(CR₇R₈)_n-, $-(\text{CR}_5\text{R}_6)_m$ -morpholino-CO(Aa)_t(CR₇R₈)_n-, $-(\text{CR}_5\text{R}_6)_m$ -piperazino-CO(Aa)_t(CR₇R₈)_n-, $-(\text{CR}_5\text{R}_6)_m$ -N-methylpiperazin-CO(Aa)_t(CR₇R₈)_n-, $-(\text{CR}_5\text{R}_6)_m$ -(Aa)_tphenyl-, $-(\text{CR}_5\text{R}_6)_m$ -(Aa)_tfuryl-, $-(\text{CR}_5\text{R}_6)_m$ -oxazolyl(Aa)_t-, $-(\text{CR}_5\text{R}_6)_m$ -thiazolyl(Aa)_t-, $-(\text{CR}_5\text{R}_6)_m$ -thienyl(Aa)_t-, $-(\text{CR}_5\text{R}_6)_m$ -imidazolyl(Aa)_t-, $-(\text{CR}_5\text{R}_6)_m$ -morpholino-(Aa)_t-, $-(\text{CR}_5\text{R}_6)_m$ -piperazino-(Aa)_t-, $-(\text{CR}_5\text{R}_6)_m$ -N-methylpiperazino-(Aa)_t-,
 $-\text{K}(\text{CR}_5\text{R}_6)_m(\text{Aa})_r(\text{CR}_7\text{R}_8)_n(\text{OCH}_2\text{CH}_2)_t$ -, $-\text{K}(\text{CR}_5\text{R}_6)_m(\text{CR}_7\text{R}_8)_n(\text{Aa})_r(\text{OCH}_2\text{CH}_2)_t$ -, $-\text{K}(\text{Aa})_r(\text{CR}_5\text{R}_6)_m(\text{CR}_7\text{R}_8)_n(\text{OCH}_2\text{CH}_2)_t$ -, $-\text{K}(\text{CR}_5\text{R}_6)_m(\text{CR}_7\text{R}_8)_n(\text{OCH}_2\text{CH}_2)_t(\text{Aa})_t$ -, $-\text{K}(\text{CR}_5\text{R}_6)_m(\text{CR}=\text{CR}_8)(\text{CR}_9\text{R}_{10})_n(\text{Aa})_t(\text{OCH}_2\text{CH}_2)_r$ -, $-\text{K}(\text{CR}_5\text{R}_6)_m(\text{NR}_{11}\text{CO})(\text{Aa})_t(\text{CR}_9\text{R}_{10})_n(\text{OCH}_2\text{CH}_2)_r$ -, $-\text{K}(\text{CR}_5\text{R}_6)_m(\text{Aa})_t(\text{NR}_{11}\text{CO})(\text{CR}_9\text{R}_{10})_n(\text{OCH}_2\text{CH}_2)_r$ -, $-\text{K}(\text{CR}_5\text{R}_6)_m(\text{OCO})(\text{Aa})_t(\text{CR}_9\text{R}_{10})_n(\text{OCH}_2\text{CH}_2)_r$ -, $-\text{K}(\text{CR}_5\text{R}_6)_m(\text{OCNR}_7)(\text{Aa})_t(\text{CR}_9\text{R}_{10})_n(\text{OCH}_2\text{CH}_2)_r$ -, $-\text{K}(\text{CR}_5\text{R}_6)_m(\text{CO})(\text{Aa})_t(\text{CR}_9\text{R}_{10})_n(\text{OCH}_2\text{CH}_2)_r$ -, $-\text{K}(\text{CR}_5\text{R}_6)_m(\text{NR}_{11}\text{CO})(\text{Aa})_t(\text{CR}_9\text{R}_{10})_n(\text{OCH}_2\text{CH}_2)_r$ -, $-\text{K}(\text{CR}_5\text{R}_6)_m(\text{OCO})(\text{Aa})_t(\text{CR}_9\text{R}_{10})_n(\text{OCH}_2\text{CH}_2)_r$ -, $-\text{K}(\text{CR}_5\text{R}_6)_m(\text{OCNR}_7)(\text{Aa})_t(\text{CR}_9\text{R}_{10})_n(\text{OCH}_2\text{CH}_2)_r$ -, $-\text{K}(\text{CR}_5\text{R}_6)_m(\text{CO})(\text{Aa})_t(\text{CR}_9\text{R}_{10})_n(\text{OCH}_2\text{CH}_2)_r$ -, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -phenyl-CO(Aa)_t(CR₇R₈)_n-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -furyl-CO(Aa)_t(CR₇R₈)_n-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -oxazolyl-CO(Aa)_t(CR₇R₈)_n-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -thiazolyl-CO(Aa)_t(CR₇R₈)_n-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -thienyl-CO(CR₇R₈)_n-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -imidazolyl-CO-(CR₇R₈)_n-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -morpholino-CO(Aa)_t(CR₇R₈)_n-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -piperazino-CO(Aa)_t(CR₇R₈)_n-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -N-methylpiperazinCO(Aa)_t(CR₇R₈)_n-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -(Aa)_tphenyl-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -(Aa)_tfuryl-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -oxazolyl(Aa)_t-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -thiazolyl(Aa)_t-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -thienyl(Aa)_t-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -imidazolyl(Aa)_t-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -morpholino(Aa)_t-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -piperazino-(Aa)_tG₂₂-, $-\text{K}(\text{CR}_5\text{R}_6)_m$ -N-methylpiperazino(Aa)_t-, wherein m, Aa, m, and n are described above; t and r are 0 – 100 independently; R₃, R₄, R₅, R₆, R₇, and R₈ are independently chosen from H; halide; C₁~C₈ alkyl; C₂~C₈ aryl, alkenyl, alkynyl, ether, ester, amine or amide, which optionally substituted by one or more halide, CN, NR₁R₂, CF₃, OR₁, Aryl, heterocycle, S(O)R₁, SO₂R₁, -CO₂H, -SO₃H, -OR₁, -CO₂R₁, -CONR₁, -PO₂R₁R₂, -PO₃H or P(O)R₁R₂R₃; K is NR₁, -SS-, -C(=O)-, -C(=O)NH-, -C(=O)O-, -C=NH-O-, -C=N-NH-, -C(=O)NH-NH-, O, S, Se, B, Het (heterocyclic or heteroaromatic ring having C₃-C₈), or peptides containing 1- 20 amino acids;

or R₁, R₂, R₃, and R₄, are independently linear alkyl having from 1-18 carbon atoms, or polyethyleneoxy unit having formula (OCH₂CH₂)_p, p = 1~5000, or a peptide containing 1~20 units of amino acids (L or D form), or combination above;

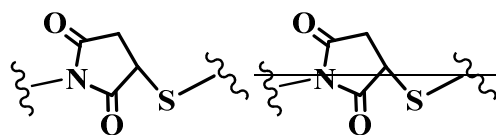
in addition, Y₁, Y₂, R₁, R₂, R₃, R₄, Z₁ or Z₂ may independently be composed of one or more following components as shown below:



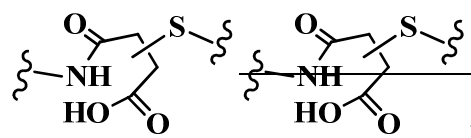
6-maleimidocaproyl (MC),



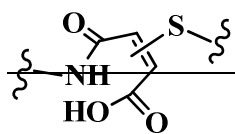
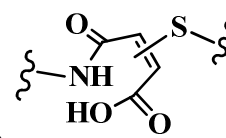
maleimido propanoyl (MP),



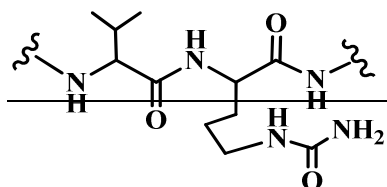
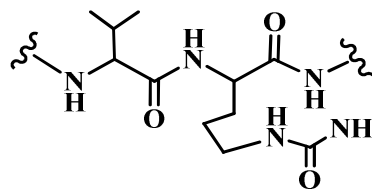
thio-maleido,



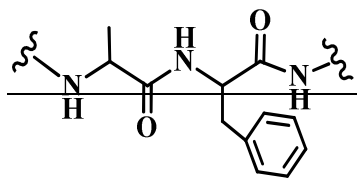
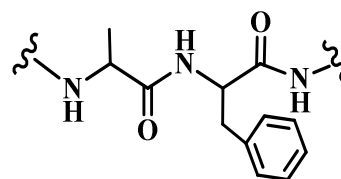
thio-amino-oxobutanoic acid,



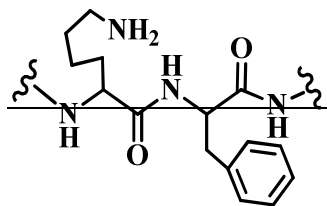
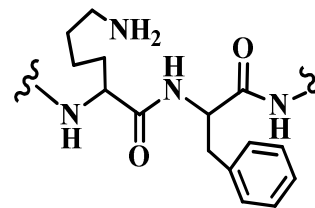
thio-amino-oxobutanoic acid,



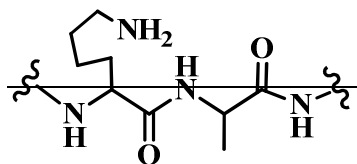
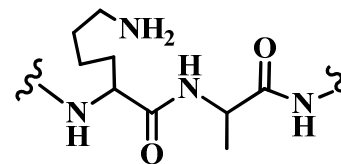
valine-citrulline (val-cit),



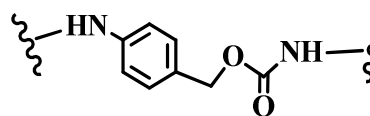
alanine-phenylalanine (ala-phe),

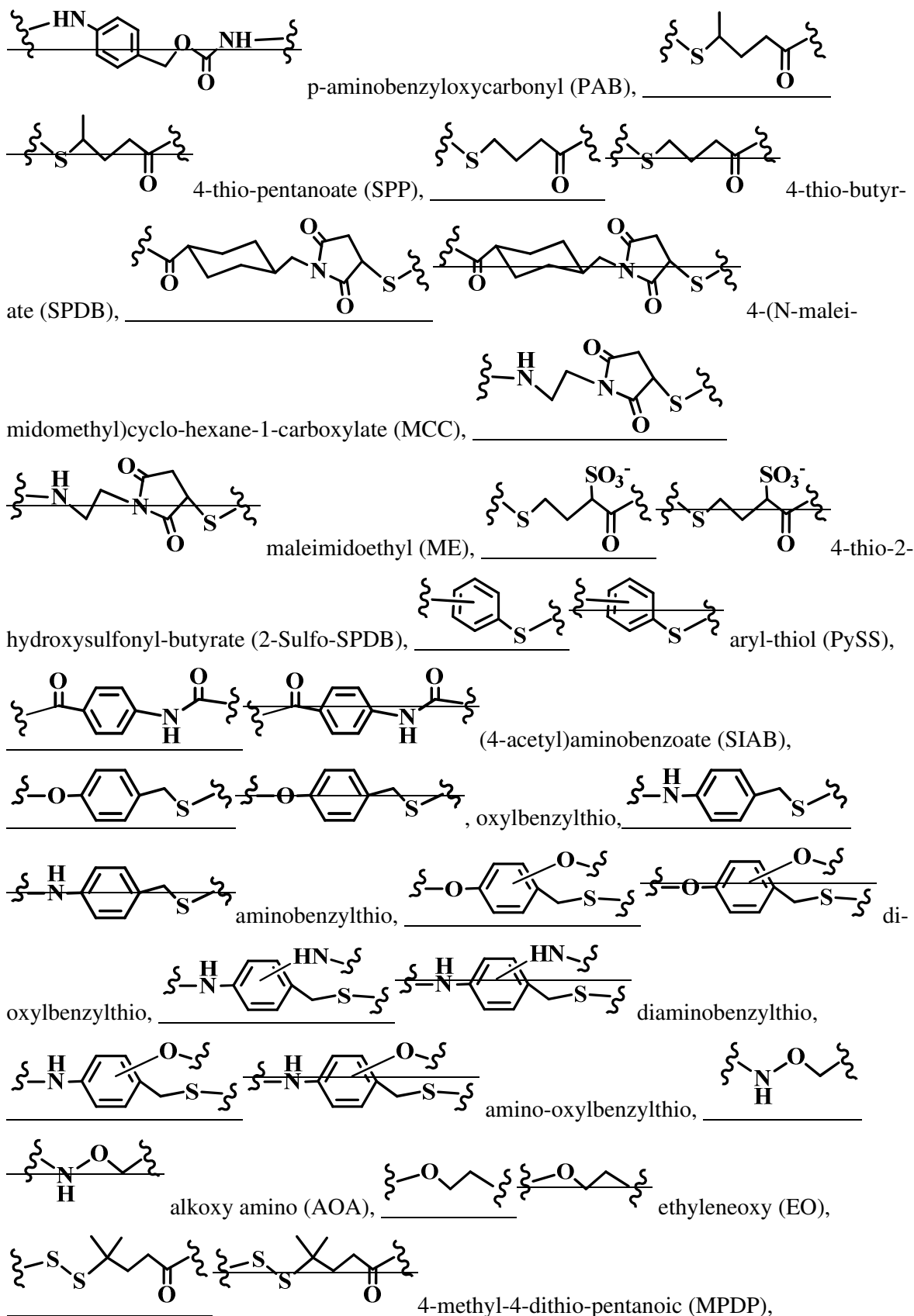


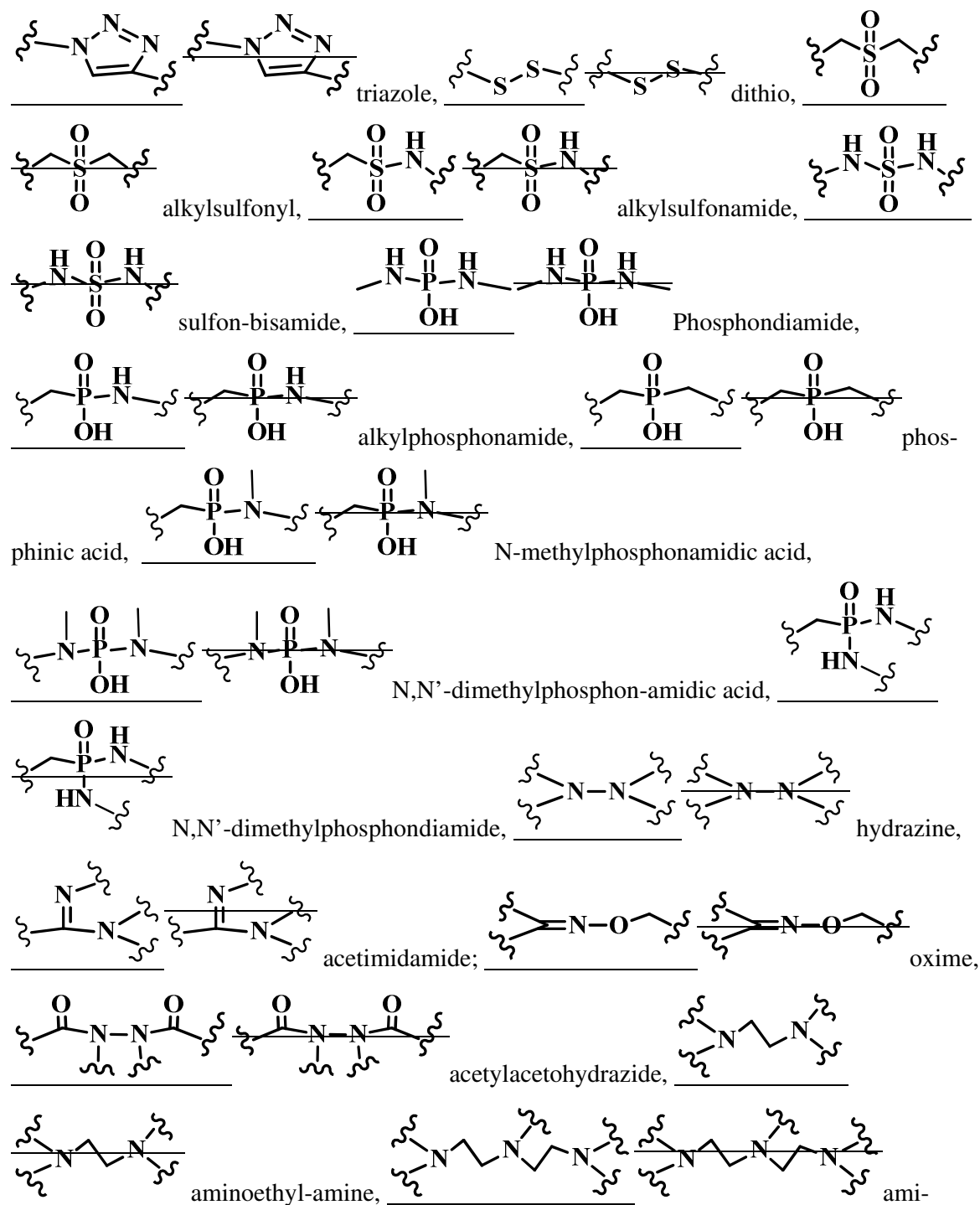
lysine-phenylalanine (lys-phe),



lysine-alanine (lys-ala),

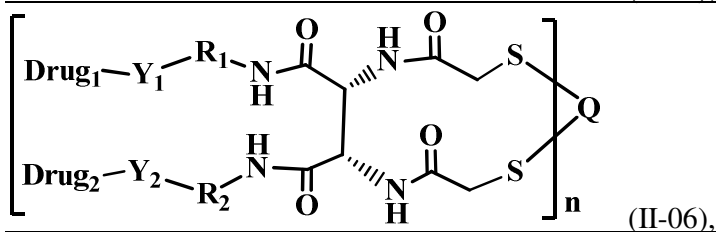
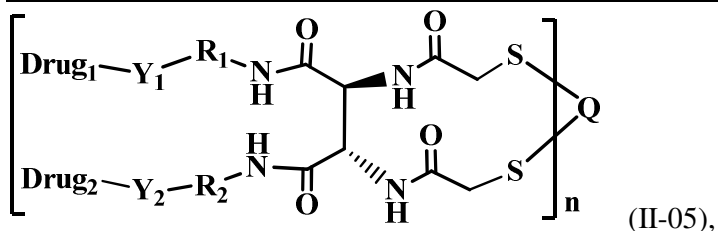
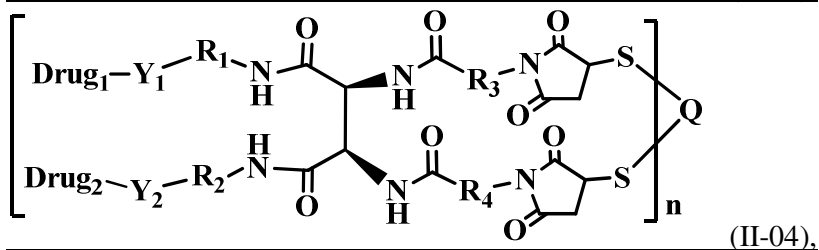
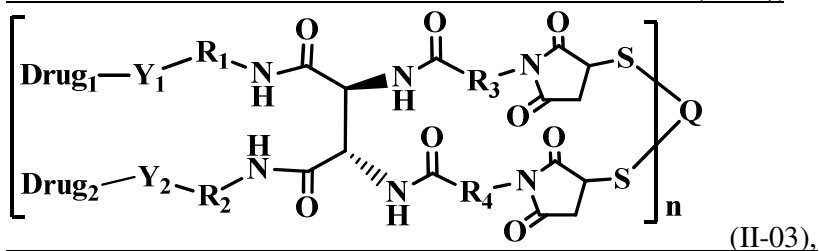
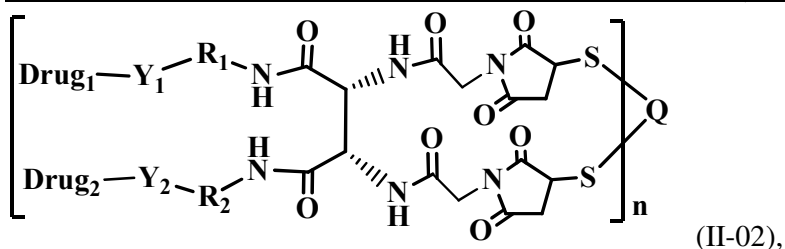
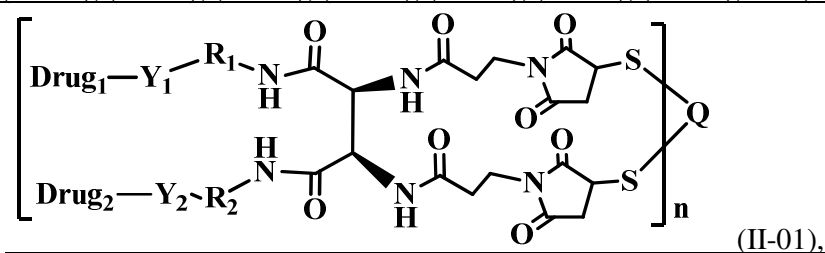


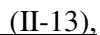
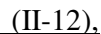
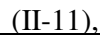
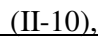
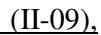
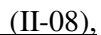
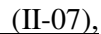


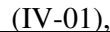


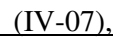
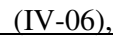
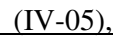
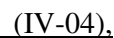
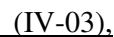
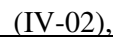
alternatively Alternatively, Y₁, Y₂, R₁, R₂, R₃, R₄, Z₁ or Z₂, can be independently absent, but Y₁, Y₂, R₁, R₂, R₃, R₄, Z₁ and Z₂ may not be absent at the same time.

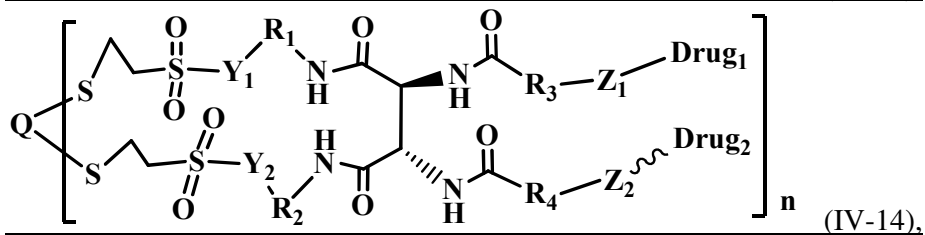
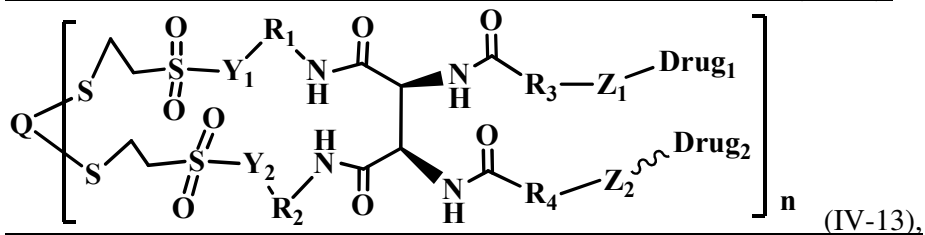
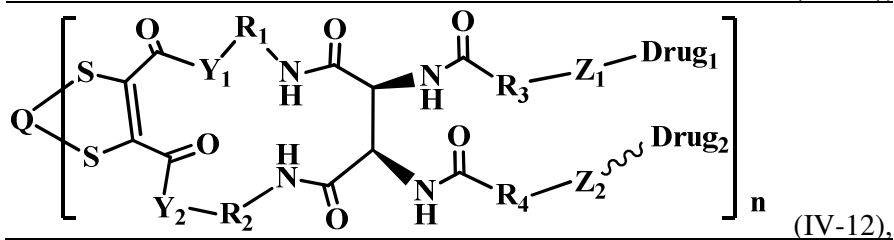
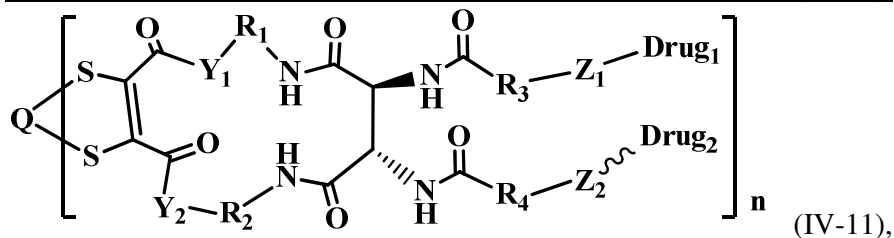
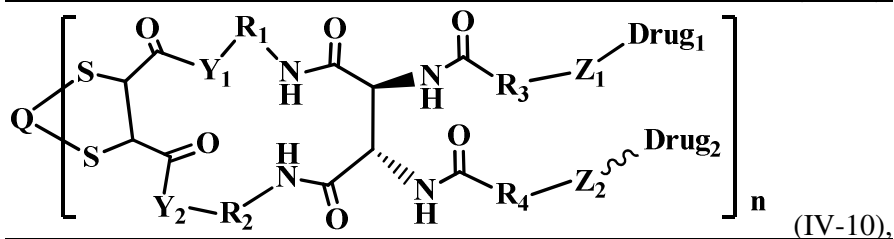
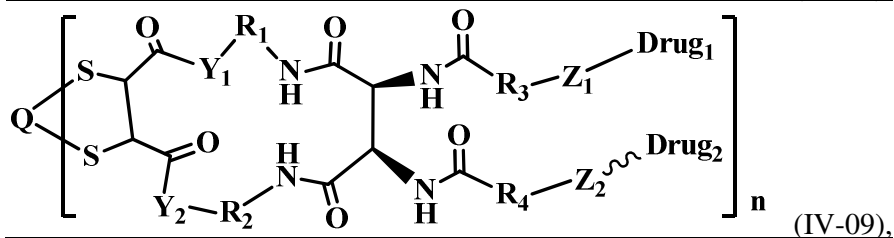
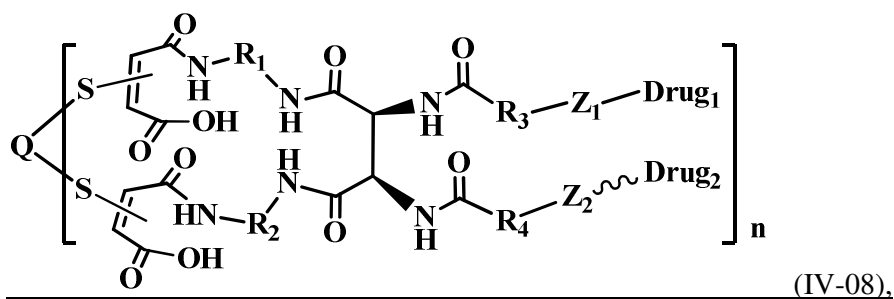
2. The conjugate compound compounds of Formula (I), (II), (III) and (IV) according to Claim 1 is further represented by Formula (II-01), (II-02), (II-03), (II-04), (II-05), (II-06), (II-07), (II-08), (II-09), (II-10), (II-11), (II-12), (II-13), (II-14), (II-15), (II-16), (II-17), (II-18), (IV-01), (IV-02), (IV-03), (IV-04), (IV-05), (IV-06), (IV-07), (IV-08), (IV-09), (IV-10), (IV-11), (IV-12), (IV-13), (IV-14), (IV-15), (IV-16), (IV-17), (IV-18), (IV-19), and (IV-20) below:

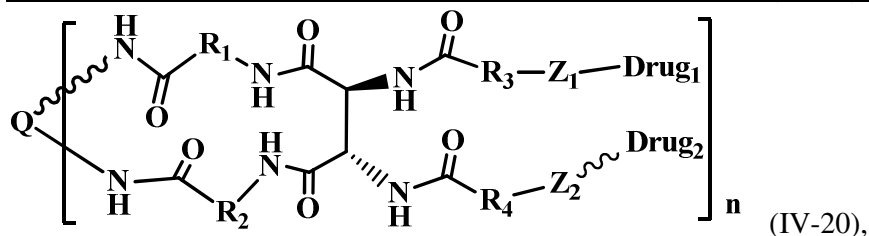
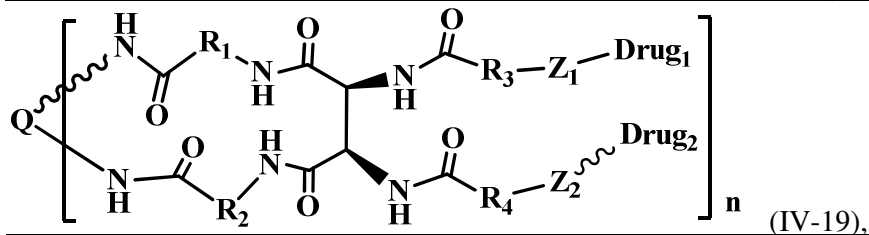
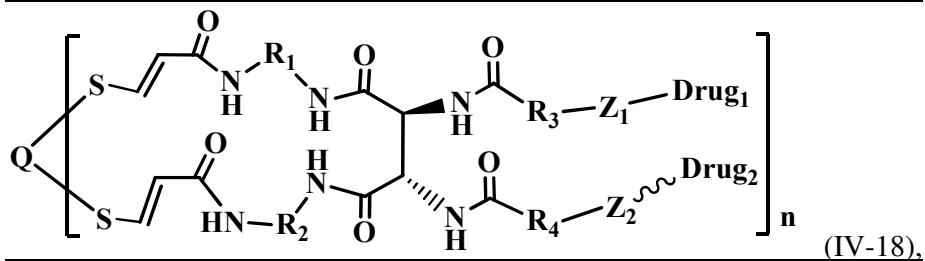
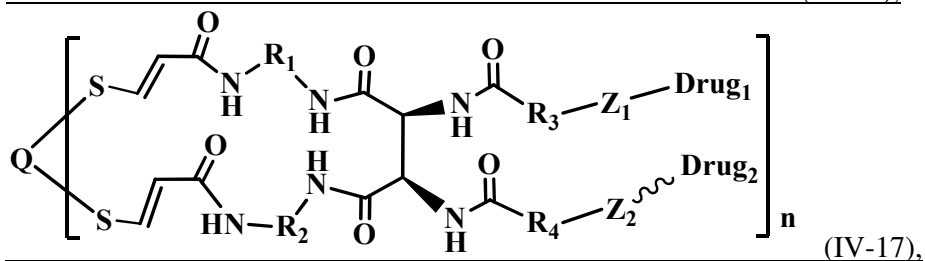
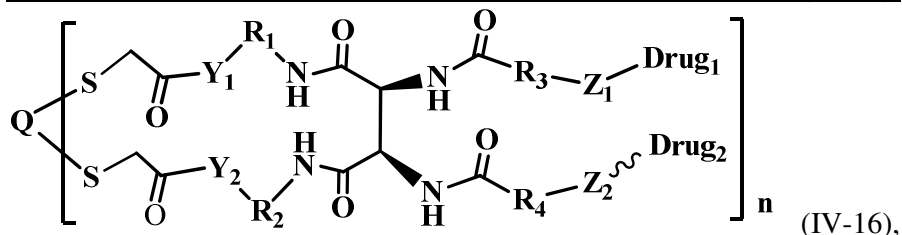
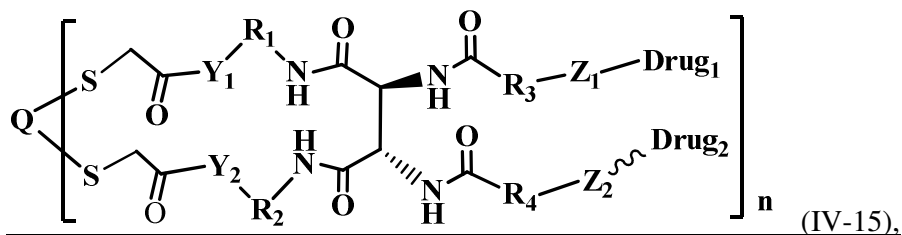










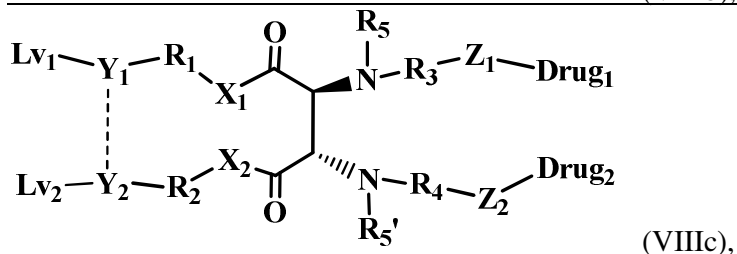
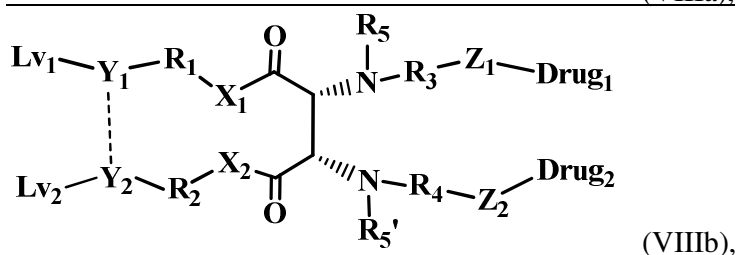
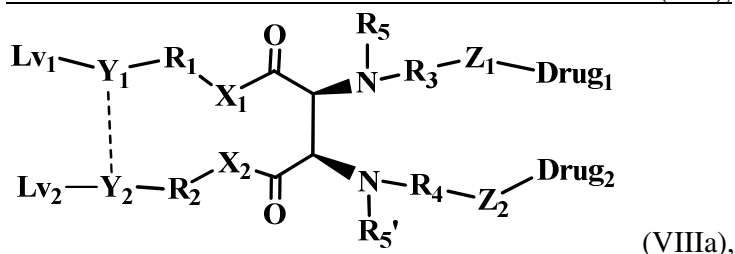
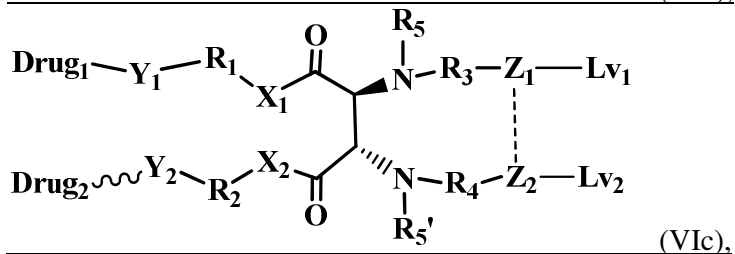
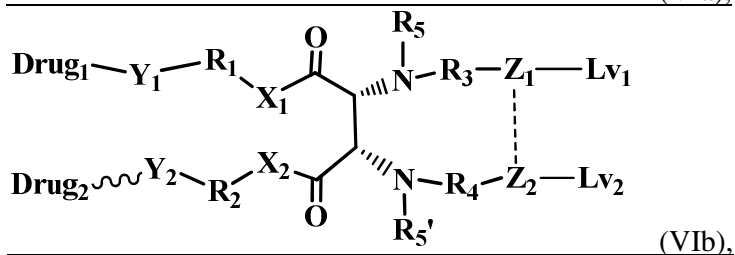
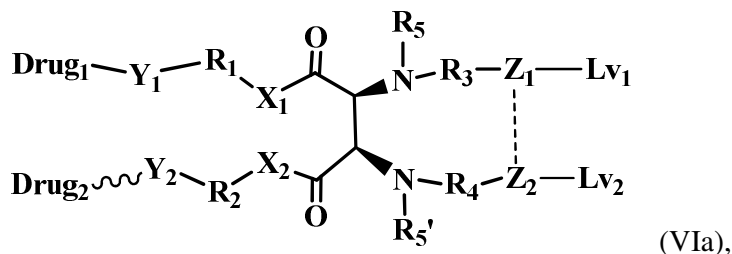


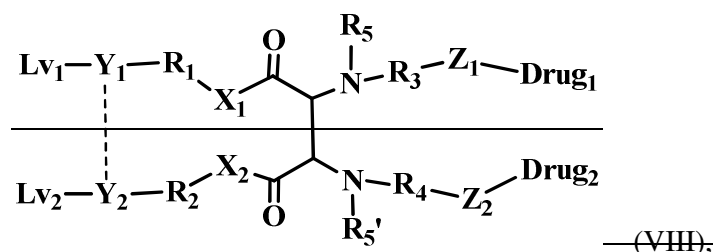
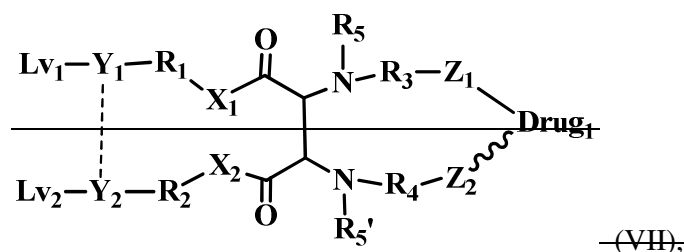
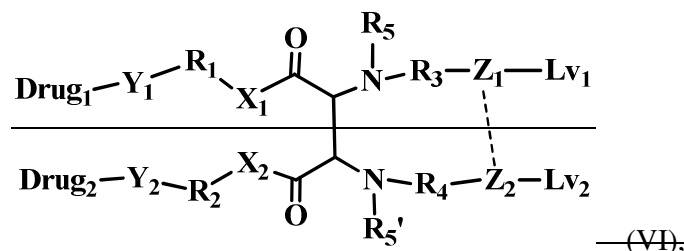
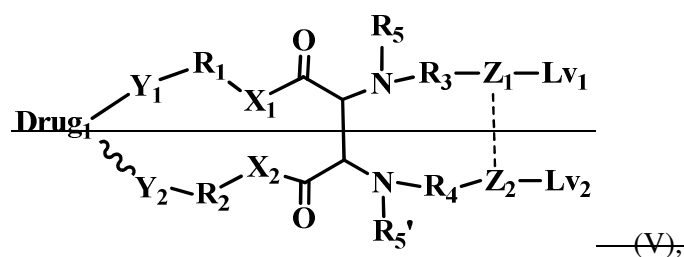
wherein “-----”, “~~~~”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R_{5'}, Z₁, Z₂, Drug₁ and Drug₂

are defined the same above in Claim 1; in addition, one of Drug₁ and Drug₂ can be independently absent but may not be absent at the same time.

2. 3. The conjugates compounds according to Claim 2 are made from a readily reactive stereoisomeric bis-linker compound presented by of Formula (VIa), (VIb), (VIc), (VIIIa), (VIIIb) and

(VIIIc) below accordingly, ~~V), (VI), (VII) or (VIII) containing 2,3-diaminosuccinyl group below~~, wherein two or more function groups ~~residues~~ of a cell-binding molecule can simultaneously or sequentially ~~sequentially~~ react to Lv_1 and/or Lv_2 of the compounds: ~~the compound of Formula (V), (VI), (VII) or (VIII) accordingly:~~





wherein:

“-----” is optionally either a single bond, or a double bond, or a triple bond, or can optionally be absent; It provided that when ----- represents a triple bond, Lv₁ and Lv₂ are absent;

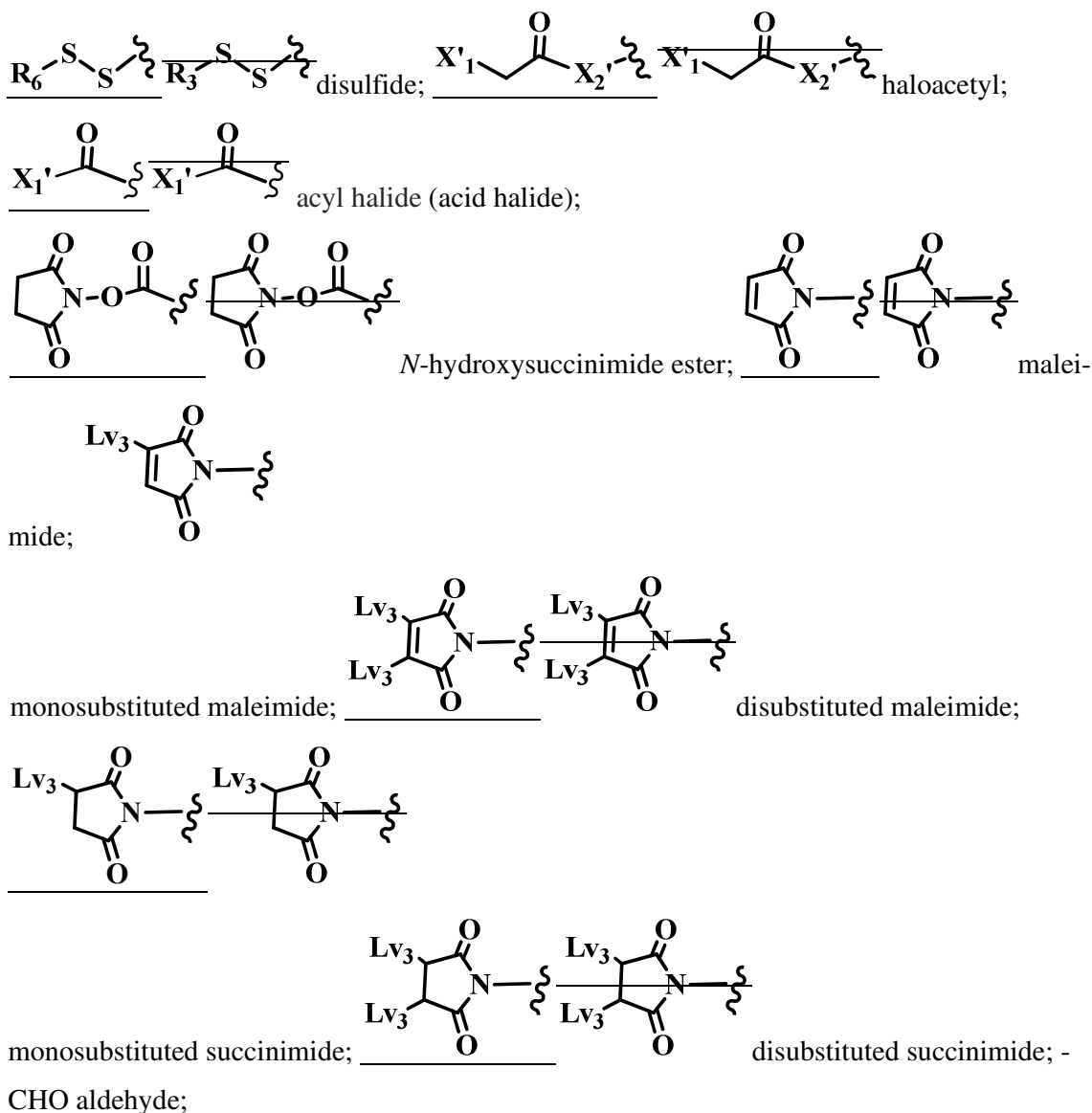
“____”, “~~~~”, Drug₁, Drug₂, n, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R_{5'}, Z₁, and Z₂ are defined the same as in Claim 1; Formula (I) (IV);

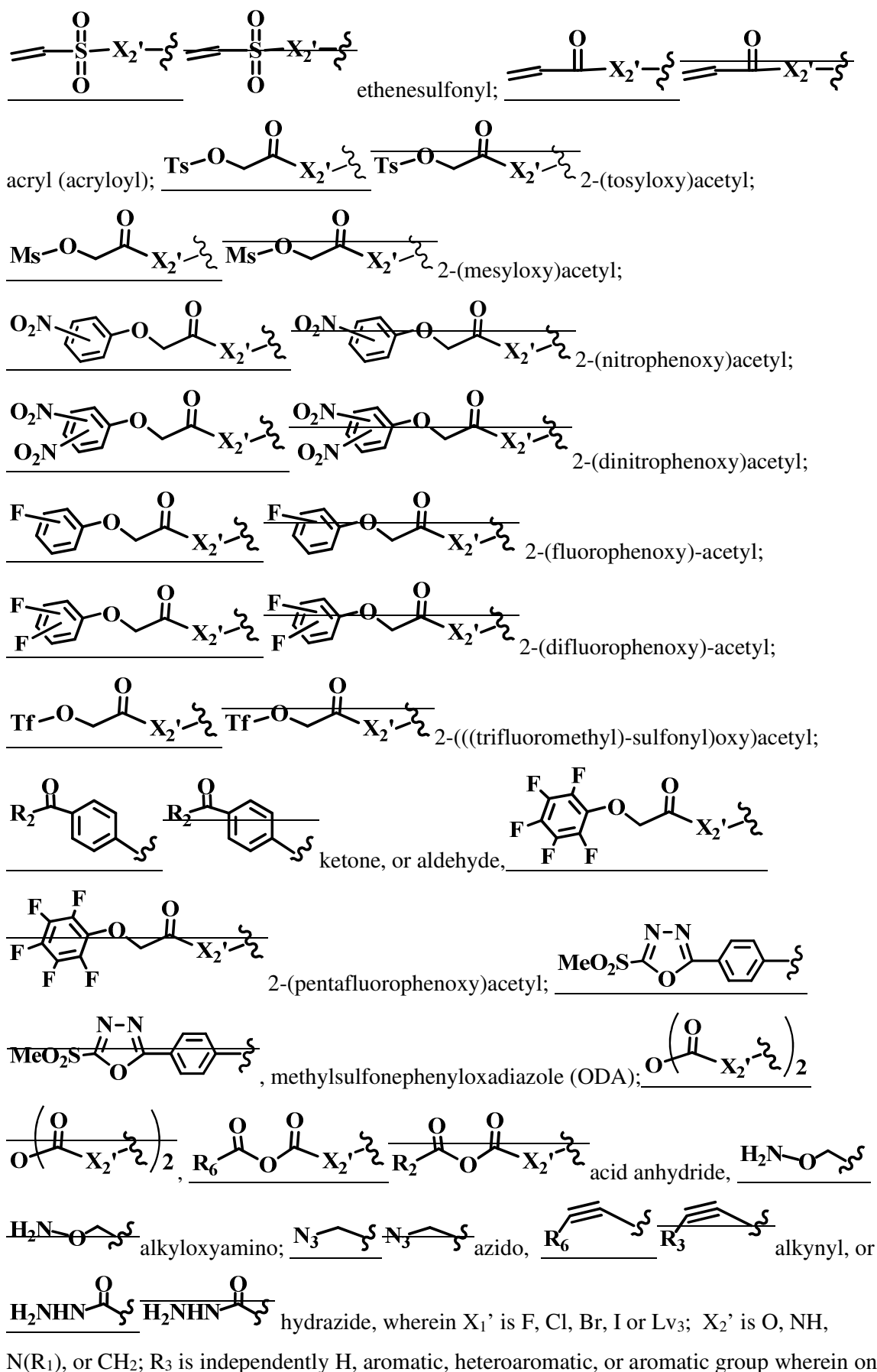
Lv₁ and Lv₂ represent the same or different leaving group that can be reacted with a thiol, amine, carboxylic acid, selenol, phenol or hydroxyl group on a cell-binding molecule. Lv₁ and Lv₂ are independently selected from OH; F; Cl; Br; I; nitrophenol; N-hydroxysuccinimide (NHS); phenol; dinitrophenol; pentafluorophenol; tetrafluorophenol; difluorophenol; monofluorophenol; pentachlorophenol; triflate; imidazole; dichlorophenol; tetrachlorophenol; 1-hydroxybenzotriazole; tosylate; mesylate; 2-ethyl-5-phenylisoxazolium-3'-sulfonate, anhydrides formed its self, or formed with the other anhydride, acetyl anhydride, formyl anhydride; or an intermediate molecule generated with a condensation reagent for peptide coupling reactions,

or for Mitsunobu reactions, which are selected from: EDC (N-(3-Dimethylaminopropyl)-N'-ethylcarbodiimide), DCC (Dicyclohexyl-carbodiimide), N,N'-Diisopropylcarbodiimide (DIC), N-Cyclohexyl-N'-(2-morpholino-ethyl)carbodiimide metho-p-toluenesulfonate (CMC, or CME-CDI), 1,1'-Carbonyldiimi-dazole (CDI), TBTU (O-(Benzotriazol-1-yl)-N,N,N',N'-tetramethyluronium tetrafluoroborate), N,N,N',N'-Tetramethyl-O-(1H-benzotriazol-1-yl)-uronium hexafluorophosphate (HBTU), (Benzotriazol-1-yloxy)tris(dimethylamino)-phosphonium hexafluorophosphate (BOP), (Benzotriazol-1-yloxy)tripyrrolidinophosphonium hexafluorophosphate (PyBOP), Diethyl cyanophosphonate (DEPC), Chloro-N,N,N',N'-tetramethylformamidiniumhexafluorophosphate, 1-[Bis(dimethylamino)methylene]-1H-1,2,3-triazolo[4,5-b]pyridinium 3-oxid hexafluorophos-phate (HATU), 1-[(~~Dimethylami-no~~)(~~morpholino~~Dimethylamino)(~~morpho-lino~~)methylene]-1H-[1,2,3]triazolo[4,5-b]pyridine-1-ium 3-oxide hexafluoro-phosphate (HDMA), 2-Chloro-1,3-dimethyl-imidazolidinium hexafluorophosphate (CIP), Chlorotripyrrolidinophosphonium hexafluorophosphate (PyCloP), Fluoro-N,N,N',N'-bis(tetramethylene)-formamidinium hexafluorophosphate (BTFFH), N,N,N',N'-Tetramethyl-S-(1-oxido-2-pyridyl)thiuronium hexafluorophosphate, O-(2-Oxo-1(2H)pyridyl)-N,N,N',N'-tetramethyluroni-um~~tetramethyl-uronium~~ tetrafluoroborate (TPTU), S-(1-Oxido-2-pyridyl)-N,N,N',N'-tetramethylthiuronium tetrafluoroborate, O-[(Ethoxycarbonyl)-cyanomethylenamino]-N,N,N',N'-tetramethyluronium hexafluorophosphate (HOTU), (1-Cyano-2-ethoxy-2-oxoethylidenaminoxy) dimethylamino-morpholino-carbenium hexafluorophosphate (COMU), O-(Benzotriazol-1-yl)-N,N,N',N'-bis(tetramethylene)uronium hexafluorophosphate (HBPYU), N-Benzyl-N'-cyclohexyl-carbodiimide (with, or without polymer-bound), Dipyrrolidino(N-succinimidyl-oxy)carbenium hexafluoro-phosphate (HSPYU), Chlorodipyrrolidinocarbenium hexafluorophosphate (PyCIU), 2-Chloro-1,3-dimethylimidazolidinium tetrafluoroborate(CIB), (Benzotriazol-1-yloxy)dipiperidino-carbenium~~dipiperi-dinocarbenium~~ hexafluorophosphate (HBPipU), O-(6-Chlorobenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium tetrafluoroborate (TCTU), Bromotris(dimethylamino)-phosphonium hexafluorophosphate (BroP), Propylphosphonic anhydride (PPACA, T3P®), 2-Morpholinoethyl isocyanide (MEI), N,N,N',N'-Tetramethyl-O-(N-succinimidyl)uronium hexafluorophosphate (HSTU), 2-Bromo-1-ethyl-pyridinium tetrafluoroborate (BEP), O-[(Ethoxycarbonyl)cyano-methylenamino]-N,N,N',N'-tetra-methyluronium tetrafluoroborate (TOTU), 4-(4,6-Dimethoxy-1,3,5-triazin-2-yl)-4-methylmorpholiniumchloride (MMTM, DMTMM), N,N,N',N'-Tetramethyl-O-(N-succinimidyl)uronium tetrafluoroborate (TSTU), O-(3,4-Dihydro-4-oxo-1,2,3-benzotriazin-3-yl)-N,N,N',N'-tetramethyluronium tetrafluoro-borate (TDBTU), 1,1'-(Azodicarbonyl)-dipiperidine (ADD), Di-(4-chlorobenzyl)azodicarboxylate (DCAD), Di-tert-butyl azodicarboxylate (DBAD), Diisopropyl azodicarboxylate

(DIAD), Diethyl azodicarboxylate (DEAD). In addition, L_{V1} and L_{V2} can be an anhydride, formed by acid themselves or formed with other $C_1\sim C_8$ acid anhydrides;

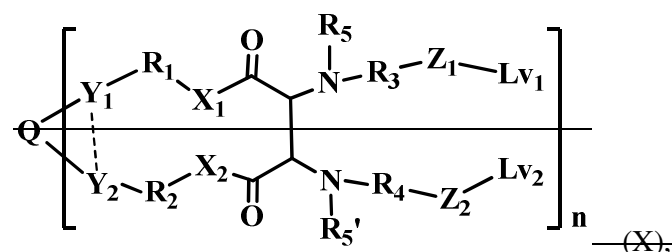
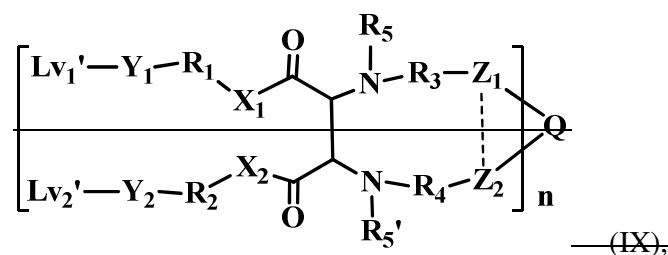
or L_{V1} and L_{V2} can be independently selected from, a halide (fluoride, chloride, bromide, and iodide), methanesulfonyl (mesyl), toluenesulfonyl (tosyl), trifluoromethyl-sulfonyl (triflate), trifluoromethylsulfonate, nitrophenoxyl, N-succinimidylloxyl (NHS), phenoxyl; dinitrophenoxyl; pentafluorophenoxyl, tetrafluorophenoxyl, trifluorophenoxyl, difluorophenoxyl, monofluorophenoxyl, pentachlorophenoxyl, 1H-imidazole-1-yl, chlorophenoxyl, dichlorophenoxyl, trichlorophenoxyl, tetrachlorophenoxyl, N-(benzotriazol-yl)oxyl, 2-ethyl-5-phenylisoxazolium-3'-sulfonyl, phenyloxadiazole-sulfonyl (-sulfone-ODA), 2-ethyl-5-phenylisoxazolium-yl, phenyloxadiazol-yl (ODA), oxadiazol-yl, unsaturated carbon (a double or a triple bond between carbon-carbon, carbon-nitrogen, carbon-sulfur, carbon-phosphorus, sulfur-nitrogen, phosphorus-nitrogen, oxygen-nitrogen, or carbon-oxygen), or one of the following structure:





or several H atoms are replaced independently by $-R_1$, -halogen, $-OR_1$, $-SR_1$, $-NR_1R_2$, $-NO_2$, $-S(O)R_1$, $-S(O)_2R_1$, or $-COOR_1$; Lv_3 is a leaving group selected from F, Cl, Br, I, nitrophenol; N-hydroxysuccinimide (NHS); -phenol; dinitrophenol; pentafluorophenol; tetrafluorophenol; difluorophenol; monofluorophenol; pentachlorophenol; triflate; imidazole; dichlorophenol; tetrachlorophenol; 1-hydroxybenzotriazole; tosylate; mesylate; 2-ethyl-5-phenylisoxazolium-3'-sulfonate; R_1 and R_2 are defined above.

~~3. 4. The compound conjugate compounds of Formula (I), (II), (III) and (IV) according to Claim 1 are made from a readily reactive bis-linker compound of Formula (IX) and (X) containing 2,3-diaminosuccinyl group below, wherein two or more function groups of a cytotoxic molecule can simultaneously or sequentially react to the compound of Formula (IX) and (X):~~



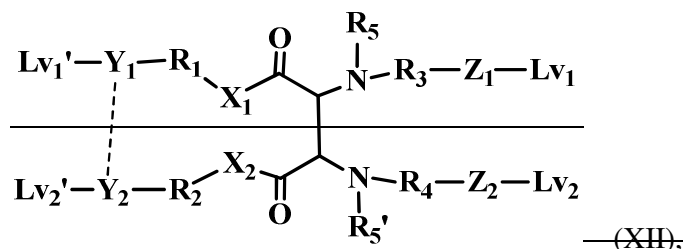
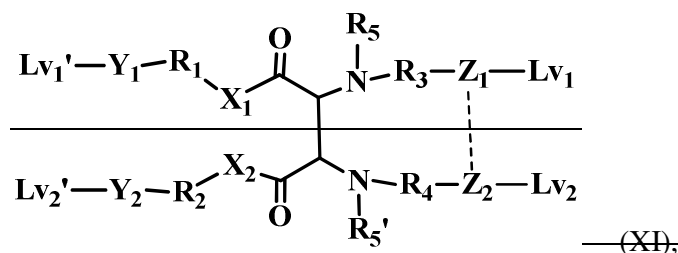
wherein:

“—”, “—”, Q, n, X_1 , X_2 , Y_1 , Y_2 , R_1 , R_2 , R_3 , R_4 , R_5 , R_5' , Z_1 , and Z_2 are defined the same as in Claim 1;

Lv_1 , Lv_2 , Lv_1' and Lv_2' are a function group that can independently react with a residue groups of a cytotoxic drug simultaneously or sequentially to form a compound of Formula (I), (II), (III) and (IV) respectively;

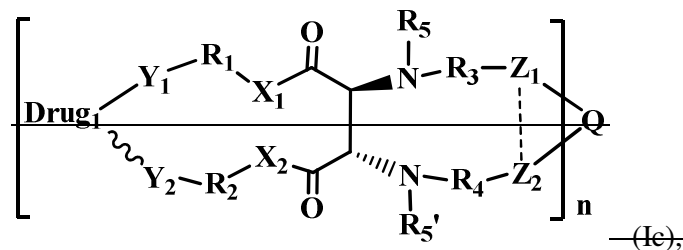
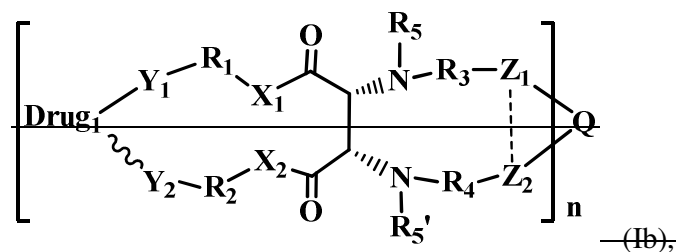
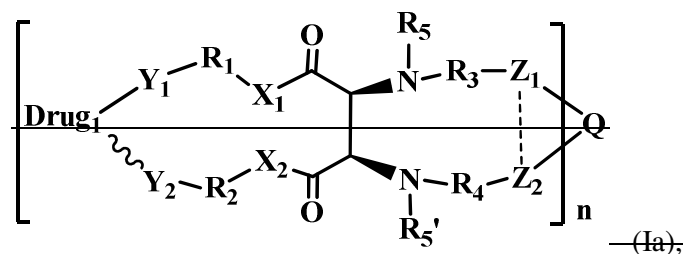
Lv_1' or Lv_2' are defined the same as Lv_1 or Lv_2 in Claim 2.

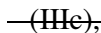
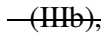
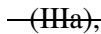
~~4. The conjugate compound of Formula (I), (II), (III) and (IV) according to Claim 1 are made from a readily reactive bis-linker molecule of Formula (XI) and (XII) below, wherein a cytotoxic molecule and a cell binding molecule can react the compound of Formula (XI) and (XII) independently, or simultaneously, or sequentially:~~

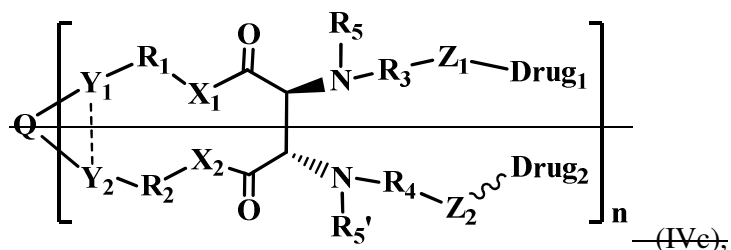
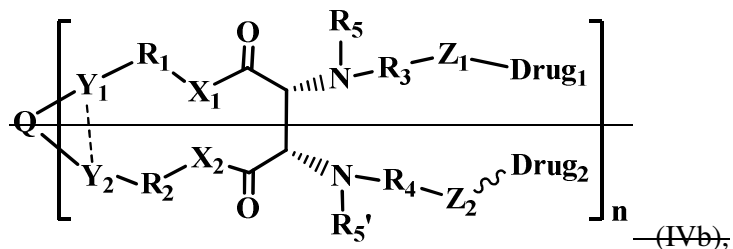
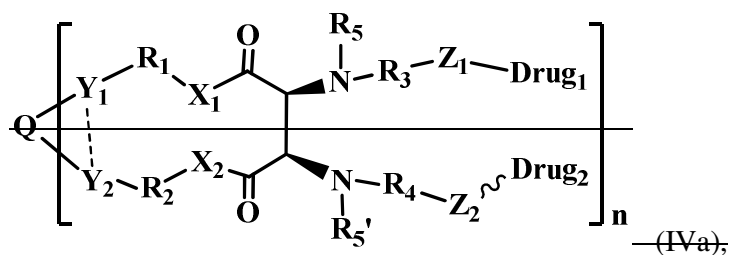


wherein “—”, X_1 , X_2 , Y_1 , Y_2 , R_1 , R_2 , R_3 , R_4 , R_5 , $\text{R}_{5'}$, Z_1 , and Z_2 are defined the same as in Claim 1; and “—”, Lv_1 , Lv_2 , Lv_1' and Lv_2' are defined the same as Lv_1 and Lv_2 in Claim 2.

5. The conjugate compound of Formula (I), (II), (III) and (IV) of Claim 1 having a structure represented by Formula (Ia), (Ib), (Ic), (IIa), (IIb), (IIc), (IIIa), (IIIb), (IIIc), (IVa), (IVb) and (IVc) below:

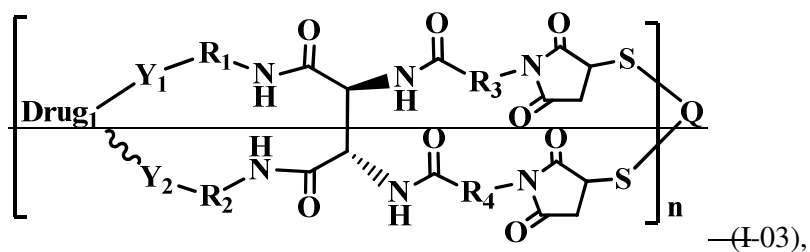
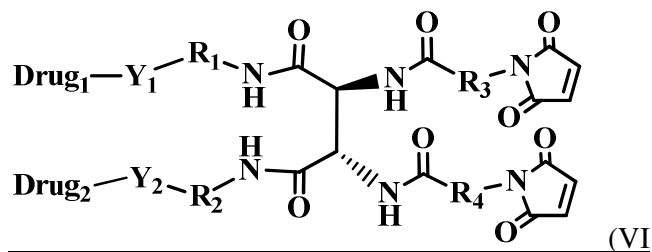
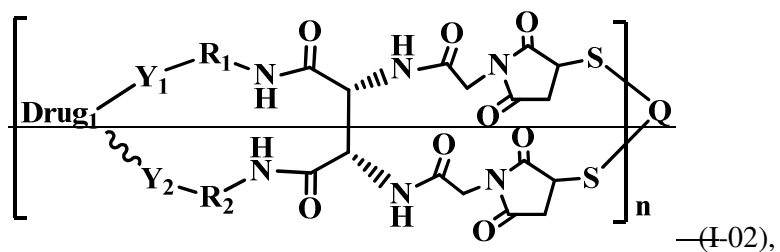
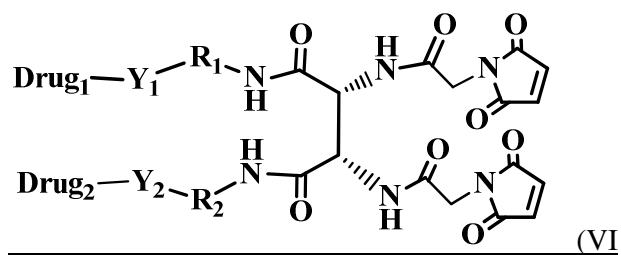
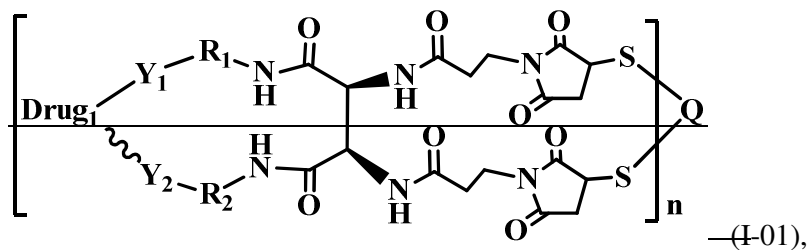
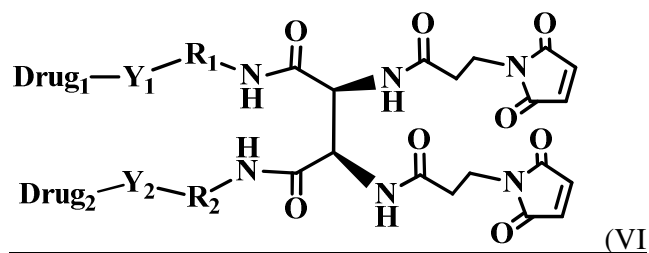




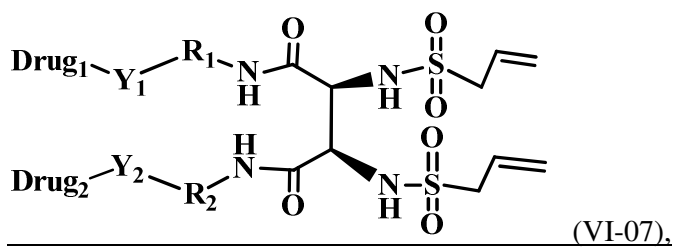
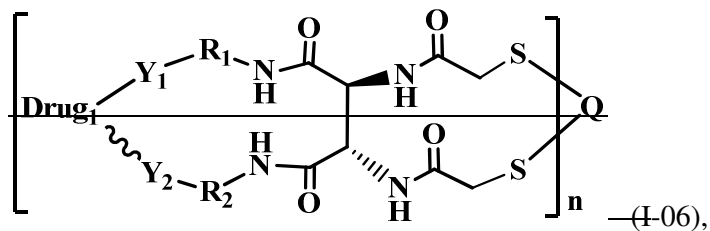
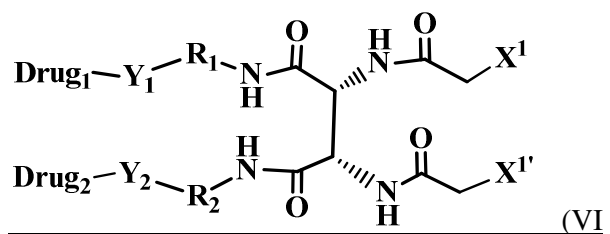
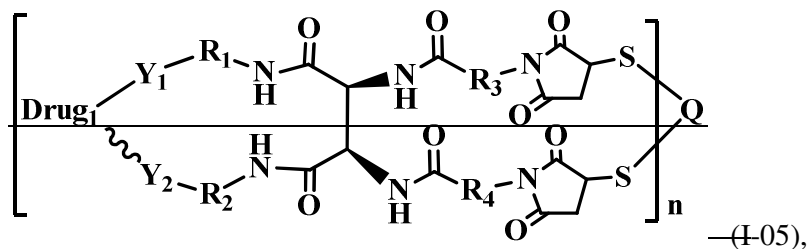
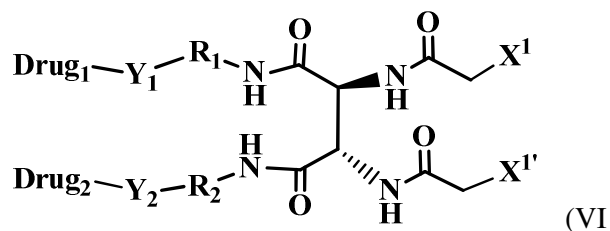
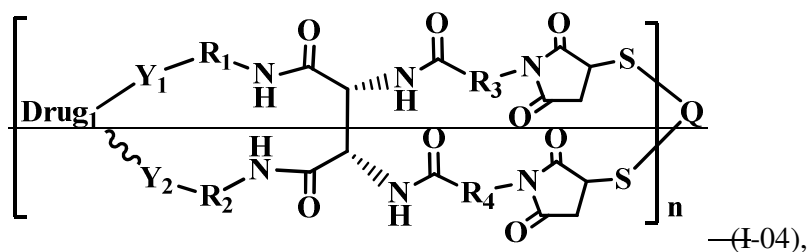
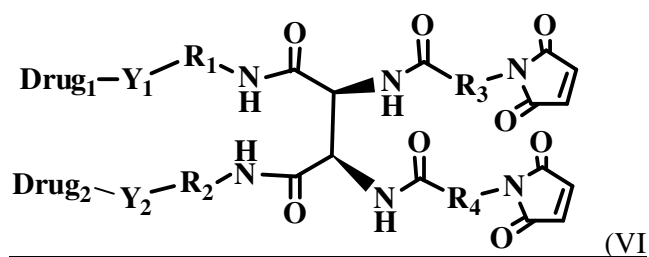


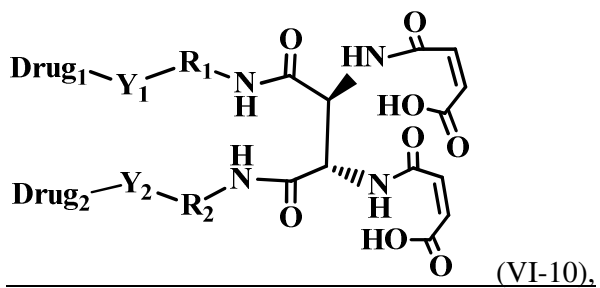
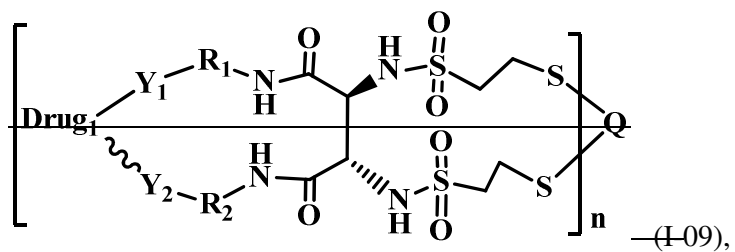
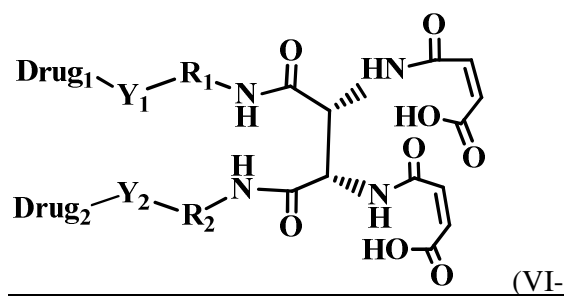
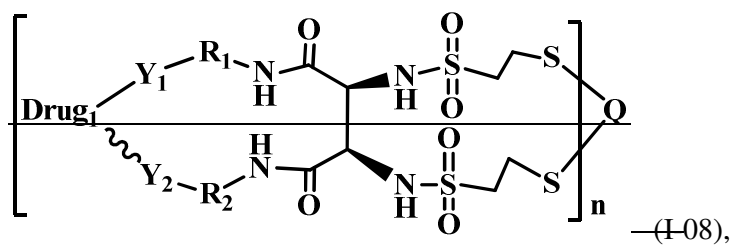
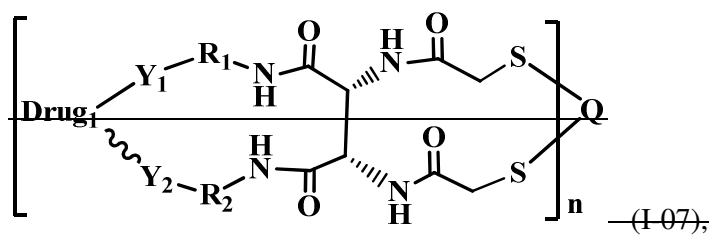
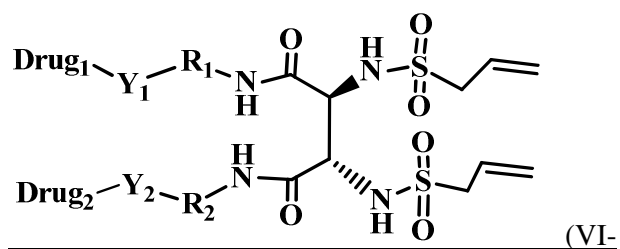
wherein “---”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R_{5'}, Z₁, Z₂, Drug₁ and Drug₂ are defined the same in Claim 1.

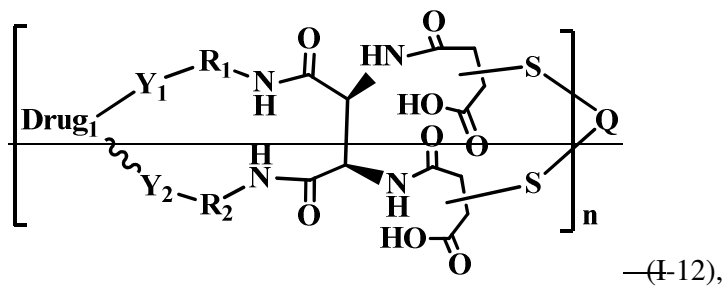
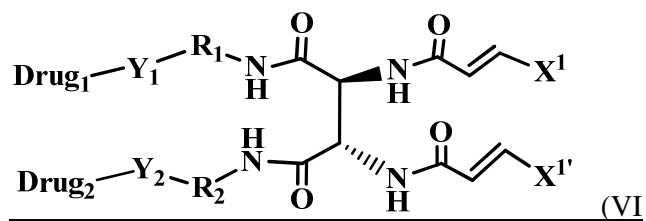
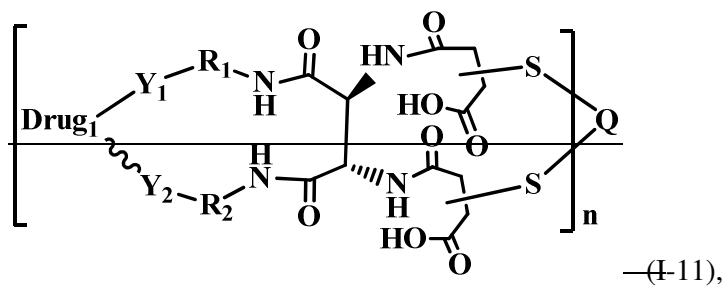
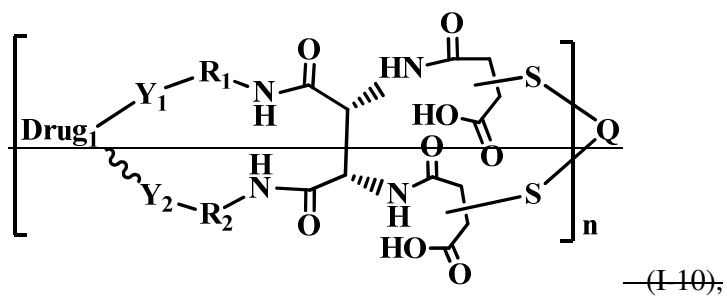
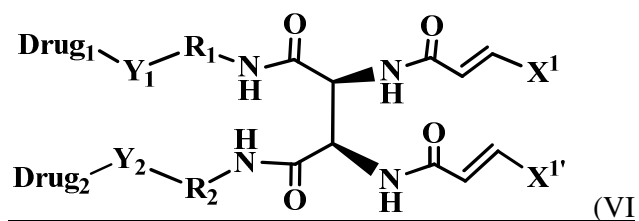
6.3. The conjugate compound of Formula (I), (II), (III) or (IV) of Claim 1 is further represented by Formula ~~(VI-01)~~, ~~(VI-02)~~, ~~(VI-03)~~, ~~(VI-04)~~, ~~(VI-05)~~, ~~(VI-06)~~, ~~(VI-07)~~, ~~(VI-08)~~, ~~(VI-09)~~, ~~(VI-10)~~, ~~(VI-11)~~, ~~(VI-12)~~, ~~(VI-13)~~, ~~(VI-14)~~, ~~(VI-15)~~, ~~(VI-16)~~, ~~(VI-17)~~, ~~(VI-18)~~, ~~(VII-19)~~, ~~(I-20)~~, ~~(I-21)~~, ~~(I-22)~~, ~~(I-23)~~, ~~(II-01)~~, ~~(VIIII-02)~~, ~~(VIIII-03)~~, ~~(VIIII-04)~~, ~~(VIIII-05)~~, ~~(VIIII-06)~~, ~~(VIIII-07)~~, ~~(VIIII-08)~~, ~~(VIIII-09)~~, ~~(VIIII-10)~~, ~~(VIIII-11)~~, ~~(VIIII-12)~~, ~~(VIIII-13)~~, ~~(VIIII-14)~~, ~~(VIIII-15)~~, ~~(VIIII-16)~~, ~~(VIIII-17)~~, ~~(VIIII-18)~~, ~~(VIII-19)~~, and ~~(VIIII-01)~~, ~~(III-02)~~, ~~(III-03)~~, ~~(III-04)~~, ~~(III-05)~~, ~~(III-06)~~, ~~(III-07)~~, ~~(III-08)~~, ~~(III-09)~~, ~~(III-10)~~, ~~(III-11)~~, ~~(III-12)~~, ~~(III-13)~~, ~~(III-14)~~, ~~(III-15)~~, ~~(III-16)~~, ~~(III-17)~~, ~~(III-18)~~, ~~(III-19)~~, ~~(III-20)~~, ~~(IV-01)~~, ~~(IV-02)~~, ~~(IV-03)~~, ~~(IV-04)~~, ~~(IV-05)~~, ~~(IV-06)~~, ~~(IV-07)~~, ~~(IV-08)~~, ~~(IV-09)~~, ~~(IV-10)~~, ~~(IV-11)~~, ~~(IV-12)~~, ~~(IV-13)~~, ~~(IV-14)~~, ~~(IV-15)~~, ~~(IV-16)~~, ~~(IV-17)~~, ~~(IV-18)~~, ~~(IV-19)~~, and ~~(IV-20)~~ below:



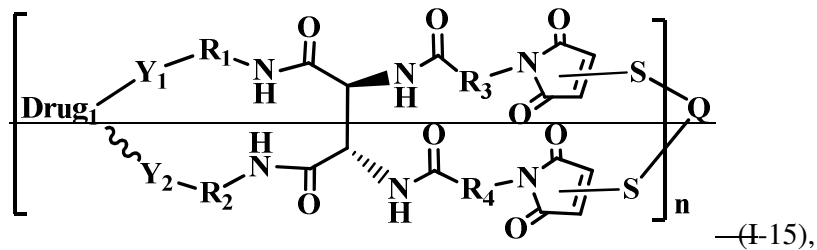
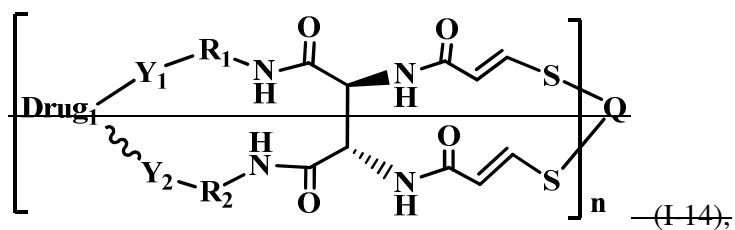
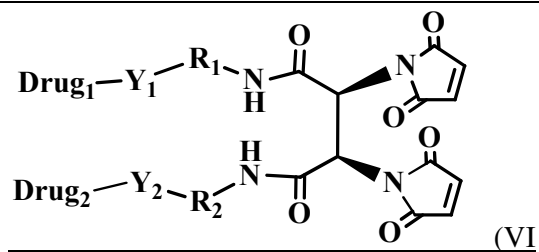
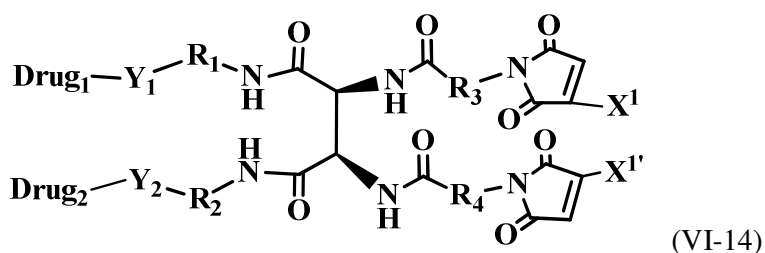
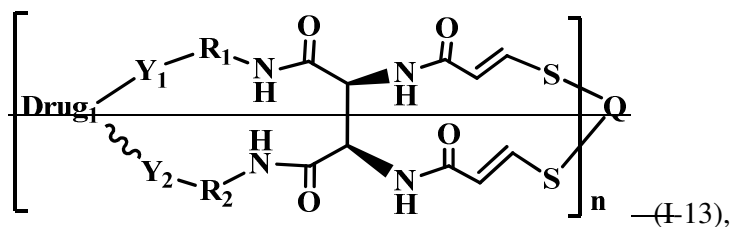
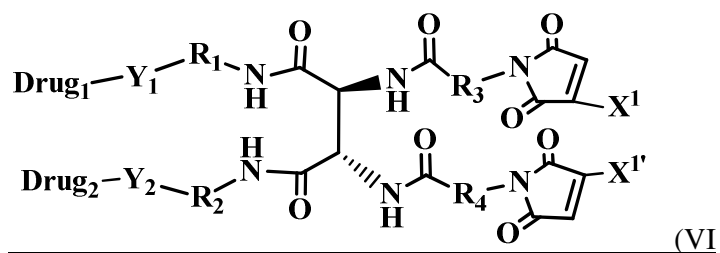
368

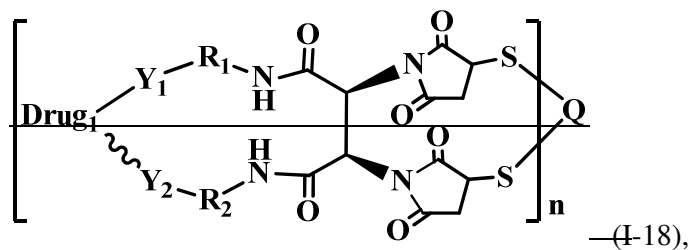
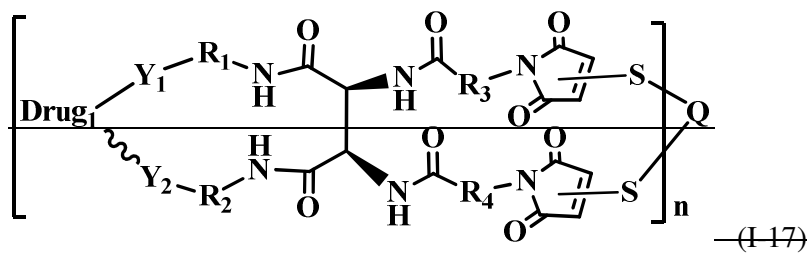
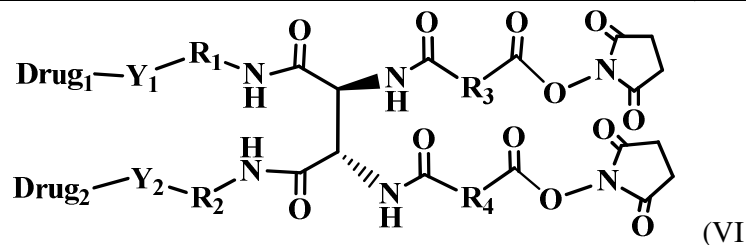
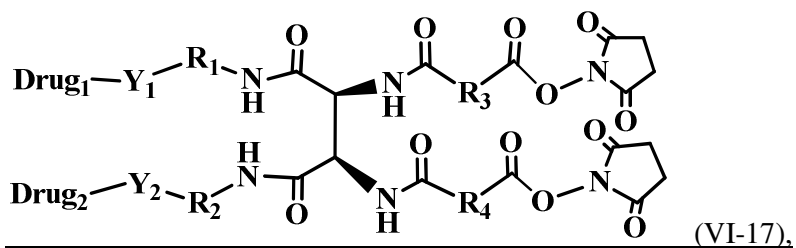
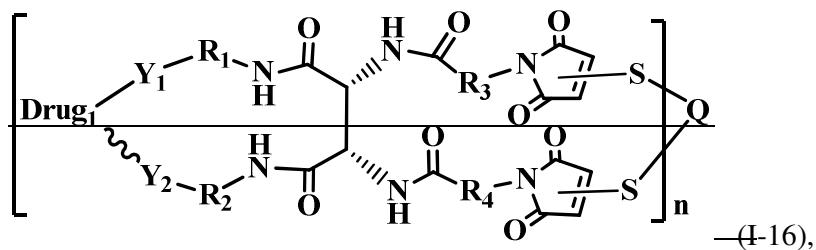
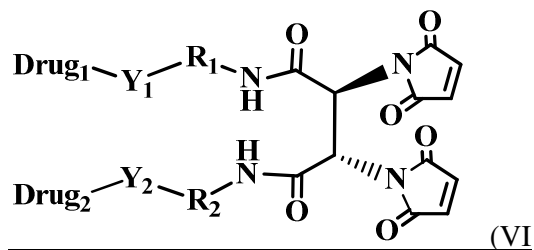


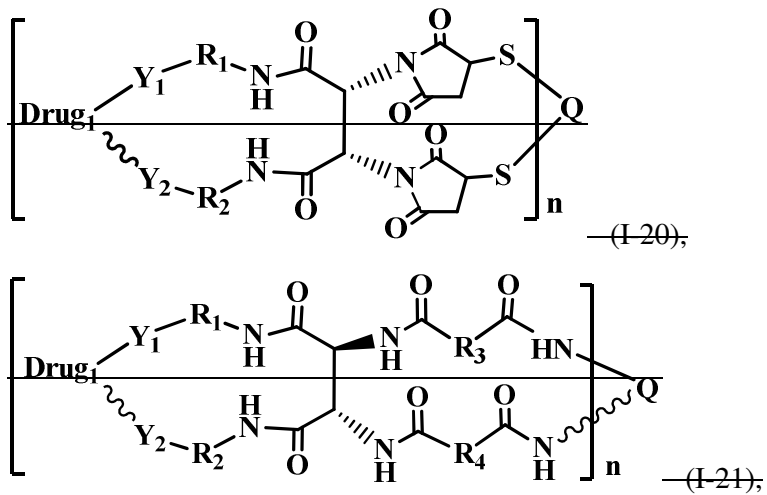
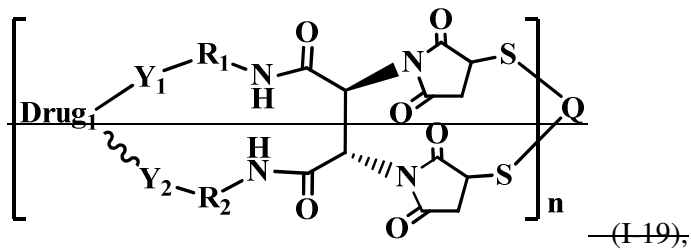
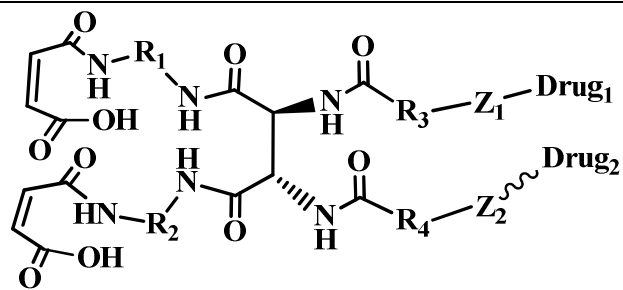
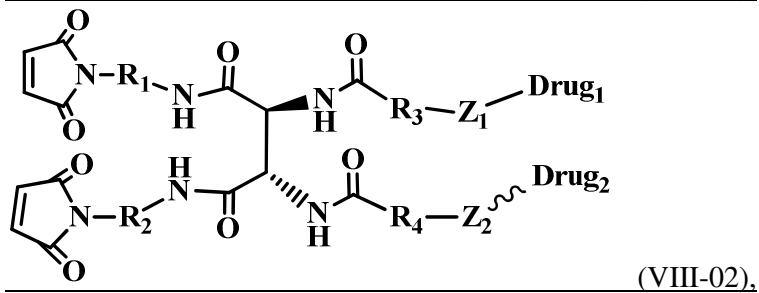
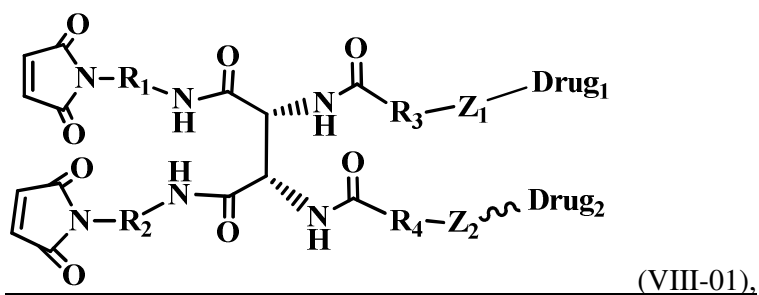


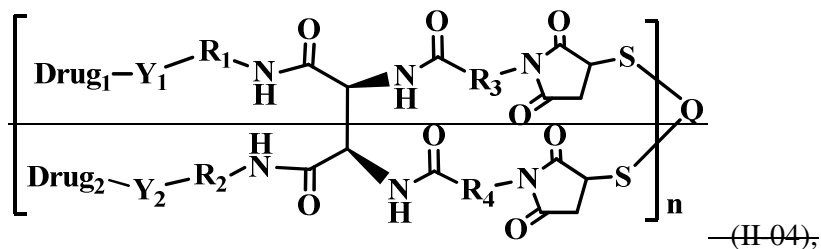
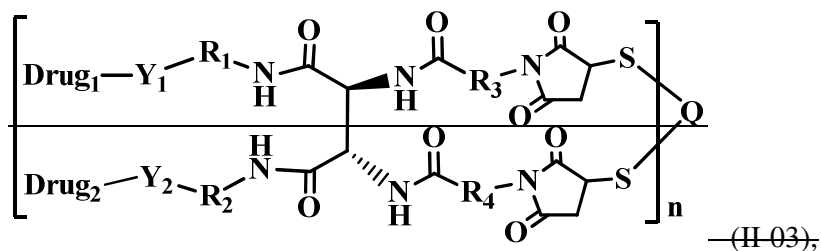
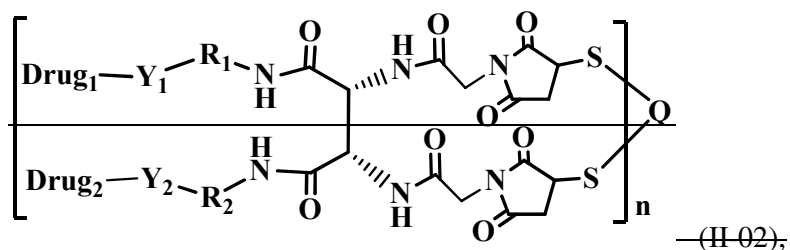
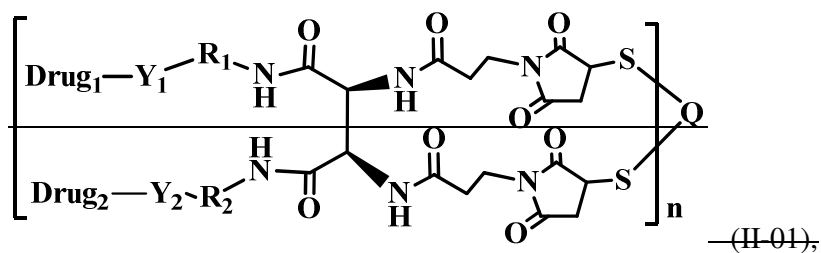
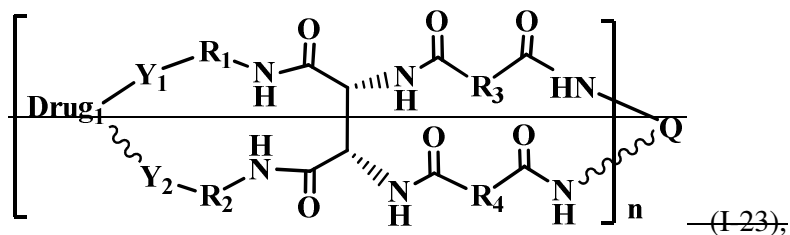
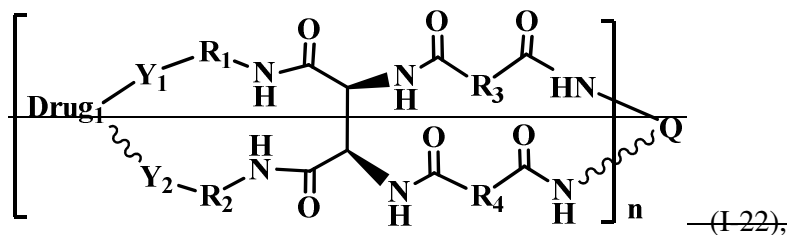


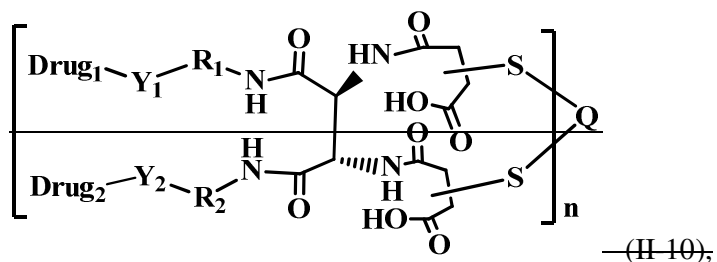
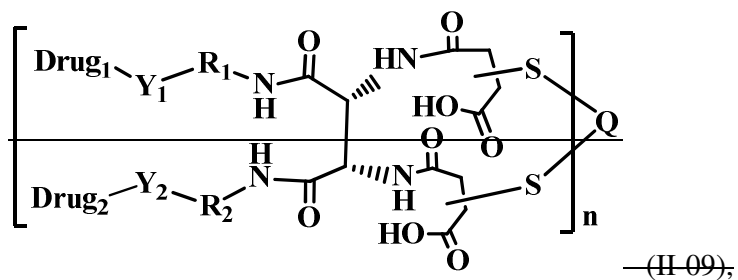
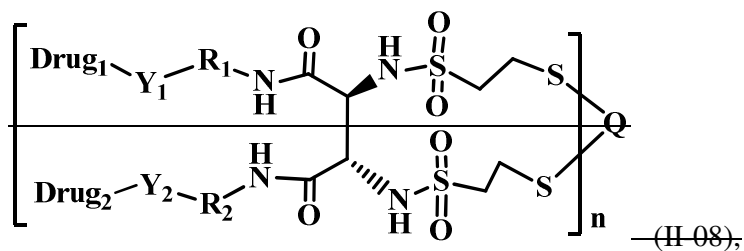
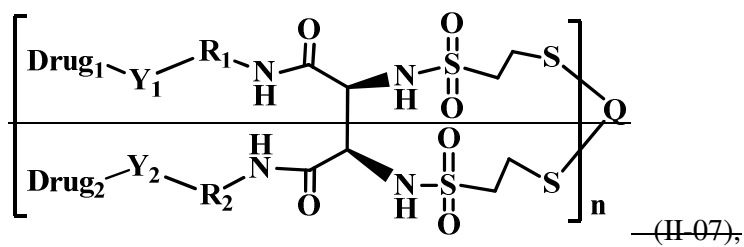
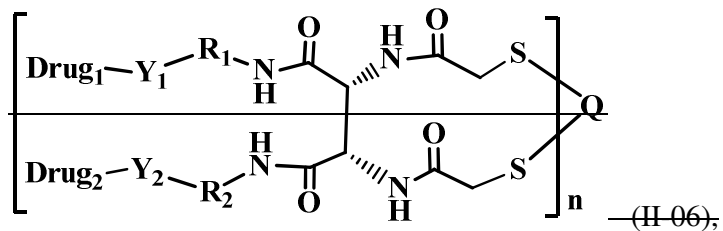
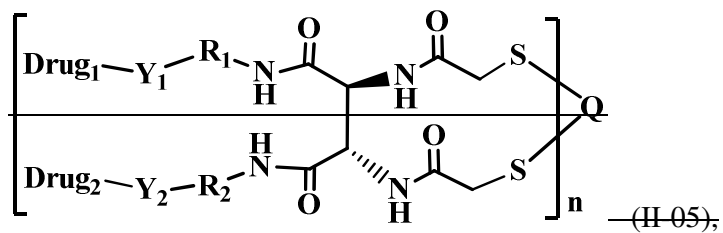
371

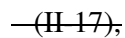
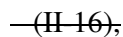
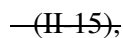
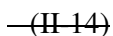
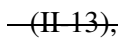
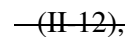
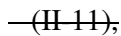


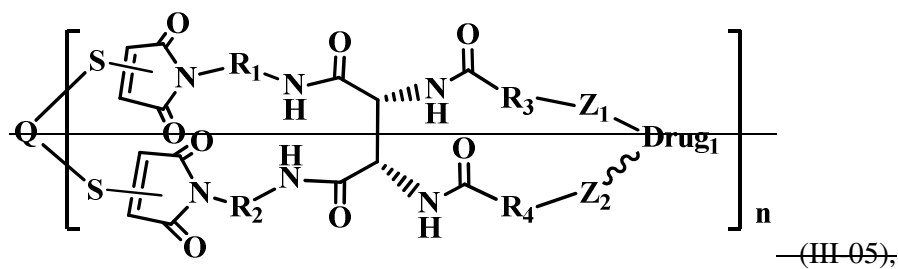
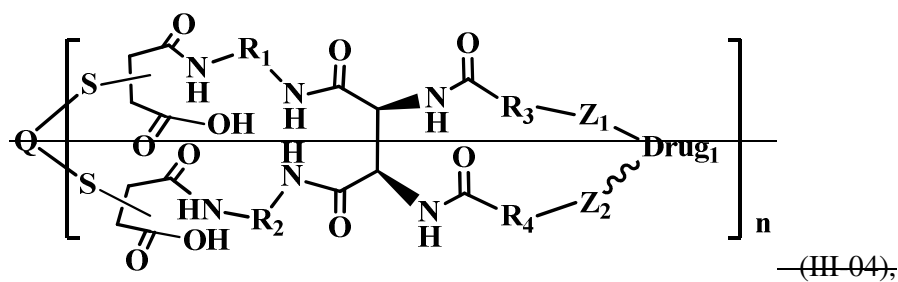
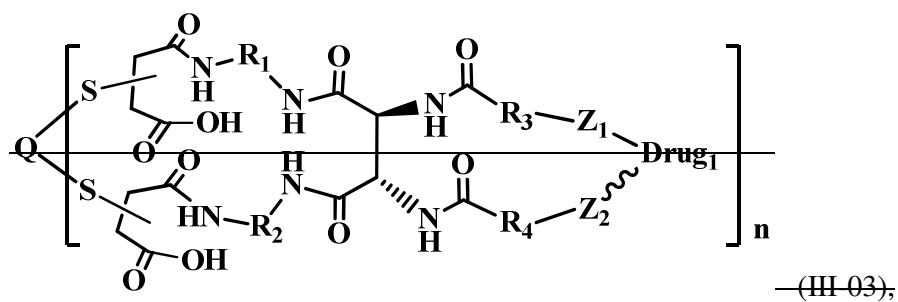
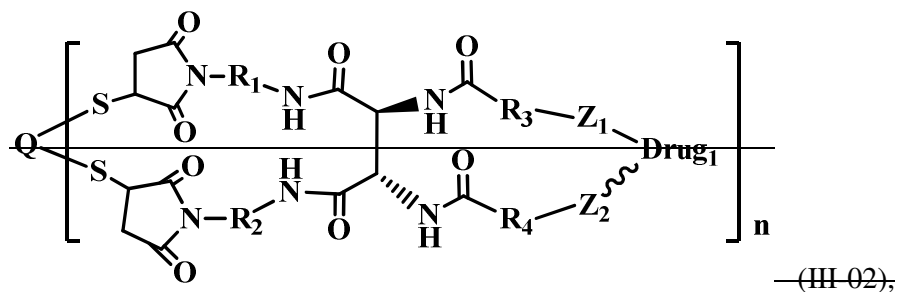
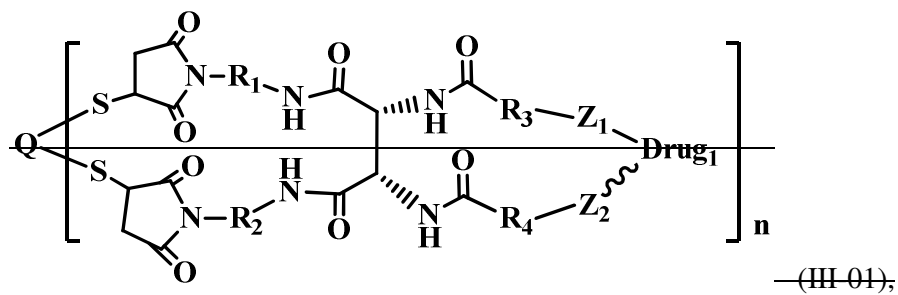
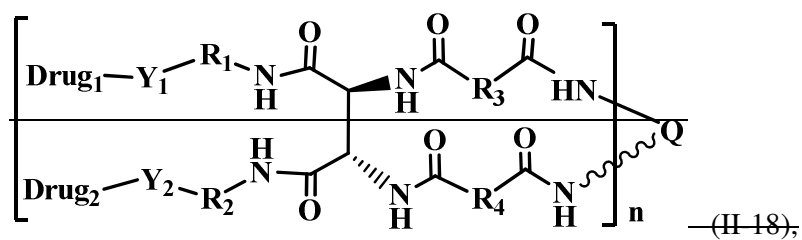


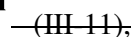
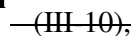
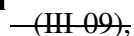
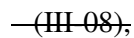
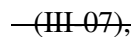
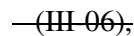


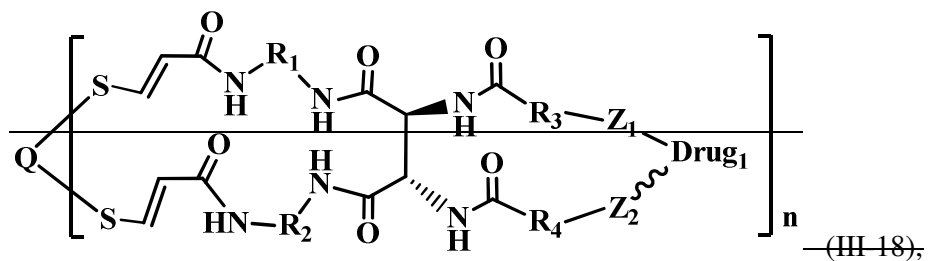
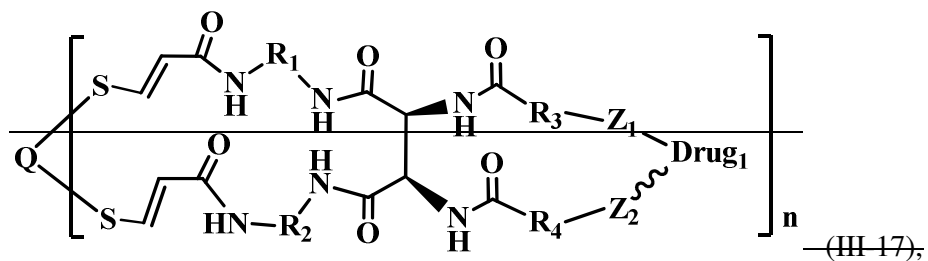
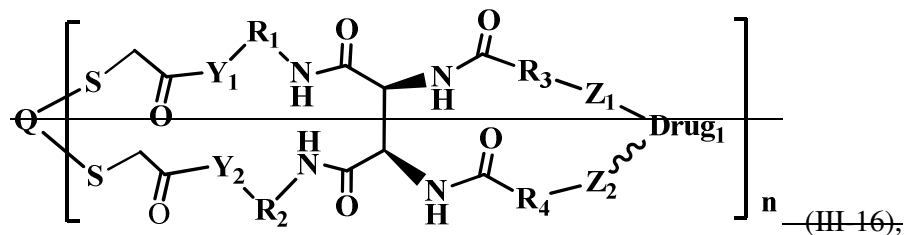
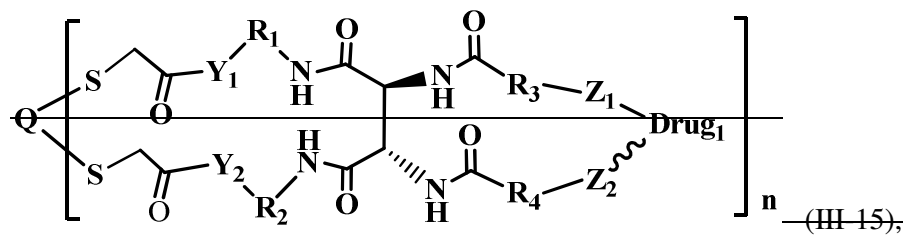
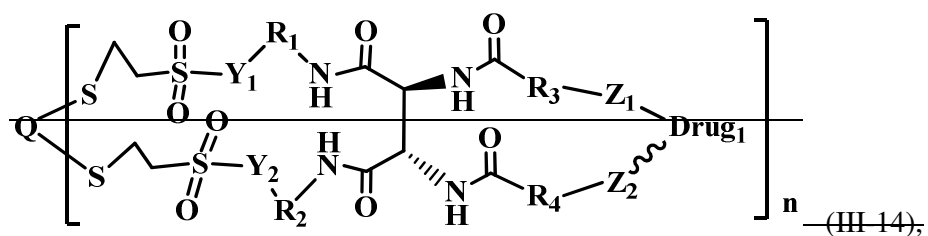
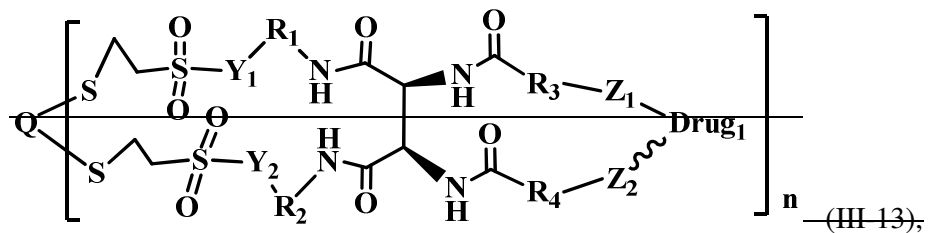
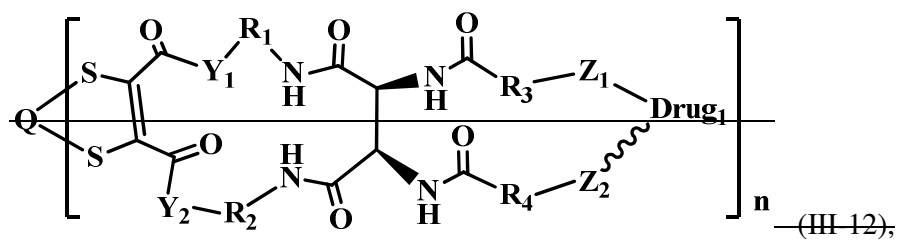


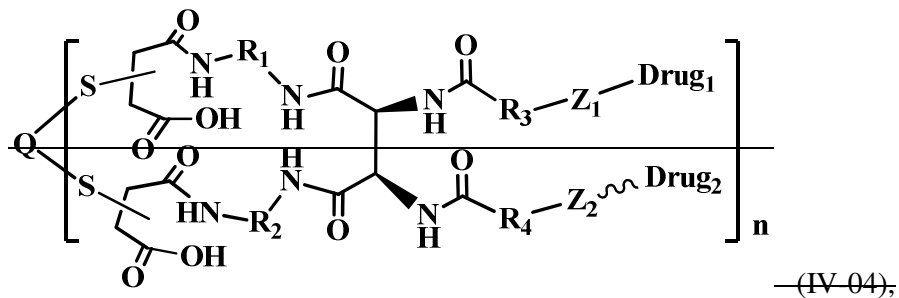
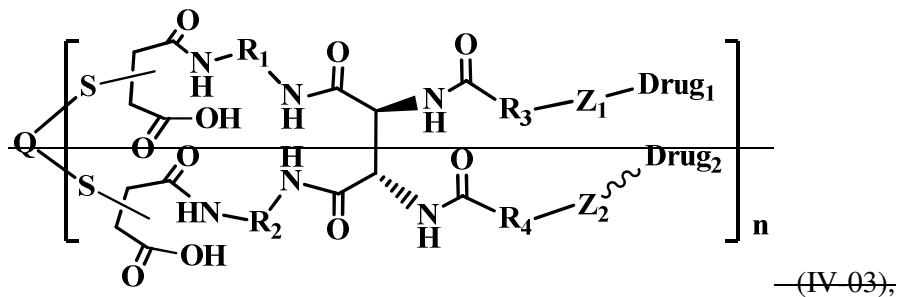
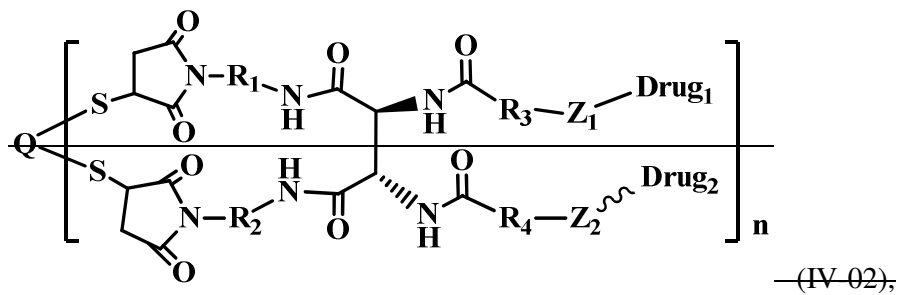
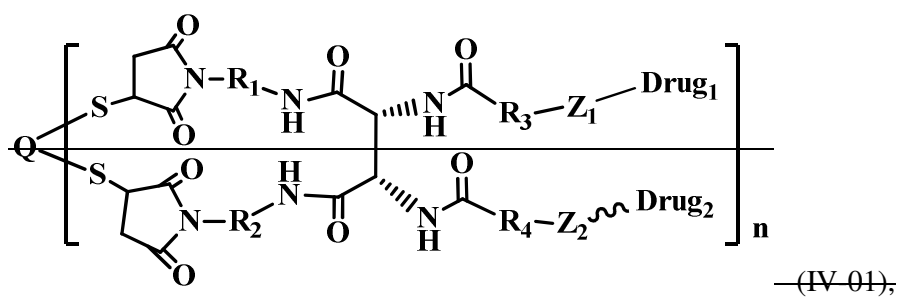
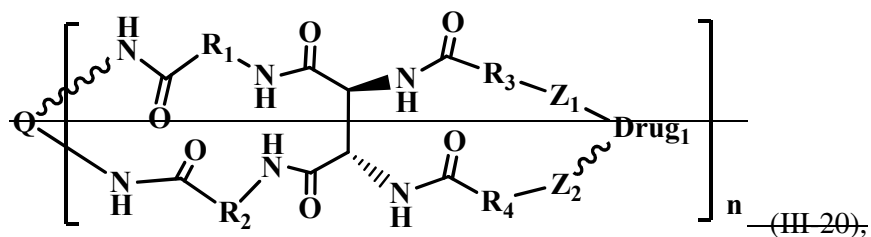
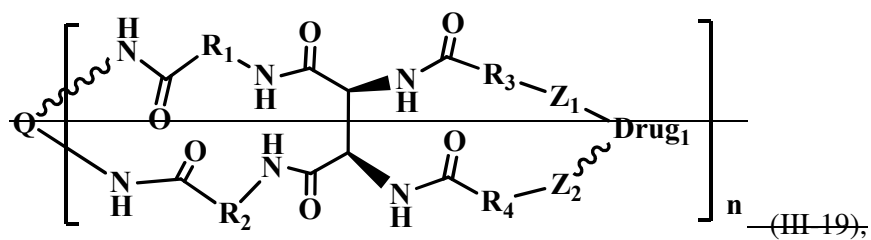


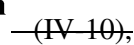
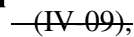
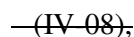
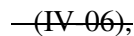
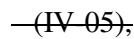


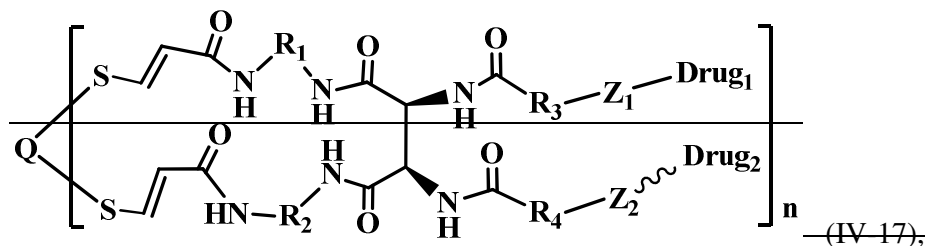
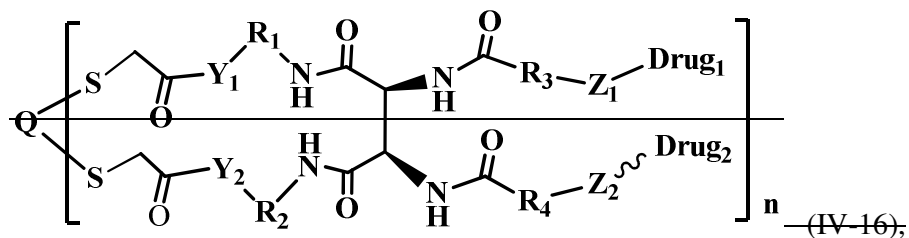
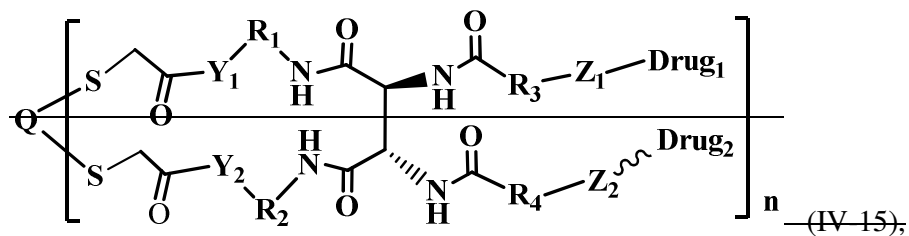
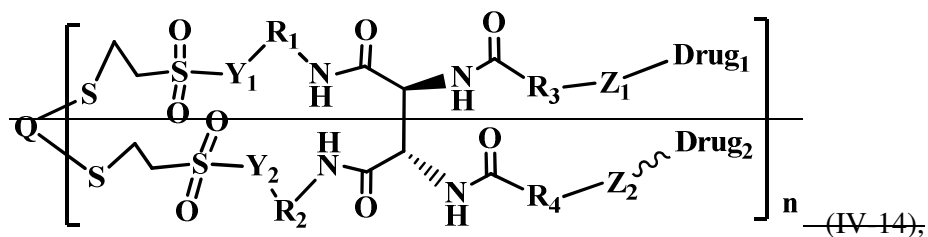
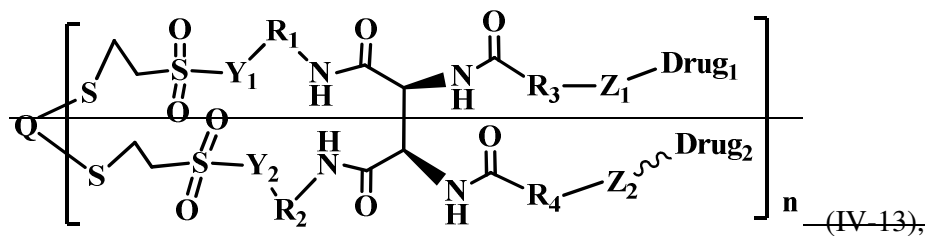
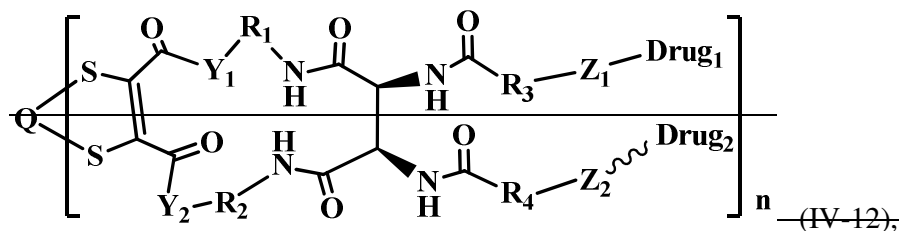
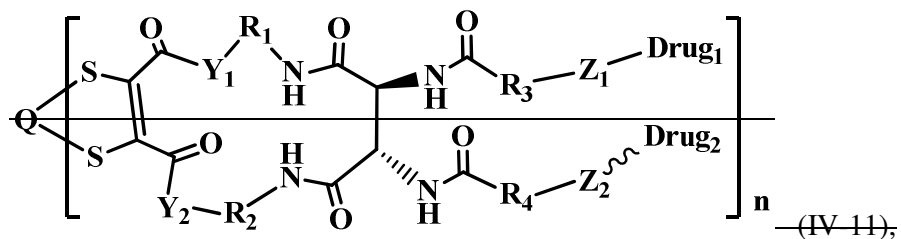


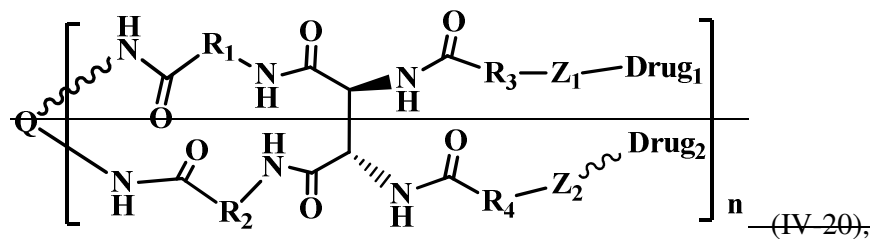
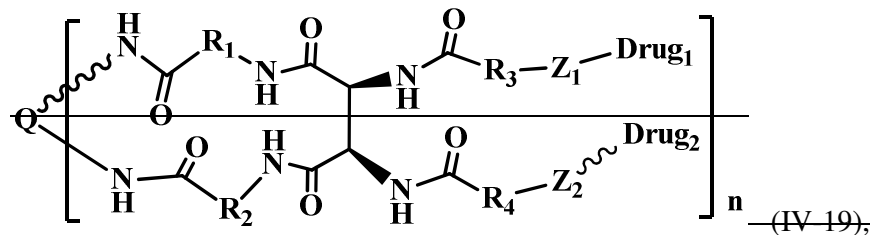
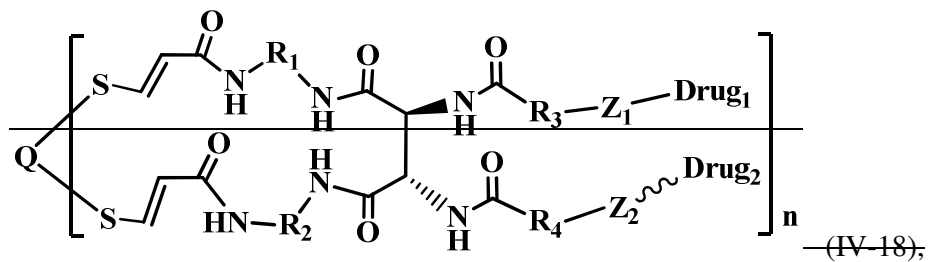






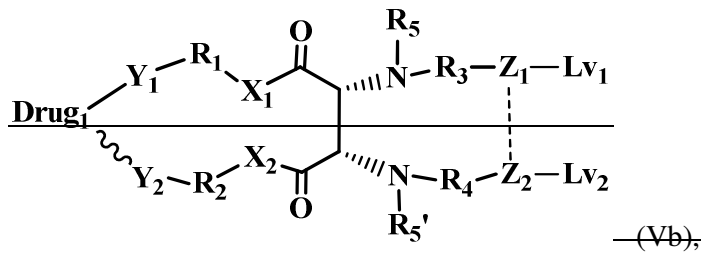
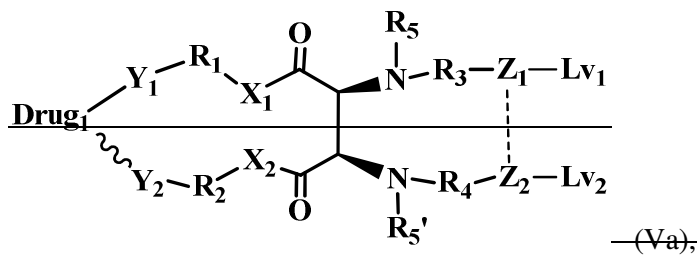


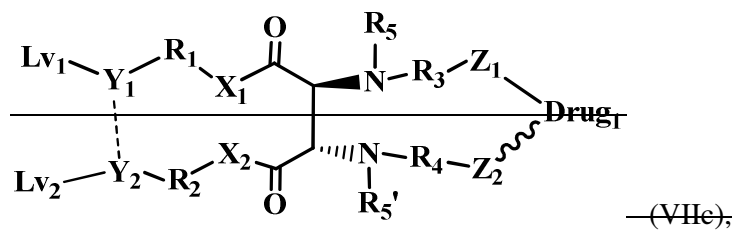
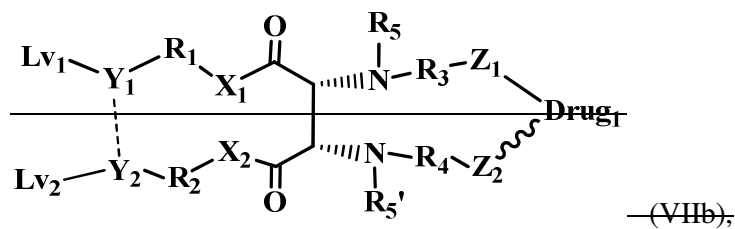
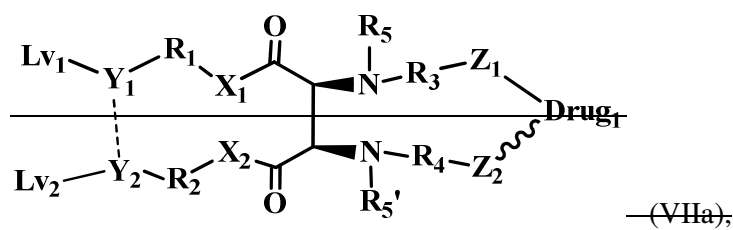
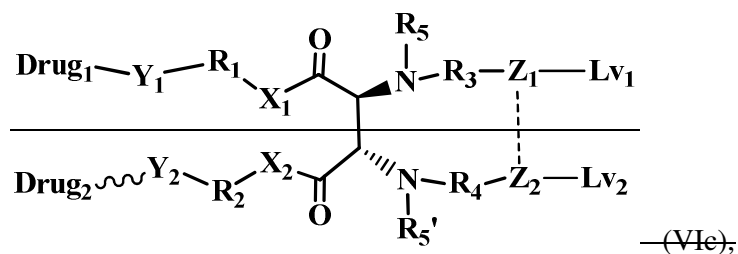
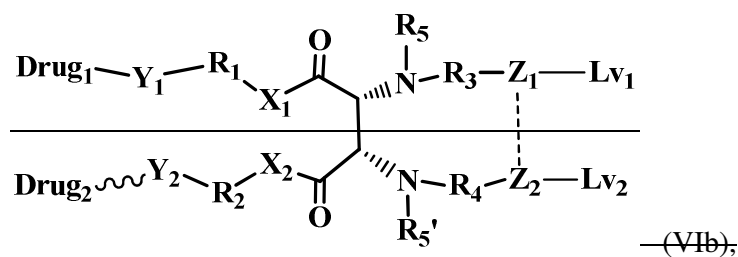
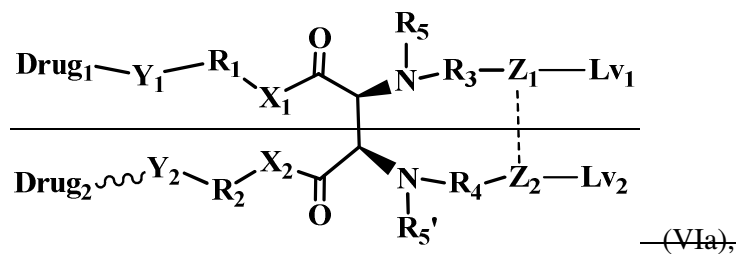
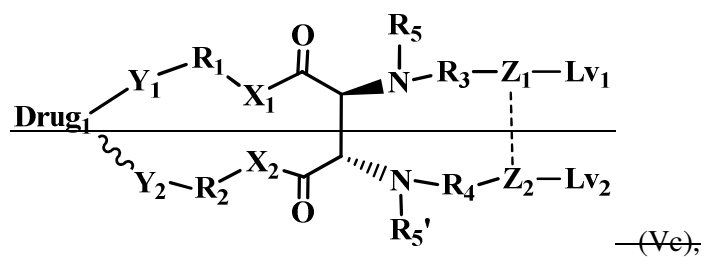


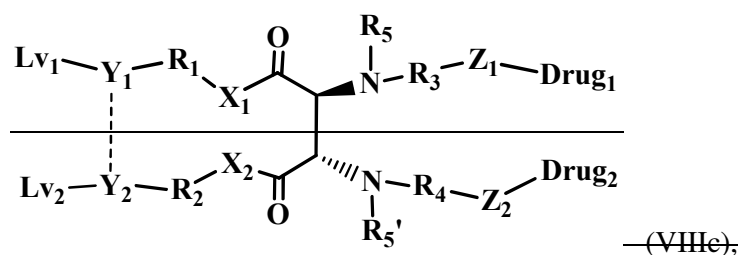
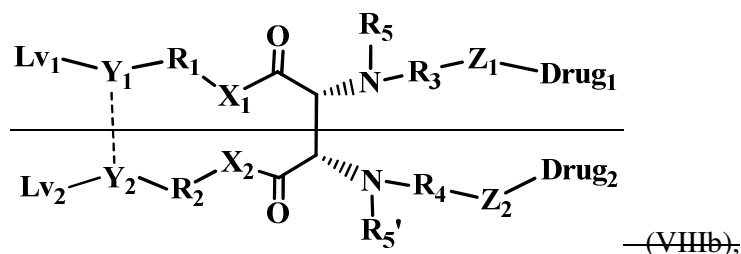
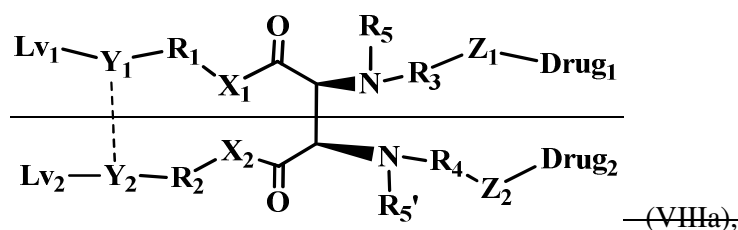


wherein “~~_____~~”, “~~~~~~~~~”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R_{5'}, Z₁, Z₂, Drug₁ and Drug₂ are defined the same above in Claim 1. In addition, one of Drug₁ and Drug₂ can be independently absent but both may not be absent at the same time.

7.	7. The compound of Formula (V), (VI), (VII) or (VIII) of Claim 2 having a structure represented by Formula (Va), (Vb), (Vc), (VIa), (Vib), (Vle), (VIIa), (VIib), (VIIc), (VIIIa), (VIIib) and (VIHic):
----	---

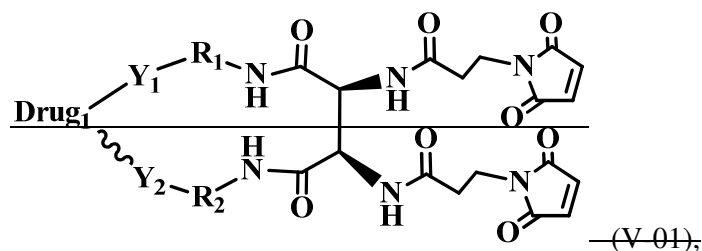


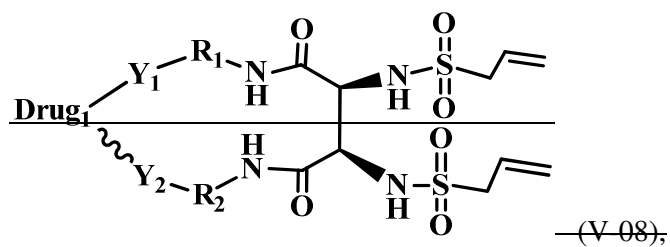
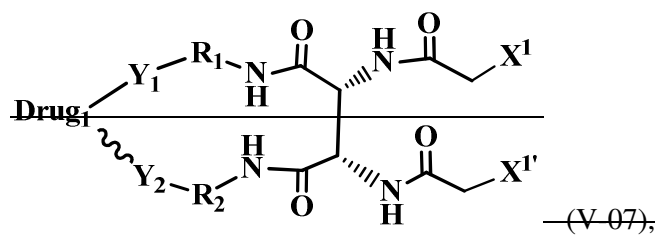
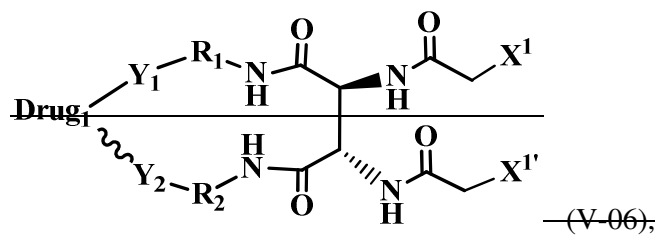
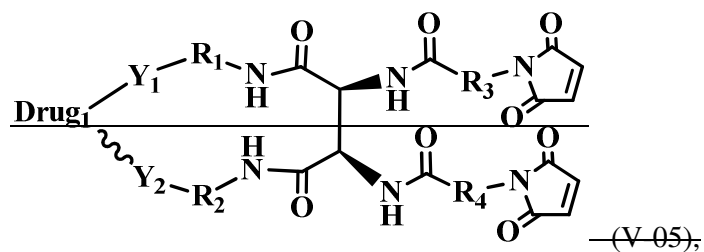
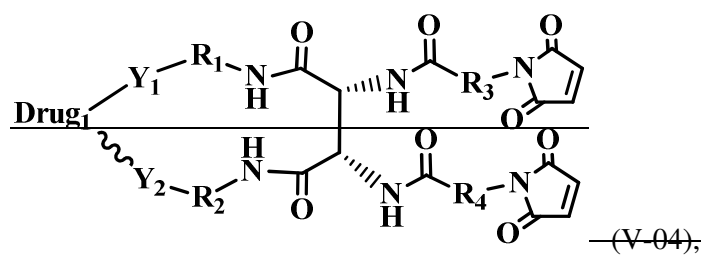
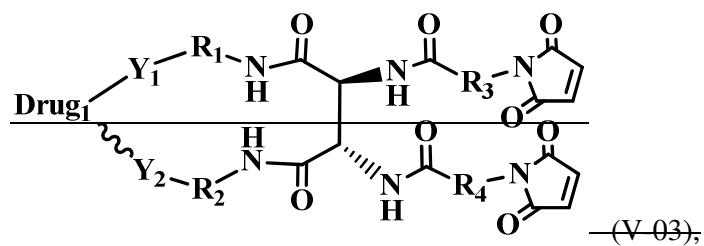
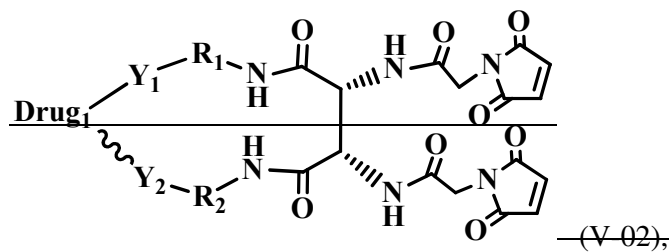


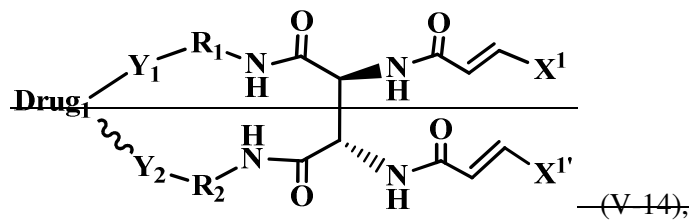
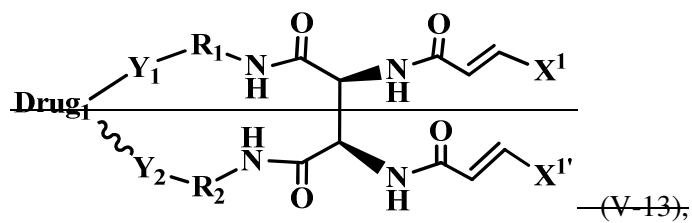
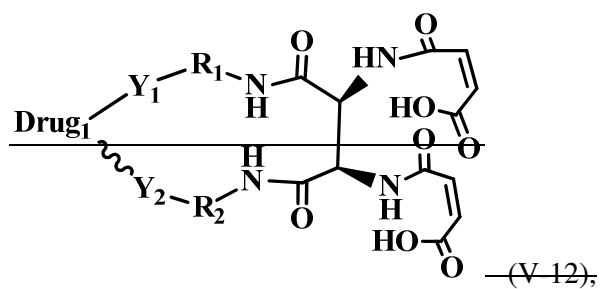
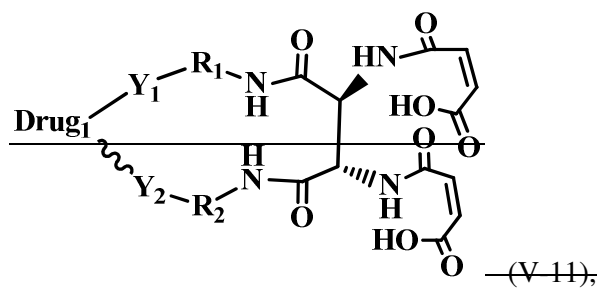
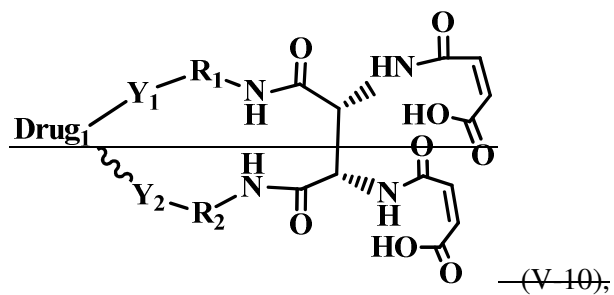
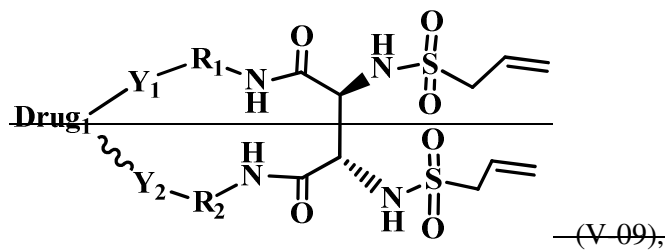


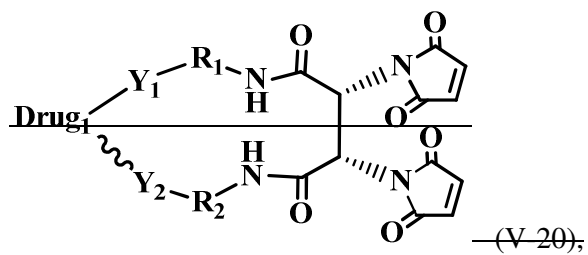
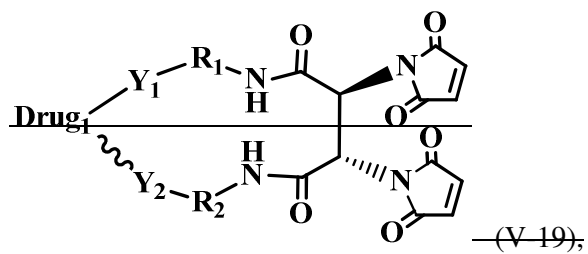
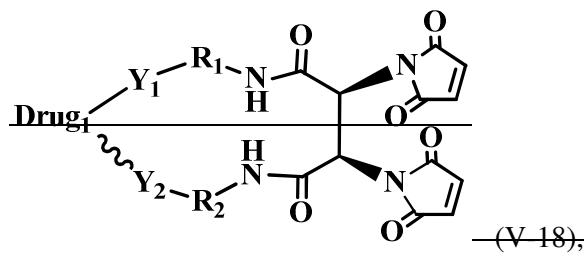
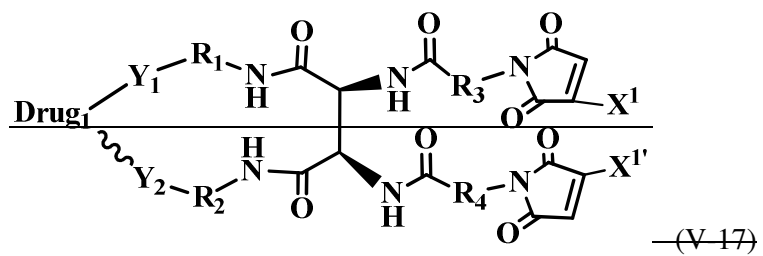
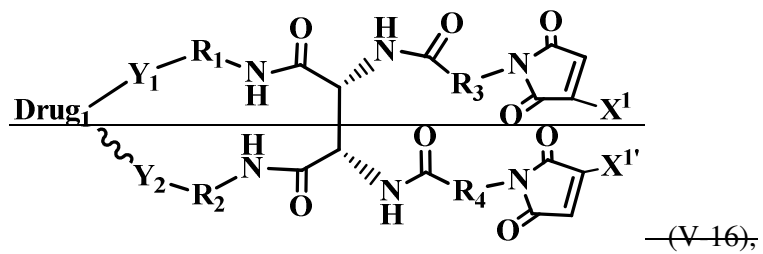
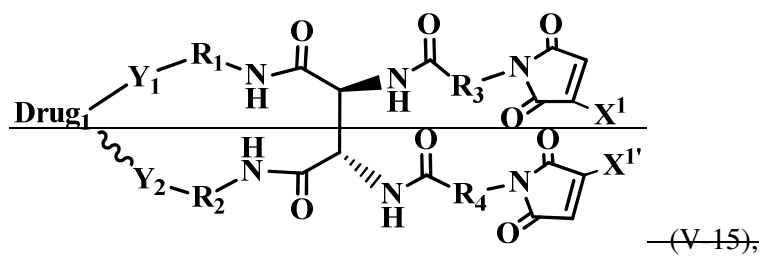
wherein “—”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R₅', Z₁, Z₂, Lv₁, Lv₂, Drug₁ and Drug₂ are defined the same above.

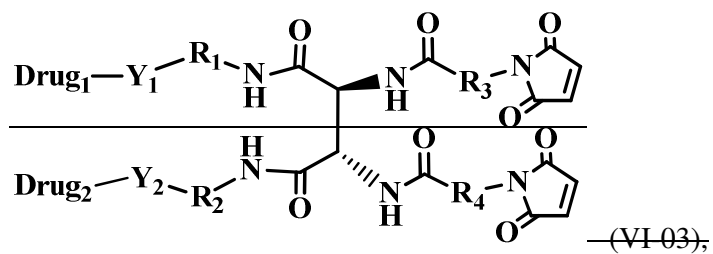
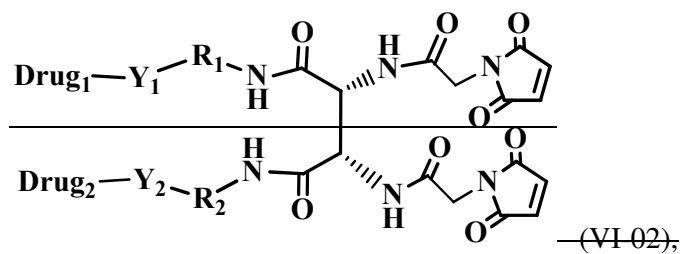
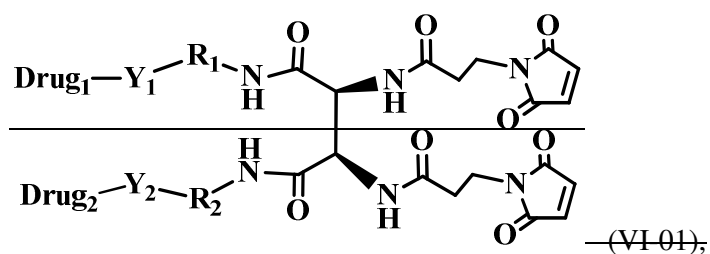
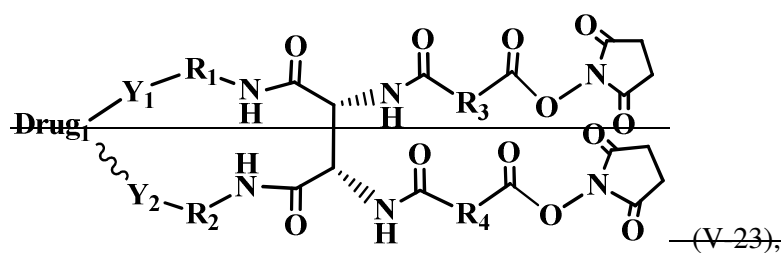
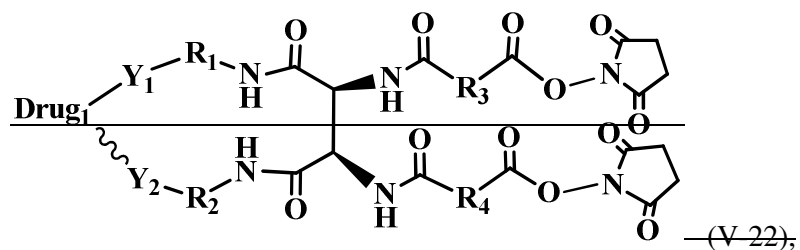
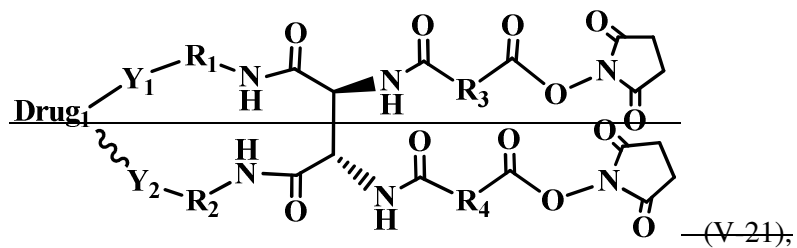
8. The compound of Formula (V), (VI), (VII) or (VIII) of Claim 2 having a structure further represented by Formula (V-01), (V-02), (V-03), (V-04), (V-05), (V-06), (V-07), (V-08), (V-09), (V-10), (V-11), (V-12), (V-13), (V-14), (V-15), (V-16), (V-17), (V-18), (V-19), (V-20), (V-21), (V-22), (V-23), (VI-01), (VI-02), (VI-03), (VI-04), (VI-05), (VI-06), (VI-07), (VI-08), (VI-09), (VI-10), (VI-11), (VI-12), (VI-13), (VI-14), (VI-15), (VI-16), (VI-17), (VI-18), (VII-01), (VII-02), (VII-03), (VII-04), (VII-05), (VII-06), (VII-07), (VII-08), (VII-09), (VII-10), (VII-11), (VII-12), (VII-13), (VII-14), (VII-15), (VII-16), (VII-17), (VII-18), (VII-19), (VII-20), (VIII-01), (VIII-02), (VIII-03), (VIII-04), (VIII-05), (VIII-06), (VIII-07), (VIII-08), (VIII-09), (VIII-10), (VIII-11), (VIII-12), (VIII-13), (VIII-14), (VIII-15), (VIII-16), (VIII-17), (VIII-18), (VIII-19), and (VIII-20) below:

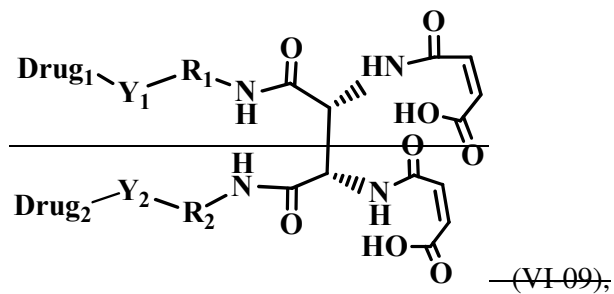
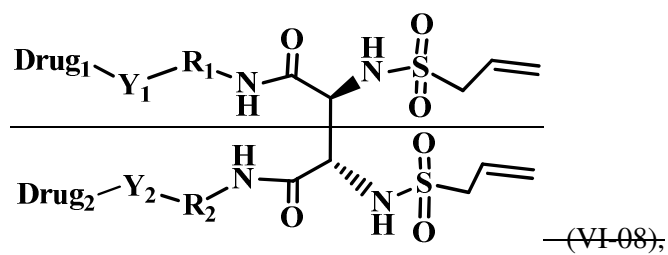
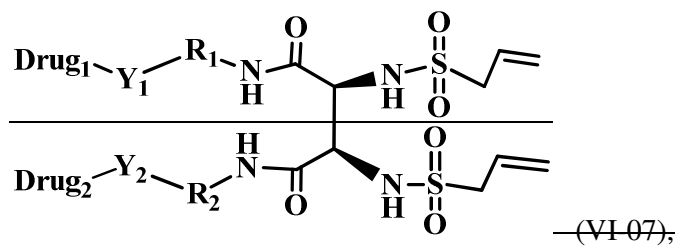
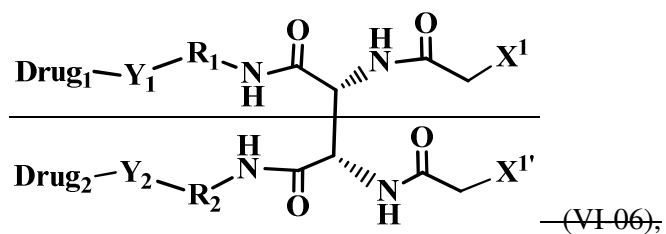
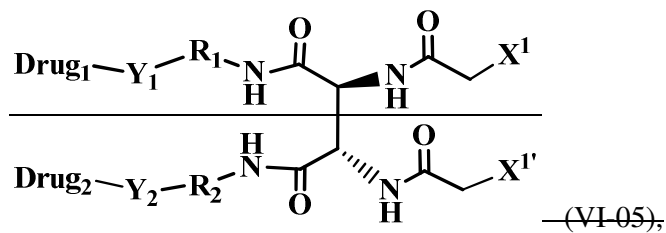
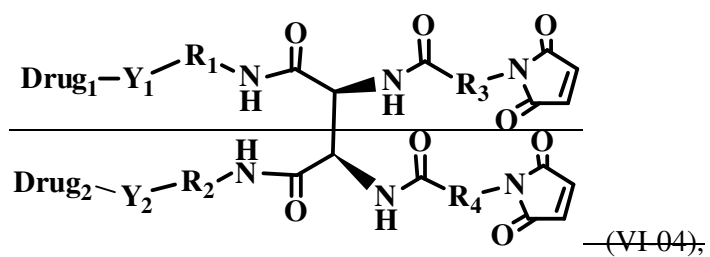


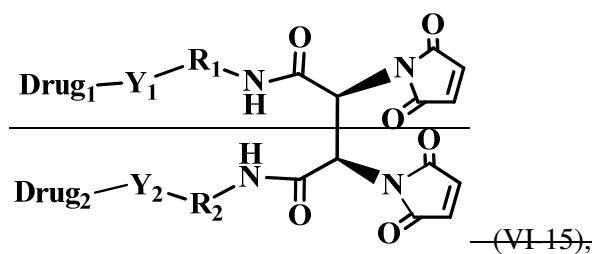
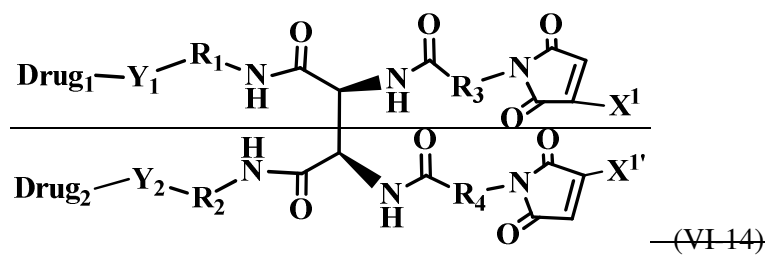
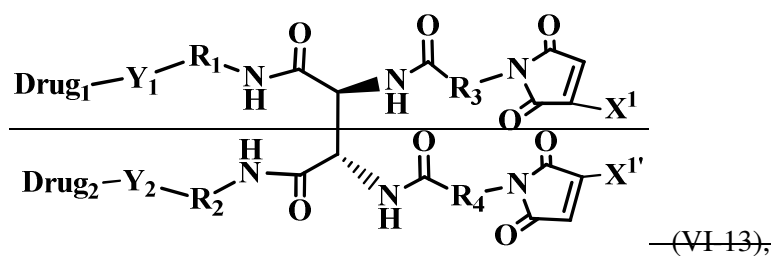
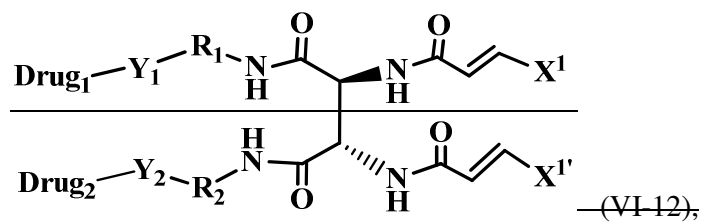
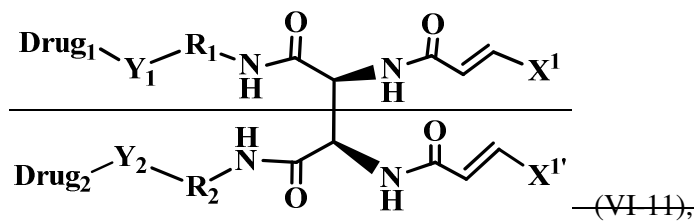
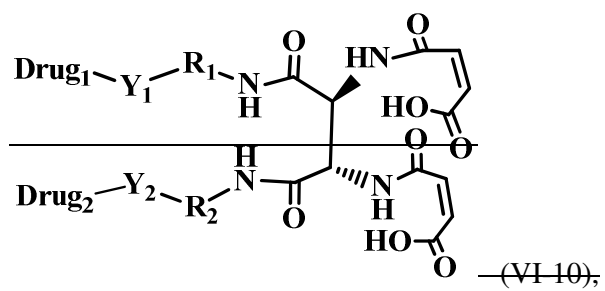


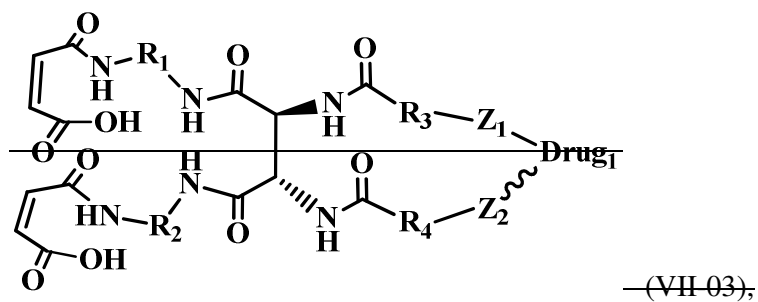
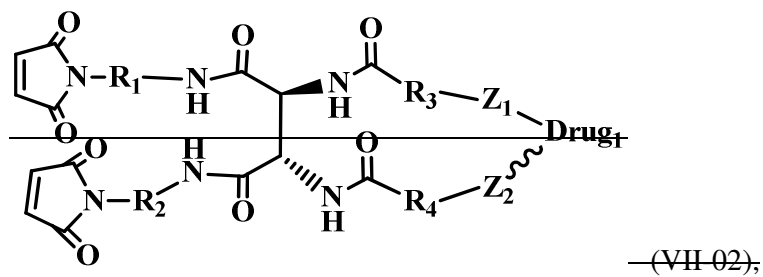
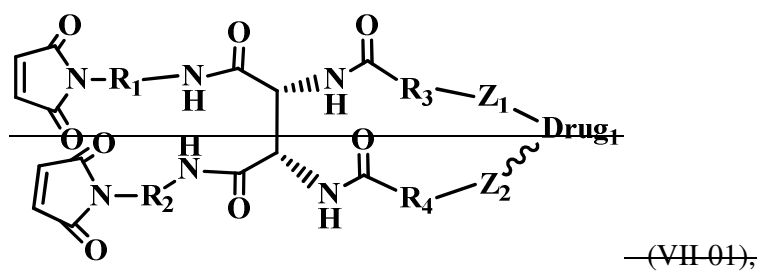
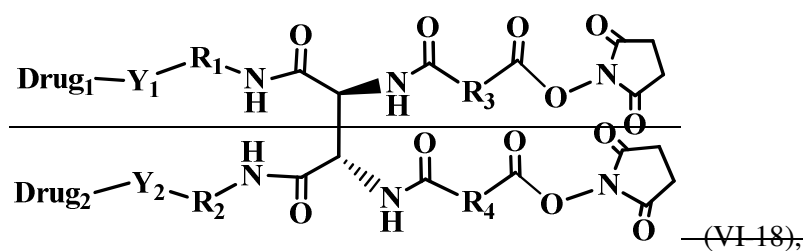
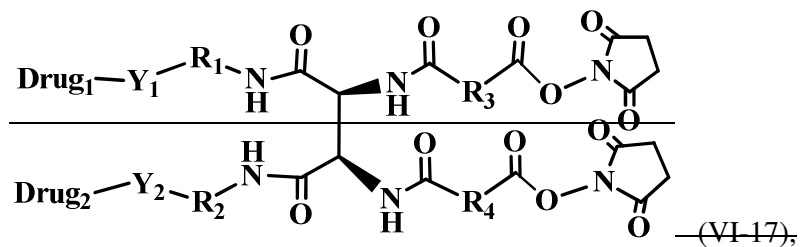
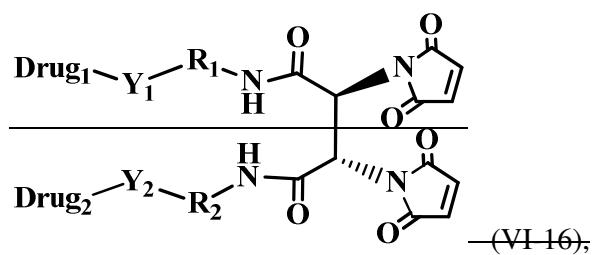


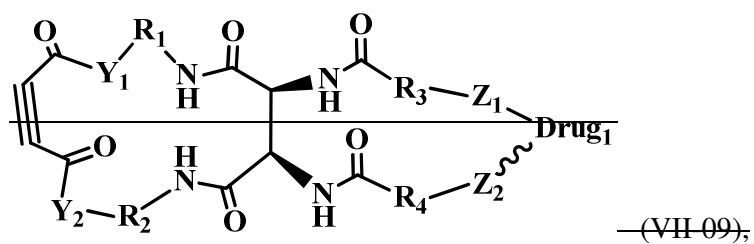
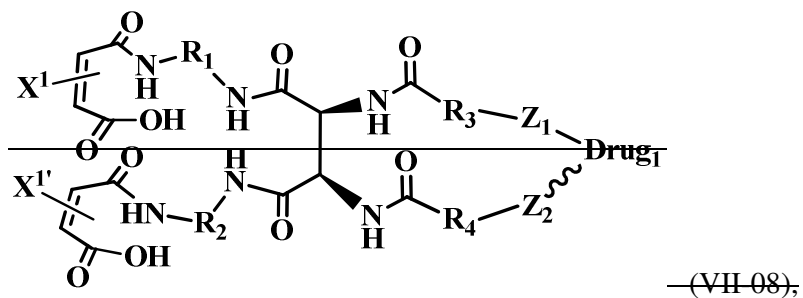
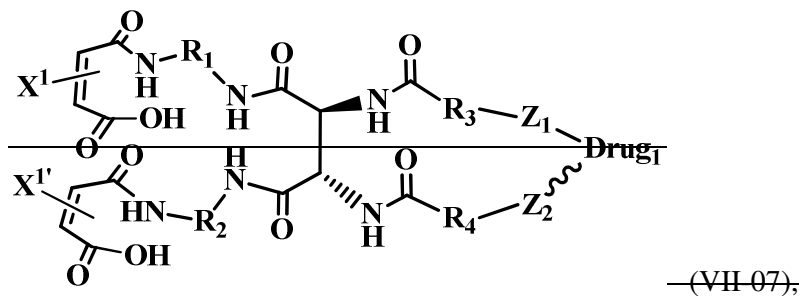
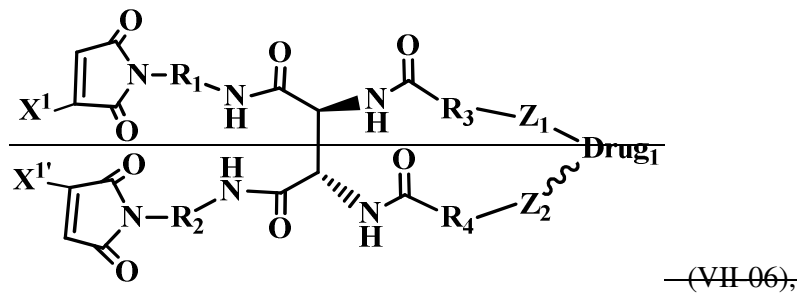
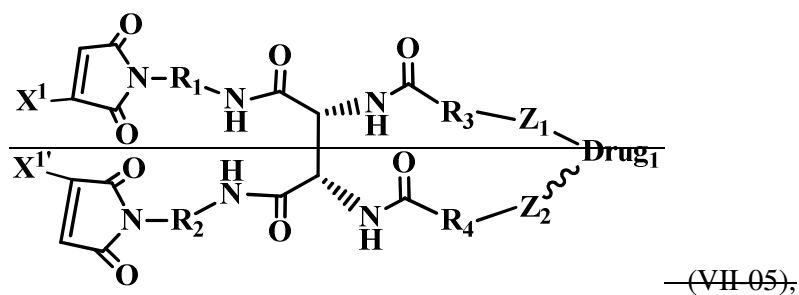
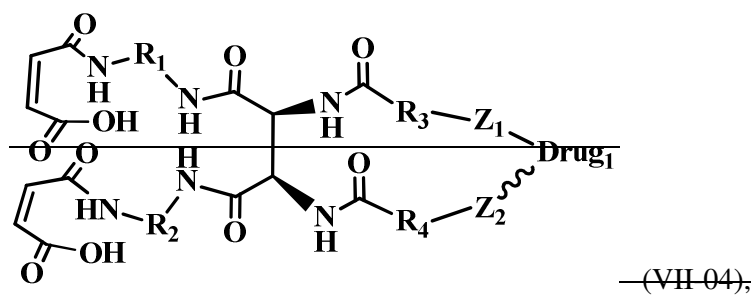


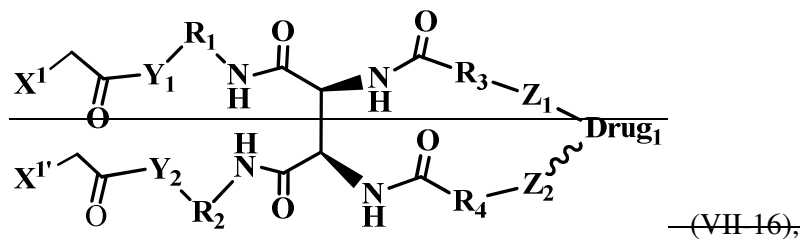
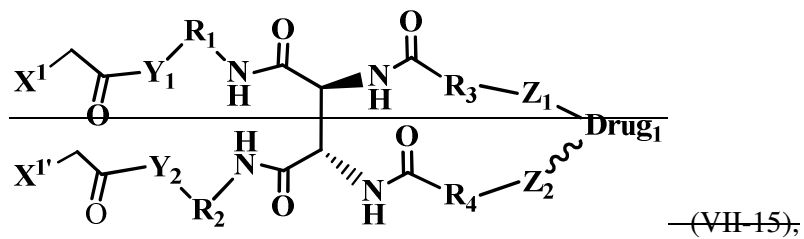
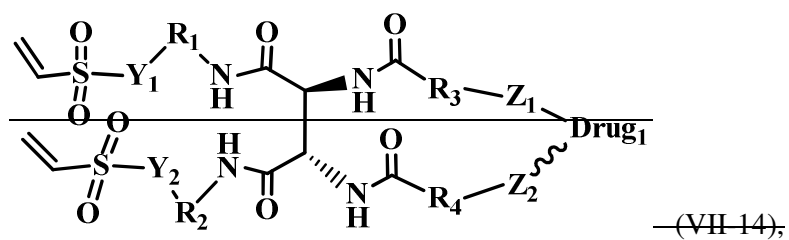
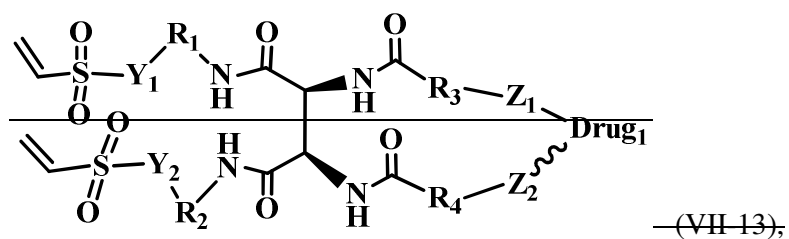
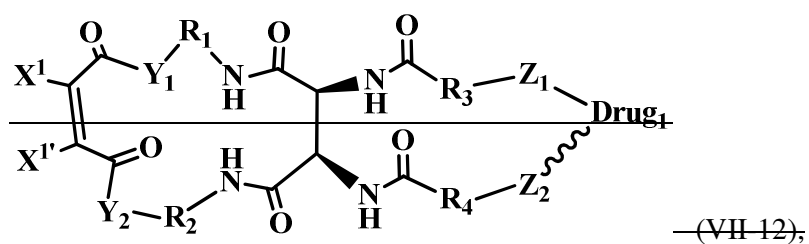
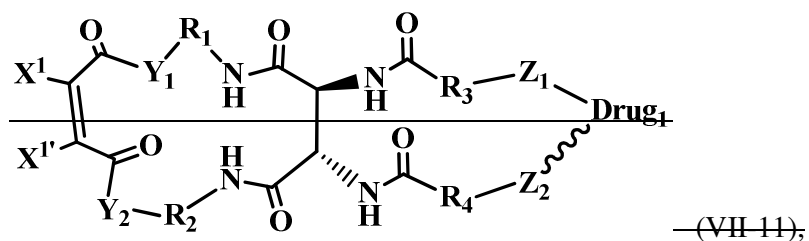
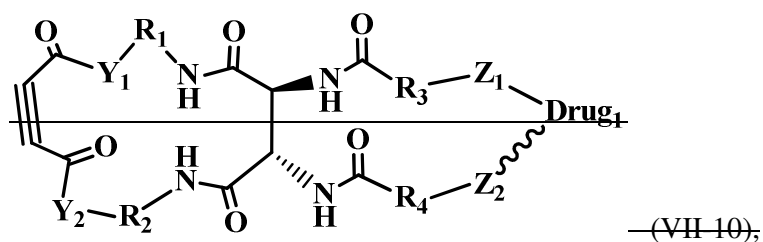


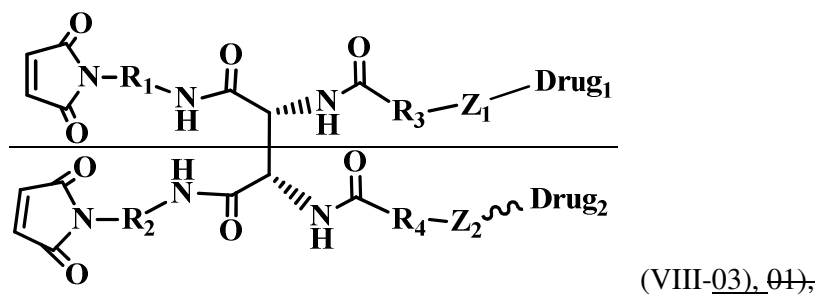
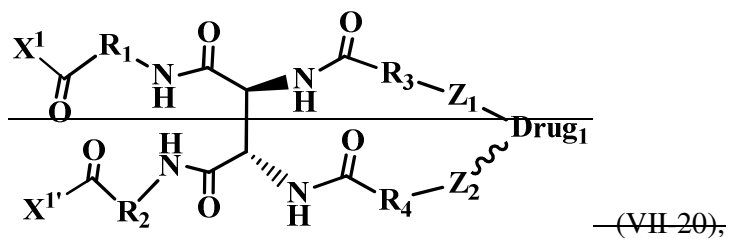
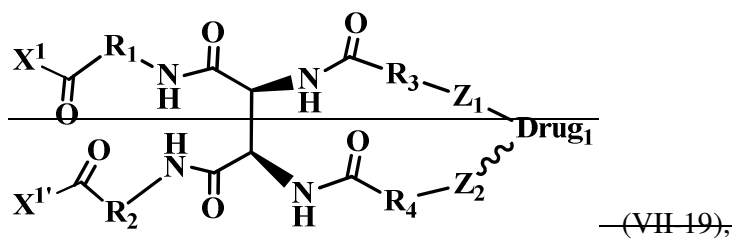
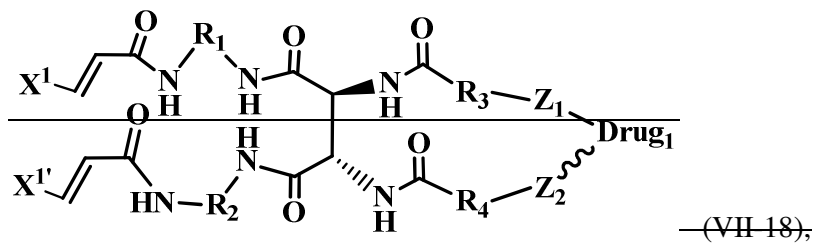
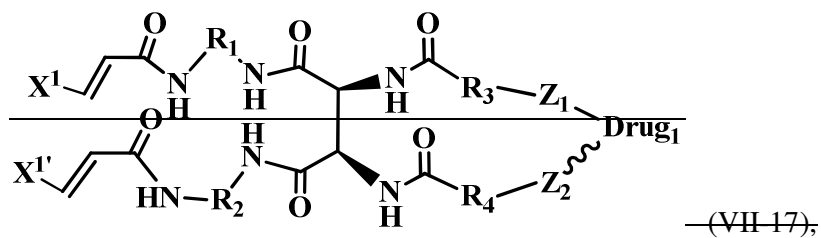


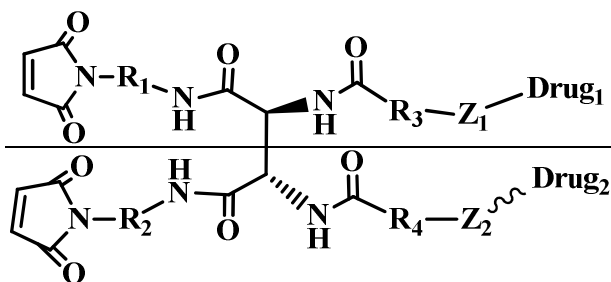
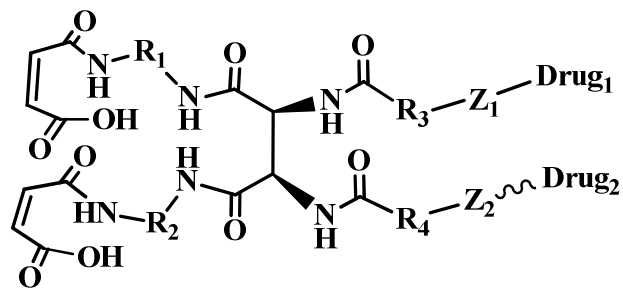




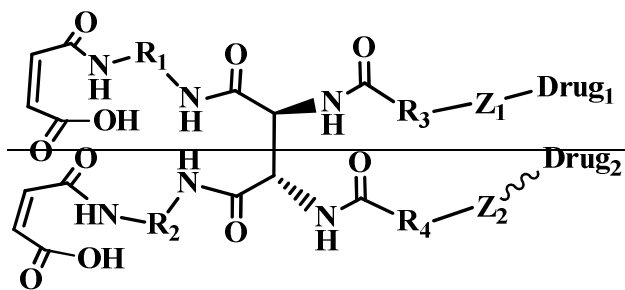
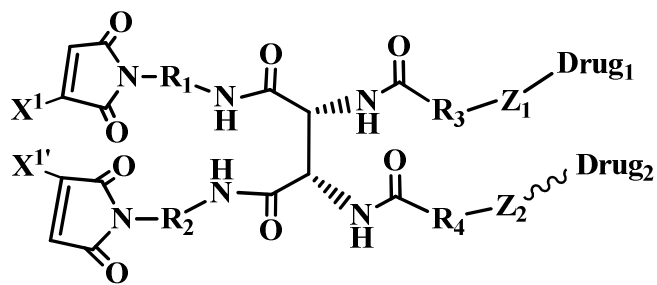




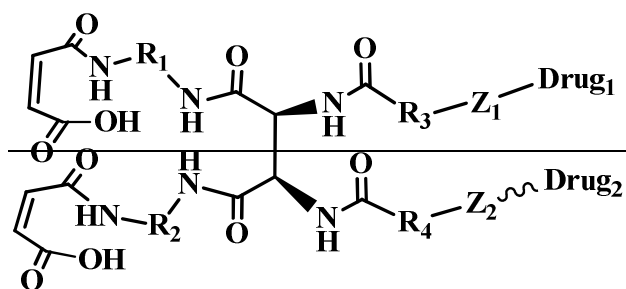
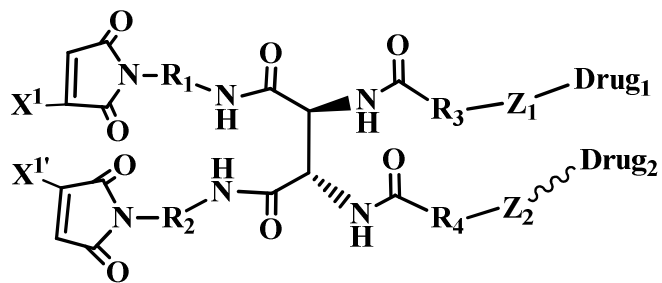




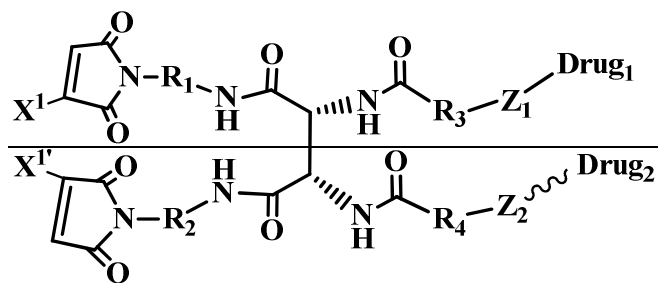
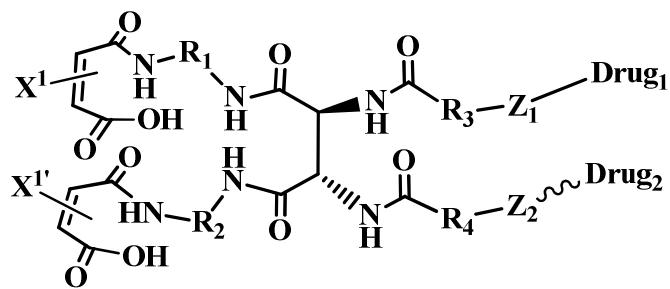
(VIII-04), 02);



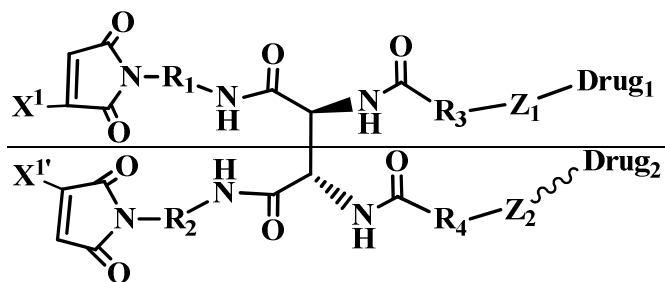
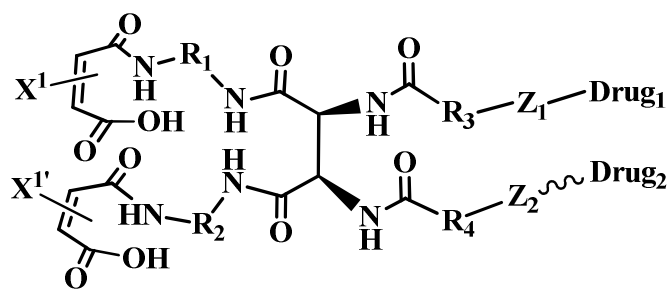
(VIII-05), 03);



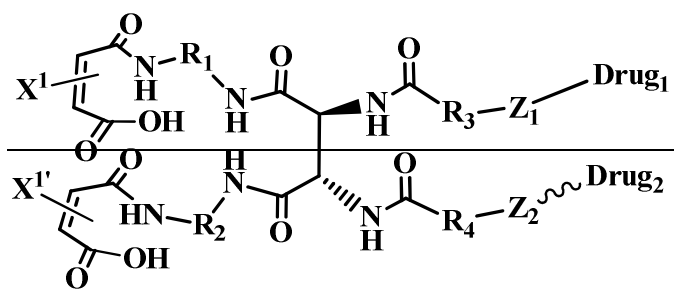
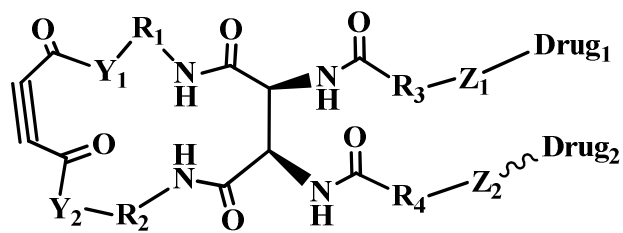
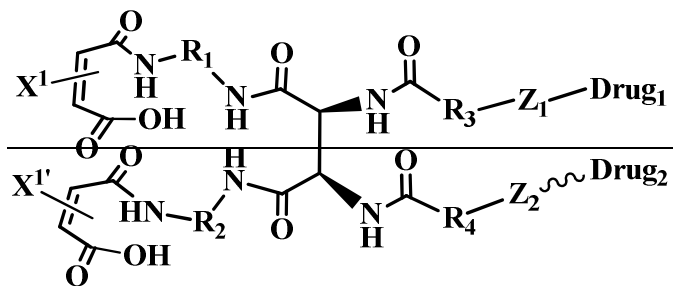
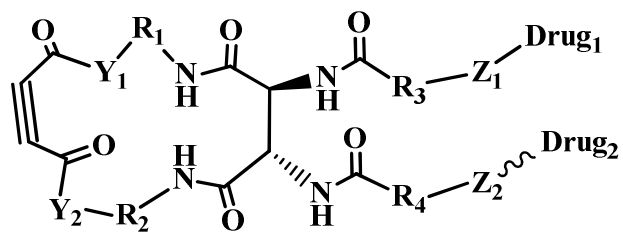
(VIII-06), 04);

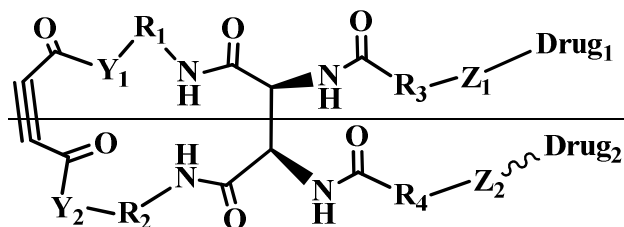
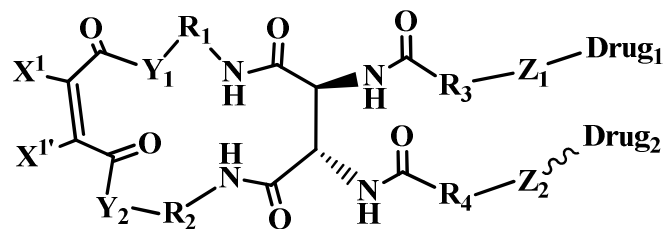


(VIII-07), 05);

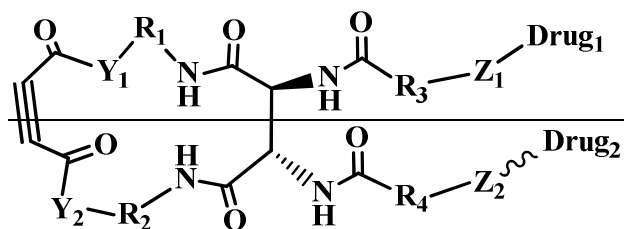
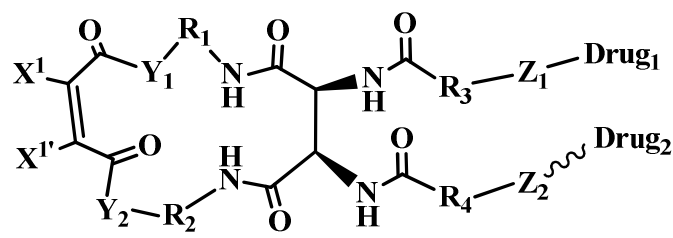


(VIII-08), 06),

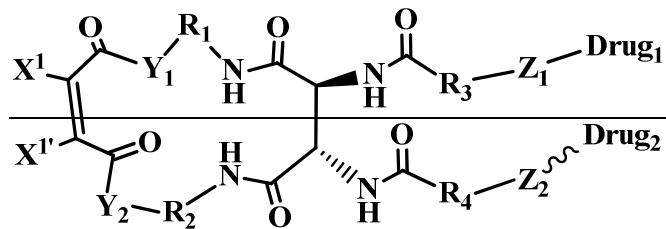
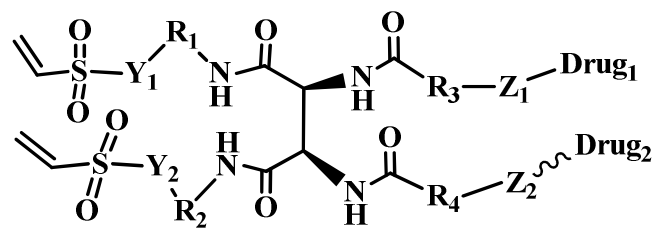
(VIII-09), 07),(VIII-10), ~~08~~),



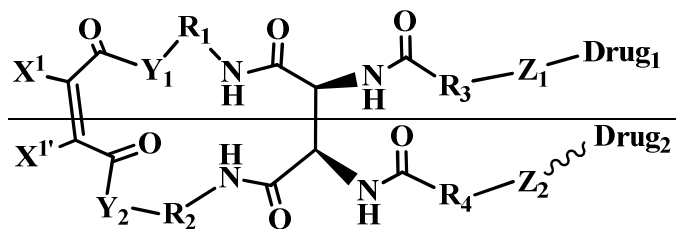
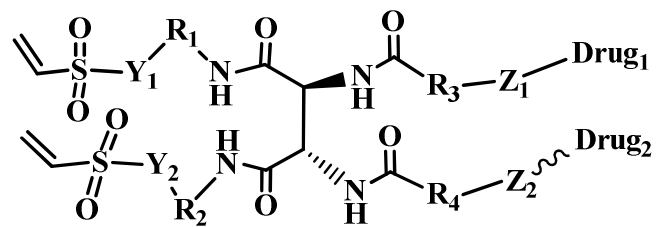
(VIII-11), 99,



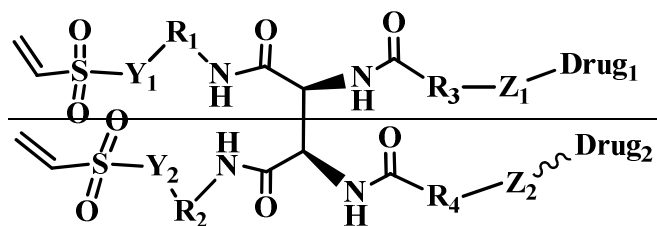
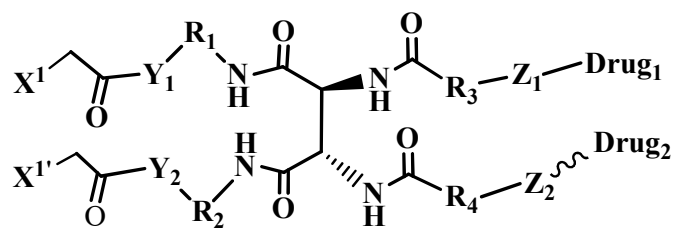
(VIII-12), 40,



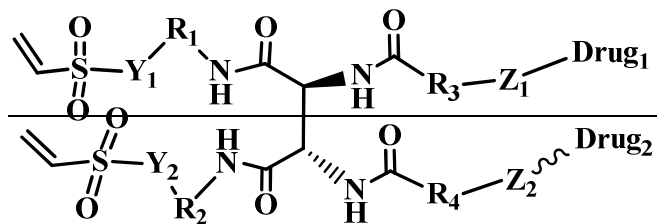
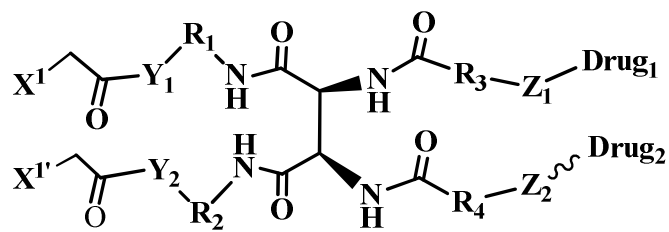
(VIII-13), 44,



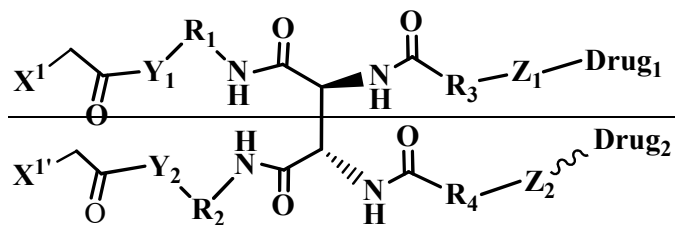
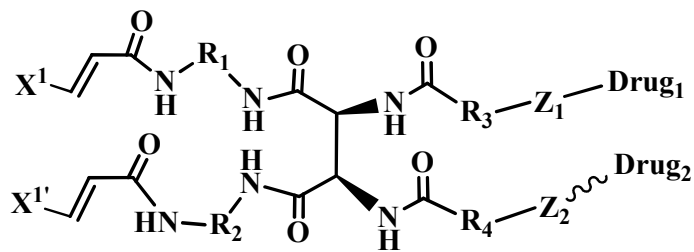
(VIII-1412),



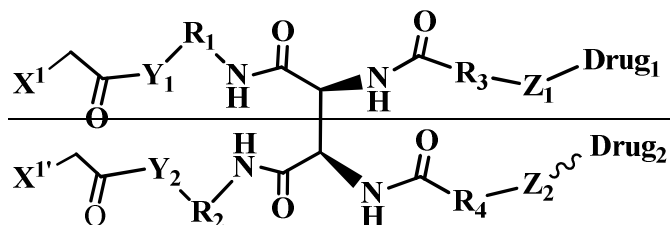
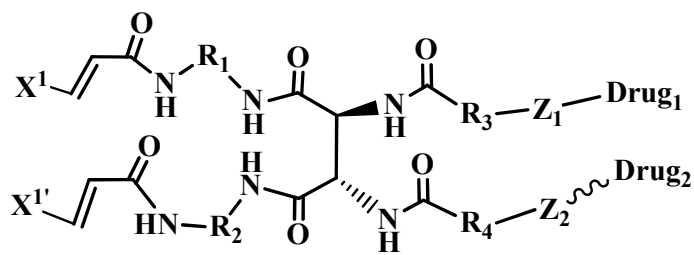
(VIII-1543),



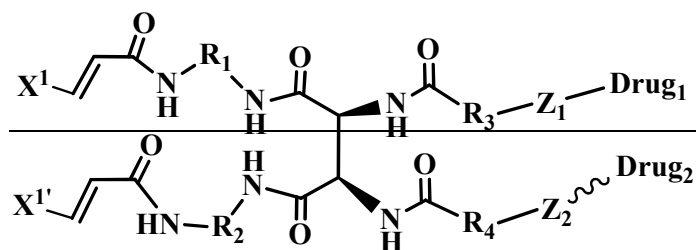
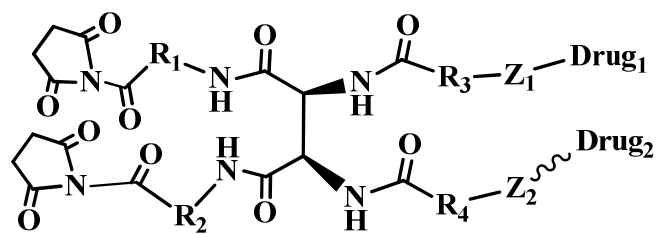
(VIII-1644),



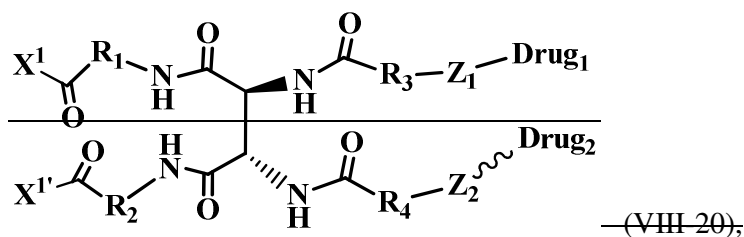
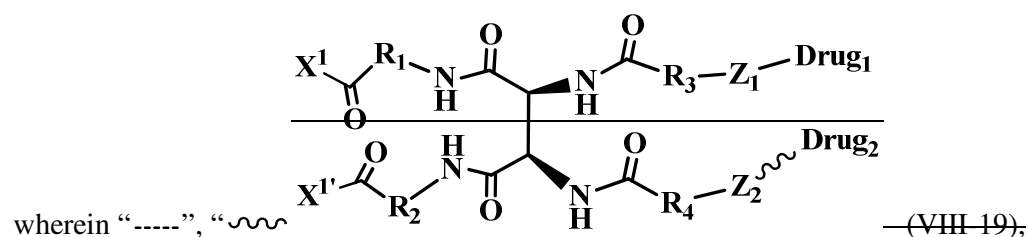
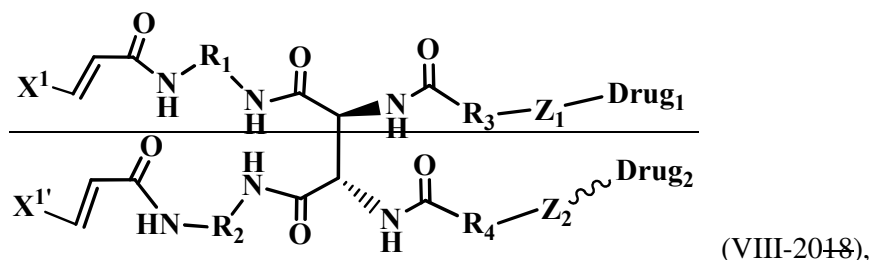
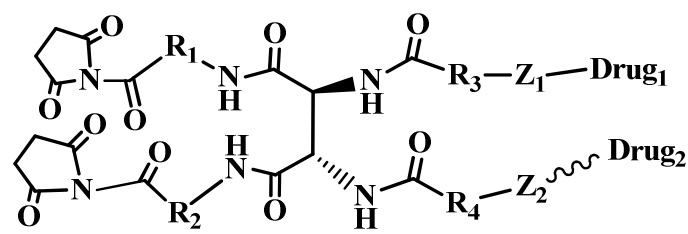
(VIII-1745),



(VIII-1846),



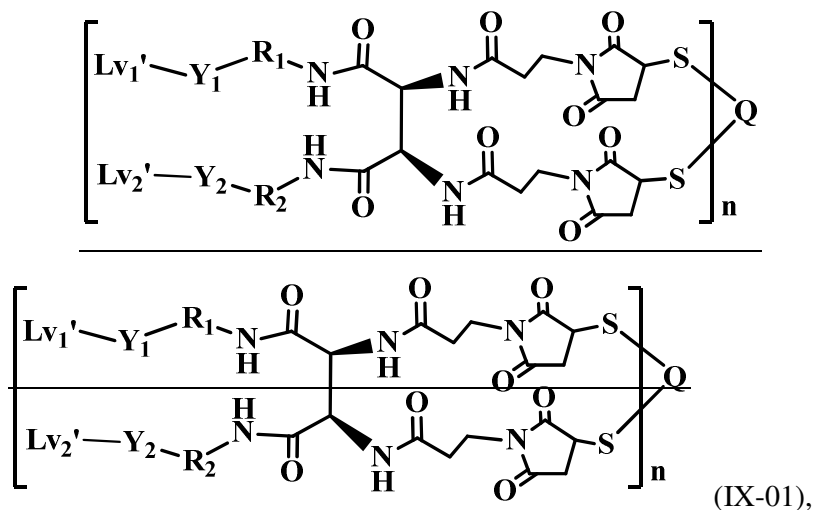
(VIII-1947),

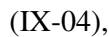
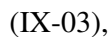
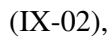


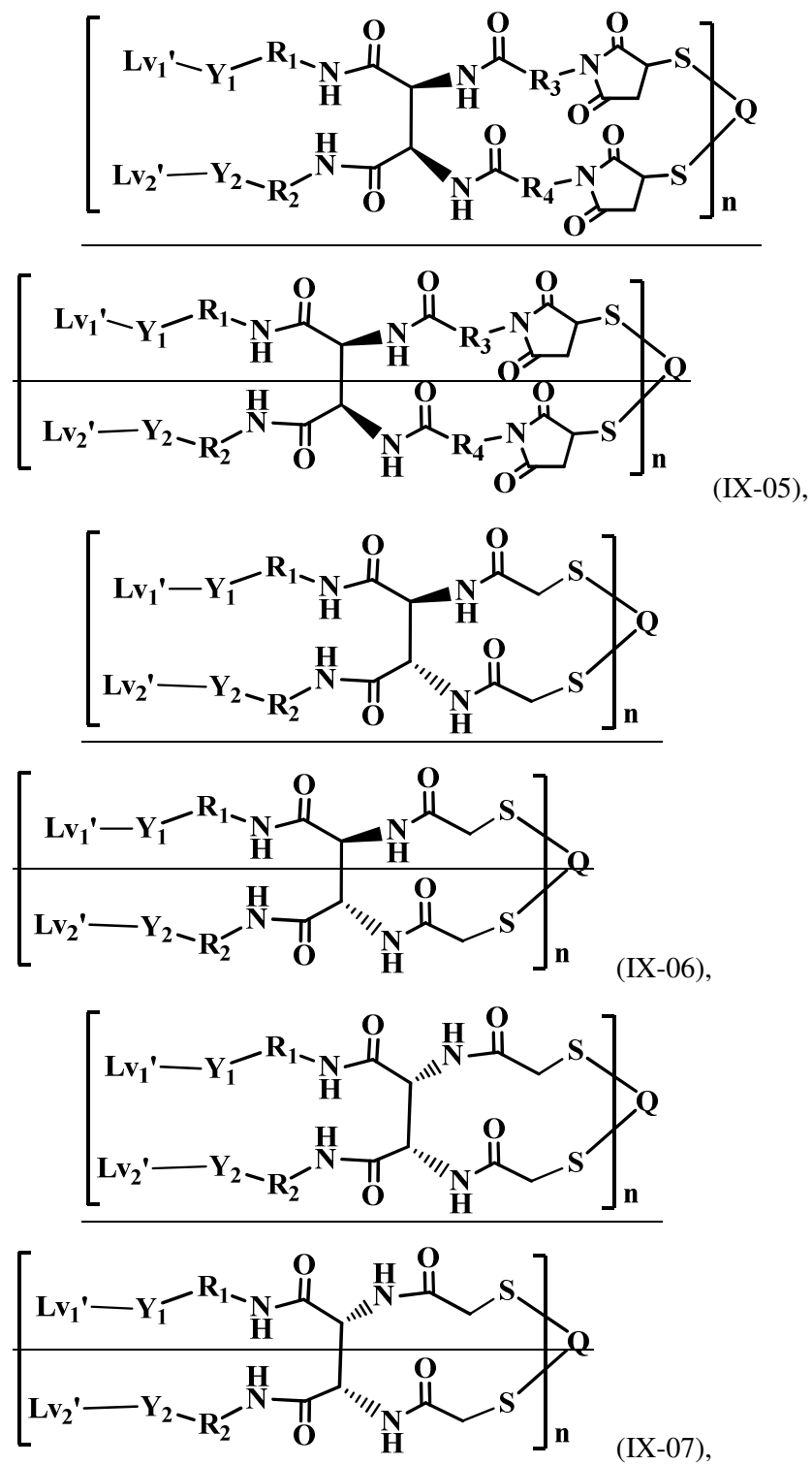
wherein “-----”, “~~~~”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R_{5'}, Z₁, Z₂, Drug₁ and Drug₂ are defined the same above, X¹ and X^{1'} are independently H, F, Cl, Br, I, OTs, OMs, OTf, N₃, CHO, -C=CH, -C≡C-, ArC(=O)R₁, C(=O)NHNH₂, -O-NH₂, -nitrophenol; N-hydroxy-succinimide (NHS); phenol; dinitrophenol; pentafluorophenol; tetrafluorophenol; difluorophenol; mono-fluorophenol; pentachlorophenol; triflate; imidazole; dichlorophenol; tetrachlorophenol; 1-hydroxybenzotriazole; tosylate; mesylate; 2-ethyl-5-phenylisoxazolium-3'-sulfonate, anhydrides formed its self, or anhydrides formed with the other anhydride, e.g. acetyl anhydride, or formyl anhydride; O-NHS (O-N-hydroxy-succinimide), O-imidazole, O-triazole, O-tetrazole, O-Ar, O-ArNO₂, O-Ar(NO₂)₂, O-ArF₄, O-ArF₃, O-ArF₅, O-ArF₂, O-ArF, O-ArCl₄, O-ArCl₃, O-ArCl₅, O-ArCl₂, O-ArCl, O-ArSO₃H, O-ArOPO₃H₂, O-Ar(NO₂)₂COOH, S-Ar(NO₂)₂COOH, O-pyridine, O-nitrophenol, O-dinitrophenol, O-pentafluorophenol, O-tetrafluorophenol, O-trifluoro-

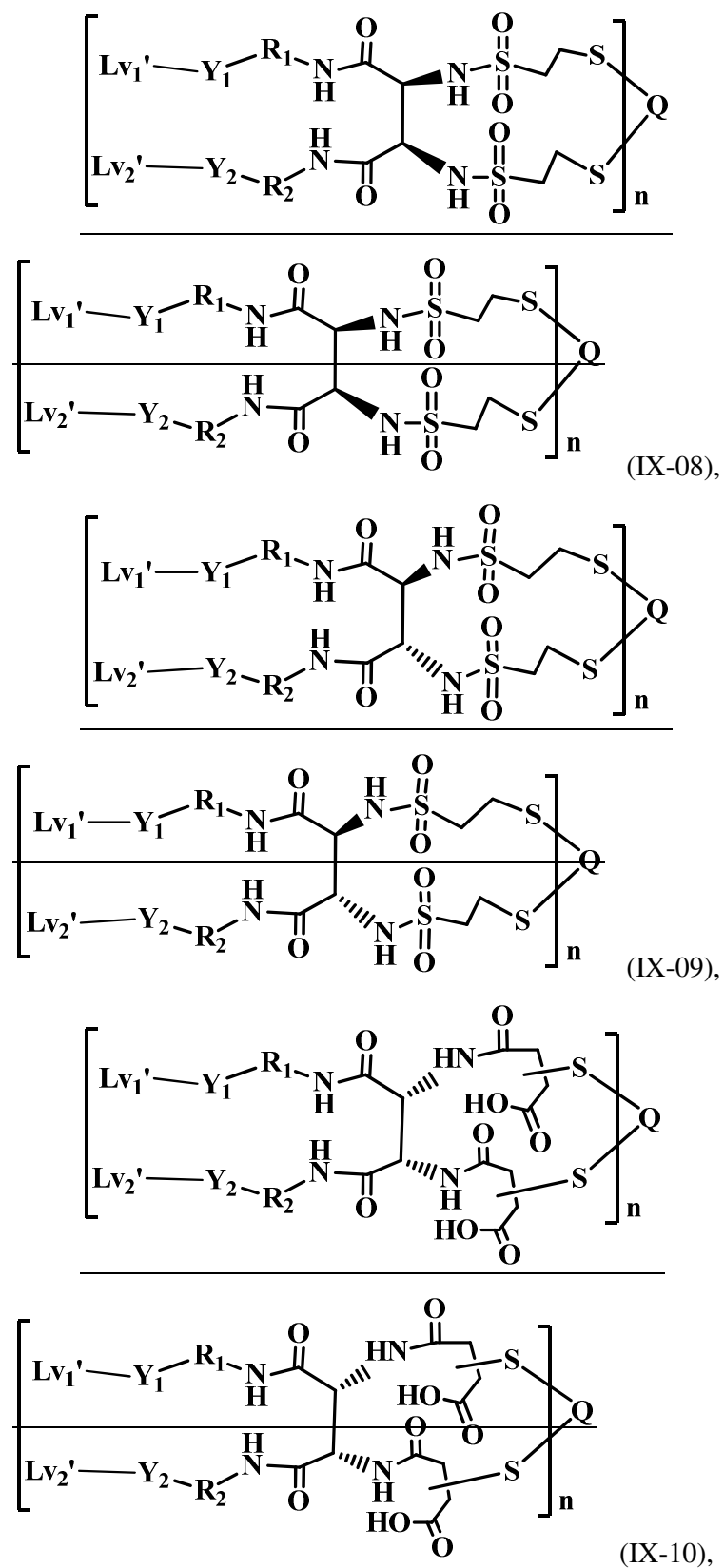
phenol, O-difluorophenol, O-fluorophenol, O-pentachlorophenol, O-tetrachlorophenol, O-trichloro-phenol, O-dichlorophenol, O-chlorophenol, O-pyridine, O-nitropyridine, O-dinitropyridine, O-C₁-C₈ alkyl, O-triflate, O-benzotriazole, S-Ar, S-ArNO₂, S-Ar(NO₂)₂, S-ArF₄, S-ArF₃, S-ArF₅, S-ArF₂, S-ArF, S-ArCl₄, S-ArCl₃, S-ArCl₅, S-ArCl₂, S-ArCl, S-ArSO₃H, S-ArOPO₃H₂, S-Ar(NO₂)COOH, S-Ar(NO₂)₂COOH, S-pyridine, S-S-pyridine, S-nitropyridine, S-dinitropyridine, S-C₁-C₈ alkyl, S-S-C₁-C₈ alkyl, S-triflate, S-benzotriazole, wherein Ar is C₃-C₈ aromatic ring; or an intermediate molecule generated with a condensation reagent for peptide coupling reactions, or for Mitsunobu reactions.

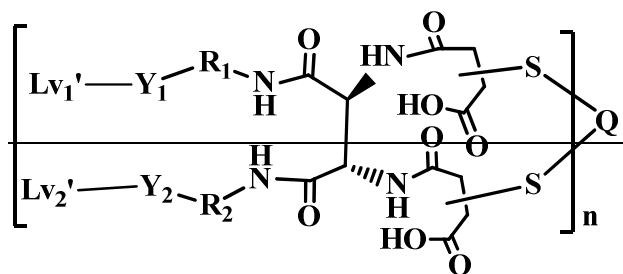
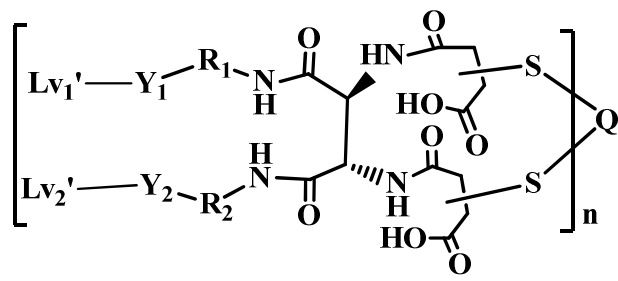
9.4.5. The conjugate compound according to Formula (IX) or (X) of Claim 1 are made from 3 having a readily-reactive compound structure represented by Formula (IX-01), (IX-02), (IX-03), (IX-04), (IX-05), (IX-06), (IX-07), (IX-08), (IX-09), (IX-10), (IX-11), (IX-12), (IX-13), (IX-14), (IX-15), (IX-16), (IX-17), (IX-18), (IX-19), (IX-20), (IX-21), (IX-22), (IX-23), (X-01), (X-02), (X-03), (X-04), (X-05), (X-06), (X-07), (X-08), (X-09), (X-10), (X-11), (X-12), (X-13), (X-14), (X-15), (X-16), (X-17), (X-18), (X-19), and (X-20) below accordingly, wherein two or more function groups of a cytotoxic molecule can simultaneously or sequentially react to Lv₁' and /or Lv₂' of the compounds:



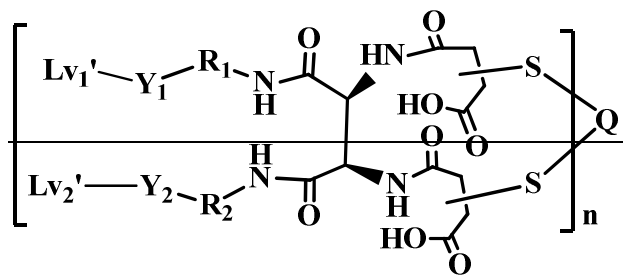
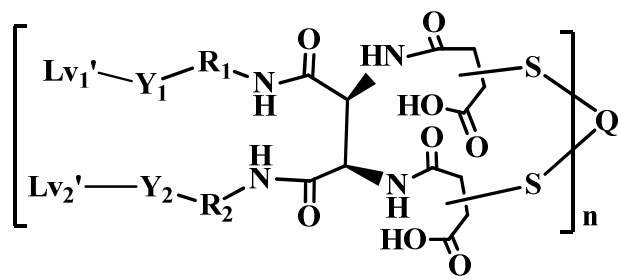




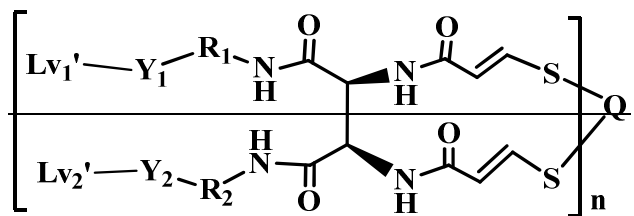
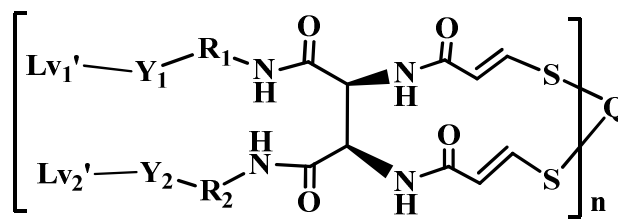




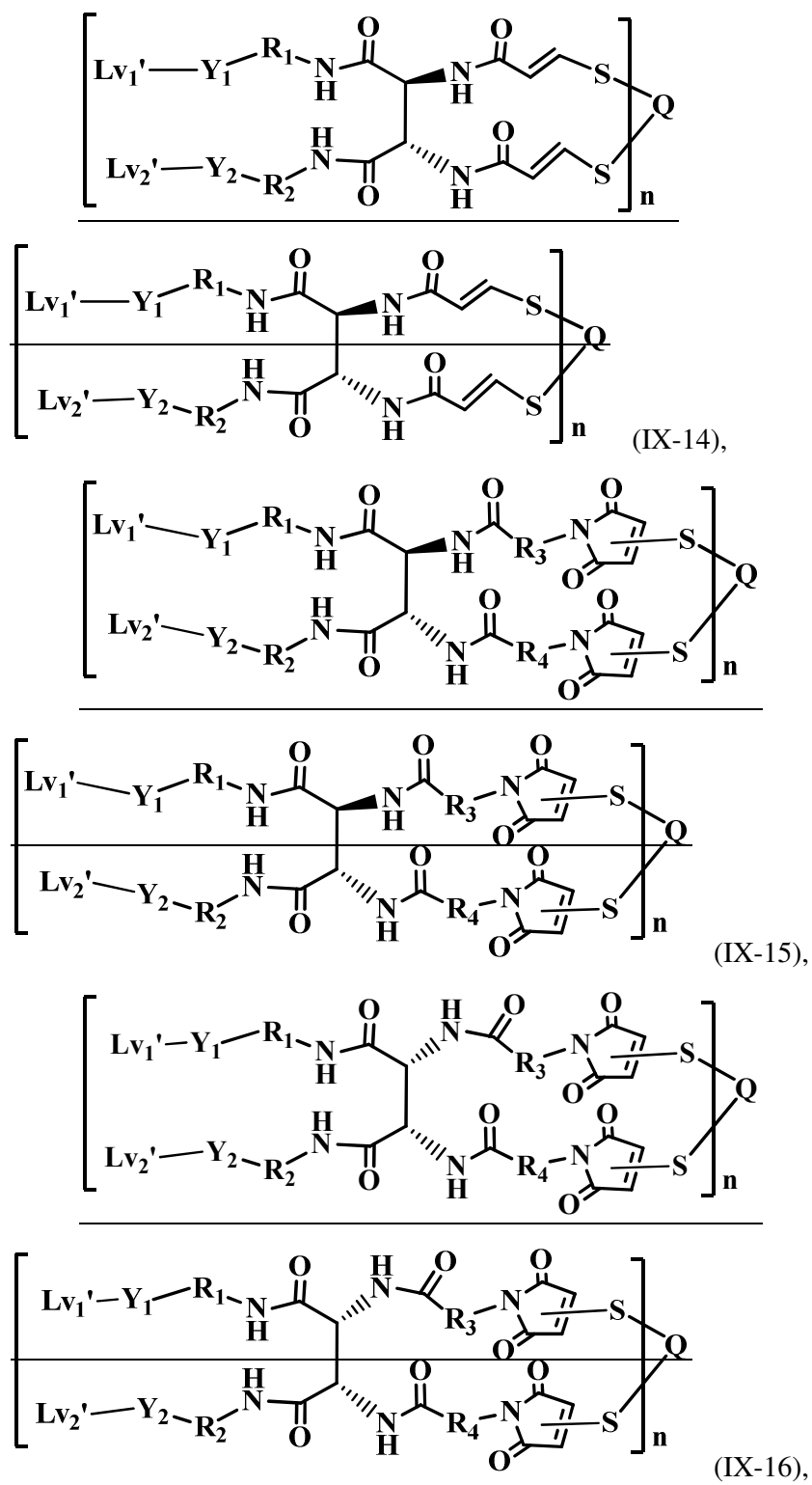
(IX-11),

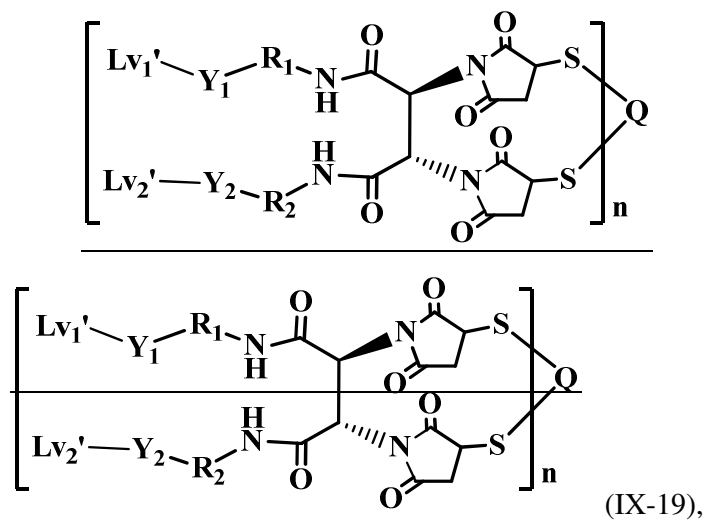
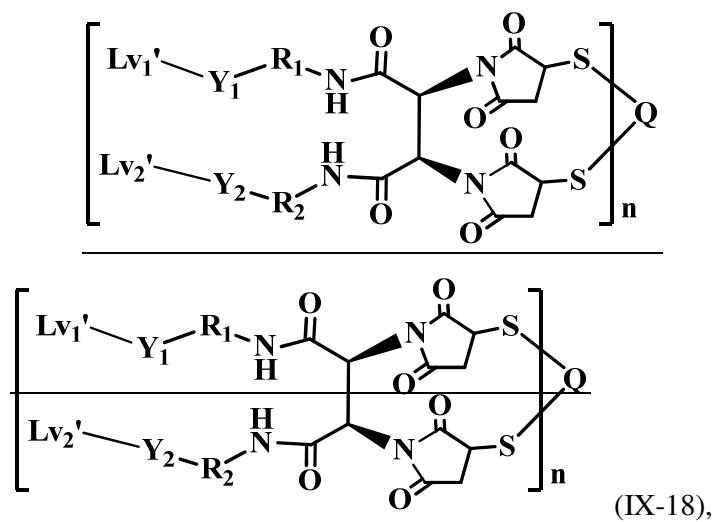
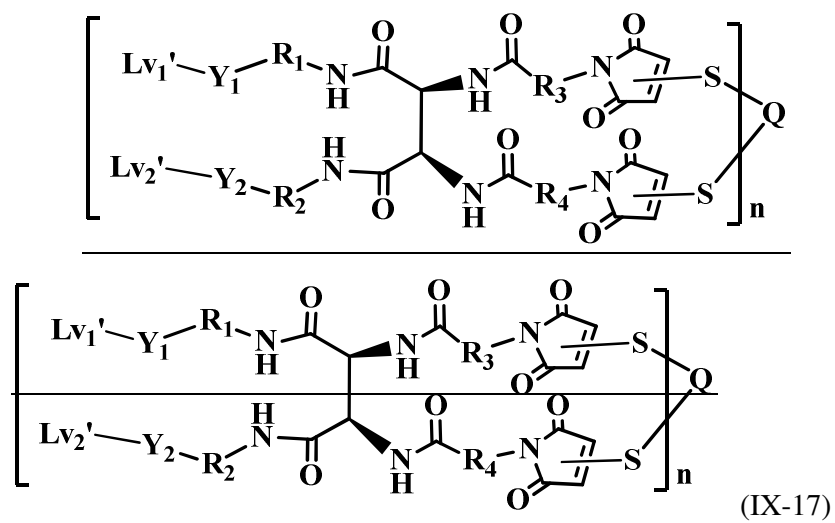


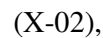
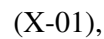
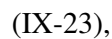
(IX-12),

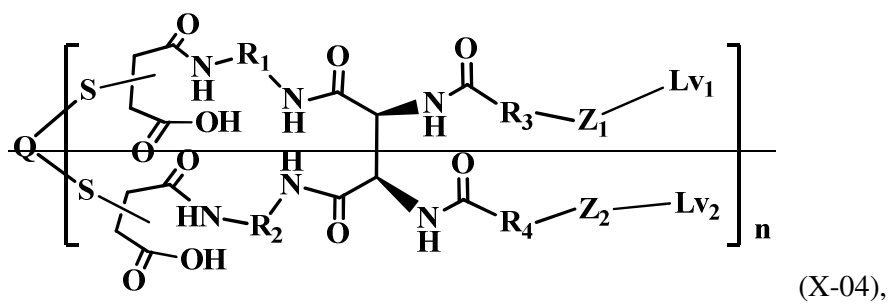
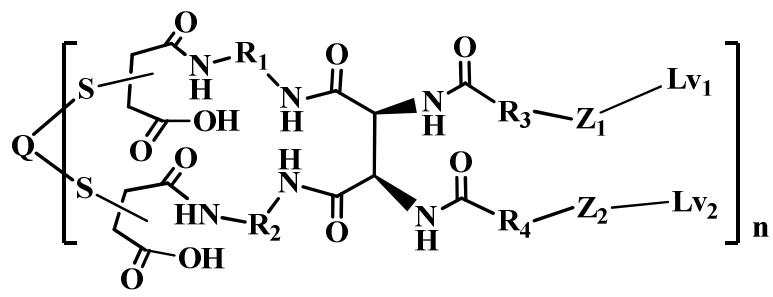
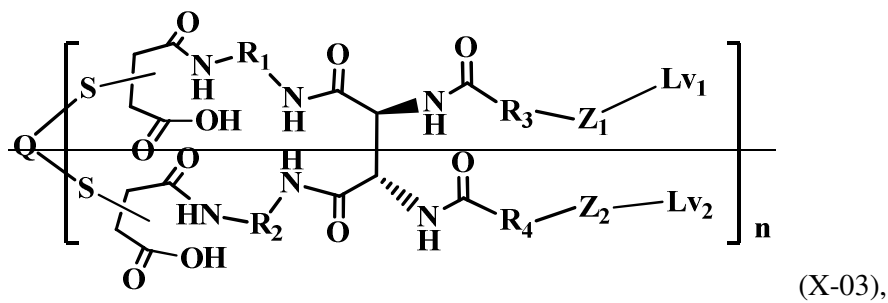
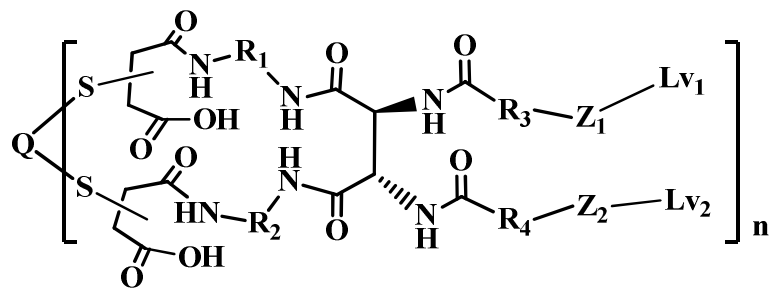


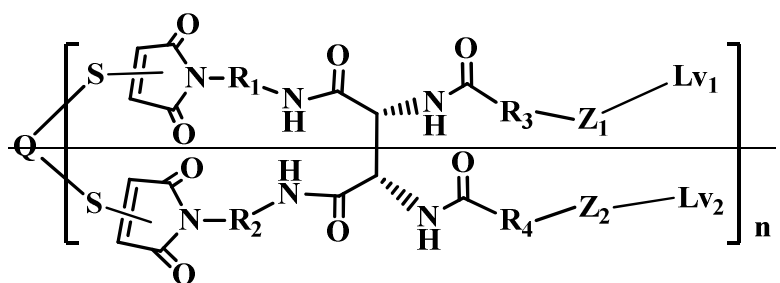
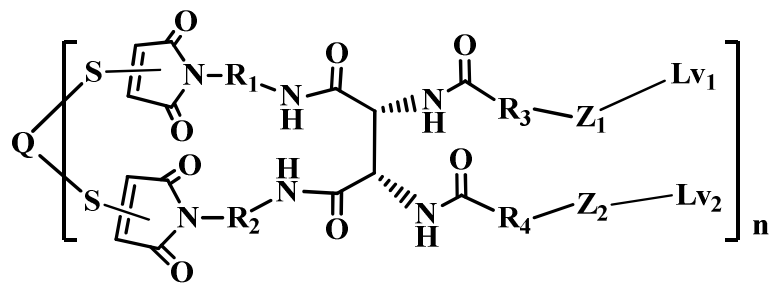
(IX-13),



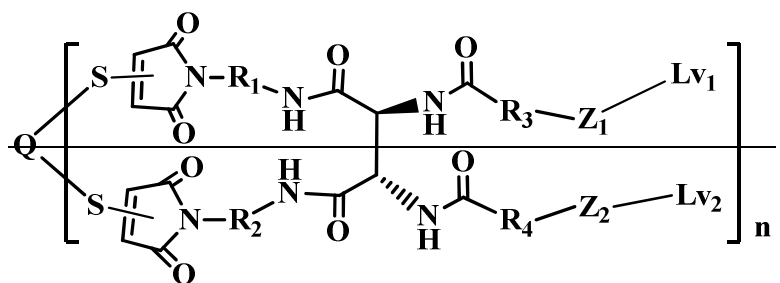
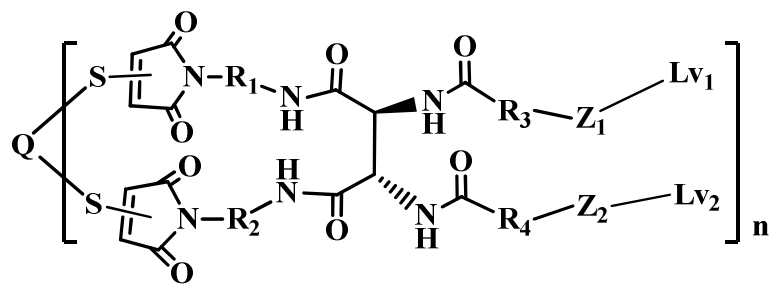




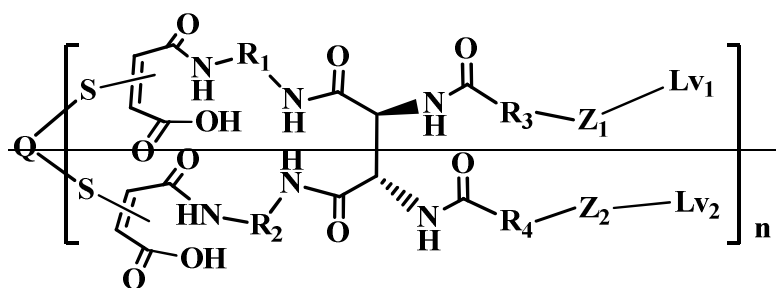
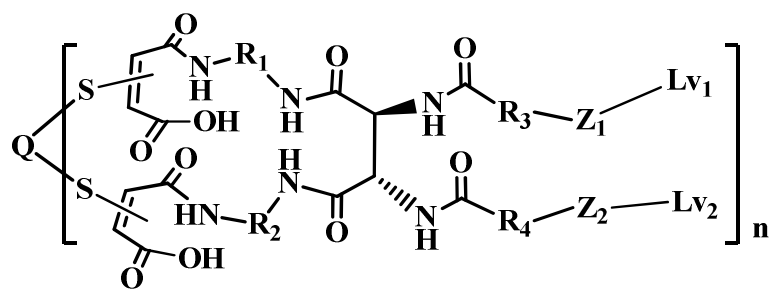




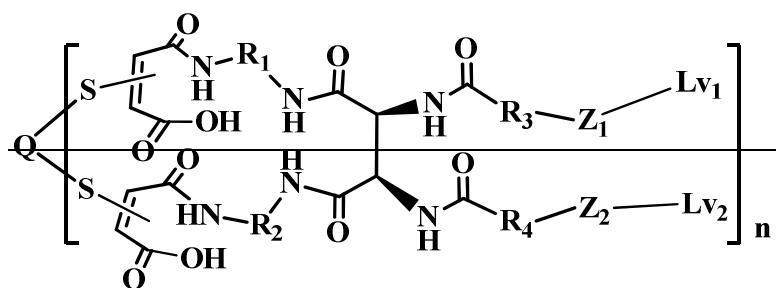
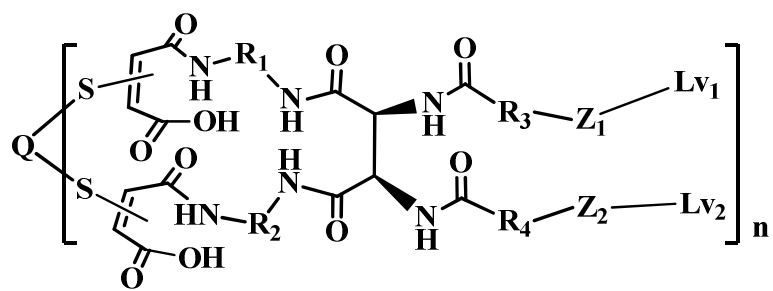
(X-05),



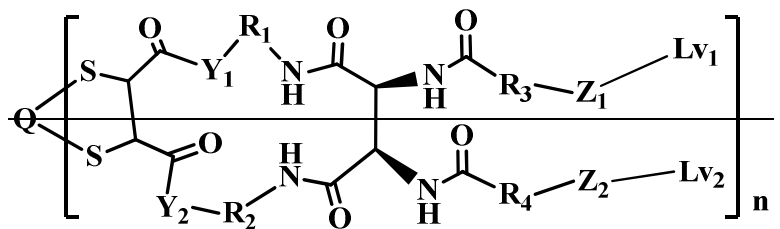
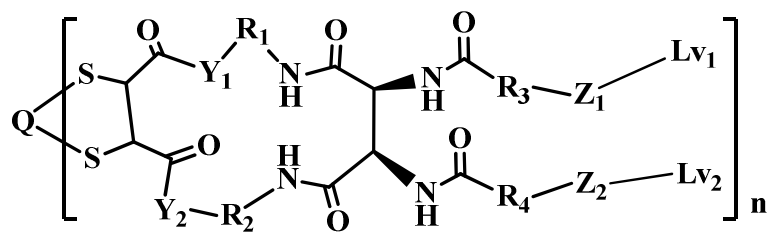
(X-06),



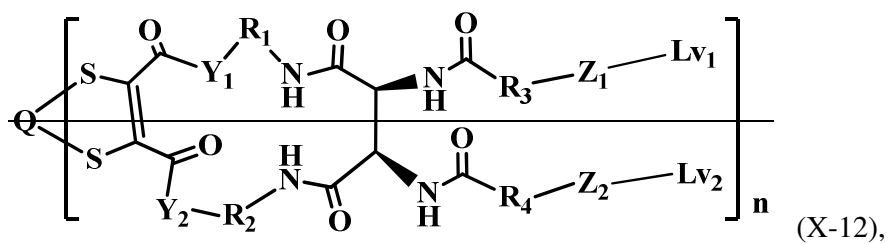
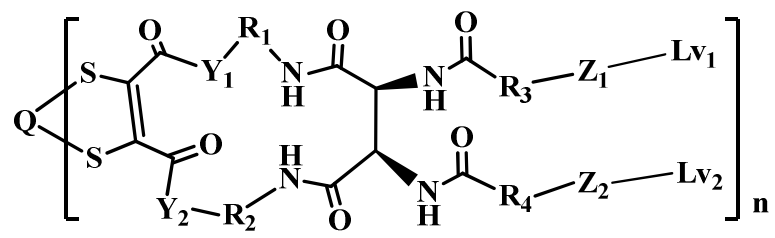
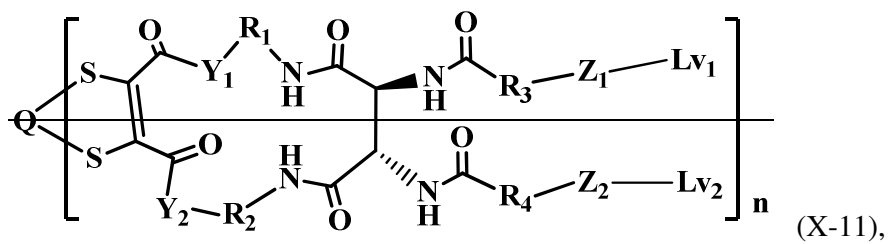
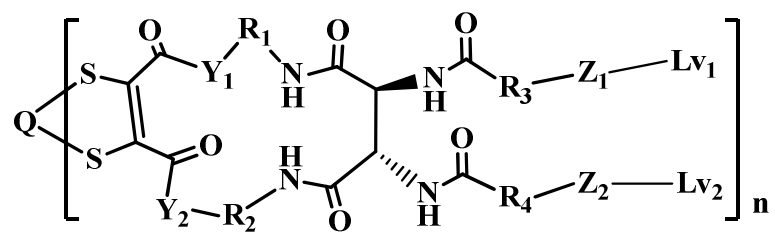
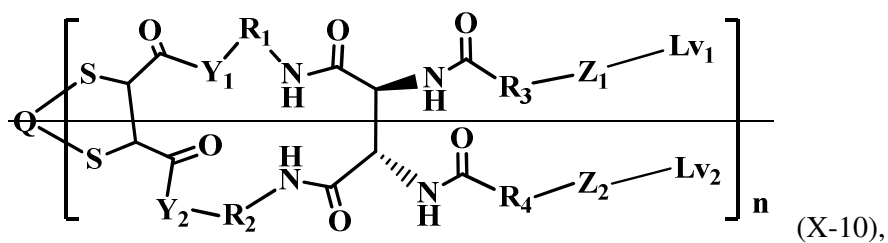
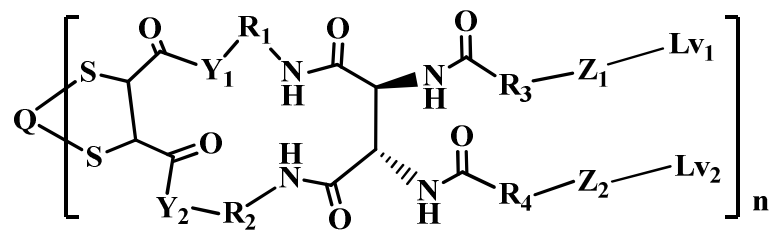
(X-07),

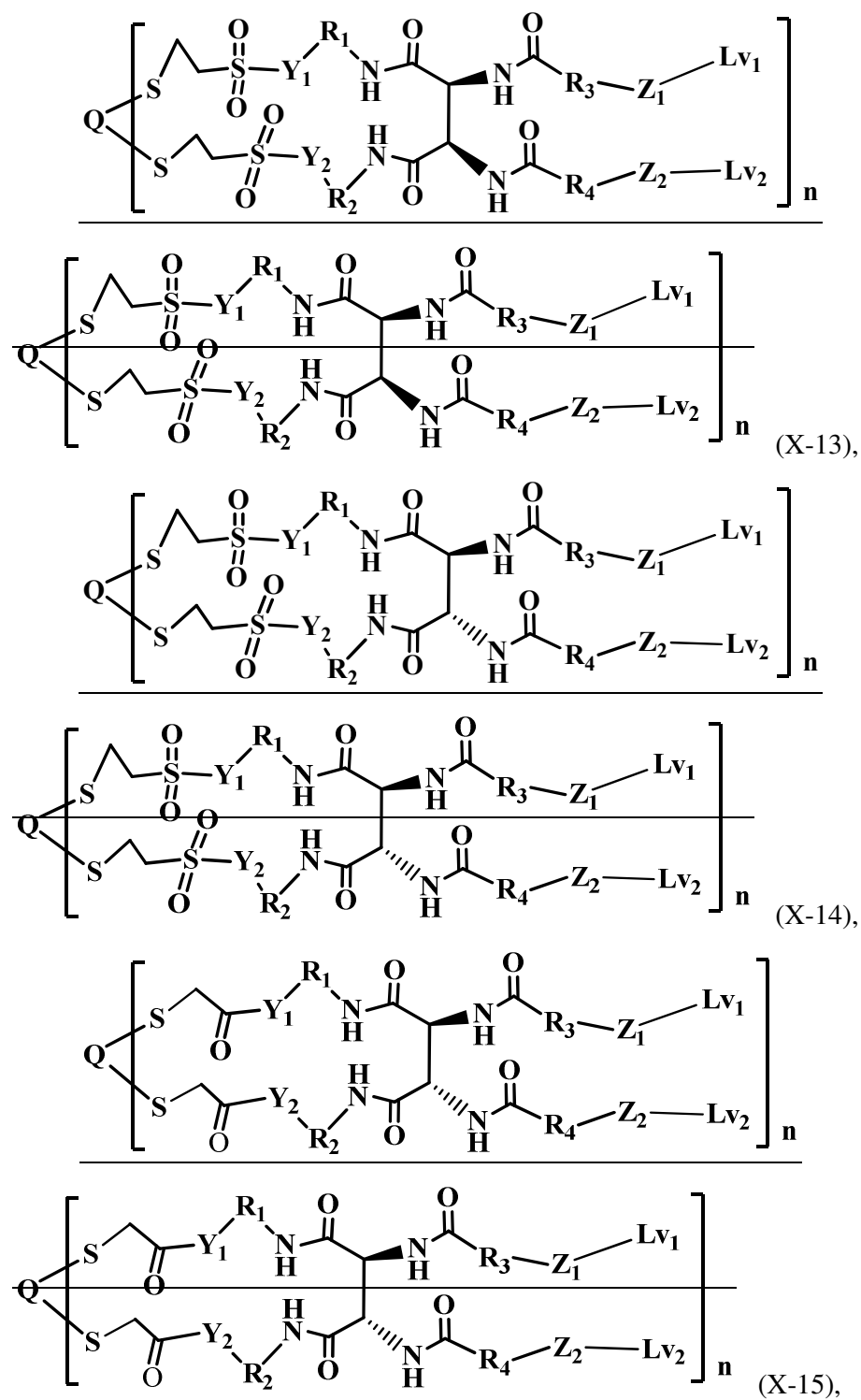


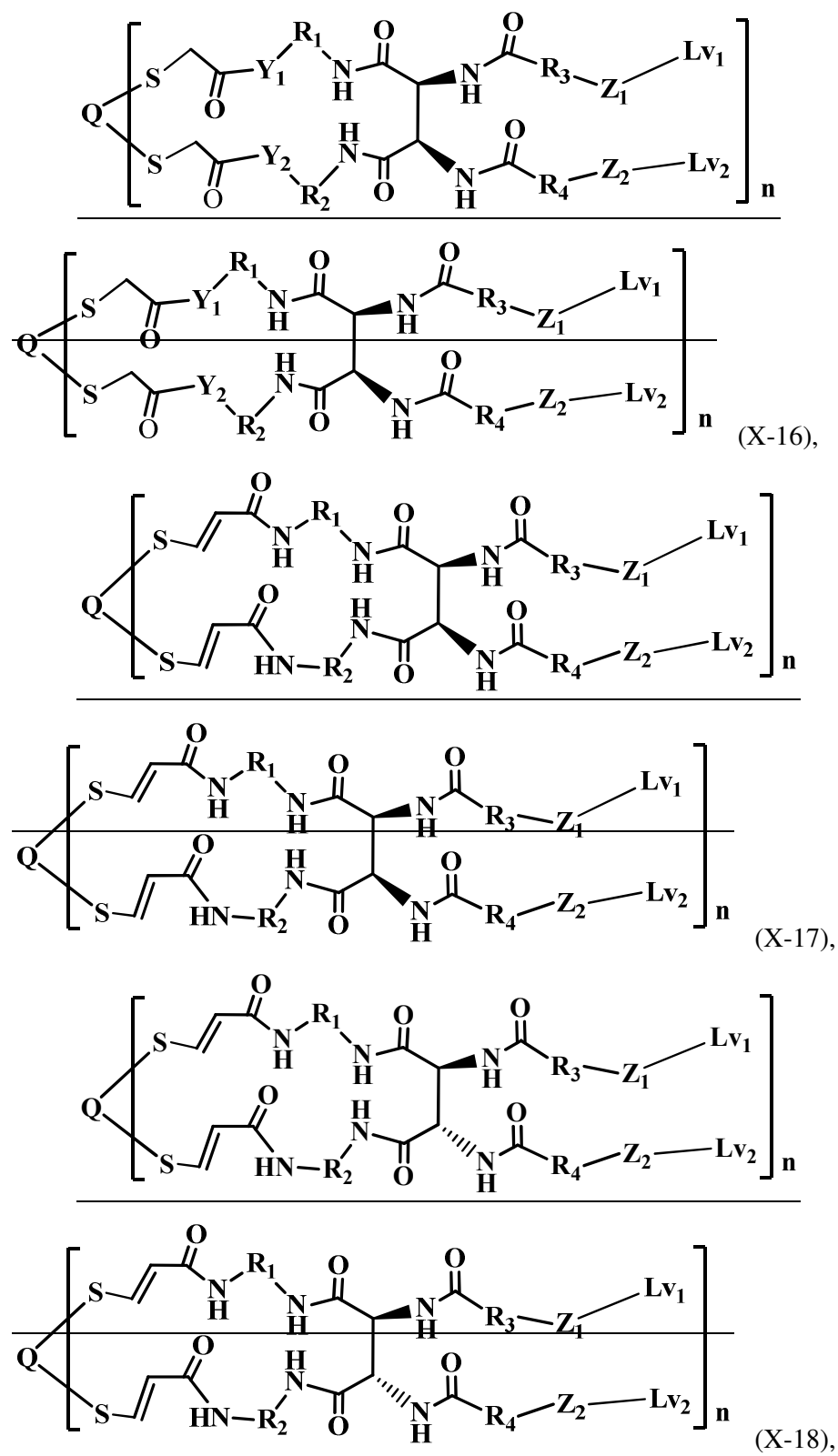
(X-08),

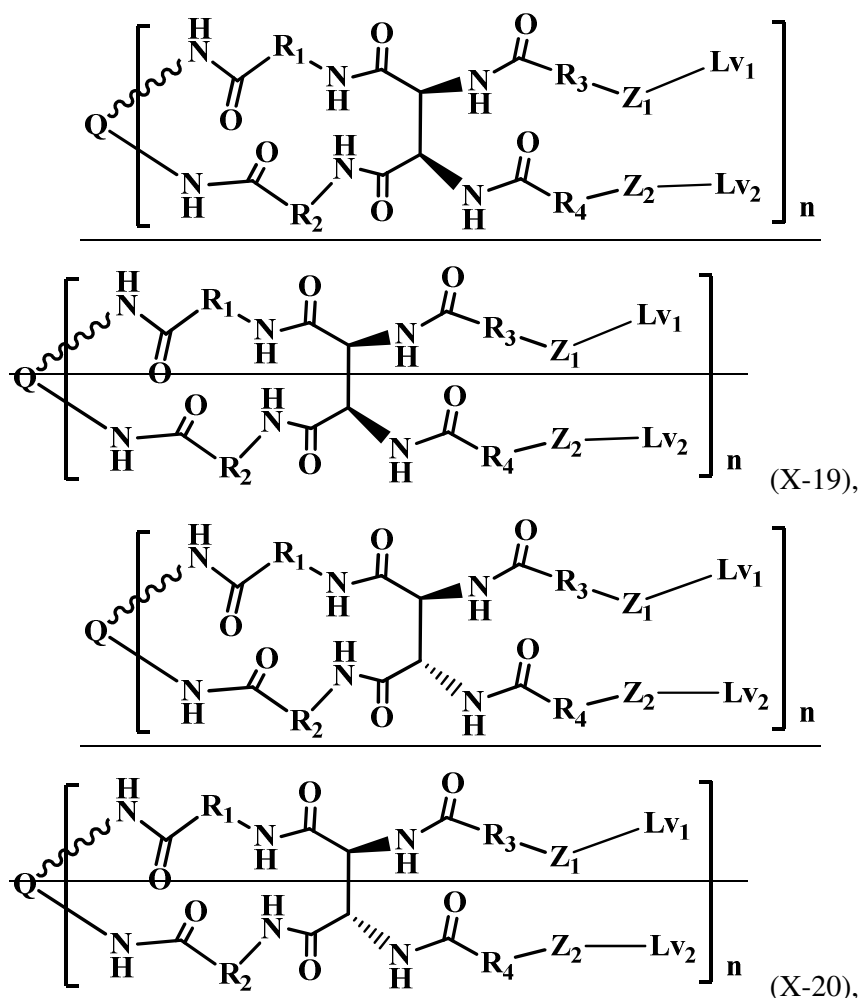


(X-09),



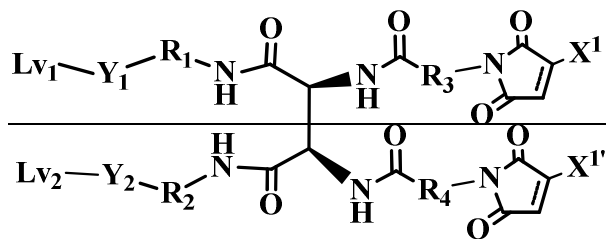
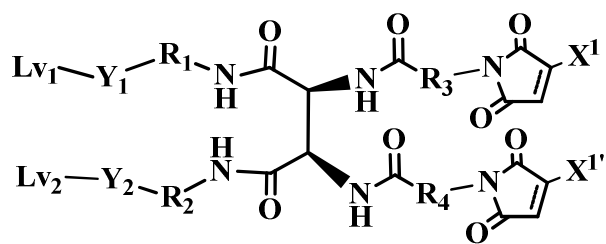




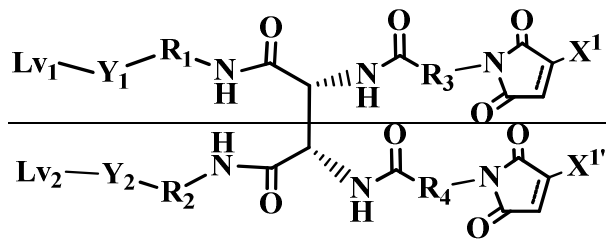
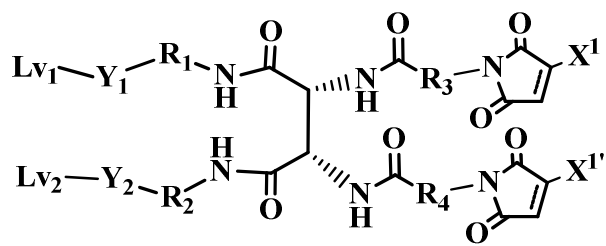


wherein “-----”, “-----”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R_{5'}, Z₁, Z₂, Lv₁, Lv₂, Lv_{1'}, and Lv_{2'} are defined the same above. In addition, one of Drug₁ and Drug₂ can be independently absent but may not be absent at the same time.

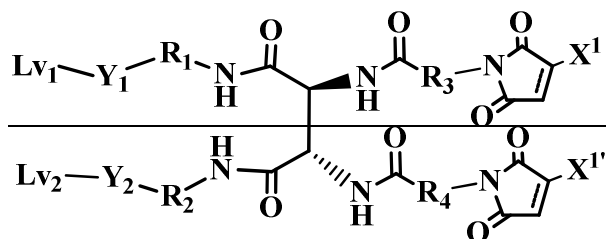
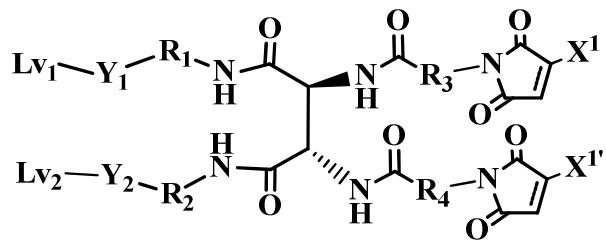
10.5. 6. The conjugate compounds according to compound of Formula (XI) or (XII) of Claim 1 are made from 4 having a readily-reactive compound structure represented by Formula (XI-01)₁, (XI-02)₁, (XI-03)₁, (XI-04)₁, (XI-05)₁, (XI-06)₁, (XI-07)₁, (XI-08)₁, (XI-09)₁, (XI-10)₁, (XI-11)₁, (XI-12)₁, (XI-13)₁, (XI-14)₁, (XI-15)₁, (XI-16)₁, (XI-17)₁, (XI-18)₁, (XII-01)₁, (XII-02)₁, (XII-03)₁, (XII-04)₁, (XII-05)₁, (XII-06)₁, (XII-07)₁, (XII-08)₁, (XII-09)₁, (XII-10)₁, (XII-11)₁, (XII-12)₁, (XII-13)₁, (XII-14)₁, (XII-15)₁, (XII-16)₁, (XII-17)₁, (XII-18)₁, (XII-19)₁, (XII-20)₁, (XII-21)₁, (XII-22)₁, (XII-23)₁, and (XII-24) below accordingly, wherein a cytotoxic molecule and a cell-binding molecule can react the compound independently, or simultaneously, or sequentially;



(XI-01),

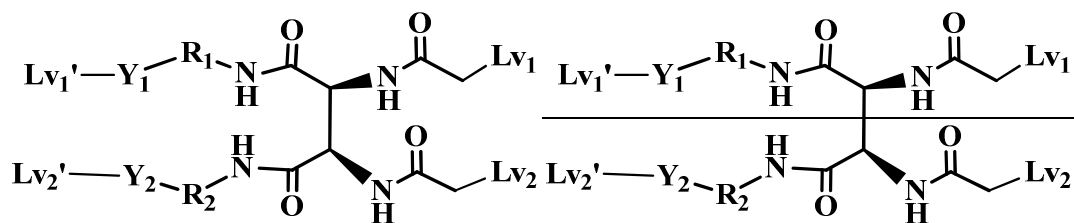


(XI-02),

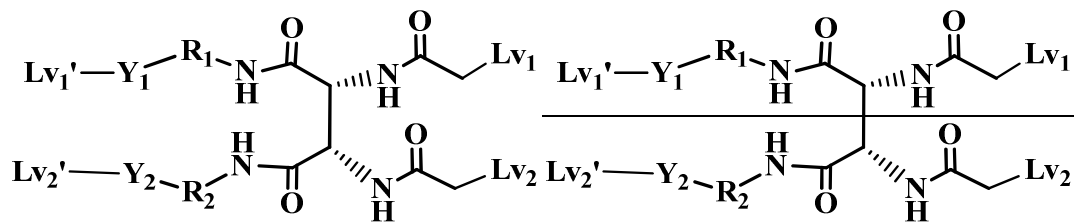


(XI-03),

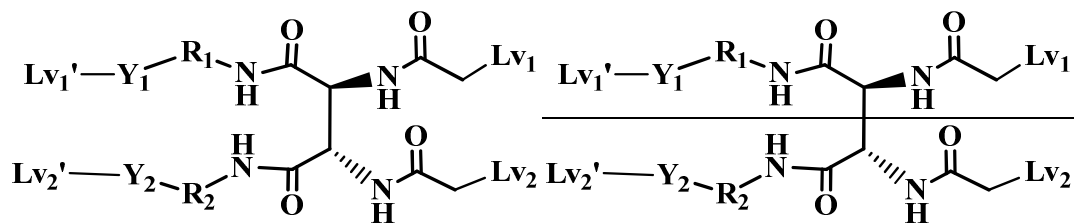
420



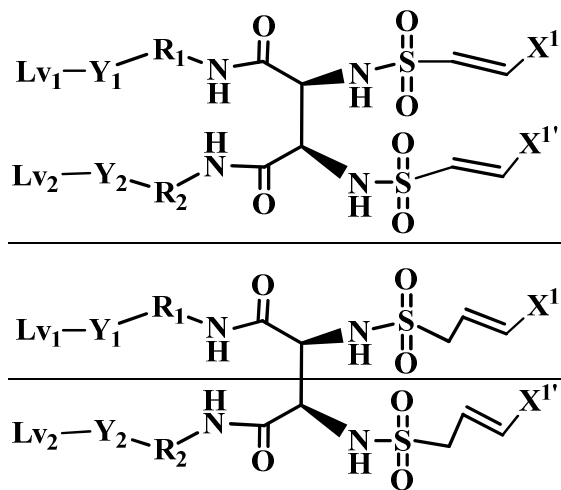
(XI-04),



(XI-05),

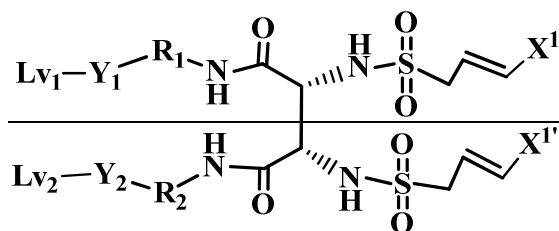
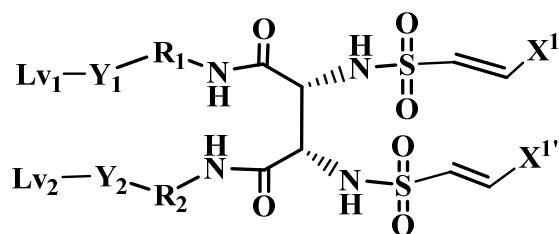


(XI-06)

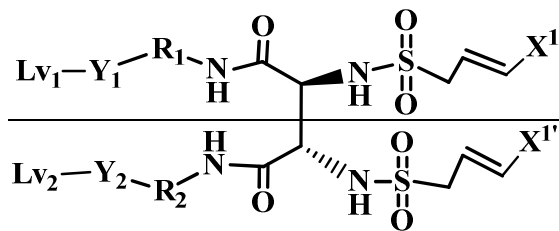
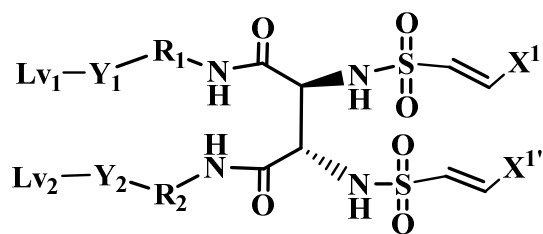


(XI-07),

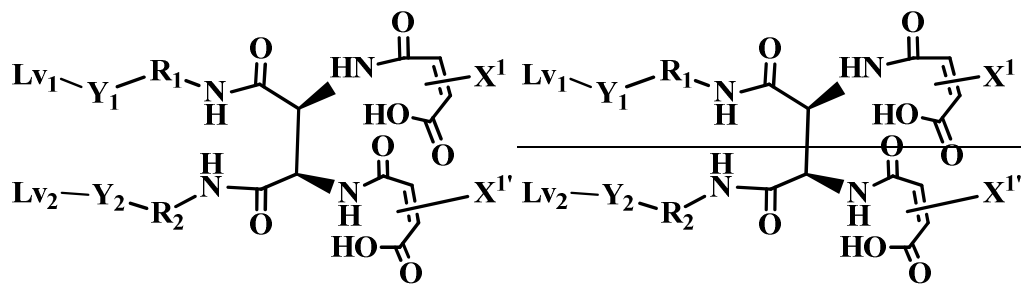
421



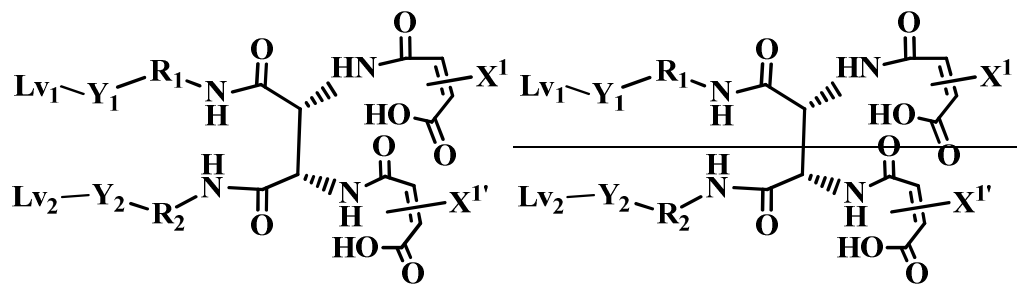
(XI-08),



(XI-09),

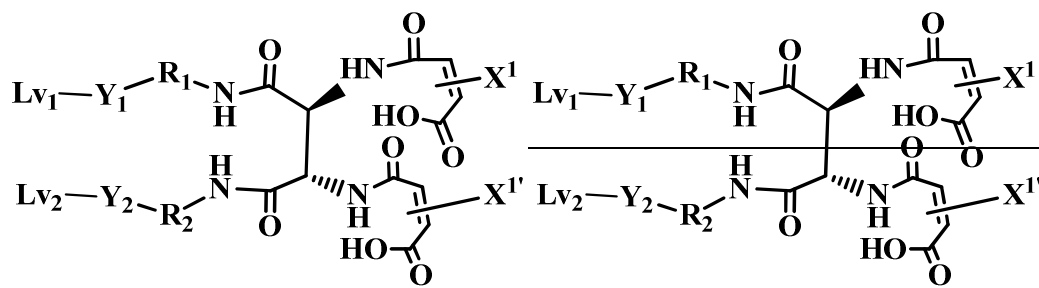


(XI-10),

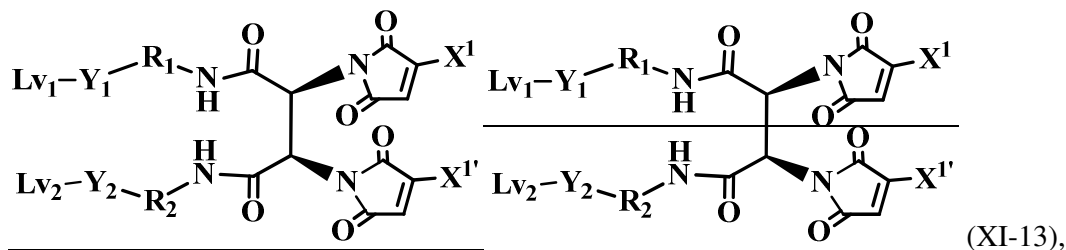


11),

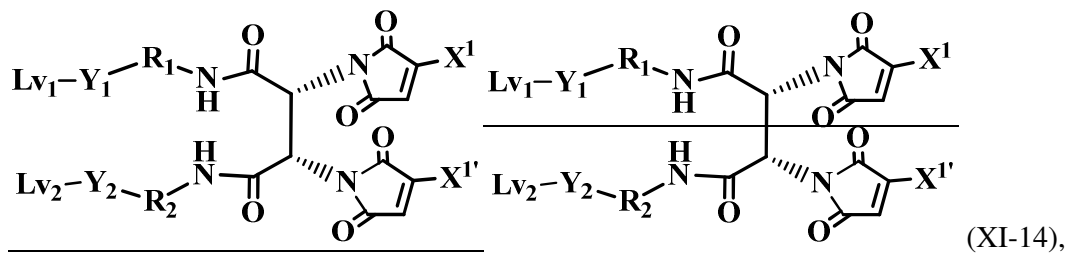
(XI-



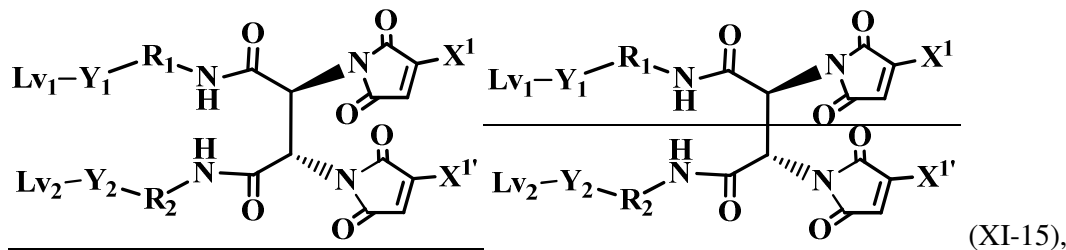
(XI-12),



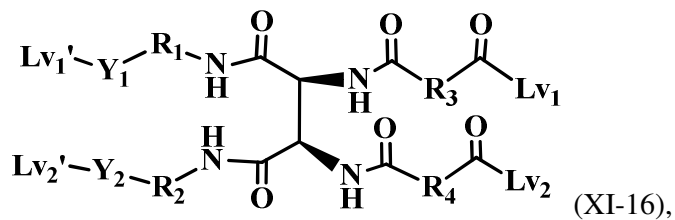
(XI-13),



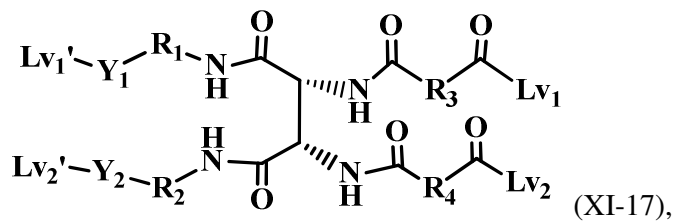
(XI-14),



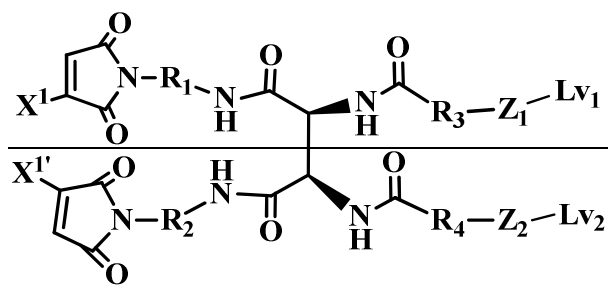
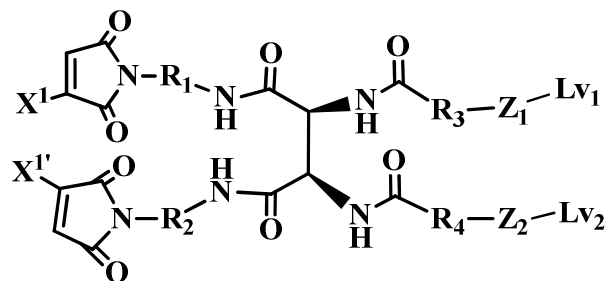
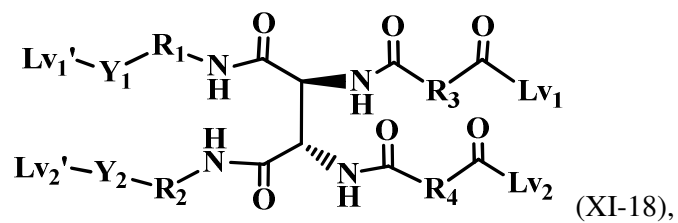
(XI-15),

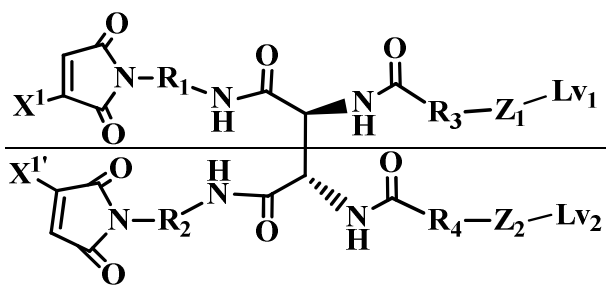
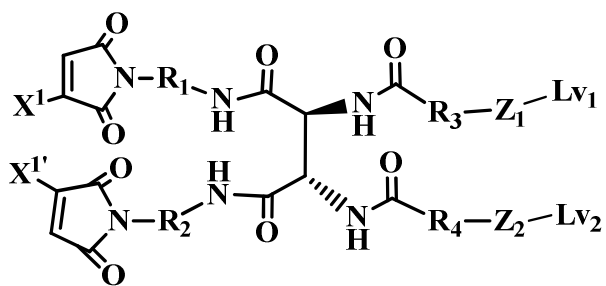


(XI-16),

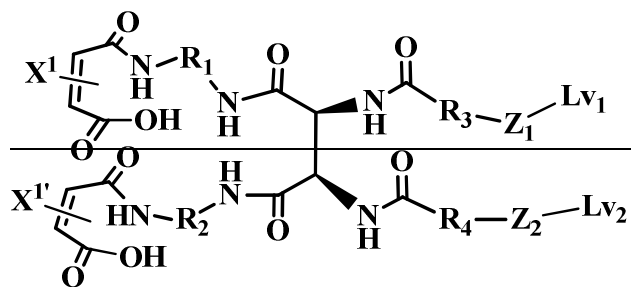
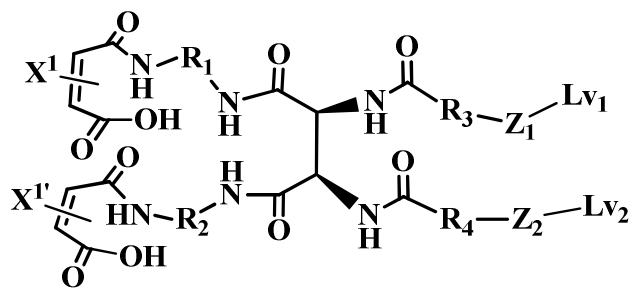


(XI-17),

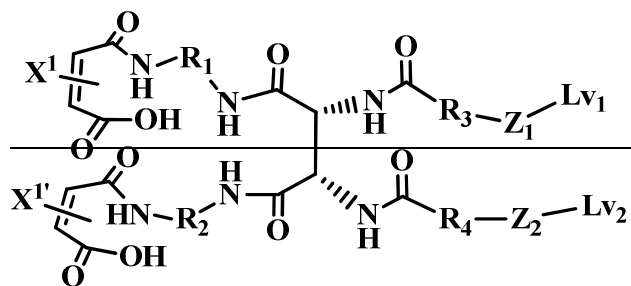
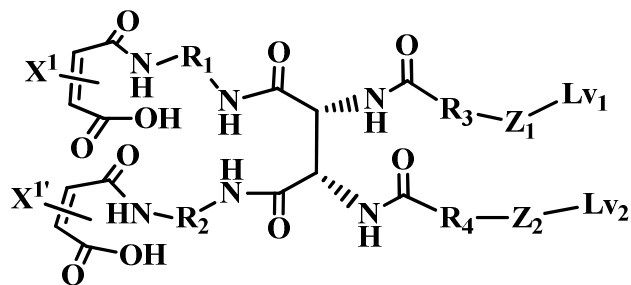




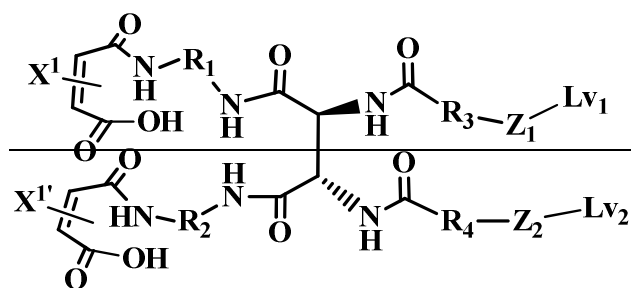
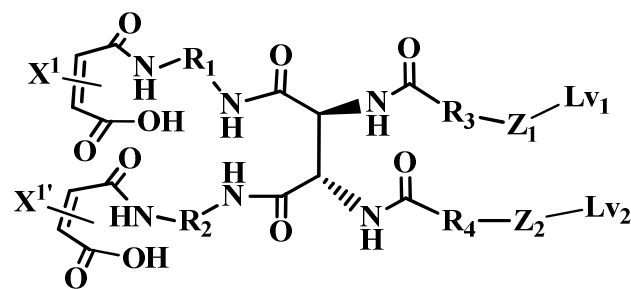
(XII-03),



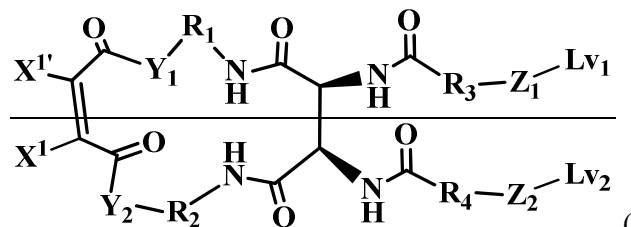
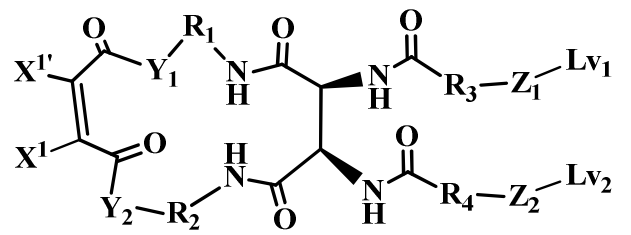
(XII-04),



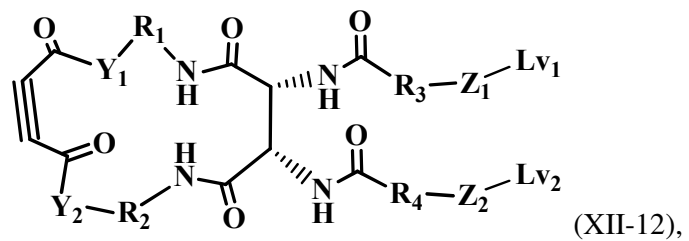
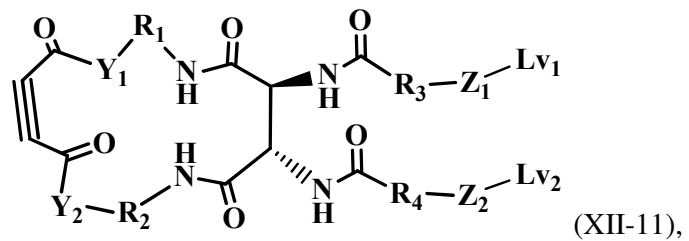
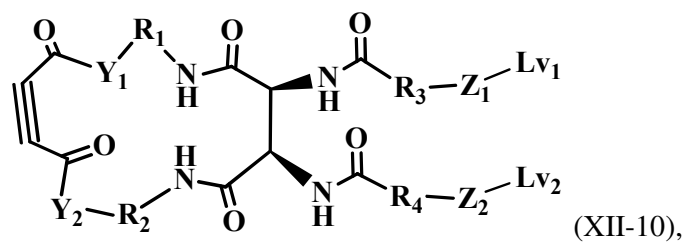
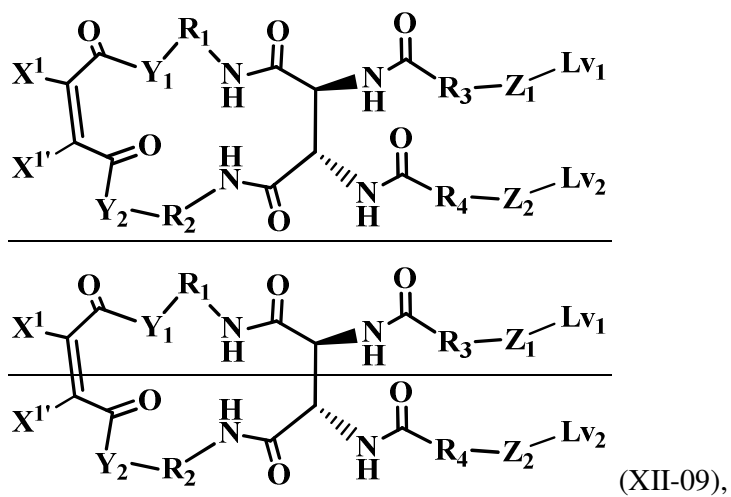
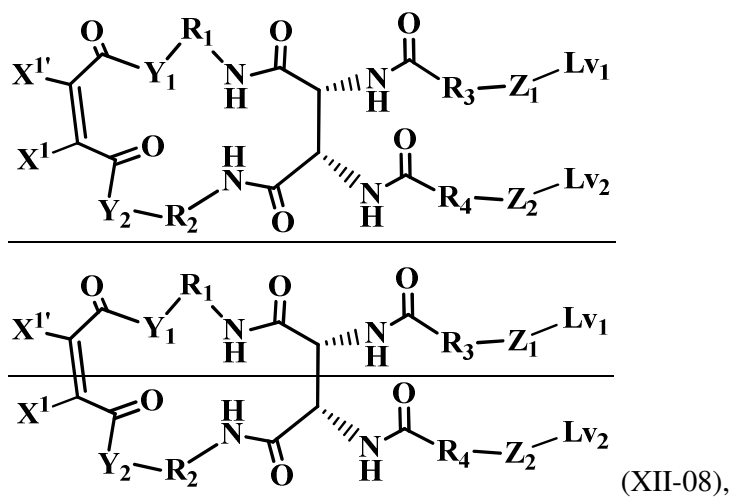
(XII-05),

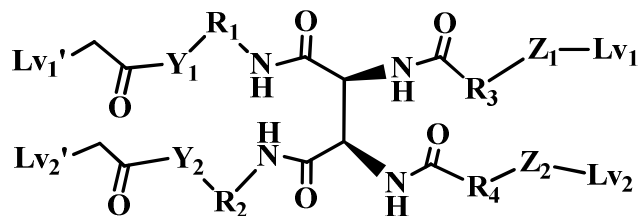
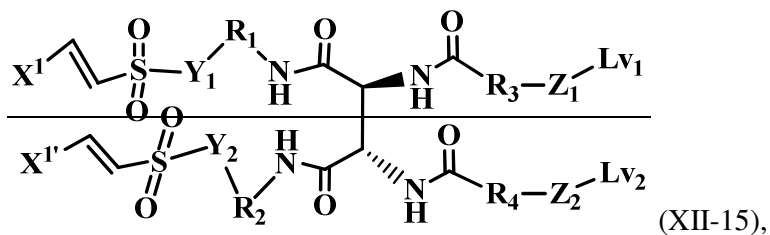
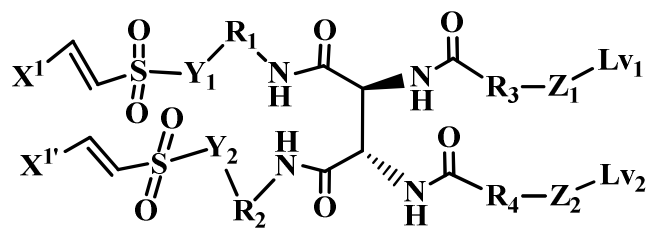
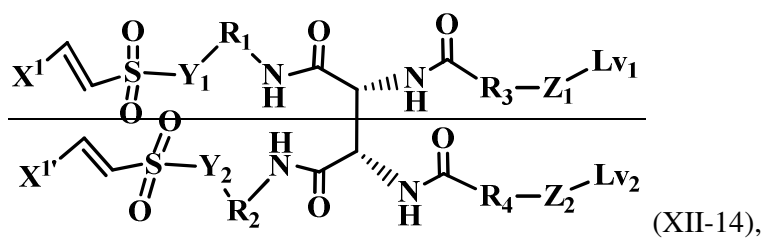
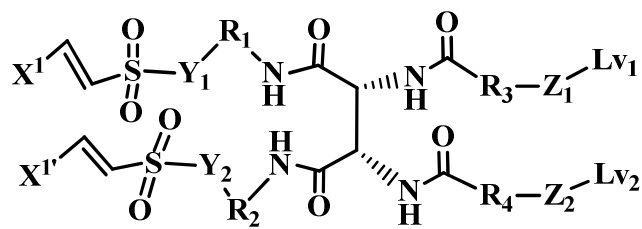
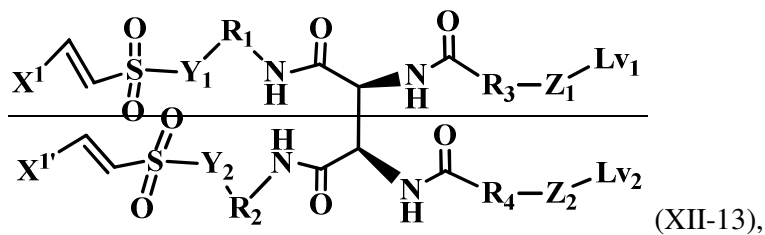
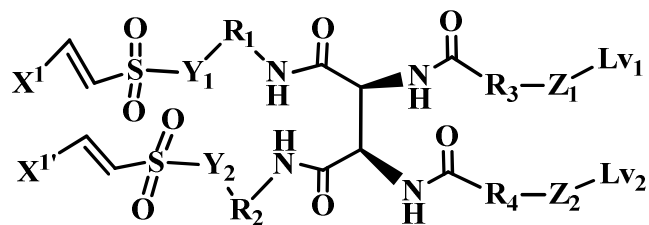


(XII-06),

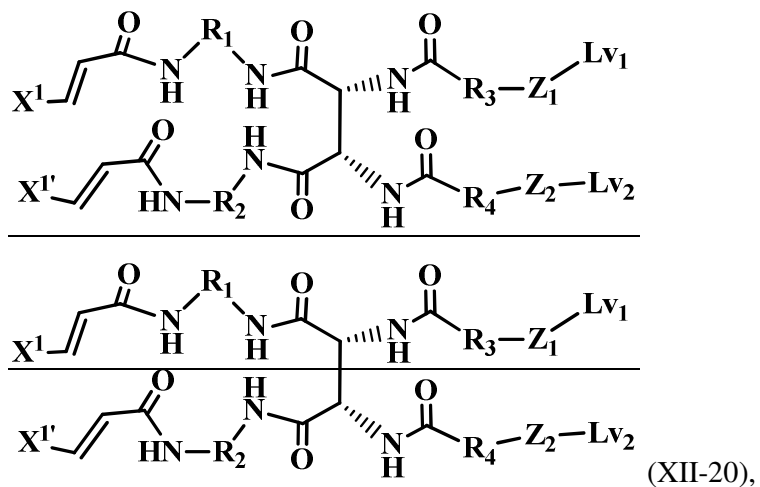
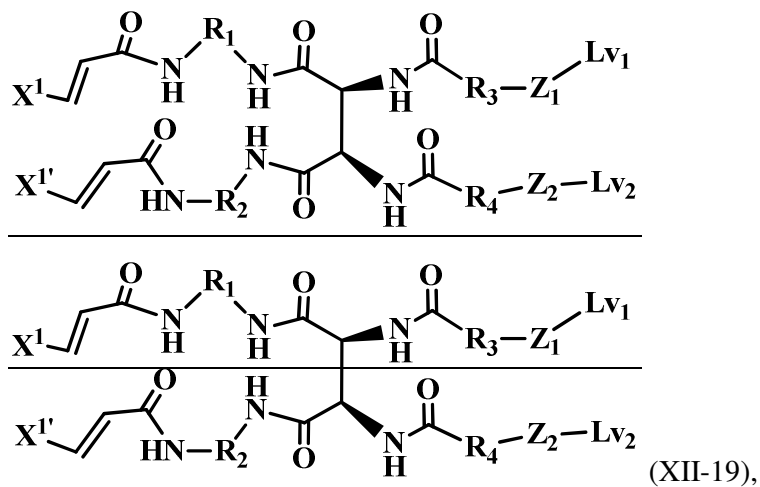
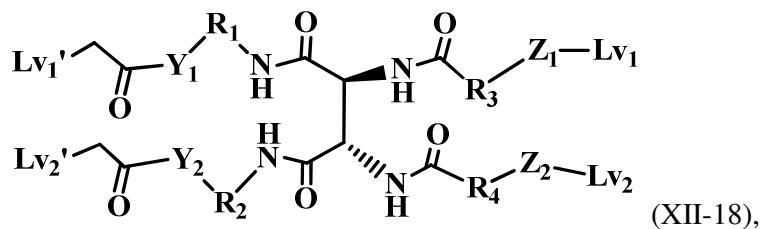
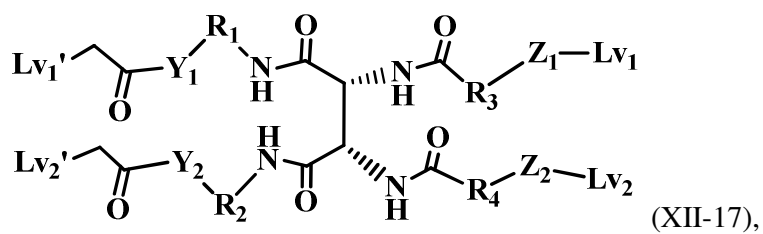


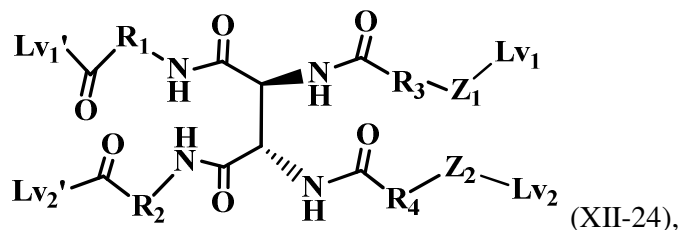
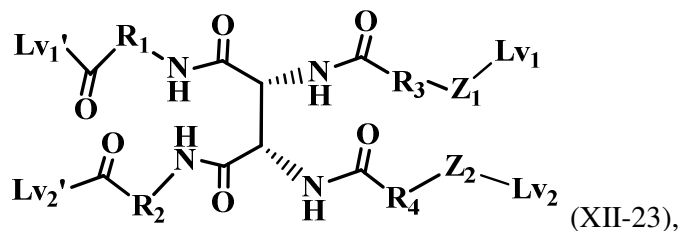
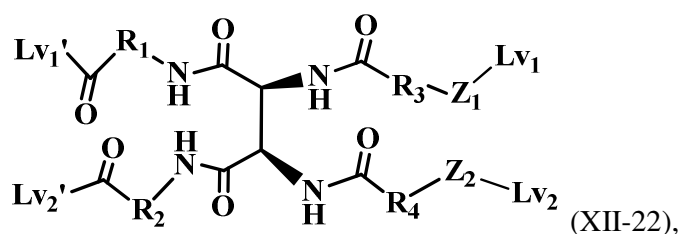
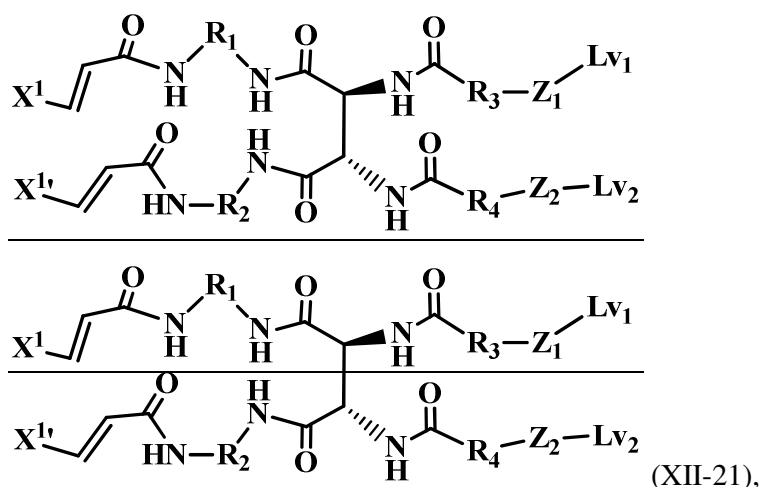
(XII-07),





(XII-16),





wherein “-----”, “~~~~”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R₅', Z₁, Z₂, Lv₁, Lv₂, Lv₁', Lv₂', X¹ and X^{1'} are defined the same above;

11.6. 7. The conjugate according to Claim 1, wherein Y₁, Y₂, Z₁-and Z₂-may link to pairs of thiols of a cell-binding agent/molecule through reduction from the inter chain disulfide bonds of the cell-binding agent with dithiothreitol (DTT), dithioerythritol (DTE), L-glutathione (GSH), tris (2-carboxyethyl) phosphine (TCEP), 2-mercaptoethylamine (β-MEA), or/and beta mercaptoeth-anol/mercaptoethanol (β-ME, 2-ME).

12.7. 8. The conjugate compound according to Claim 1, wherein the Drug₁ or Drug₂ is selected from:

- (1). A chemotherapeutic agent selected from the group consisting of:

a). an alkylating agent: selected from the group consisting of nitrogen mustards: chlorambucil, chlornaphazine, cyclophosphamide, dacarbazine, estramustine, ifosfamide, mechlorethamine, mechlorethamine oxide hydrochloride, mannomustine, mitobronitol, melphalan, mitolactol, pipobroman, novembichin, phenesterine, prednimustine, thiotepa, trofosfamide, uracil mustard; CC-1065 and adozelesin, carzelesin, bizelesin or their synthetic analogues; duocarmycin and its synthetic analogues, KW-2189, CBI-TMI, or CBI dimers; benzodiazepine dimers or pyrrolobenzodiazepine (PBD) dimers, tomaymycin dimers, indolinobenzodiazepine dimers, imidazobenzothiadiazepine dimers, or oxazolidinobenzodiazepine dimers; Nitrosoureas: comprising carmustine, lomustine, chlorozotocin, fotemustine, nimustine, ranimustine; Alkylsulphonates: comprising busulfan, treosulfan, improsulfan and piposulfan); Triazenes or dacarbazine; Platinum containing compounds: comprising carboplatin, cisplatin, and oxaliplatin; aziridines, benzodopa, carboquone, meturedopa, or uredopa; ethylenimines and methylamelamines including altretamine, triethylenemelamine, trietylenephosphoramidate, triethylenethiophosphoramidate and trimethylolomelamine];

b). A plant alkaloid: selected from the group consisting of Vinca alkaloids: comprising vincristine, vinblastine, vindesine, vinorelbine, and navelbin; Taxoids: comprising paclitaxel, docetaxol and their analogs, Maytansinoids comprising DM1, DM2, DM3, DM4, DM5, DM6, DM7, maytansine, ansamitocins and their analogs, cryptophycins (including the group consisting of cryptophycin 1 and cryptophycin 8); epothilones, eleutherobin, discodermolide, bryostatins, dolostatins, auristatins, tubulysins, cephalostatins; pancratistatin; erbulins, a sarcodictyin; spongistatin;

c). A DNA Topoisomerase Inhibitor: selected from the groups of Epipodophyllins: comprising 9-aminocamptothecin, camptothecin, crisnatol, daunomycin, etoposide, etoposide phosphate, irinotecan, mitoxantrone, novantrone, retinoic acids (or retinols), teniposide, topotecan, 9-nitrocamptothecin or RFS 2000; and mitomycins and their analogs;

d). An antimetabolite: selected from the group consisting of { [Anti-folate: (DHFR inhibitors: comprising methotrexate, trimetrexate, denopterin, pteropterin, aminopterin (4-aminopteronic acid) or folic acid analogues); IMP dehydrogenase Inhibitors: (comprising mycophenolic acid, tiazofurin, ribavirin, EICAR); Ribonucleotide reductase Inhibitors: (comprising hydroxyurea, deferroxamine)]; [pyrimidine analogs: Uracil analogs: (comprising ancitabine, azacitidine, 6-azauridine, capecitabine (Xeloda), carmofur, cytarabine, dideoxyuridine, doxifluridine, enocitabine, 5-fluorouracil, floxuridine, ratitrexed (Tomudex)); Cytosine analogs:

(comprising cytarabine, cytosine arabinoside, fludarabine); Purine analogs: (comprising azathioprine, fludarabine, mercaptopurine, thiamiprine, thioguanine)]; folic acid replenisher, frolinic acid]; and Inhibitors of nicotinamide phosphoribosyltransferase (NAMPT);

e). A hormonal therapy: selected from the group consisting of {Receptor antagonists: [Anti-estrogen: (comprising megestrol, raloxifene, tamoxifen); LHRH agonists: (comprising goserelin, leuprolide acetate); Anti-androgens: (comprising bicalutamide, flutamide, calusterone, dromostanolone propionate, epitio stanol, goserelin, leuprolide, mepitio stanane, nilutamide, testolactone, trilostane and other androgens inhibitors)]; Retinoids/Deltoids: [Vitamin D3 analogs: (comprising CB 1093, EB 1089 KH 1060, cholecalciferol, ergocalciferol); Photodynamic therapies: (comprising verteporfin, phthalocyanine, photosensitizer Pc4, demethoxyhypocrellin A); Cytokines: (comprising Interferon-alpha, Interferon-gamma, tumor necrosis factor (TNFs), human proteins containing a TNF domain)]};

f). A kinase inhibitor, selected from the group consisting of BIBW 2992 (anti-EGFR/Erb2), imatinib, gefitinib, pegaptanib, sorafenib, dasatinib, sunitinib, erlotinib, nilotinib, lapatinib, axitinib, pazopanib, vandetanib, E7080 (anti-VEGFR2), mubritinib, ponatinib (AP24534), bafetinib (INNO-406), bosutinib (SKI-606), cabozantinib, vismodegib, iniparib, ruxolitinib, CYT387, axitinib, tivozanib, sorafenib, bevacizumab, cetuximab, Trastuzumab, Ranibizumab, Panitumumab, ispinesib;

g). A poly (ADP-ribose) polymerase (PARP) inhibitors selected from the group consisting of olaparib, niraparib, iniparib, talazoparib, veliparib, CEP 9722 (Cephalon's), E7016 (Eisai's), BGB-290 (BeiGene's), or 3-aminobenzamide.

h). An antibiotic, selected from the group consisting of an enediyne antibiotic (selected from the group consisting of calicheamicin, calicheamicin γ 1, δ 1, α 1 or β 1; dynemicin, including dynemicin A and deoxydynemicin; esperamicin, kedarcidin, C-1027, maduropeptin, or neo-carzinostatin chromophore and related chromoprotein enediyne antibiotic chromomorphores), aclacinomycins, actinomycin, authramycin, azaserine, bleomycins, cactinomycin, carabycin, carminomycin, carzinophilin; chromomycins, dactinomycin, daunorubicin, detorubicin, 6-diazo-5-oxo-L-norleucine, doxorubicin, morpholino-doxorubicin, cyanomorpholino-doxorubicin, 2-pyrrolino-doxorubicin and deoxydoxorubicin, epirubicin, eribulin, esorubicin, idarubicin, marcellomycin, nitomycins, mycophenolic acid, nogalamycin, olivomycins, peplomycin, potfiromycin, puromycin, quelamycin, rodorubicin, streptonigrin, streptozocin, tubercidin, ubenimex, zinostatin, zorubicin;

i). A polyketide (acetogenin), bullatacin and bullatacinone; gemcitabine, epoxomicins and carfilzomib, bortezomib, thalidomide, lenalidomide, pomalidomide, tosedostat, zybrestat,

PLX4032, STA-9090, Stimuvax, allovectin-7, Xegeva, Provenge, Yervoy, Isoprenylation inhibitors and Lovastatin, Dopaminergic neurotoxins and 1-methyl-4-phenylpyridinium ion, Cell cycle inhibitors (selected from staurosporine), Actinomycins (comprising Actinomycin D, dactinomycin), amanitins, Bleomycins (comprising bleomycin A2, bleomycin B2, peplomycin), Anthracyclines (comprising daunorubicin, doxorubicin (adriamycin), idarubicin, epirubicin, pirarubicin, zorubicin, mitoxantrone, MDR inhibitors or verapamil, Ca^{2+} ATPase inhibitors or thapsigargin, Histone deacetylase inhibitors ((comprising Vorinostat, Romidepsin, Panobinostat, Valproic acid, Mocetinostat (MGCD0103), Belinostat, PCI-24781, Entinostat, SB939, Resminostat, Givinostat, AR-42, CUDC-101, sulforaphane, Trichostatin A) ; Thapsigargin, Celecoxib, glitazones, epigallocatechin gallate, Disulfiram, Salinosporamide A.; Anti-adrenals, selected from the group consisting of aminoglutethimide, mitotane, trilostane; aceglatone; aldophosphamide glycoside; aminolevulinic acid; amsacrine; arabinoside, bestabucil; bisantrene; edatraxate; defofamine; demecolcine; diaziquone; eflornithine (DFMO), elfomithine; eliptinium acetate, etoglucid; gallium nitrate; gacytosine, hydroxyurea; ibandronate, lentinan; lonidamine; mitoguazone; mitoxantrone; mopidamol; nitracrine; pentostatin; phenamet; pirarubicin; podophyllinic acid; 2-ethylhydrazide; procarbazine; PSK[®]; razoxane; rhizoxin; sizofiran; spirogermanium; tenuazonic acid; triaziquone; 2, 2',2''-trichlorotriethylamine; trichothecenes (including the group consisting of T-2 toxin, verrucarins A, roridin A and anguidine); urethane, siRNA, antisense drugs;

(2). An anti-autoimmune disease agent: cyclosporine, cyclosporine A, aminocaproic acid, azathioprine, bromocriptine, chlorambucil, chloroquine, cyclophosphamide, corticosteroids (including the group consisting of amcinonide, betamethasone, budesonide, hydrocortisone, flunisolide, fluticasone propionate, fluocortolone, danazol, dexamethasone, Triamcinolone acetonide, beclomethasone dipropionate), DHEA, enanercept, hydroxychloroquine, infliximab, meloxicam, methotrexate, mofetil, mycophenylate, prednisone, sirolimus, tacrolimus.

(3). An anti-infectious disease agents comprising:

a). Aminoglycosides: amikacin, astromicin, gentamicin (netilmicin, sisomicin, isepamicin), hygromycin B, kanamycin (amikacin, arbekacin, bekanamycin, dibekacin, tobramycin), neomycin (framycetin, paromomycin, ribostamycin), netilmicin, spectinomycin, streptomycin, tobramycin, verdamicin;

b). Amphenicols: azidamfenicol, chloramphenicol, florfenicol, thiamphenicol;

c). Ansamycins: geldanamycin, herbimycin;

d). Carbapenems: biapenem, doripenem, ertapenem, imipenem/cilastatin, meropenem, panipenem;

e). Cepheids: carbacephem (loracarbef), cefacetile, cefaclor, cefradine, cefadroxil, cefalonium, cefaloridine, cefalotin or cefalothin, cefalexin, cefaloglycin, cefamandole, cefapirin, cefatrizine, cefazaflur, cefazedone, cefazolin, cefbuperazone, cefcapene, cefdaloxime, cefepime, cefminox, cefoxitin, cefprozil, cefroxadine, ceftezole, cefuroxime, cefixime, cefdinir, cefditoren, cefepime, cefetamet, cefmenoxime, cefodizime, cefonicid, cefoperazone, ceforanide, cefotaxime, cefotiam, cefozopran, cephalixin, cefpimizole, cefpiramide, cefpirome, cefpodoxime, cefprozil, cefquinome, cefsulodin, ceftazidime, ceftaram, ceftibuten, ceftiolene, ceftizoxime, ceftobiprole, ceftriaxone, cefuroxime, cefuzonam, cephamycin (cefoxitin, cefotetan, cefmetazole), oxacephem (flomoxef, latamoxef);

f). Glycopeptides: bleomycin, vancomycin (oritavancin, telavancin), teicoplanin (dalbavancin), ramoplanin;

g). Glycylcyclines: tigecycline;

h). β -Lactamase inhibitors: penam (sulbactam, tazobactam), clavam (clavulanic acid);

i). Lincosamides: clindamycin, lincomycin;

j). Lipopeptides: daptomycin, A54145, calcium-dependent antibiotics (CDA);

k). Macrolides: azithromycin, cethromycin, clarithromycin, dirithromycin, erythromycin, flurithromycin, josamycin, ketolide (telithromycin, cethromycin), midecamycin, miocamycin, oleandomycin, rifamycins (rifampicin, rifampin, rifabutin, rifapentine), rokitamycin, roxithromycin, spectinomycin, spiramycin, tacrolimus (FK506), troleandomycin, telithromycin;

l). Monobactams: aztreonam, tigemonam;

m). Oxazolidinones: linezolid;

n). Penicillins: amoxicillin, ampicillin, pivampicillin, hetacillin, bacampicillin, metampicillin, talampicillin, azidocillin, azlocillin, benzylpenicillin, benzathine benzylpenicillin, benzathine phenoxymethylpenicillin, clometocillin, procaine benzylpenicillin, carbenicillin (carindacillin), cloxacillin, dicloxacillin, epicillin, flucloxacillin, mecillinam (pivmecillinam), mezlocillin, meticillin, nafcillin, oxacillin, penamecillin, penicillin, pheneticillin, phenoxymethylpenicillin, piperacillin, propicillin, sulbenicillin, temocillin, ticarcillin;

o). Polypeptides: bacitracin, colistin, polymyxin B;

p). Quinolones: alatrofloxacin, balofloxacin, ciprofloxacin, clinafloxacin, danofloxacin, difloxacin, enoxacin, enrofloxacin, floxin, garenoxacin, gatifloxacin, gemifloxacin, grepafloxacin, kano trovafloxacin, levofloxacin, lomefloxacin, marbofloxacin, moxifloxacin, nadifloxacin, norfloxacin, orbifloxacin, ofloxacin, pefloxacin, trovafloxacin, grepafloxacin, sitafloxacin, sparfloxacin, temafloxacin, tosufloxacin, trovafloxacin;

q). Streptogramins: pristnamycin, quinupristin/dalfopristin;

- r). Sulfonamides: mafenide, prontosil, sulfacetamide, sulfamethizole, sulfanilimide, sulfasalazine, sulfisoxazole, trimethoprim, trimethoprim-sulfamethoxazole (co-trimoxazole);
- s). Steroid antibacterials: selected from fusidic acid;
- t). Tetracyclines: doxycycline, chlortetracycline, clomocycline, demeclocycline, lymecycline, meclocycline, metacycline, minocycline, oxytetracycline, penimepicycline, rolitetracycline, tetracycline, glycylcyclines (including tigecycline);
- u). Other antibiotics: selected from the group consisting of annonacin, arspenamine, bactoprenol inhibitors (Bacitracin), DADAL/AR inhibitors (cycloserine), dictyostatin, discodermolide, eleutherobin, epothilone, ethambutol, etoposide, faropenem, fusidic acid, furazolidone, isoniazid, laulimalide, metronidazole, mupirocin, mycolactone, NAM synthesis inhibitors (fosfomycin), nitrofurantoin, paclitaxel, platensimycin, pyrazinamide, quinupristin/dalfopristin, rifampicin (rifampin), tazobactam, tinidazole, uvaricin;
- (4). Anti-viral drugs comprising:
 - a). Entry/fusion inhibitors: aplaviroc, maraviroc, vicriviroc, *gp41* (enfuvirtide), PRO 140, CD4 (ibalizumab);
 - b). Integrase inhibitors: raltegravir, elvitegravir, globoindan A;
 - c). Maturation inhibitors: bevirimat, vivecon;
 - d). Neuraminidase inhibitors: oseltamivir, zanamivir, peramivir;
 - e). Nucleosides & nucleotides: abacavir, aciclovir, adefovir, amdoxovir, apricitabine, brivudine, cidofovir, clevidine, dextelvucitabine, didanosine (ddI), elvucitabine, emtricitabine (FTC), entecavir, famciclovir, fluorouracil (5-FU), 3'-fluoro-substituted 2', 3'-dideoxynucleoside analogues (including the group consisting of 3'-fluoro-2',3'-dideoxythymidine (FLT) and 3'-fluoro-2',3'-dideoxyguanosine (FLG), fomivirsen, ganciclovir, idoxuridine, lamivudine (3TC), l-nucleosides (including the group consisting of β -l-thymidine and β -l-2'-deoxycytidine), penciclovir, racivir, ribavirin, stampidine, stavudine (d4T), taribavirin (viramidine), telbivudine, tenofovir, trifluridine, valaciclovir, valganciclovir, zalcitabine (ddC), zidovudine (AZT);
 - f). Non-nucleosides: amantadine, ateviridine, capravirine, diarylpyrimidines (etravirine, rilpivirine), delavirdine, docosanol, emivirine, efavirenz, foscarnet (phosphonoformic acid), imiquimod, interferon α , loviride, lodenosine, methisazone, nevirapine, NOV-205, peginterferon α , podophyllotoxin, rifampicin, rimantadine, resiquimod (R-848), tromantadine;
 - g). Protease inhibitors: amprenavir, atazanavir, boceprevir, darunavir, fosamprenavir, indinavir, lopinavir, nelfinavir, pleconaril, ritonavir, saquinavir, telaprevir (VX-950), tipranavir;
 - h). Other types of anti-virus drugs: abzyme, arbidol, calanolide A, ceragenin, cyanovirin-n, diarylpyrimidines, epigallocatechin gallate (EGCG), foscarnet, griffithsin, taribavirin

(viramidine), hydroxyurea, KP-1461, miltefosine, pleconaril, portmanteau inhibitors, ribavirin, seliciclib.

(5). A radioisotope that can be selected from the group consisting of (radionuclides) ^3H , ^{11}C , ^{14}C , ^{18}F , ^{32}P , ^{35}S , ^{64}Cu , ^{68}Ga , ^{86}Y , ^{99}Tc , ^{111}In , ^{123}I , ^{124}I , ^{125}I , ^{131}I , ^{133}Xe , ^{177}Lu , ^{211}At , or ^{213}Bi .

(6). A chromophore molecule, which is capable of absorbing UV light, florescent light, IR light, near IR light, visual light; A class or subclass of xanthophores, erythrophores, iridophores, leucophores, melanophores, cyanophores, fluorophore molecules which are fluorescent chemical compounds reemitting light upon light, visual phototransduction molecules, photophore molecules, luminescence molecules, luciferin compounds; Non-protein organic fluorophores, selected from: Xanthene derivatives (comprising fluorescein, rhodamine, Oregon green, eosin, and Texas red); Cyanine derivatives: (comprising cyanine, indocarbocyanine, oxacarbocyanine, thiocarbocyanine, and merocyanine); Squaraine derivatives and ring-substituted squaraines, including Seta, SeTau, and Square dyes; Naphthalene derivatives (comprising dansyl and prodan derivatives); Coumarin derivatives; Oxadiazole derivatives (comprising pyridyloxazole, nitrobenzoxadiazole and benzoxadiazole); Anthracene derivatives (comprising anthraquinones, including DRAQ5, DRAQ7 and CyTRAK Orange); Pyrene derivatives (cascade blue); Oxazine derivatives (comprising Nile red, Nile blue, cresyl violet, oxazine 170). Acridine derivatives (comprising proflavin, acridine orange, acridine yellow). Arylmethine derivatives (comprising auramine, crystal violet, malachite green). Tetrapyrrole derivatives (comprising porphin, phthalocyanine, bilirubin); Any analogs and derivatives of the following fluorophore compounds comprising CF dye, DRAQ and CyTRAK probes, BODIPY, Alexa Fluor, DyLight Fluor, Atto and Tracy, FluoProbes, Abberior Dyes, DY and MegaStokes Dyes, Sulfo Cy dyes, HiLyte Fluor, Seta, SeTau and Square Dyes, Quasar and Cal Fluor dyes, SureLight Dyes (APC, RPEPerCP, Phycobilisomes), APC, APCXL, RPE, BPE, Allophycocyanin (APC), Aminocoumarin, APC-Cy7 conjugates, BODIPY-FL, Cascade Blue, Cy2, Cy3, Cy3.5, Cy3B, Cy5, Cy5.5, Cy7, Fluorescein, FluorX, Hydroxycoumarin, Lissamine Rhodamine B, Lucifer yellow, Methoxycoumarin, NBD, Pacific Blue, Pacific Orange, PE-Cy5 conjugates, PE-Cy7 conjugates, PerCP, R-Phycoerythrin(PE), Red 613, Seta-555-Azide, Seta-555-DBCO, Seta-555-NHS, Seta-580-NHS, Seta-680-NHS, Seta-780-NHS, Seta-APC-780, Seta-PerCP-680, Seta-R-PE-670, SeTau-380-NHS, SeTau-405-Maleimide, SeTau-405-NHS, SeTau-425-NHS, SeTau-647-NHS, Texas Red, TRITC, TruRed, X-Rhodamine, 7-AAD (7-aminoactinomycin D, CG-selective), Acridine Orange, Chromomycin A3, CyTRAK Orange (red excitation dark), DAPI, DRAQ5, DRAQ7, Ethidium Bromide, Hoechst33258, Hoechst33342, LDS 751, Mithramycin, PropidiumIodide (PI), SYTOX Blue, SYTOX Green,

SYTOX Orange, Thiazole Orange, TO-PRO: Cyanine Monomer, TOTO-1, TO-PRO-1, TOTO-3, TO-PRO-3, YOSeta-1, YOYO-1; A fluorophore compound: comprising DCFH (2',7'-Dichlorodihydro-fluorescein, oxidized form), DHR (Dihydrorhodamine 123, oxidized form, light catalyzes oxidation), Fluo-3 (AM ester. pH > 6), Fluo-4 (AM ester. pH 7.2), Indo-1 (AM ester, low/high calcium (Ca²⁺)), SNARF(pH 6/9), Allophycocyanin(APC), AmCyan1 (tetramer, Clontech), AsRed2 (tetramer, Clontech), Azami Green (monomer), Azurite, B-phycoerythrin (BPE), Cerulean, CyPet, DsRed monomer (Clontech), DsRed2 ("RFP"), EBFP, EBFP2, ECFP, EGFP (weak dimer), Emerald (weak dimer), EYFP (weak dimer), GFP (S65A mutation), GFP (S65C mutation), GFP (S65L mutation), GFP (S65T mutation), GFP (Y66F mutation), GFP (Y66H mutation), GFP (Y66W mutation), GFPuv, HcRed1, J-Red, Katusha, Kusabira Orange (monomer, MBL), mCFP, mCherry, mCitrine, Midoriishi Cyan (dimer, MBL), mKate (TagFP635, monomer), mKeima-Red (monomer), mKO, mOrange, mPlum, mRaspberry, mRFP1 (monomer), mStrawberry, mTFP1, mTurquoise2, P3 (phycobilisome complex), Peridinin Chlorophyll (PerCP), R-phycoerythrin (RPE), T-Sapphire, TagCFP (dimer), TagGFP (dimer), TagRFP (dimer), TagYFP (dimer), tdTomato (tandem dimer), Topaz, TurboFP602 (dimer), TurboFP635 (dimer), TurboGFP (dimer), TurboRFP (dimer), TurboYFP (dimer), Venus, Wild Type GFP, YPet, ZsGreen1 (tetramer), ZsYellow1 (tetramer) and their derivatives.

(7). The cell-binding ligands or receptor agonists, which can be selected from: Folate derivatives; Glutamic acid urea derivatives; Somatostatin and its analogs (selected from the group consisting of octreotide (Sandostatin) and lanreotide (Somatuline)); Aromatic sulfonamides; Pituitary adenylate cyclase activating peptides (PACAP) (PAC1); Vasoactive intestinal peptides (VIP/PACAP) (VPAC1, VPAC2); Melanocyte-stimulating hormones (α -MSH); Cholecystokinins (CCK) /gastrin receptor agonists; Bombesins (selected from the group consisting of Pyr-Gln-Arg-Leu-Gly-Asn-Gln-Trp-Ala-Val-Gly-His-Leu-Met-NH₂)/gastrin-releasing peptide (GRP); Neurotensin receptor ligands (NTR1, NTR2, NTR3); Substance P (NK1 receptor) ligands; Neuropeptide Y (Y1–Y6); Homing Peptides include RGD (Arg-Gly-Asp), NGR (Asn-Gly-Arg), the dimeric and multimeric cyclic RGD peptides (selected from cRGDfV), TAASGVRSMH and LTLRWVGLMS (Chondroitin sulfate proteoglycan NG2 receptor ligands) and F3 peptides; Cell Penetrating Peptides (CPPs); Peptide Hormones, selected from the group consisting of luteinizing hormone-releasing hormone (LHRH) agonists and antagonists, and gonadotropin-releasing hormone (GnRH) agonist, acts by targeting follicle stimulating hormone (FSH) and luteinising hormone (LH), as well as testosterone production, selected from the group consisting of buserelin (Pyr-His-Trp-Ser-Tyr-D-Ser(OtBu)-Leu-Arg-

Pro-NHEt), Gonadorelin (Pyr-His-Trp-Ser-Tyr-Gly-Leu-Arg-Pro-Gly-NH₂), Goserelin (Pyr-His-Trp-Ser-Tyr-D-Ser(OtBu)-Leu-Arg-Pro-AzGly-NH₂), Histrelin (Pyr-His-Trp-Ser-Tyr-D-His(N-benzyl)-Leu-Arg-Pro-NHEt), leuprolide (Pyr-His-Trp-Ser-Tyr-D-Leu-Leu-Arg-Pro-NHEt), Nafarelin (Pyr-His-Trp-Ser-Tyr-2Nal-Leu-Arg-Pro-Gly-NH₂), Triptorelin (Pyr-His-Trp-Ser-Tyr-D-Trp-Leu-Arg-Pro-Gly-NH₂), Nafarelin, Deslorelin, Abarelix (Ac-D-2Nal-D-4-chloroPhe-D-3-(3-pyridyl)Ala-Ser-(N-Me)Tyr-D-Asn-Leu-isopropylLys-Pro-DAla-NH₂), Cetorelix (Ac-D-2Nal-D-4-chloroPhe-D-3-(3-pyridyl)Ala-Ser-Tyr-D-Cit-Leu-Arg-Pro-D-Ala-NH₂), Degarelix (Ac-D-2Nal-D-4-chloroPhe-D-3-(3-pyridyl)Ala-Ser-4-aminoPhe(L-hydroorotyl)-D-4-aminoPhe(carba-moyl)-Leu-isopropylLys-Pro-D-Ala-NH₂), and Ganirelix (Ac-D-2Nal-D-4-chloroPhe-D-3-(3-pyridyl)Ala-Ser-Tyr-D-(N₉, N₁₀-diethyl)-homoArg-Leu-(N₉, N₁₀-diethyl)-homoArg-Pro-D-Ala-NH₂); Pattern Recognition Receptor (PRRs), selected from the group consisting of Toll-like receptors' (TLRs) ligands, C-type lectins and Nodlike Receptors' (NLRs) ligands; Calcitonin receptor agonists; integrin receptors' and their receptor subtypes' (selected from the group consisting of $\alpha_v\beta_1$, $\alpha_v\beta_3$, $\alpha_v\beta_5$, $\alpha_v\beta_6$, $\alpha_6\beta_4$, $\alpha_7\beta_1$, $\alpha_L\beta_2$, $\alpha_{IIb}\beta_3$) agonists (selected from the group consisting of GRGDSPK, cyclo(RGDfV) (L1) and its derivatives [cyclo(-N(Me)R-GDfV), cyclo(R-Sar-DfV), cyclo(RG-N(Me)D-fV), cyclo(RGD-N(Me)f-V), cyclo(RGDf-N(Me)V-)(Cilengitide)]; Nanobody (a derivative of VHH (camelid Ig)); Domain antibodies (dAb, a derivative of VH or VL domain); Bispecific T cell Engager (BiTE, a bispecific diabody); Dual Affinity ReTargeting (DART, a bispecific diabody); Tetravalent tandem antibodies (TandAb, a dimerized bispecific diabody); Anticalin (a derivative of Lipocalins); Adnectins (10th FN3 (Fibronectin)); Designed Ankyrin Repeat Proteins (DARPs); Avimers; EGF receptors and VEGF receptors' agonists.

(8). The pharmaceutically acceptable salts, acids, derivatives, hydrate or hydrated salt; or a crystalline structure; or an optical isomer, racemate, diastereomer or enantiomer of any of the above drugs.

913. The conjugate compound according to claim 1, wherein the Drug₁ or Drug₂ is a chromophore molecule, is used for detecting, monitoring, or studying the interactions and/or functions of the cell binding molecule, and/or the interactions of the conjugate with a targeted cell.

1014. The conjugate compound according to claim 1, wherein the Drug₁ or Drug₂ is a polyalkylene glycols [comprising poly(ethylene glycol) (PEGs), poly(propylene glycol), a copolymer of ethylene oxide or propylene oxide, or their analogs], is used for extending the half-life of the cell-binding molecule when it is administered to a mammal.

1115. The conjugate compound according to claim **1**, wherein the Drug₁ or Drug₂ is a cell-binding ligand, a cell receptor agonist, or a cell receptor binding molecule, is used for as a targeting conductor/director to deliver the conjugate compound to malignant cells, or for modulating or co-stimulating a desired immune response, or for altering signaling pathways.

1216. The conjugate compound of any one of claim **1** or Claim **2**, wherein the Drug₁ or Drug₂ is selected from the group consisting of tubulysins, calicheamicins, auristatins, maytansinoids, CC-1065 analogs, daunorubicin and doxorubicin compounds, taxanoids (taxanes), cryptophycins, epothilones, benzodiazepine dimers (comprising pyrrolbenzodiazepine dimers (PBD), tomaymycin dimers, anthramycin dimers, indolinbenzodiazepine dimers, imidazobenzothiadiazepine dimers, or oxazolidinobenzodiazepine dimers and their derivatives), calicheamicins and the enediyne antibiotics, actinomycins, amatoxins, amanitins, azaserines, bleomycins, epirubicins, tamoxifen, idarubicin, dolastatins/auristatins (comprising monomethyl auristatin E, MMAE, MMAF, auristatin PYE, auristatin TP, Auristatins 2-AQ, 6-AQ, EB (AEB), EFP (AEFP) and their analogs), duocarmycins, geldanamycins, methotrexates, thiotepa, vindesines, vincristines, hemiasterlins, nazumamides, microginins, radiosumins, alterobactins, microsclerodermins, theonellamides, esperamicins, erbulins, inhibitors of nicotinamide phosphoribosyltransferase (NAMPT), siRNA, miRNA, piRNA, nucleolytic enzymes, and/or pharmaceutically acceptable salts, acids, or/and their analogues, derivatives, hydrate or hydrated salt; or a crystalline structure; or an optical isomer, racemate, diastereomer or enantiomer of any of the above drugs thereof.

1317. The conjugate compound according to claim **1**, **2**, **8**, **9**, **10**, ~~**11**~~, ~~**5**~~, ~~**6**~~, ~~**12**~~, ~~**13**~~, ~~**14**~~, ~~**15**~~, or ~~**1216**~~, wherein the cell binding agent/molecule is selected from the group consisting of an antibody, a protein, probody, nanobody, a vitamin (including folate), peptides, a polymeric micelle, a liposome, a lipoprotein-based drug carrier, a nano-particle drug carrier, a dendrimer, and a molecule or a particle said above coating with cell-binding ligands, or a combination of said above thereof.

1418. The conjugate compounds according to any one of claims **1**, **2**, **8**, **9**, **10**, ~~**11**~~, ~~**5**~~, ~~**6**~~, ~~**12**~~, ~~**13**~~, ~~**14**~~, ~~**15**~~, ~~**16**~~, or ~~**1317**~~, wherein the cell binding agent/molecule is selected from an antibody, an antibody-like protein, a full-length antibody (polyclonal antibody, monoclonal antibody, antibody dimer, antibody multimer), or multispecific antibody (selected from, bispecific antibody, trispecific antibody, or tetraspecific antibody); a single chain antibody, an antibody fragment that binds to the target cell, a monoclonal antibody, a single chain monoclonal antibody, or a monoclonal antibody fragment that binds the target cell, a chimeric antibody, a chimeric antibody fragment that binds to the target cell, a domain antibody, a domain antibody

fragment that binds to the target cell, a resurfaced antibody, a resurfaced single chain antibody, or a resurfaced antibody fragment that binds to the target cell, a humanized antibody or a resurfaced antibody, a humanized single chain antibody, or a humanized antibody fragment that binds to the target cell, anti-idiotypic (anti-Id) antibodies, CDR's, diabody, triabody, tetrabody, miniantibody, a probody, a probody fragment, small immune proteins (SIP), a lymphokine, a hormone, a vitamin, a growth factor, a colony stimulating factor, a nutrient-transport molecule, large molecular weight proteins, nanoparticles or polymers modified with antibodies or large molecular weight proteins.

1519. The conjugate compounds according to any one of claims 1, 2, 8, 9, 10, 11 ~~5-6~~, 12, 13, ~~14, 15, 16, 17~~, or ~~1418~~ wherein the cell binding agent/molecule is capable of targeting against a tumor cell, a virus infected cell, a microorganism infected cell, a parasite infected cell, an autoimmune disease cell, an activated tumor cells, a myeloid cell, an activated T-cell, an affecting B cell, or a melanocyte, or any cells expressing any one of the following antigens or receptors: CD2, CD2R, CD3, CD3gd, CD3e, CD4, CD5, CD6, CD7, CD8, CD8a, CD8b, CD9, CD10, CD11a, CD11b, CD11c, CD12, CD12w, CD13, CD14, CD15, CD15s, CD15u, CD16, CD16a, CD16b, CD17, CDw17, CD18, CD19, CD20, CD21, CD22, CD23, CD24, CD25, CD26, CD27, CD28, CD29, CD30, CD31, CD32, CD33, CD34, CD35, CD36, CD37, CD38, CD39, CD40, CD41, CD42, CD42a, CD42b, CD42c, CD42d, CD43, CD44, CD44R, CD45, CD45RA, CD45RB, CD45RO, CD46, CD47, CD47R, CD48, CD49a, CD49b, CD49c, CD49e, CD49f, CD50, CD51, CD52, CD53, CD54, CD55, CD56, CD57, CD58, CD59, CD60, CD60a, CD60b, CD60c, CD61, CD62E, CD62L, CD62P, CD63, CD64, CD65, CD65s, CD66, CD66a, CD66b, CD66c, CD66d, CD66e, CD66f, CD67, CD68, CD69, CD70, CD71, CD72, CD73, CD74, CD74, CD75, CD75s, CD76, CD77, CD78, CD79, CD79a, CD79b, CD80, CD81, CD82, CD83, CD84, CDw84, CD85, CD86, CD87, CD88, CD89, CD90, CD91, CD92, CDw92, CD93, CD94, CD95, CD96, CD97, CD98, CD99, CD99R, CD100, CD101, CD102, CD103, CD104, CD105, CD106, CD107, CD107a, CD107b, CD108, CD109, CD110, CD111, CD112, CD113, CDw113, CD114, CD115, CD116, CD117, CD118, CD119, CDw119, CD120a, CD120b, CD121a, CD121b, CDw121b, CD122, CD123, CDw123, CD124, CD125, CDw125, CD126, CD127, CD128, CDw128, CD129, CD130, CD131, CDw131, CD132, CD133, CD134, CD135, CD136, CDw136, CD137, CDw137, CD138, CD139, CD140a, CD140b, CD141, CD142, CD143, CD144, CD145, CDw145, CD146, CD147, CD148, CD149, CD150, CD151, CD152, CD153, CD154, CD155, CD156a, CD156b, CDw156c, CD157, CD158a, CD158b, CD159a, CD159b, CD159c, CD160, CD161, CD162, CD162R, CD163, CD164, CD165, CD166, CD167, CD167a, CD168, CD169, CD170, CD171, CD172a, CD172b,

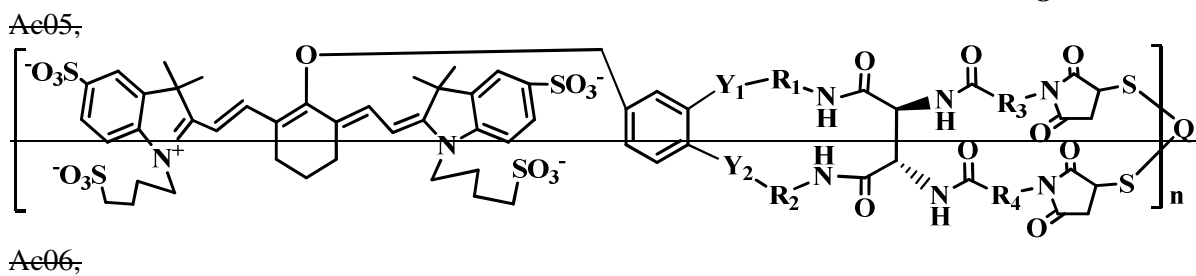
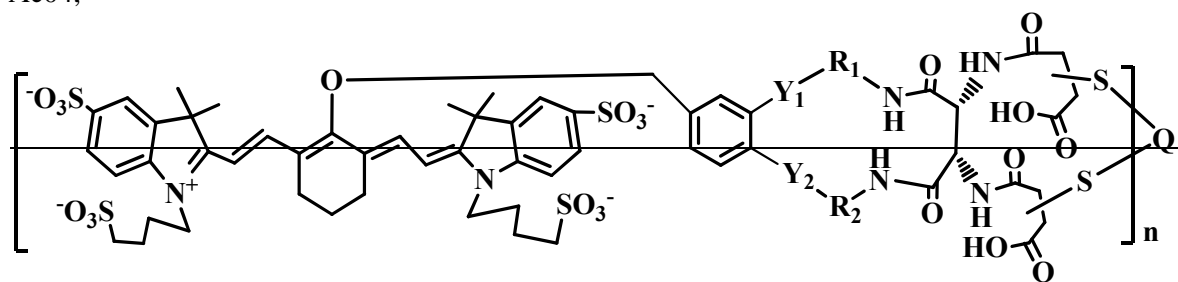
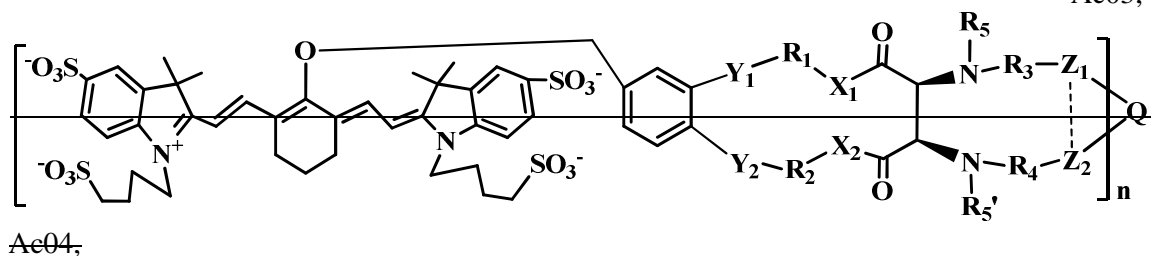
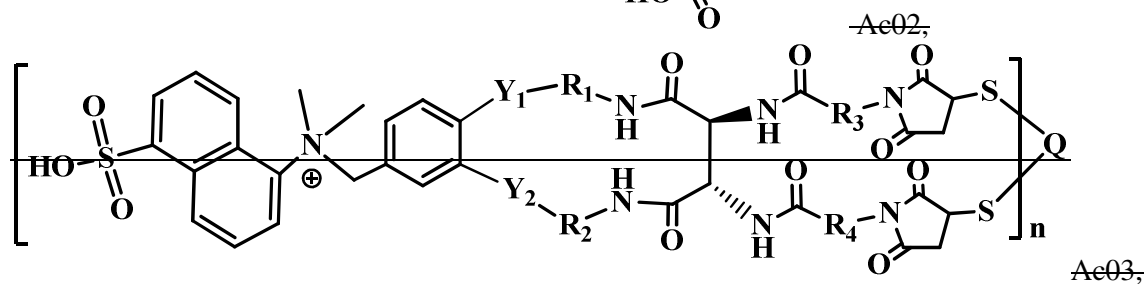
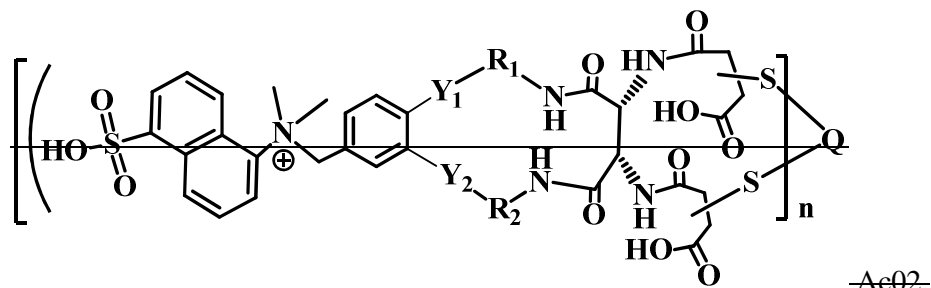
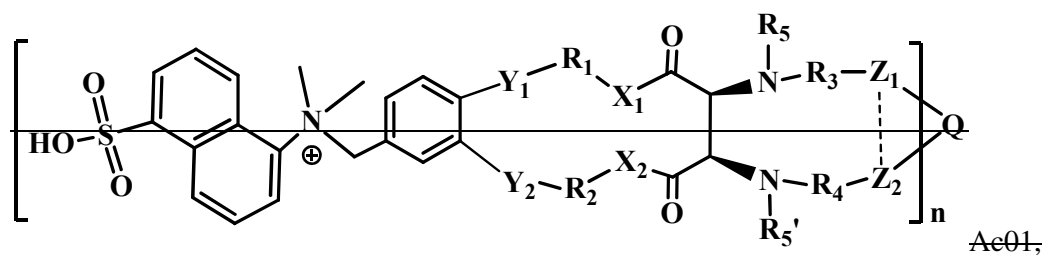
CD172g, CD173, CD174, CD175, CD175s, CD176, CD177, CD178, CD179, CD180, CD181, CD182, CD183, CD184, CD185, CD186, CDw186, CD187, CD188, CD189, CD190, Cd191, CD192, CD193, CD194, CD195, CD196, CD197, CD198, CDw198, CD199, CDw199, CD200, CD200a, CD200b, CD201, CD202, CD202b, CD203, CD203c, CD204, CD205, CD206, CD207, CD208, CD209, CD210, CDw210, CD211, CD212, CD213a1, CD213a2, CD214, CD215, CD216, CDw217, CDw218a, CDw218b, CD219, CD220, CD221, CD222, CD223, CD224, CD225, CD226, CD227, CD228, CD229, CD230, CD231, CD232, CD233, CD234, CD235a, CD235ab, CD235b, CD236, CD236R, CD237, CD238, CD239, CD240, CD240CE, CD240D, CD241, CD242, CD243, CD244, CD245, CD246, CD247, CD248, CD249, CD250, CD251, CD252, CD253, CD254, CD256, CD257, CD258, CD259, CD260, CD261, CD262, CD263, CD264, CD265, CD266, CD267, CD268, CD269, , CD270, CD271, CD272, CD273, CD274, CD275, CD276 (B7-H3), CD277, CD278, CD279, CD280, CD281, CD282, CD283, CD284, CD285, CD286, CD287, CD288, CD289, CD290, CD291, CD292, CDw293, CD294, CD295, CD296, CD297, CD298, CD299, CD300a, CD300c, CD300e, CD301, CD302, CD303, CD304, CD305, CD306, CD307, CD308, CD309, CD310, CD311, CD312, CD314, CD315, CD316, CD317, CD318, CD319, CD320, CD321, CD322, CD323, CD324, CDw325, CD326, CDw327, CDw328, CDw329, CD330, CD331, CD332, CD333, CD334, CD335, CD336, CD337, CDw338, CD339, 4-1BB, 5AC, 5T4 (Trophoblast glycoprotein, TPBG, 5T4, Wnt-Activated Inhibitory Factor 1 or WAIF1), Adenocarcinomaantigen, AGS-5, AGS-22M6, Activin receptor-like kinase 1, AFP, AKAP-4, ALK, Alpha intergrin, Alpha v beta6, Amino-peptidase N, Amyloid beta, Androgen receptor, Angiopoietin 2, Angiopoietin 3, Annexin A1, Anthrax toxin-protective antigen, Anti-transferrin receptor, AOC3 (VAP-1), B7-H3, Bacillus anthracisanthrax, BAFF (B-cell activating factor), B-lymphoma cell, bcr-abl, Bombesin, BORIS, C5, C242 antigen, CA125 (carbohydrate antigen 125, MUC16), CA-IX (or CAIX, carbonic anhydrase 9), CALLA, CanAg, Canis lupus familiaris IL31, Carbonic anhydrase IX, Cardiac myosin, CCL11(C-C motif chemokine 11), CCR4 (C-C chemokine receptor type 4, CD194), CCR5, CD3E (epsilon), CEA (Carcinoembryonic antigen), CEACAM3, CEACAM5 (carcinoembryonic antigen), CFD (Factor D), Ch4D5, Cholecystokinin 2 (CCK2R), CLDN18 (Claudin-18), Clumping factor A, CRIPTO, FCSF1R (Colony stimulating factor 1 receptor, CD115), CSF2 (colony stimulating factor 2, Granulocyte-macrophage colony-stimulating factor (GM-CSF)), CTLA4 (cytotoxic T-lymphocyte associated protein 4), CTAA16.88 tumor antigen, CXCR4 (CD184), C-X-C chemokine receptor type 4, cyclic ADP ribose hydrolase, Cyclin B1, CYP1B1, Cytomegalovirus, Cytomegalovirus glycoprotein B, Dabigatran, DLL3 (delta-like-ligand 3), DLL4 (delta-like-ligand 4), DPP4 (Dipeptidyl-peptidase 4), DR5 (Death

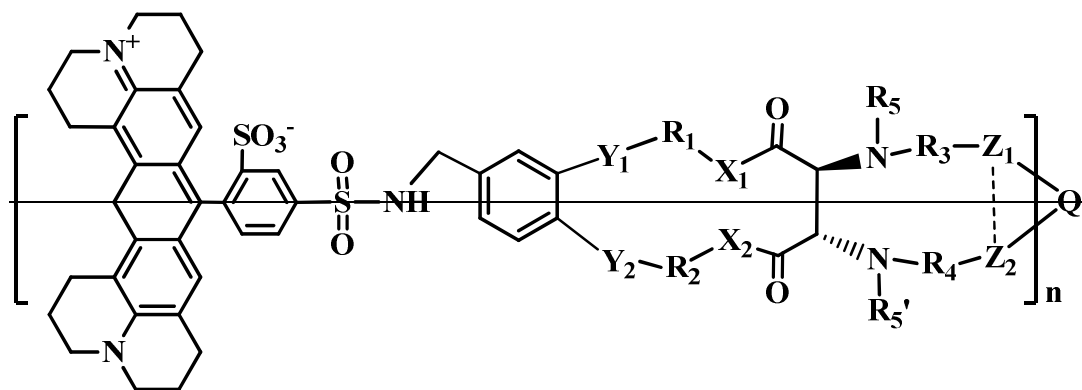
receptor 5), E. coli shiga toxintype-1, E. coli shiga toxintype-2, ED-B, EGFL7 (EGF-like domain-containing protein 7), EGFR, EGFR^{II}, EGFR^{vIII}, Endoglin (CD105), Endothelin B receptor, Endotoxin, EpCAM (epithelial cell adhesion molecule), EphA2, Episialin, ERBB2 (Epidermal Growth Factor Receptor 2), ERBB3, ERG (TMPRSS2 ETS fusion gene), Escherichia coli, ETV6-AML, FAP (Fibroblast activation proteinalpha), FCGR1, alpha-Fetoprotein, Fibrin II, beta chain, Fibronectin extra domain-B, FOLR (folate receptor), Folate receptor alpha, Folate hydrolase, Fos-related antigen 1, F protein of respiratory syncytial virus, Frizzled receptor, Fucosyl GM1, GD2 ganglioside, G-28 (a cell surface antigen glycolipid), GD3 idio type, GloboH, Glypican 3, N-glycolylneuraminic acid, GM3, GMCSF receptor α -chain, Growth differentiation factor 8, GP100, GPNMB (Transmembrane glycoprotein NMB), GUCY2C (Guanylate cyclase 2C, guanylyl cyclase C(GC-C), intestinal Guanylate cyclase, Guanylate cyclase-C receptor, Heat-stable enterotoxin receptor (hSTAR)), Heat shock proteins, Hemagglutinin, Hepatitis B surface antigen, Hepatitis B virus, HER1 (human epidermal growth factor receptor 1), HER2, HER2/neu, HER3 (ERBB-3), IgG4, HGF/SF (Hepatocyte growth factor/scatter factor), HHGFR, HIV-1, Histone complex, HLA-DR (human leukocyte antigen), HLA-DR10, HLA-DRB, HMWMAA, Human chorionic gonadotropin, HNGF, Human scatter factor receptor kinase, HPV E6/E7, Hsp90, hTERT, ICAM-1 (Intercellular Adhesion Molecule 1), Idiotype, IGF1R (IGF-1, insulin-like growth factor 1 receptor), IGHE, IFN- γ , Influeza hemag-glutinin, IgE, IgE Fc region, IGHE, interleukins (IL-1, IL-2, IL-3, IL-4, IL-5, IL-6, IL-6R, IL-7, IL-8, IL-9, IL-10, IL-11, IL-12, IL-13, IL-15, IL-17, IL-17A, IL-18, IL-19, IL-20, IL-21, IL-22, IL-23, IL-27, or IL-28), IL31RA, ILGF2 (Insulin-like growth factor 2), Integrins (α_4 , $\alpha_{IIb}\beta_3$, $\alpha_v\beta_3$, $\alpha_4\beta_7$, $\alpha_5\beta_1$, $\alpha_6\beta_4$, $\alpha_7\beta_7$, $\alpha_{II}\beta_3$, $\alpha_5\beta_5$, $\alpha_v\beta_5$), Interferon gamma-induced protein, ITGA2, ITGB2, KIR2D, LCK, Le, Legumain, Lewis-Y antigen, LFA-1 (Lymphocyte function-associated antigen 1, CD11a), LHRH, LINGO-1, Lipoteichoic acid, LIV1A, LMP2, LTA, MAD-CT-1, MAD-CT-2, MAGE-1, MAGE-2, MAGE-3, MAGE A1, MAGE A3, MAGE 4, MART1, MCP-1, MIF (Macrophage migration inhibitory factor, or glycosylation-inhibiting factor (GIF)), MS4A1 (membrane-spanning 4-domains subfamily A member 1), MSLN (mesothelin), MUC1 (Mucin 1, cell surface associated (MUC1) or polymorphic epithelial mucin (PEM)), MUC1-KLH, MUC16 (CA125), MCP1 (monocyte chemotactic protein 1), MelanA/MART1, ML-IAP, MPG, MS4A1 (membrane-spanning 4-domains subfamily A), MYCN, Myelin-associated glycoprotein, Myostatin, NA17, NARP-1, NCA-90 (granulocyte antigen), Nectin-4 (ASG-22ME), NGF, Neural apoptosis-regulated proteinase 1, NOGO-A, Notch receptor, Nucleolin, Neu oncogene product, NY-BR-1, NY-ESO-1, OX-40, OxLDL (Oxidized low-density lipoprotein), OY-TES1, P21, p53 nonmutant,

P97, Page4, PAP, Paratope of anti-(N-glycolylneuraminic acid), PAX3, PAX5, PCSK9, PDCD1 (PD-1, Programmed cell death protein 1, CD279), PDGF-R α (Alpha-type platelet-derived growth factor receptor), PDGFR- β , PDL-1, PLAC1, PLAP-like testicular alkaline phosphatase, Platelet-derived growth factor receptor beta, Phosphate-sodium co-transporter, PMEL 17, Polysialic acid, Proteinase3 (PR1), Prostatic carcinoma, PS (Phosphatidylserine), Prostatic carcinoma cells, Pseudomonas aeruginosa, PSMA, PSA, PSCA, Rabies virus glycoprotein, RHD (Rh polypeptide 1 (RhPI), CD240), Rhesus factor, RANKL, RANTES receptors (CCR1, CCR3, CCR5), RhoC, Ras mutant, RGS5, ROBO4, Respiratory syncytial virus, RON, Sarcoma translocation breakpoints, SART3, Sclerostin, SLAMF7 (SLAM family member 7), Selectin P, SDC1 (Syndecan 1), sLe(a), Somatomedin C, SIP (Sphingosine-1-phosphate), Somatostatin, Sperm protein 17, SSX2, STEAP1 (six-transmembrane epithelial antigen of the prostate 1), STEAP2, STn, TAG-72 (tumor associated glycoprotein 72), Survivin, T-cell receptor, T cell transmembrane protein, TEM1 (Tumor endothelial marker 1), TENB2, Tenascin C (TN-C), TGF- α , TGF- β (Transforming growth factor beta), TGF- β 1, TGF- β 2 (Transforming growth factor-beta 2), Tie (CD202b), Tie2, TIM-1 (CDX-014), Tn, TNF, TNF- α , TNFRSF8, TNFRSF10B (tumor necrosis factor receptor superfamily member 10B), TNFRSF13B (tumor necrosis factor receptor superfamily member 13B), TPBG (trophoblast glycoprotein), TRAIL-R1 (Tumor necrosis apoptosis Inducing ligand Receptor 1), TRAILR2 (Death receptor 5 (DR5)), tumor-associated calcium signal transducer 2, tumor specific glycosylation of MUC1, TWEAK receptor, TYRP1 (glycoprotein 75), TROP-2, TRP-2, Tyrosinase, VCAM-1 (CD106), VEGF, VEGF-A, VEGF-2 (CD309), VEGFR-1, VEGFR2, or vimentin, WT1, XAGE 1, or cells expressing any insulin growth factor receptors, or any epidermal growth factor receptors.

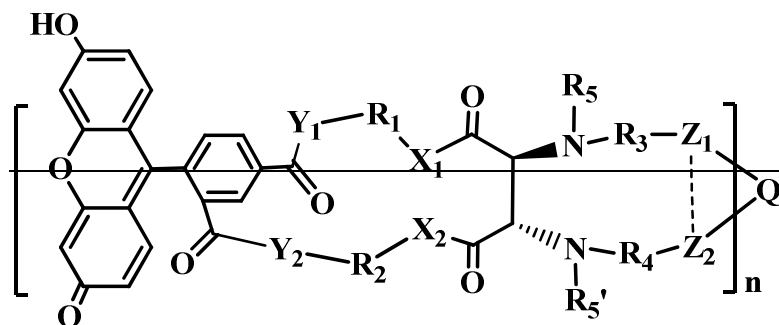
1620. The tumor cell according to ~~claim 15~~ **claim 19** is selected from the group consisting of lymphoma cells, myeloma cells, renal cells, breast cancer cells, prostate cancer cells, ovarian cancer cells, colorectal cancer cells, gastric cancer cells, squamous cancer cells, small-cell lung cancer cells, none small-cell lung cancer cells, testicular cancer cells, malignant cells, or any cells that grow and divide at an unregulated, quickened pace to cause cancers.

~~**1721.** The conjugate compound of claim 1, wherein the Drug₁ or Drug₂ is a chromophore molecule, is selected from the group consisting of structures of Ac01, Ac02, Ac03, Ac04, Ac05, Ac06, and Ac07, Ac08, Ac09, Ac010, and Ac11 as following:~~

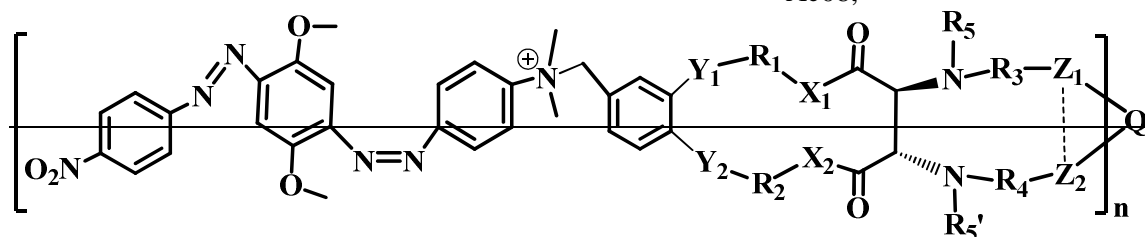




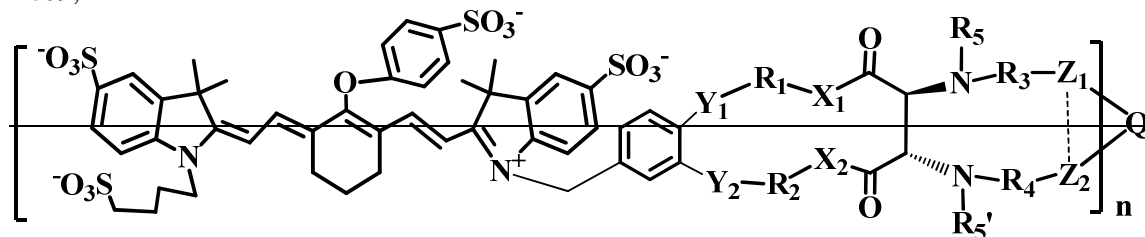
Ae07,



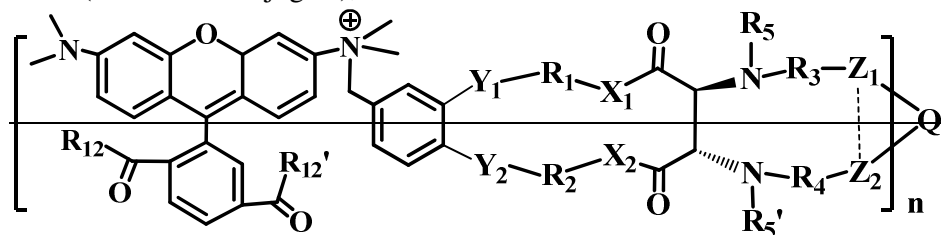
Ae08,



Ae09,



Ae10 (IR800CW conjugate),



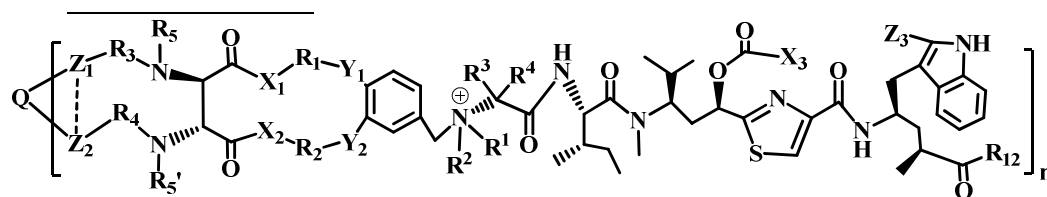
Ae11,

wherein “—”, Q, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R₅', Z₁, Z₂, and n are defined the same above,

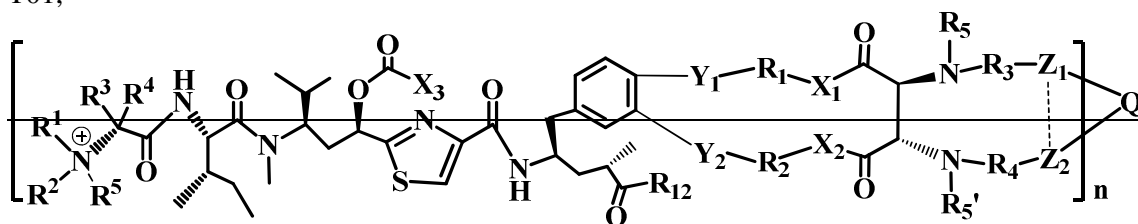
R₁₂ and R₁₂' are independently OH, NH₂, NHR₁, NHNH₂, NHHNHCOOH, O R₁-COOH, NH R₁-COOH, NH (Aa)_nCOOH, O(CH₂CH₂O)_pCH₂CH₂OH, O(CH₂CH₂O)_pCH₂CH₂NH₂, NH(CH₂CH₂O)_pCH₂CH₂NH₂, O(CH₂CH₂O)_pCH₂CH₂COOH, NH(CH₂CH₂O)_pCH₂CH₂COOH, O(CH₂CH₂O)_pCH₂CH₂NHSO₃H, NH(CH₂CH₂O)_pCH₂CH₂NHSO₃H, R₁-NHSO₃H, NH R₁-

NHSO_3H , $\text{O}(\text{CH}_2\text{CH}_2\text{O})_p\text{CH}_2\text{CH}_2\text{NHPO}_3\text{H}_2$, $\text{NH}(\text{CH}_2\text{CH}_2\text{O})_p\text{CH}_2\text{CH}_2\text{NHPO}_3\text{H}_2$, $\text{R}_1\text{NHPO}_3\text{H}_2$, $\text{R}_1\text{OPO}_3\text{H}_2$, $\text{O}(\text{CH}_2\text{CH}_2\text{O})_p\text{CH}_2\text{CH}_2\text{OPO}_3\text{H}_2$, $\text{NH}(\text{CH}_2\text{CH}_2\text{O})_p\text{CH}_2\text{CH}_2\text{NHPO}_3\text{H}_2$, or $\text{R}_1\text{NHPO}_3\text{H}_2$, $\text{NH R}_1\text{NHPO}_3\text{H}_2$, NH Ar COOH , NH Ar NH_2 , wherein $p=0-5000$, Aa is an amino acid, $(\text{Aa})_n$ comprises the same or different, natural or unnatural amino acids, $n=1-30$.

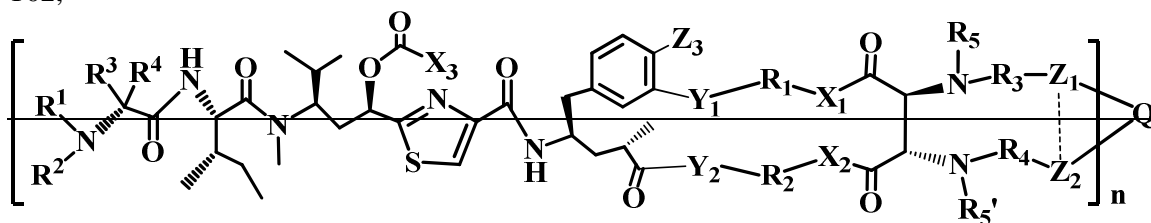
22. The conjugate compound of claim 1, wherein the Drug₁ or Drug₂ is a tubulysin analog, is selected from structures of T01, T02, T03, T04, T05, T06 T07, T08, T09, T10, T11, T12, T13, T14, T15, T16 T017, T18, T19, T20, T21, T22 and T23 as following:



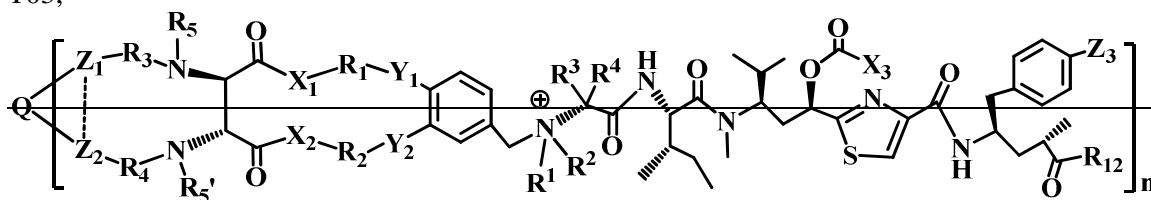
T01,



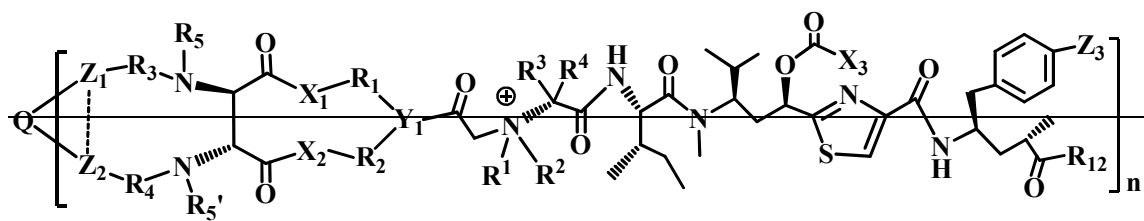
T02,



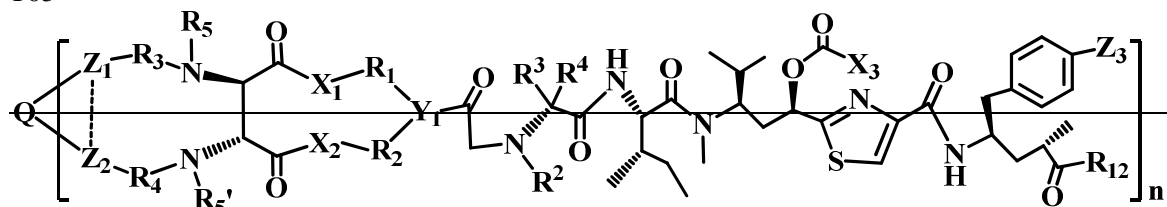
T03,



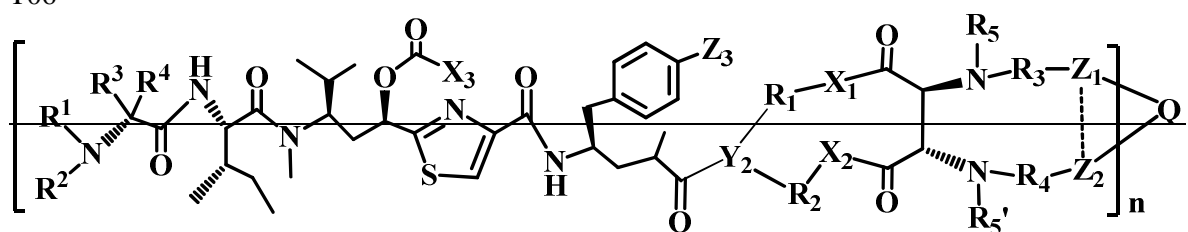
T04,



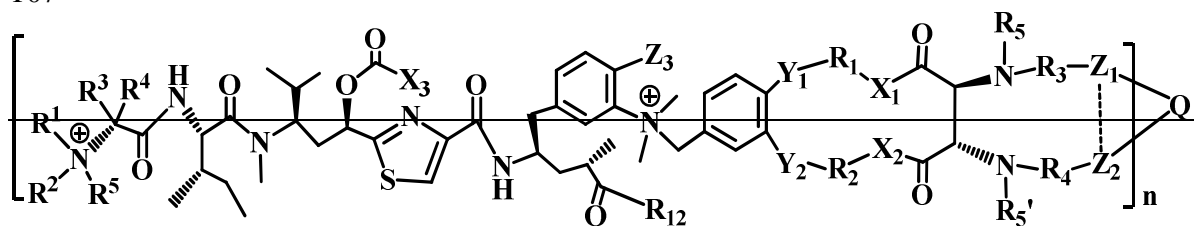
T05



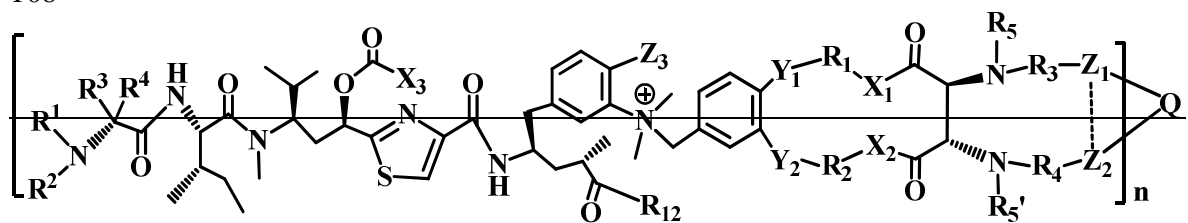
T06



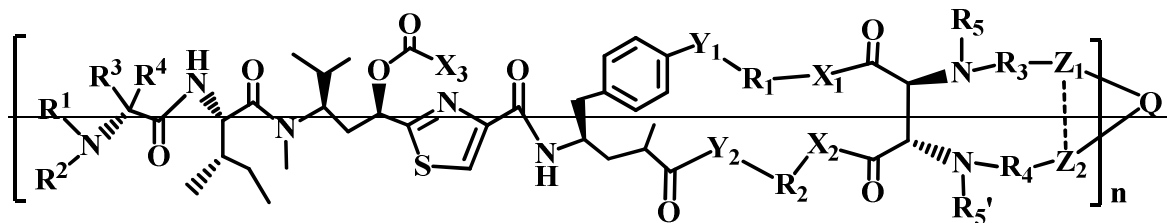
T07



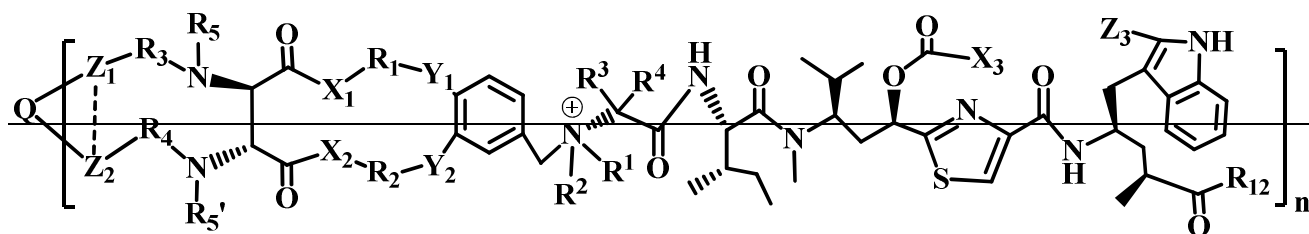
T08



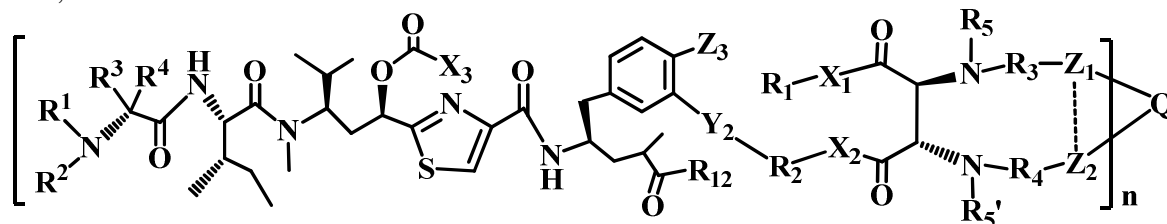
T09



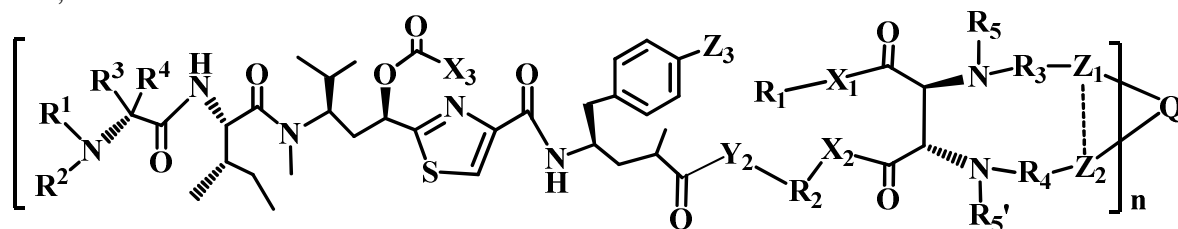
T10



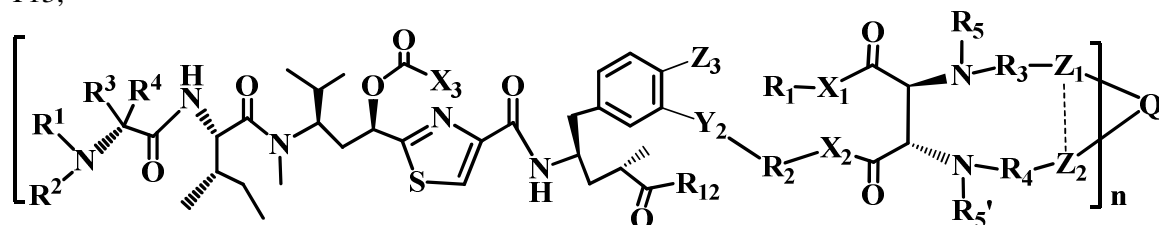
T11,



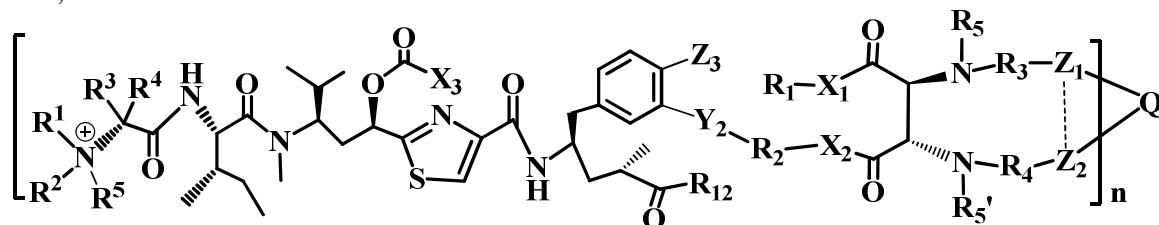
T12,



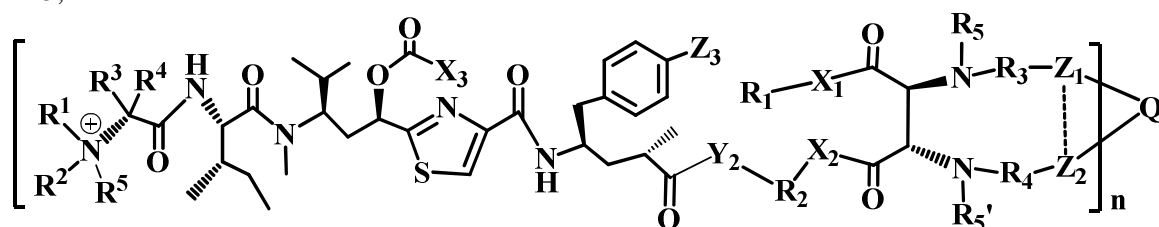
T13,



T14,



T15,

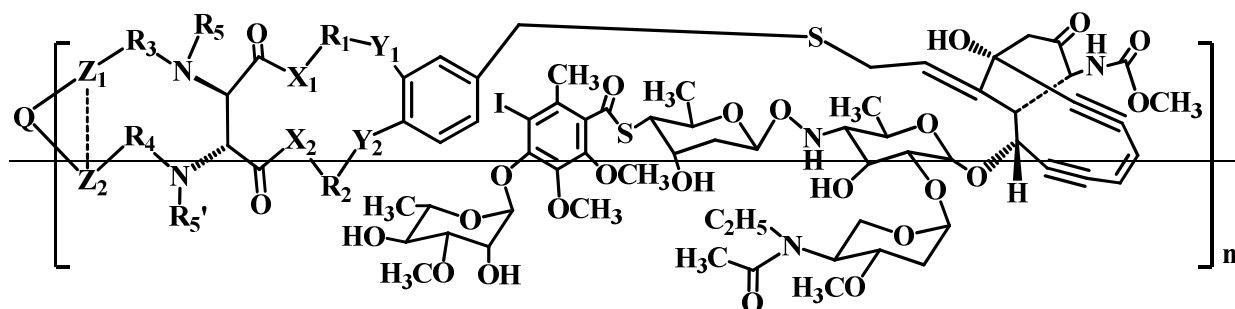


T16,

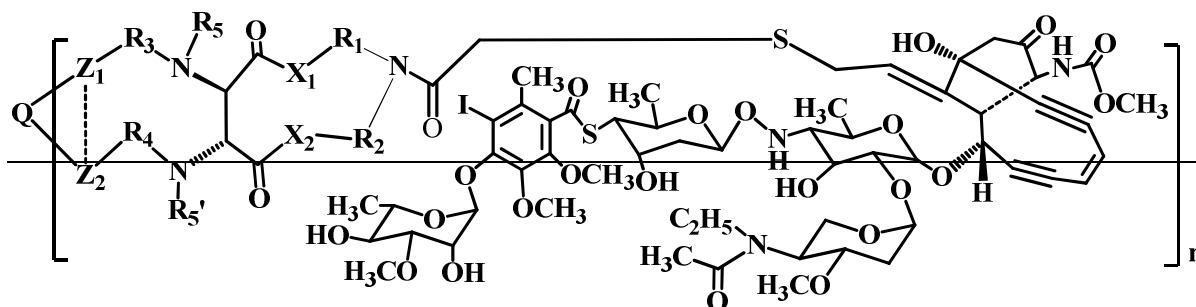


wherein “-----”, Q, X₁, X₂, R₁, R₂, R₃, R₄, R₅, R₅', Aa, (Aa)_n, Z₁, Z₂, p, and n are defined the same above; Y₁ and Y₂ are independently O, NH, NHNH, NR₅, S, C(O)O, C(O)NH, OC(O)NH, OC(O)O, NHC(O)NH, NHC(O)S, OC(O)N(R₁), N(R₁)C(O)N(R₁), CH, C(O)NHNHC(O) and C(O)NR₁; mAb is antibody, preferably monoclonal antibody; R₁₂ is OH, NH₂, NHR₁, NHNH₂, NHNHCOOH, O-R₁-COOH, NH-R₁-COOH, NH-(Aa)_nCOOH, O(CH₂CH₂O)_pCH₂CH₂OH, O(CH₂CH₂O)_pCH₂CH₂NH₂, NH(CH₂CH₂O)_pCH₂CH₂NH₂, NR₁R₁', NHOH, NHOR₁, O(CH₂CH₂O)_pCH₂CH₂COOH, NH(CH₂CH₂O)_pCH₂CH₂COOH, NH-Ar-COOH, NH-Ar-NH₂, O(CH₂CH₂O)_pCH₂CH₂NHSO₃H, NH(CH₂CH₂O)_pCH₂CH₂NHSO₃H, R₁-NHSO₃H, NH-R₁-NHSO₃H, O(CH₂CH₂O)_pCH₂CH₂NHPO₃H₂, NH(CH₂CH₂O)_pCH₂CH₂NHPO₃H₂, OR₁, R₁-NHPO₃H₂, R₁-OPO₃H₂, O(CH₂CH₂O)_pCH₂CH₂OPO₃H₂, OR₁-NHPO₃H₂, NH-R₁-NHPO₃H₂, NH(CH₂CH₂NH)_pCH₂CH₂NH₂, NH(CH₂CH₂S)_pCH₂CH₂NH₂, NH(CH₂CH₂NH)_pCH₂CH₂OH, NH(CH₂CH₂S)_pCH₂CH₂OH, NH-R₁-NH₂, or NH(CH₂CH₂O)_pCH₂CH₂NHPO₃H₂; R¹, R^{1'}, R², R³, R⁴ and R⁵ are independently H, C₁-C₈ lineal or branched alkyl, amide, or amines; C₂-C₈ aryl, alkenyl, alkynyl, heteroaryl, heteroalkyl, alkylcycloalkyl, ester, ether, heterocycloalkyl, or acyloxylamines; or peptides containing 1-8 aminoacids, or polyethyleneoxy unit having formula (OCH₂CH₂)_p or (OCH₂CH(CH₃))_p, wherein p is an integer from 1 to about 5000; The two Rs: R¹R², R²R³, R¹R³ or R³R⁴ can form 3~8 member cyclic ring of alkyl, aryl, heteroaryl, heteroalkyl, or alkylcycloalkyl group; X₃ is H, CH₃, CH₂CH₃, C₃H₇, or X₁'R₁', wherein X₁' is NH, N(CH₃), NHNH, O, or S; R₁' is H or C₁-C₈ lineal or branched alkyl, aryl, heteroaryl, heteroalkyl, alkylcycloalkyl, or acyloxylamines; R₃' is H or C₁-C₆ lineal or branched alkyl; Z₃ is H, COOR₁, NH₂, NHR₁, OR₁, CONHR₁, NHCOR₁, OCOR₁, OP(O)(OM₁)(OM₂), OCH₂OP(O)(OM₁)(OM₂), OSO₃M₁, R₁, O-glycoside (glucoside, galactoside, mannoside, glucuronoside/glucuronide, alloside, fructoside, etc.), NH-glycoside, S-glycoside or CH₂-glycoside; M₁ and M₂ are independently H, Na, K, Ca, Mg, NH₄, NR₁R₂R₃.

1823. The conjugate compound of claim 1, wherein the Drug₁ or Drug₂ is a Calicheamicin analog, is selected from structures of C01 and C02 as following:



C01.

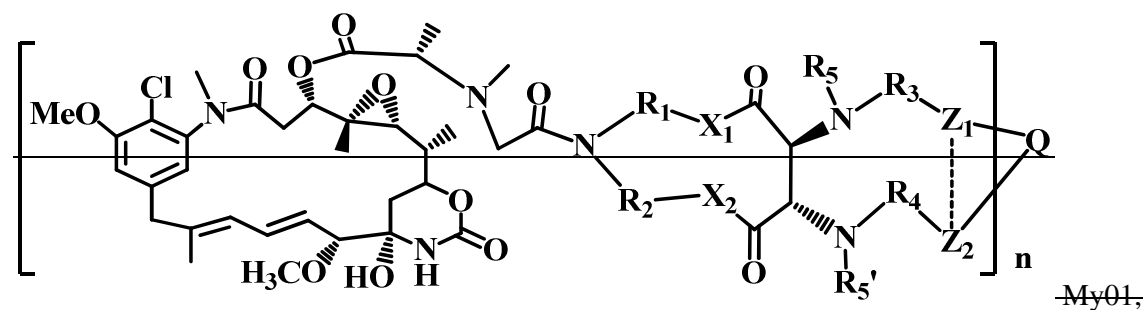


C02

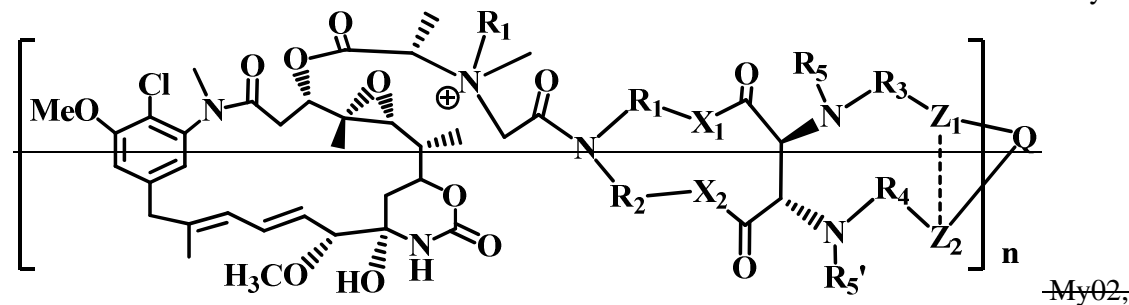
wherein “—”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R₅', Z₁, Z₂, and n are defined the same above;

Preferably X₁, X₂, Y₁ and Y₂ are independently O, NH, NHNH, NR₅, S, C(O)O, C(O)NH, OC(O)NH, OC(O)O, NHC(O)NH, NHC(O)S, OC(O)N(R₁), N(R₁)C(O)N(R₁), CH, C(O)NHNHC(O) and C(O)NR₁;

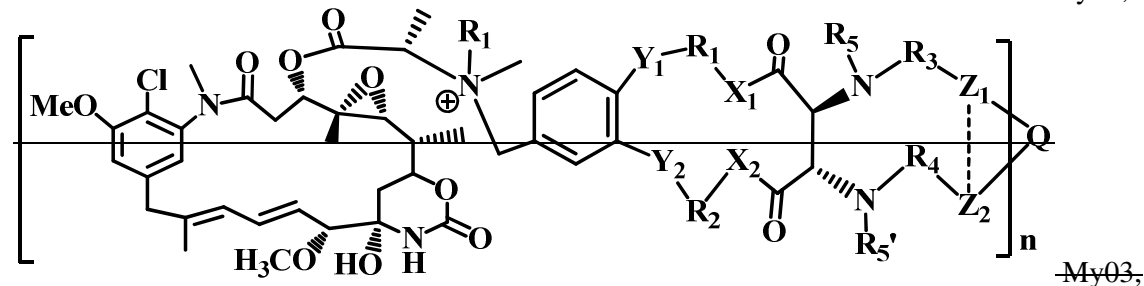
24. The conjugate compound of claim 1, wherein the Drug₁ or Drug₂ is a Maytansinoid analog, is selected from structures of the following My01, My02, My03, My04, My05, My06, My07, and My08:



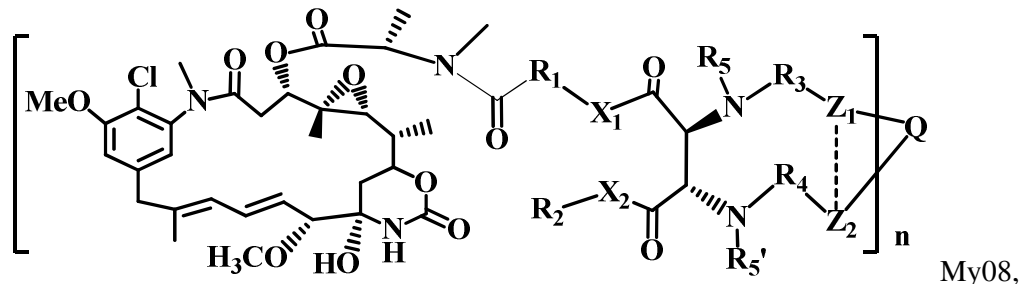
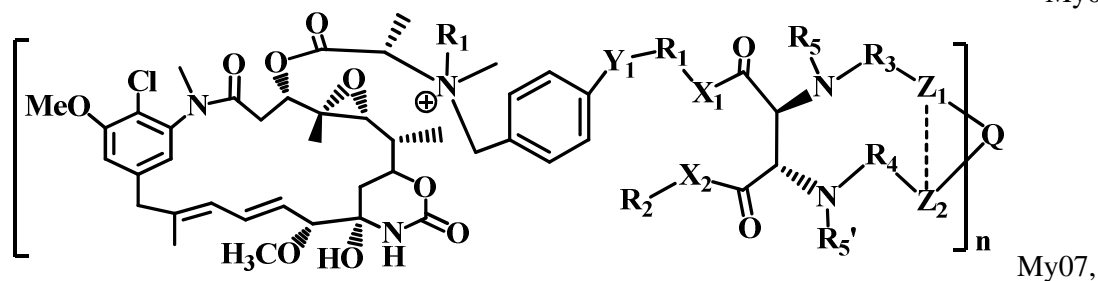
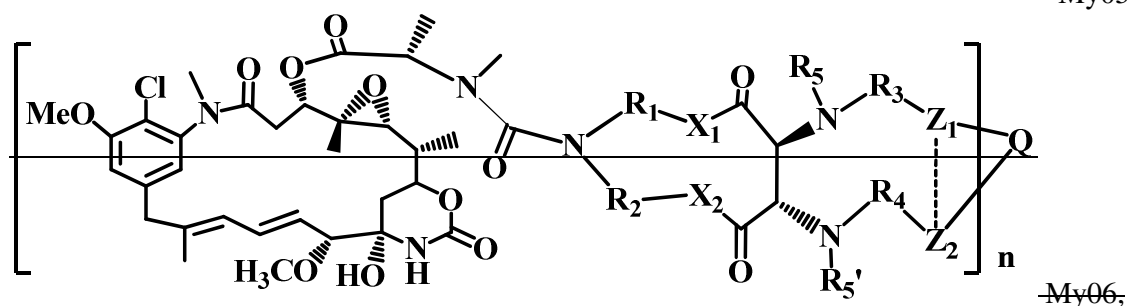
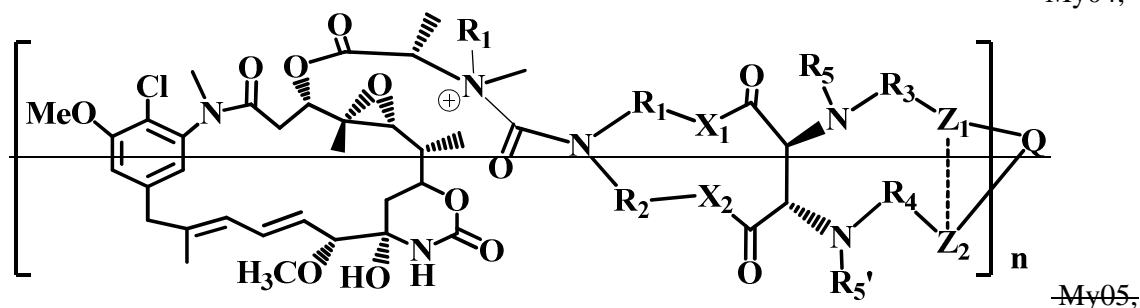
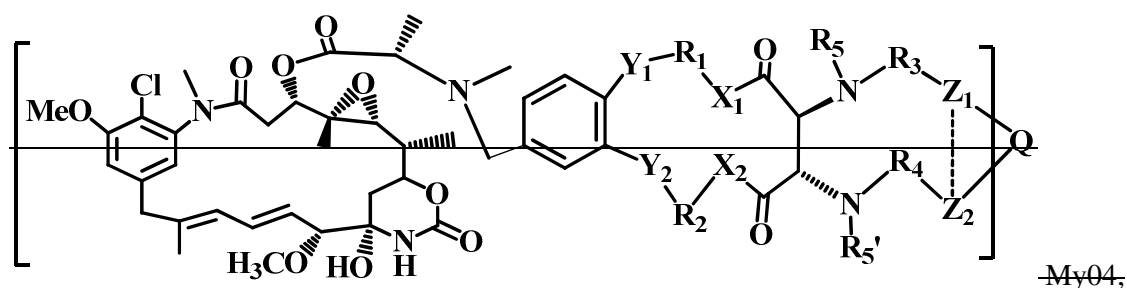
My01,



My02,



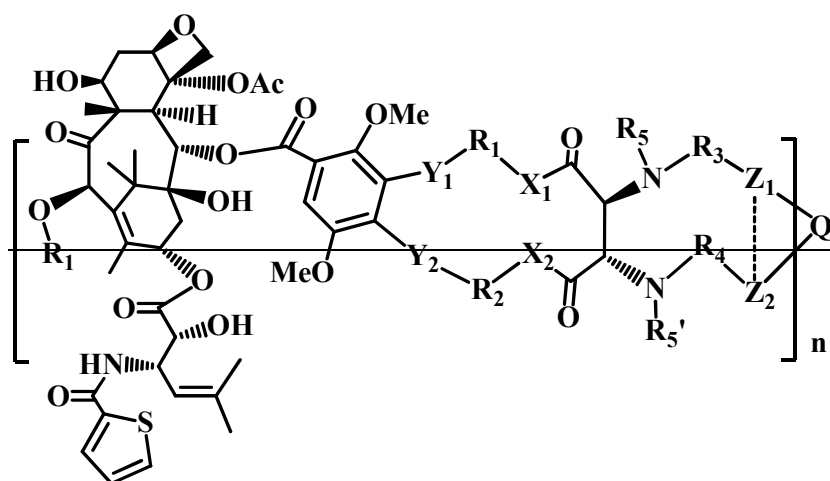
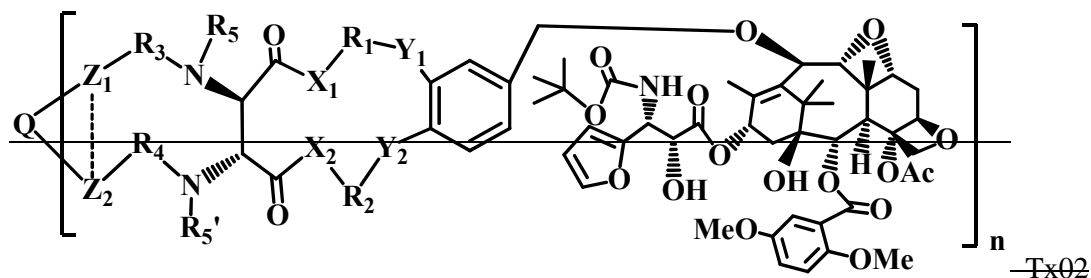
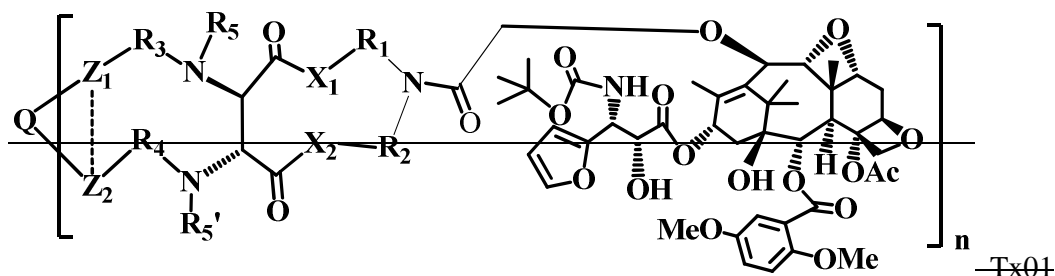
My03,



wherein “-----”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R₅', Z₁, Z₂, and n are defined the same above; Preferably X₁, X₂, Y₁ and Y₂ are independently O, NH, NHNH, NR₅, S, C(O)O, C(O)NH, OC(O)NH, OC(O)O, NHC(O)NH, NHC(O)S, OC(O)N(R₁), N(R₁)C(O)N(R₁), CH, C(O)NHNHC(O) and C(O)NR₁.

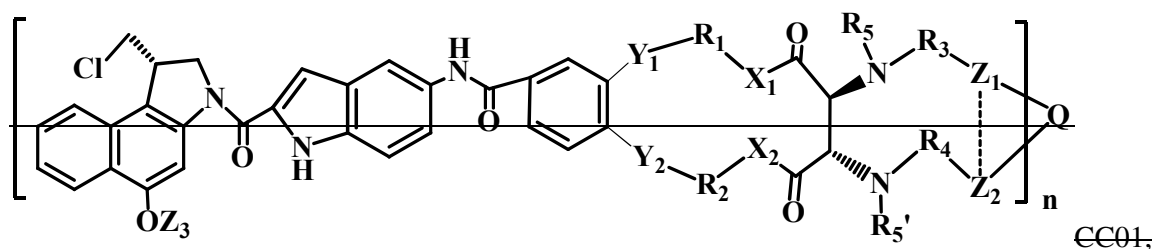
19-25. The conjugate compound of claim 1, wherein the Drug₁ or Drug₂ is a Taxane analog, is selected from structures of Tx01, Tx02 and Tx03 as following:

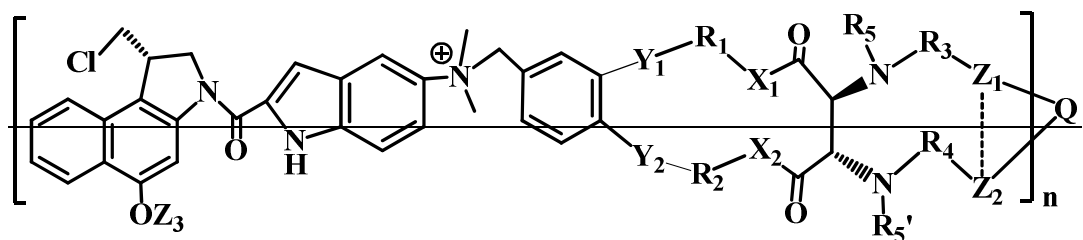
452



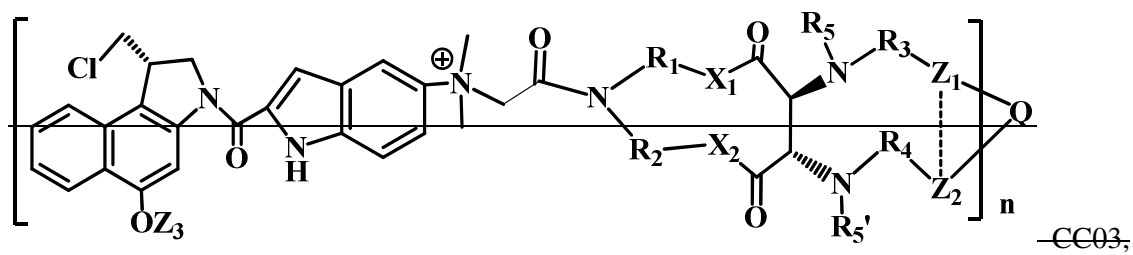
wherein “—”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R₅', Z₁, Z₂, and n are defined the same above; Preferably X₁, X₂, Y₁ and Y₂ are independently O, NH, NHNH, NR₅, S, C(O)O, C(O)NH, OC(O)NH, OC(O)O, NHC(O)NH, NHC(O)S, OC(O)N(R₁), N(R₁)C(O)N(R₁), CH₂, C(O)NHNHC(O) and C(O)NR₁.

~~26.~~ The conjugate compound of claim 1, wherein the Drug₁ or Drug₂ is a CC-1065 analogue and/or duocarmycin analog, is selected from structure of structures of CC01, CC02, CC03, CC04, CC05, CC06 and CC07 as following:

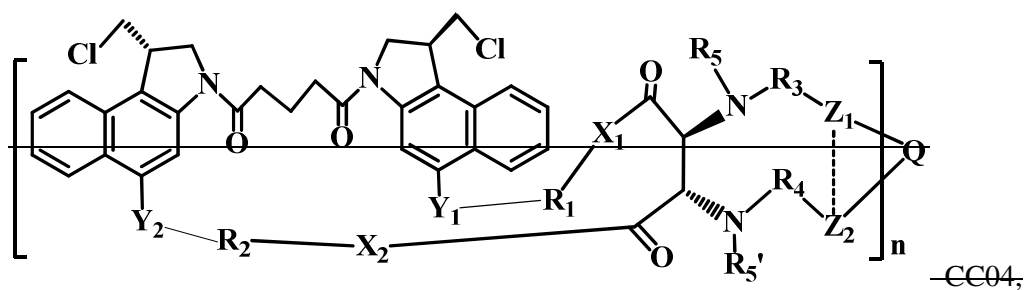




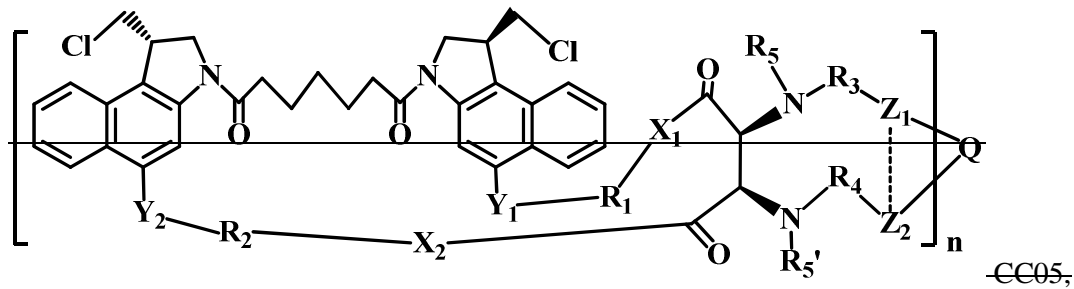
CC02,



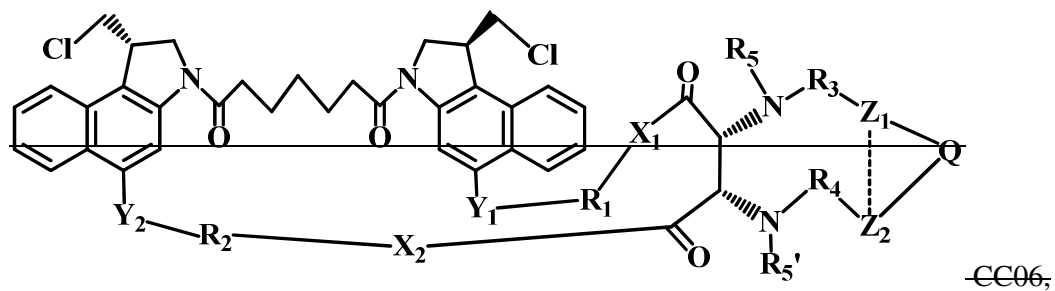
-CC03,



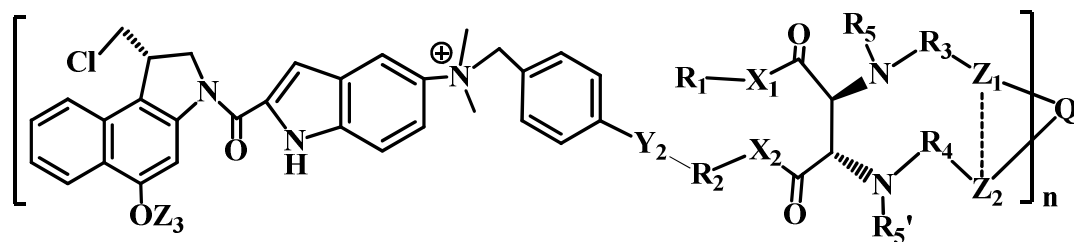
-CC04,



-CC05,



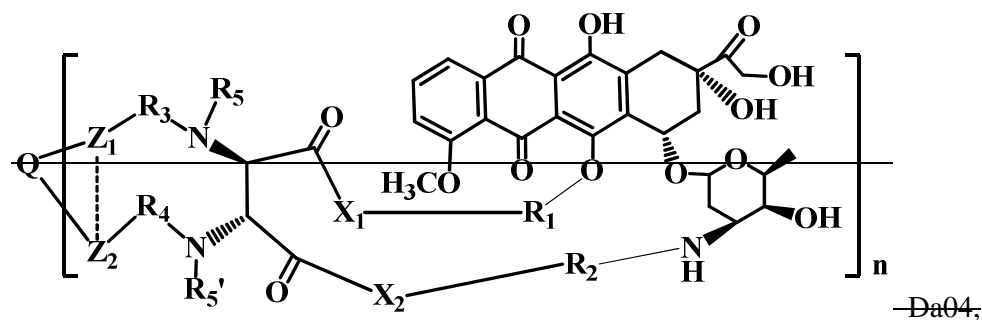
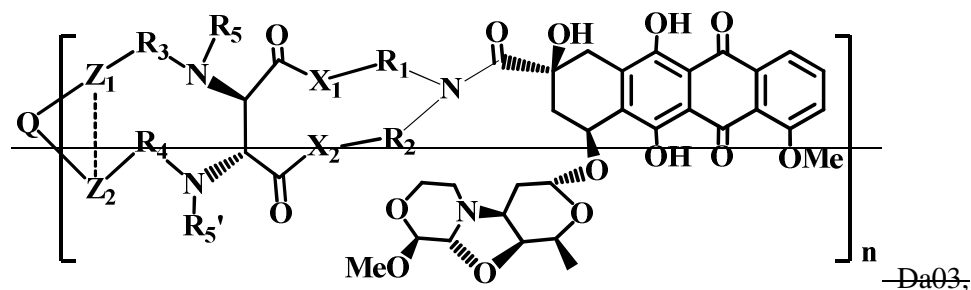
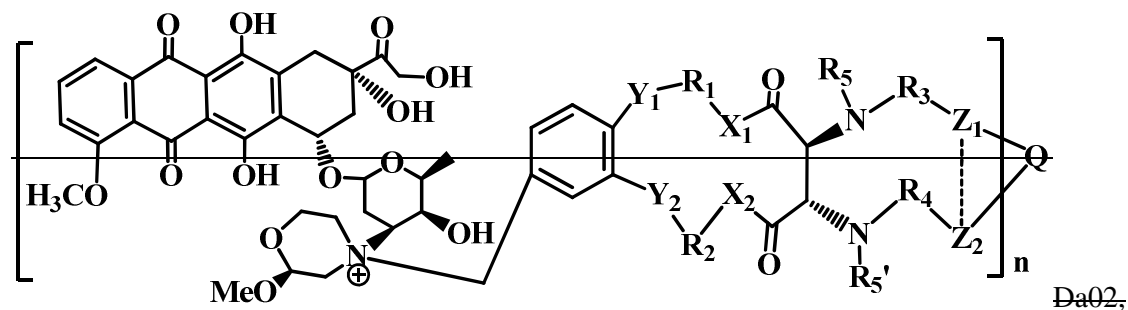
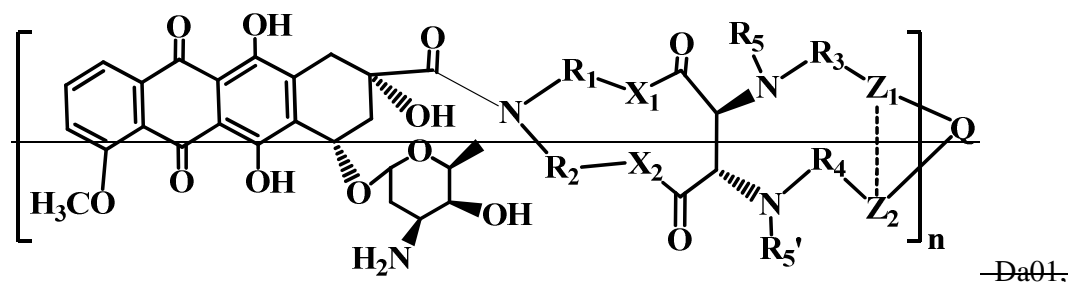
-CC06,



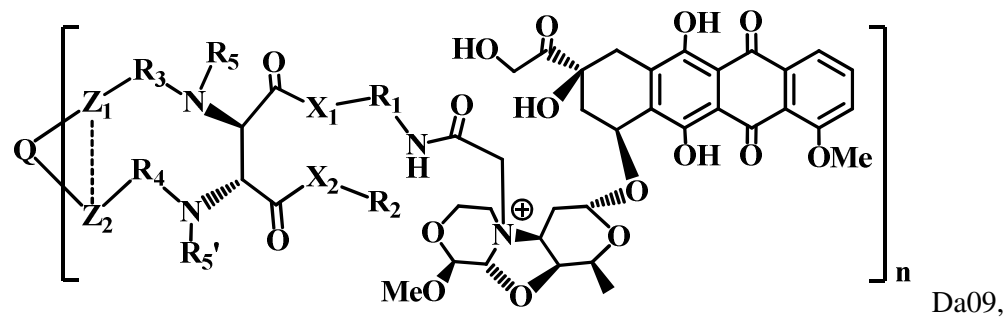
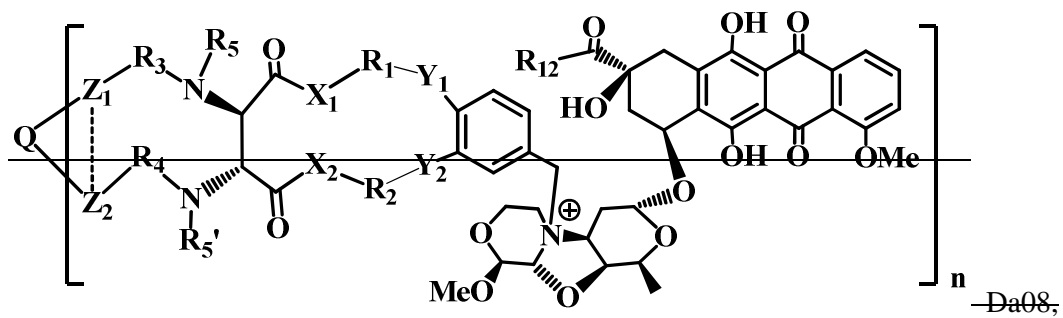
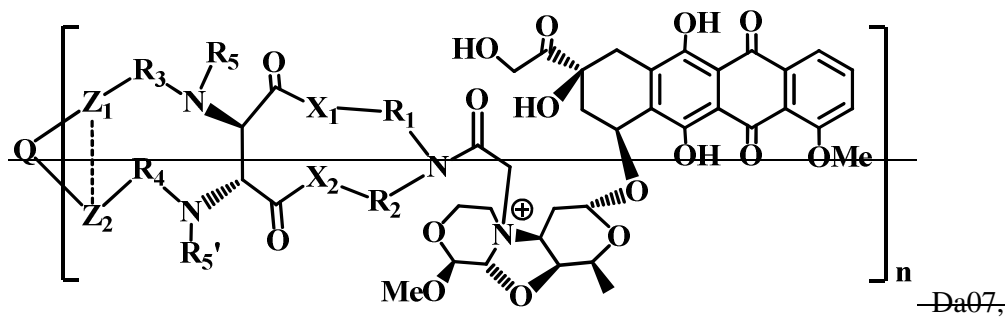
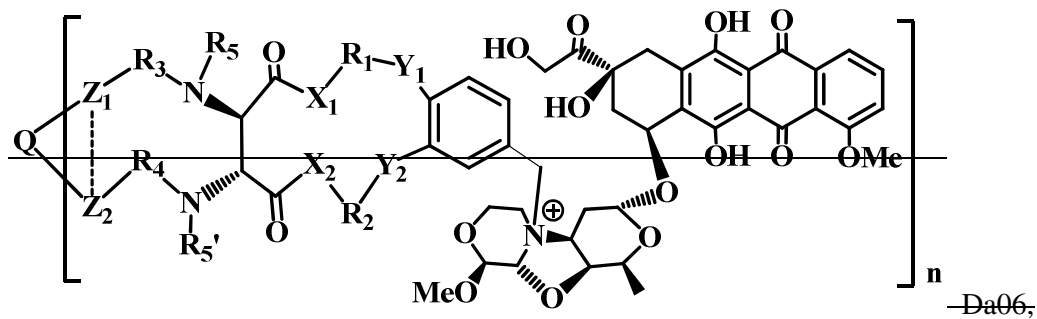
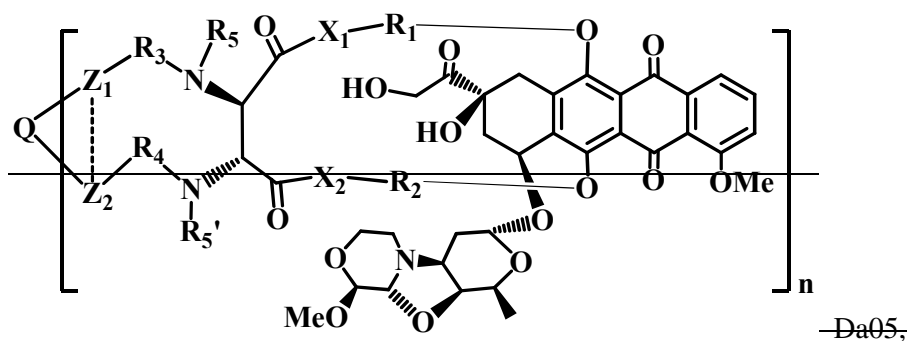
CC07,

wherein “-----”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R_{5'}, Z₁, Z₂, and n are defined the same above; preferably Preferably X₁, X₂, Y₁ and Y₂ are- independently O, NH, NHNH, NR₅, S, C(O)O, C(O)NH, OC(O)NH, OC(O)O, NHC(O)NH, NHC(O)S, OC(O)N(R₁), N(R₁)C(O)N(R₁), CH, C(O)NHNHC(O) and C(O)NR₁; Q is preferably monoclonal antibody; Z₃ is H, PO(OM₁)(OM₂), SO₃M₁, CH₂PO(OM₁)(OM₂), CH₃N(CH₂CH₂)₂NC(O)-, O(CH₂CH₂)₂NC(O)-, R₁, or glycoside.

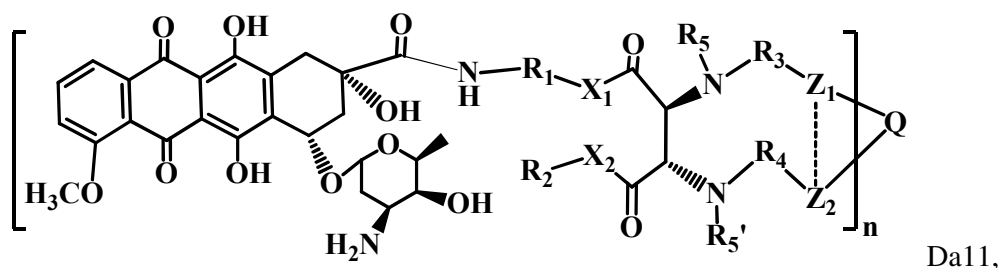
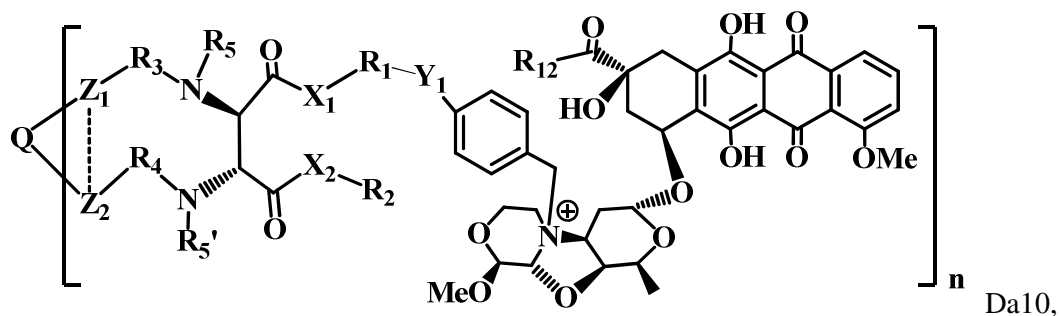
20-27. The conjugate compound of claim 1, wherein the Drug₁ or Drug₂ is a Daunorubicin or Doxorubicin analogue, is selected from structures of Da01, Da02, Da03, Da04, Da05, Da06, Da07, Da08, Da09, Da10, and Da11 as following:



455

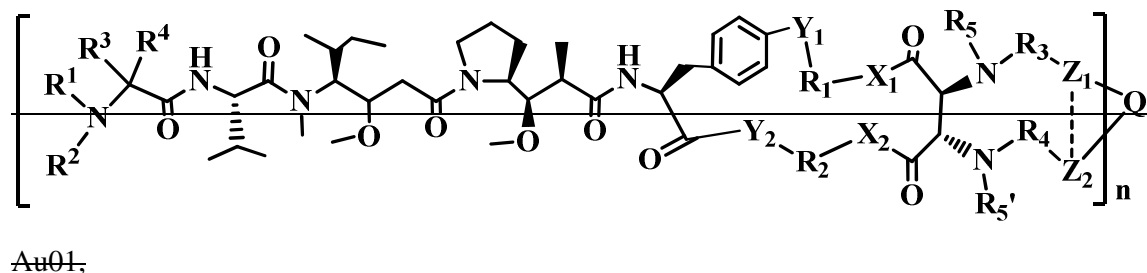


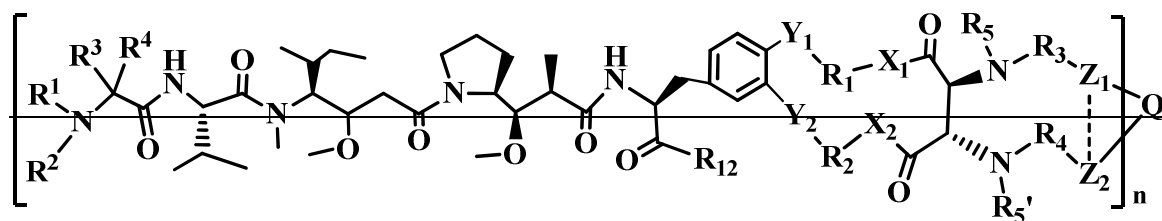
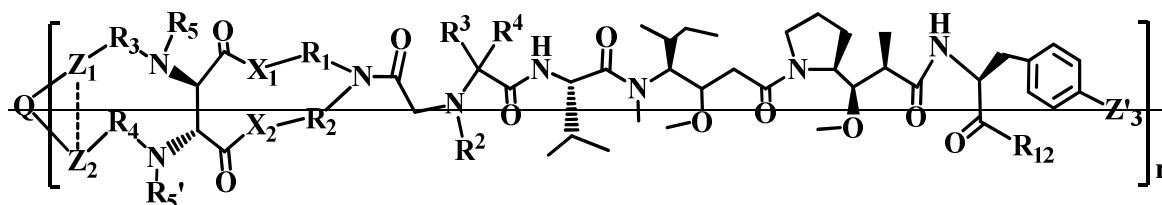
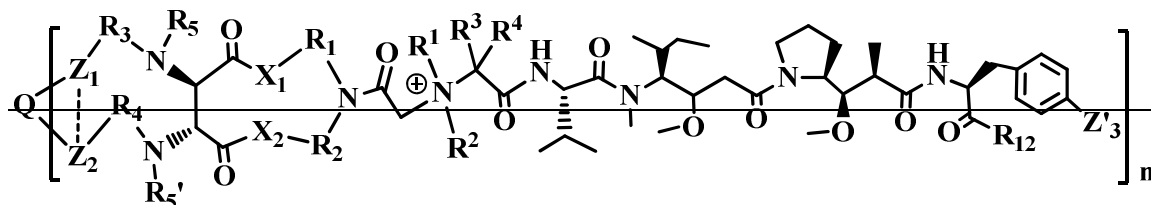
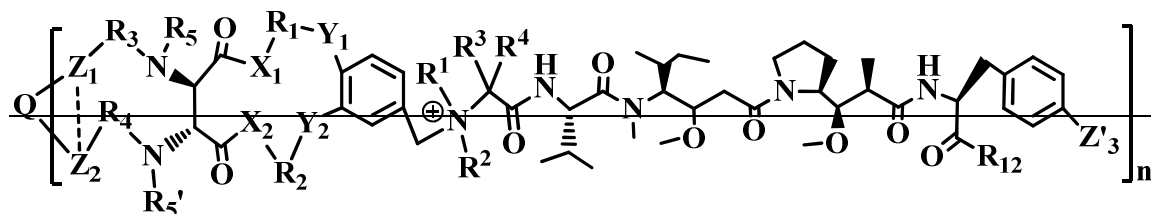
456



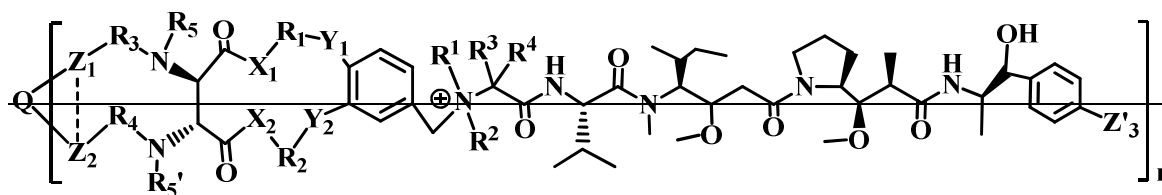
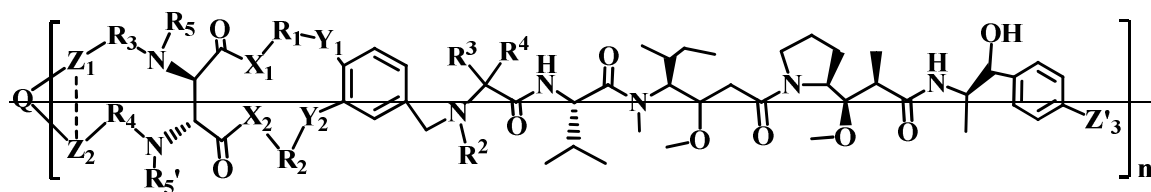
wherein “-----”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R₅', Z₁, Z₂, Aa, (Aa)_n, p, and n are defined the same above; Preferably X₁, X₂, Y₁ and Y₂ are independently O, NH, NHNH, NR₅, S, C(O)O, C(O)NH, OC(O)NH, OC(O)O, NHC(O)NH, NHC(O)S, OC(O)N(R₁), N(R₁)C(O)N(R₁), CH, C(O)NHNHC(O) and C(O)NR₁; R₁₂ is OH, NH₂, NHR₁, NHNH₂, NHNHCOOH, O-R₁-COOH, NH-R₁-COOH, NH(Aa)_nCOOH, O(CH₂CH₂O)_pCH₂CH₂OH, O(CH₂CH₂O)_pCH₂CH₂NH₂, NH(CH₂CH₂O)_pCH₂CH₂NH₂, NR₁R₁', NHOH, NHOR₁, O(CH₂CH₂O)_pCH₂CH₂COOH, NH(CH₂CH₂O)_pCH₂CH₂COOH, NH-Ar-COOH, NH-Ar-NH₂, O(CH₂CH₂O)_pCH₂CH₂NH-SO₃H, NH(CH₂CH₂O)_pCH₂CH₂NH-SO₃H, R₁-NHSO₃H, NH-R₁-NHSO₃H, O(CH₂CH₂O)_pCH₂CH₂NHPO₃H₂, NH(CH₂CH₂O)_pCH₂CH₂NHPO₃H₂, OR₁, R₁-NHPO₃H₂, R₁-OPO₃H₂, O(CH₂CH₂O)_pCH₂CH₂OPO₃H₂, OR₁-NHPO₃H₂, NH-R₁-NHPO₃H₂, NH(CH₂CH₂NH)_pCH₂CH₂NH₂, NH(CH₂CH₂S)_pCH₂CH₂NH₂, NH(CH₂CH₂NH)_pCH₂CH₂OH, NH(CH₂CH₂S)_pCH₂CH₂OH, NH-R₁-NH₂, or NH(CH₂CH₂O)_pCH₂CH₂NHPO₃H₂.

2128. The conjugate compound of claim 1, wherein the Drug₁ or Drug₂ is an Auristatin or dolastatin analogue, is selected from structures of ~~Au01, Au02, Au03, Au04, Au05, Au06, Au07, Au08, Au09, Au10, Au11, Au12, Au13, Au14, Au15, Au16, Au17, Au18, Au19, Au20, Au21, Au22, Au23, Au24, Au25, Au26, and Au27~~ as following:

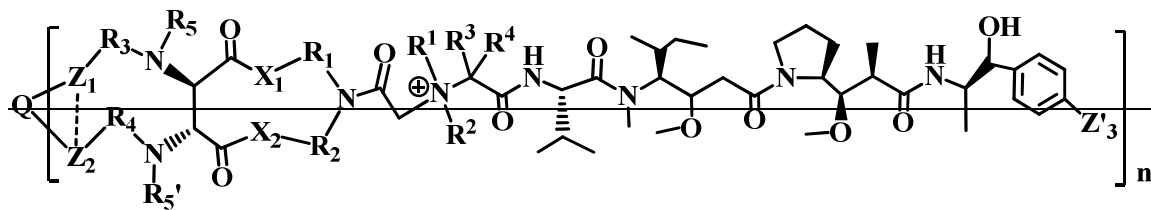
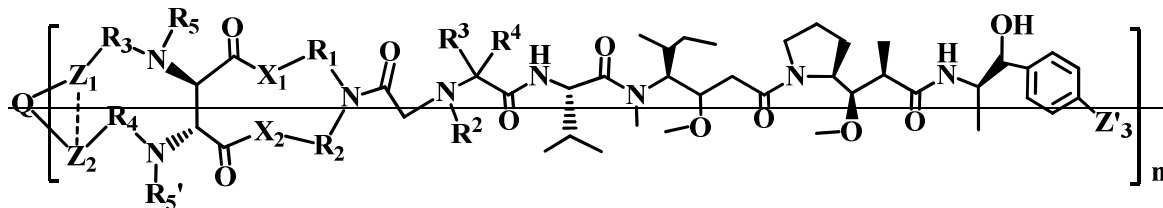
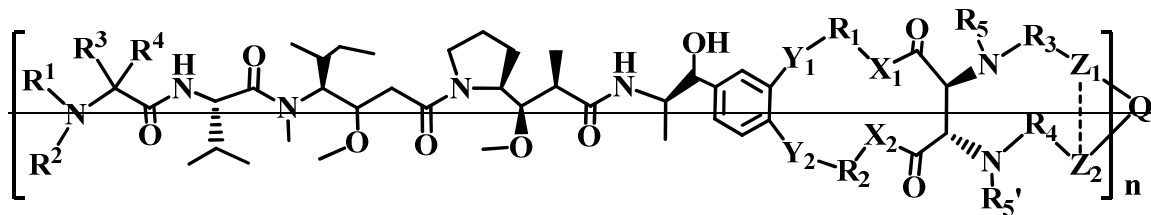
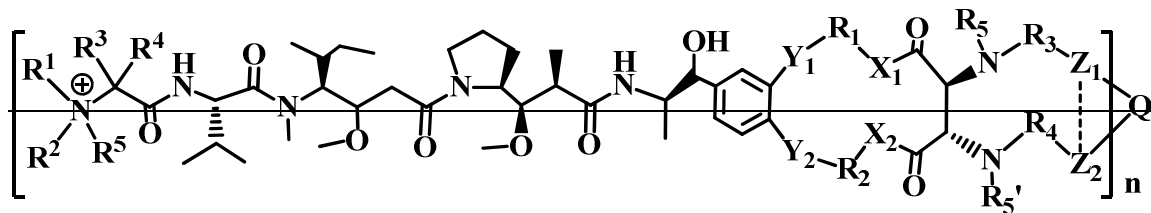
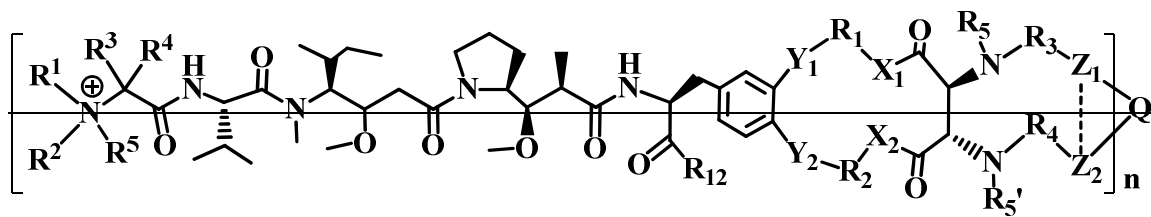
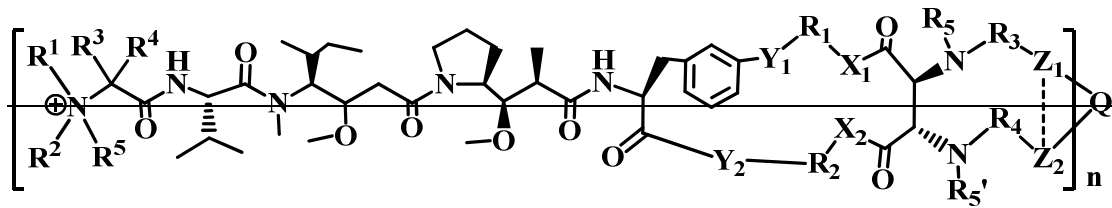


~~Au02,~~~~Au03,~~~~Au04,~~

~~Au05,~~

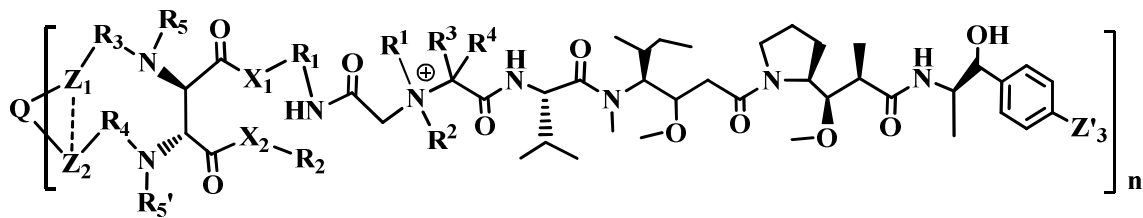
~~Au06,~~

~~Au07,~~

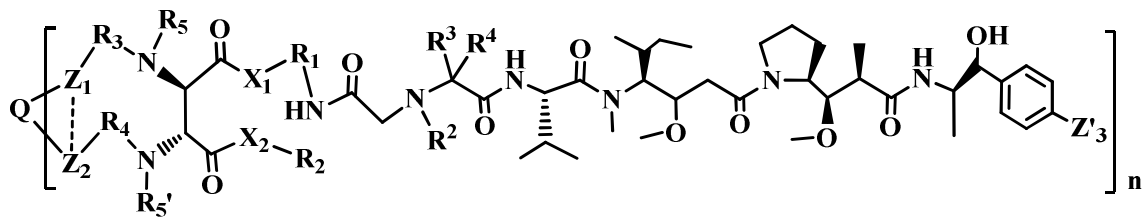
~~Au08,~~~~Au09,~~~~Au10,~~~~Au11,~~~~Au12,~~~~Au13,~~

$$\left[\begin{array}{c} \text{R}^1 \quad \text{R}^3 \quad \text{R}^4 \\ | \quad | \quad | \\ \text{N} \quad \text{C} \quad \text{C} \\ | \quad | \quad | \\ \text{R}^2 \quad \text{O} \quad \text{H} \\ | \quad | \quad | \\ \text{C} \quad \text{C} \quad \text{C} \\ | \quad | \quad | \\ \text{O} \quad \text{O} \quad \text{O} \\ | \quad | \quad | \\ \text{R}^5 \quad \text{R}_3 \quad \text{Z}_1 \\ | \quad | \quad | \\ \text{N} \quad \text{C} \quad \text{C} \\ | \quad | \quad | \\ \text{R}_5' \quad \text{R}_4 \quad \text{Z}_2 \end{array} \right]_n$$
$$\left[\begin{array}{c} \text{R}^1 \quad \text{R}^3 \quad \text{R}^4 \\ | \quad | \quad | \\ \text{N} \quad \text{C} \quad \text{C} \\ | \quad || \quad | \\ \text{R}^2 \quad \text{O} \quad \text{H} \\ | \quad | \quad | \\ \text{C} \quad \text{C} \quad \text{C} \\ || \quad | \quad | \\ \text{O} \quad \text{N} \quad \text{C} \\ | \quad | \quad | \\ \text{R}^5 \quad \text{R}_3 \quad \text{Z}_1 \\ | \quad | \quad | \\ \text{C} \quad \text{C} \quad \text{C} \\ || \quad | \quad | \\ \text{O} \quad \text{N} \quad \text{R}_4 \\ | \quad | \quad | \\ \text{R}^5' \quad \text{Z}_2 \end{array} \right]_n$$
[illegible][illegible][illegible]

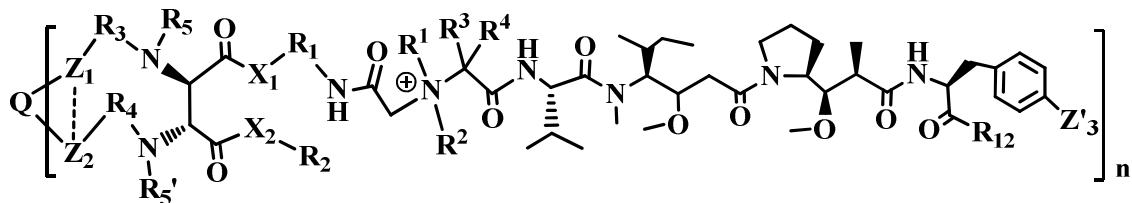
Au19,



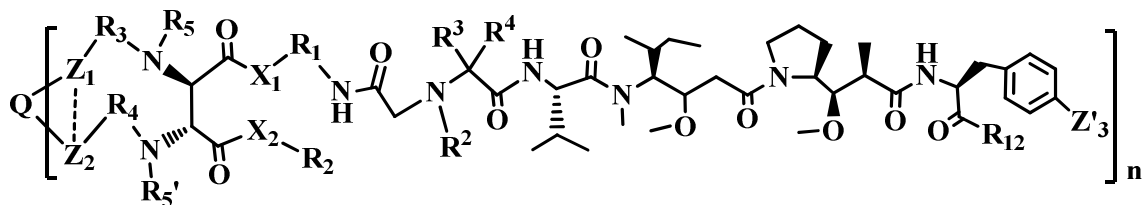
Au20,



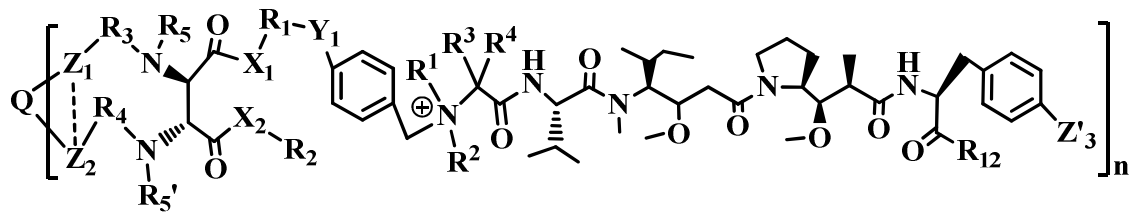
Au21,



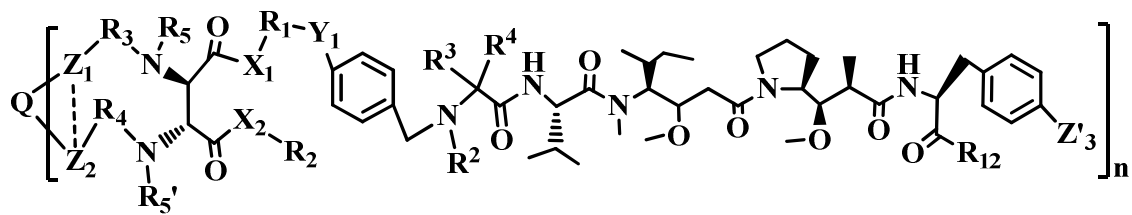
Au22,



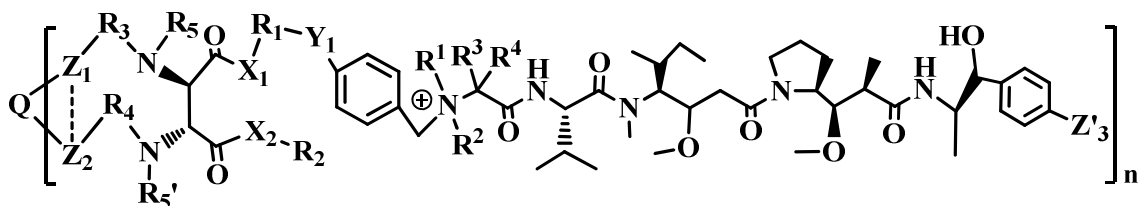
Au23,



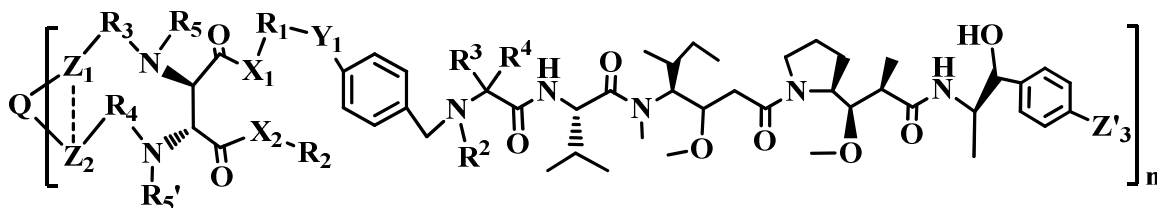
Au₂₄,



Au25,



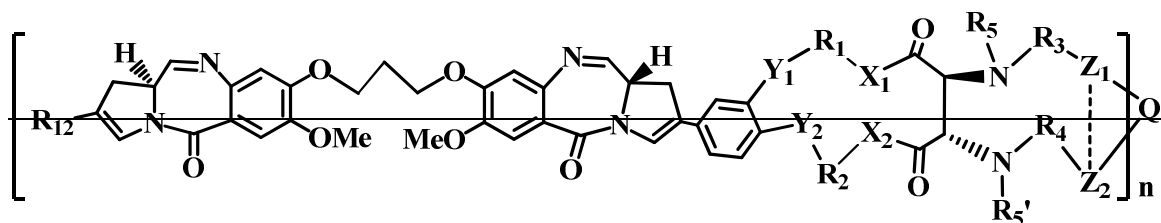
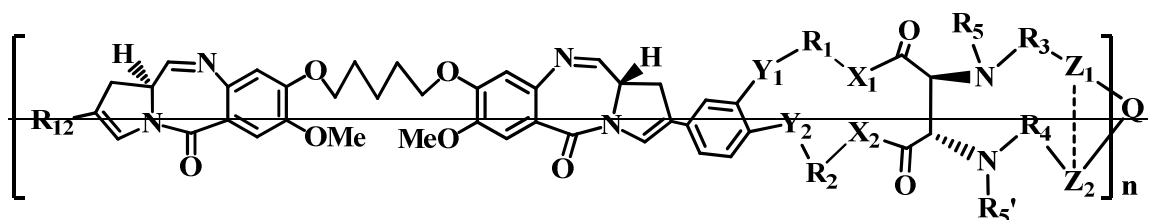
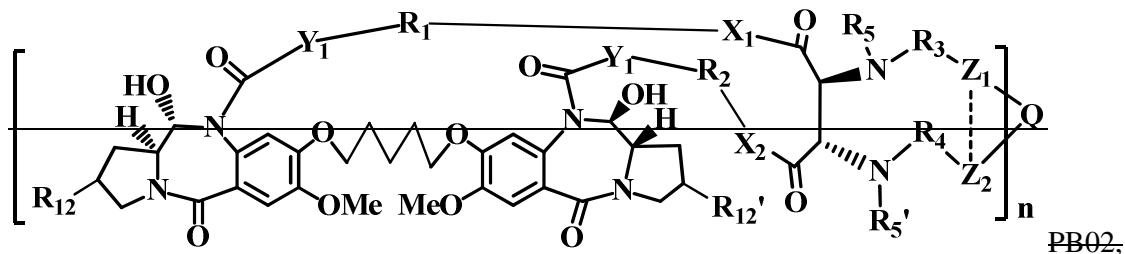
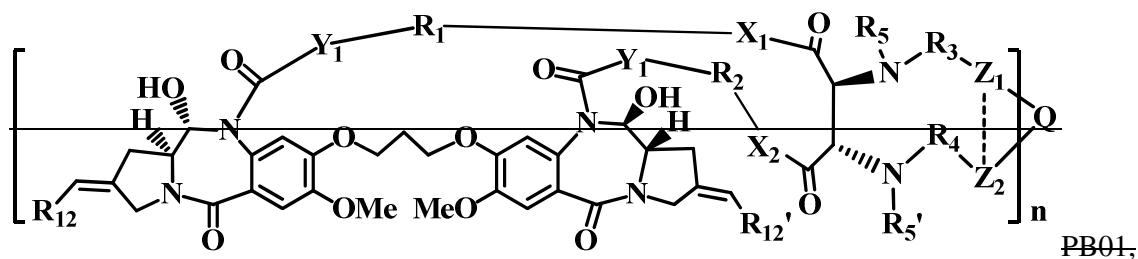
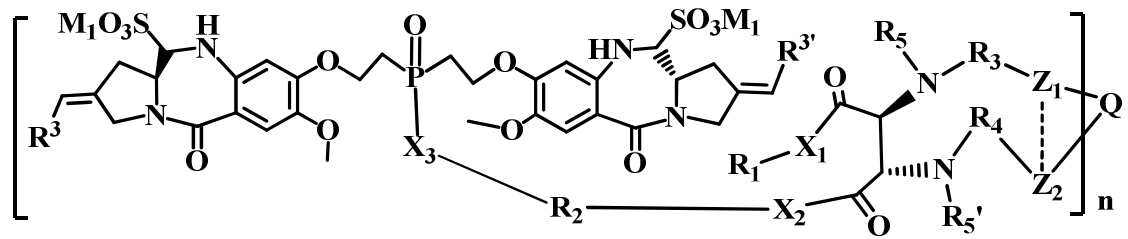
Au26,

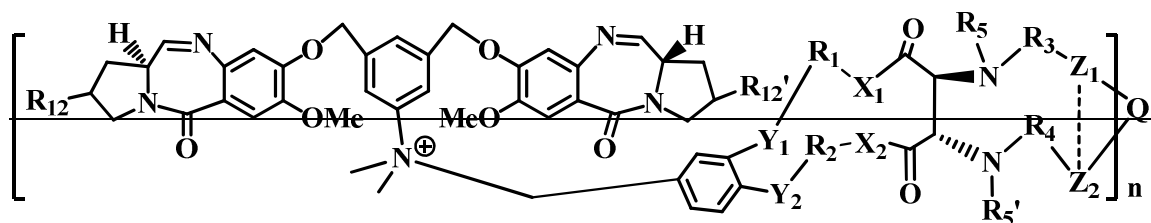


Au27,

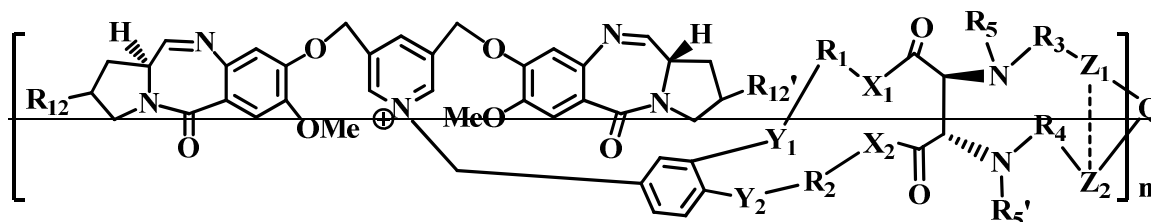
wherein “-----”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R₅′, Z₁, Z₂, Aa, (Aa)_n, p and n are defined the same above; Preferably X₁, X₂, Y₁ and Y₂ are independently O, NH, NHNH, NR₅, S, C(O)O, C(O)NH, OC(O)NH, OC(O)O, NHC(O)NH, NHC(O)S, OC(O)N(R₁), N(R₁)C(O)N(R₁), CH, C(O)NHNHC(O) and C(O)NR₁; R₁₂ is OH, NH₂, NHR₁, NHNH₂, NHNHCOOH, O-R₁-COOH, NH-R₁-COOH, NH-(Aa)_nCOOH, O(CH₂CH₂O)_pCH₂CH₂OH, O(CH₂CH₂O)_pCH₂CH₂NH₂, NH(CH₂CH₂O)_pCH₂CH₂NH₂, NR₁R₁′, NHOH, NHOR₁, O(CH₂CH₂O)_pCH₂CH₂COOH, NH(CH₂CH₂O)_pCH₂CH₂COOH, NH-Ar-COOH, NH-Ar-NH₂, O(CH₂CH₂O)_pCH₂CH₂NH-SO₃H, NH(CH₂CH₂O)_pCH₂CH₂NHSO₃H, R₁-NHSO₃H, NH-R₁-NHSO₃H, O(CH₂CH₂O)_pCH₂CH₂NHPO₃H₂, NH(CH₂CH₂O)_pCH₂CH₂NHPO₃H₂, OR₁, R₁-NHPO₃H₂, R₁-OPO₃H₂, O(CH₂CH₂O)_pCH₂CH₂OPO₃H₂, OR₁-NHPO₃H₂, NH-R₁-NHPO₃H₂, NH(CH₂CH₂NH)_pCH₂CH₂NH₂, NH(CH₂CH₂S)_pCH₂CH₂NH₂, NH(CH₂CH₂NH)_pCH₂CH₂OH, NH(CH₂CH₂S)_pCH₂CH₂OH, NH-R₁-NH₂, or NH(CH₂CH₂O)_pCH₂CH₂NHPO₃H₂; R¹, R², R³, R⁴ and R⁵ are independently H; C₁-C₈ lineal or branched alkyl, aryl, heteroaryl, heteroalkyl, alkylcycloalkyl, ester, ether, amide, amines, heterocycloalkyl, or acyloxylamines; or peptides containing 1-8 aminoacids, or polyethyleneoxy unit having formula (OCH₂CH₂)_p or (OCH₂CH(CH₃))_p, wherein p is an integer from 1 to about 5000. The two Rs: R¹R², R²R³, R¹R³ or R³R⁴ can form 3~8 member cyclic ring of alkyl, aryl, heteroaryl, heteroalkyl, or alkylcycloalkyl group; X₃ is H, CH₃ or X₁′R₁′, wherein X₁′ is NH, N(CH₃), NHNH, O, or S, and R₁′ is H or C₁-C₈ lineal or branched alkyl, aryl, heteroaryl, heteroalkyl, alkylcycloalkyl, acyloxylamines; R₃′ is H or C₁-C₆ lineal or branched alkyl; Z₃′ is H, COOR₁, NH₂, NHR₁, OR₁, CONHR₁, NHCOR₁, OCOR₁, OP(O)(OM₁)(OM₂), OCH₂OP(O)(OM₁)(OM₂), OSO₃M₁, R₁, or O-glycoside (glucoside, galactoside, mannoside, glucuronoside/glucuronide, alloside, fructoside, etc.), NH-glycoside, S-glycoside or CH₂-glycoside; M₁ and M₂ are independently H, Na, K, Ca, Mg, NH₄, NR₁R₂R₃.

2229. The conjugate compound of claim 1, wherein the Drug₁ or Drug₂ is a dimer of benzodiazepine analogues, is selected from structures of PB01, PB02, PB03, PB04, PB05, PB06, PB07, PB08, PB09, PB10, PB11, PB12, PB13, PB14, PB15, PB16, PB17, PB18, PB19, PB20, PB21, PB22, PB23, PB24, PB25, PB26, PB27, PB28, PB29, PB30, PB31 and PB32:

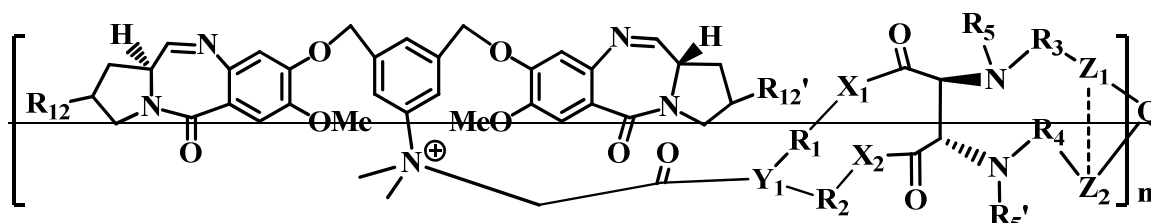




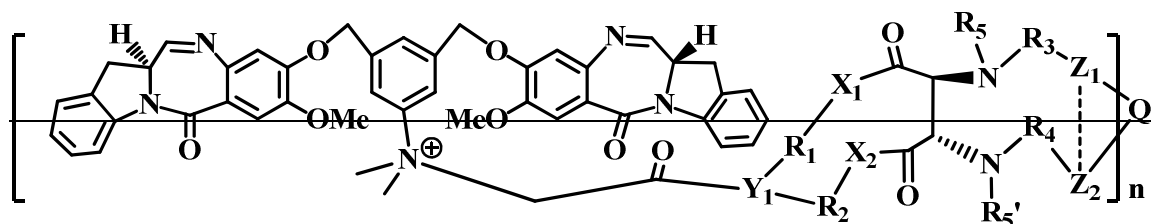
PB05;



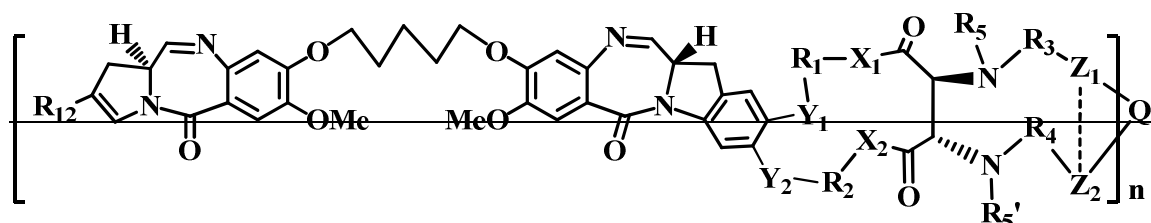
PB06;



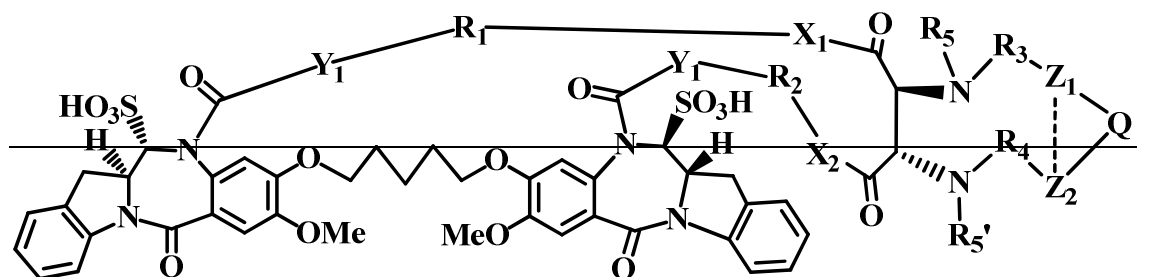
PB07;



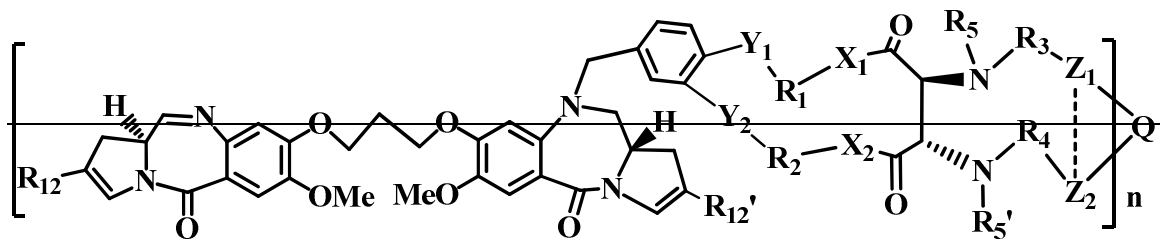
PB08;



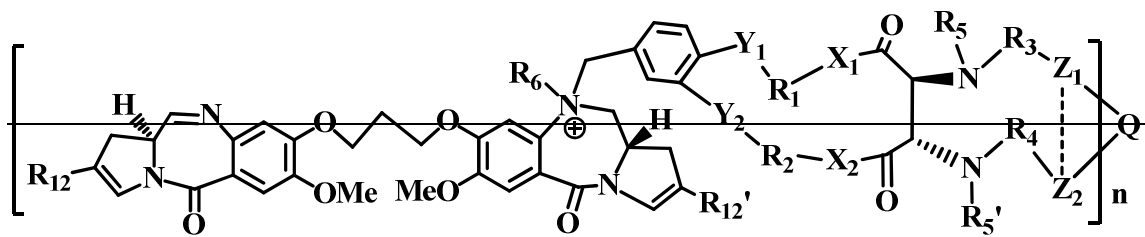
PB09;



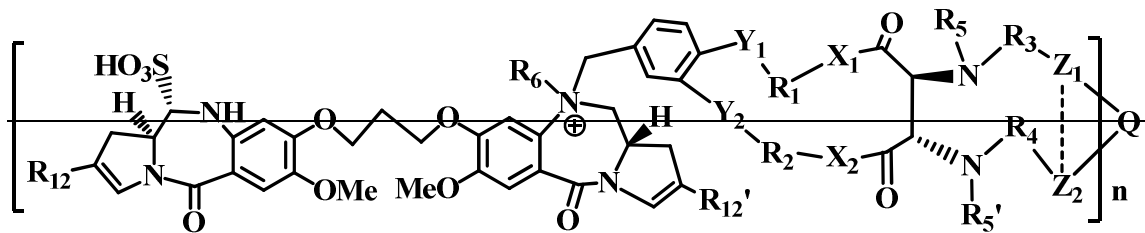
PB10;



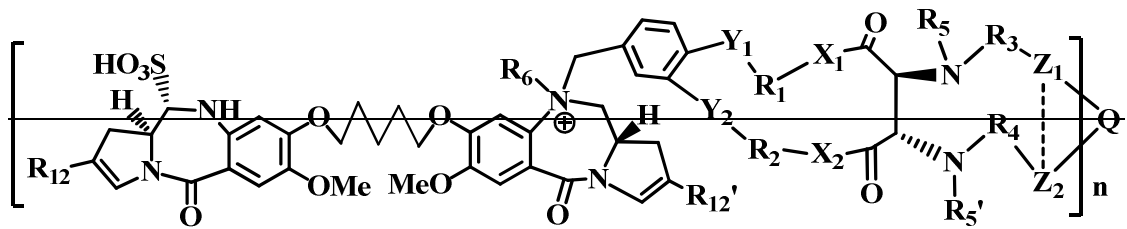
~~PB11,~~



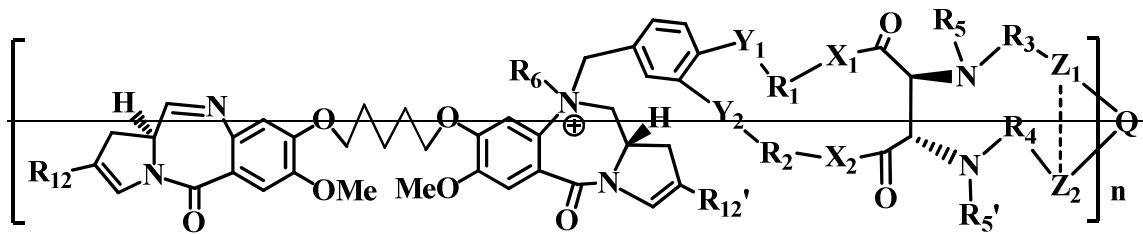
~~PB12,~~



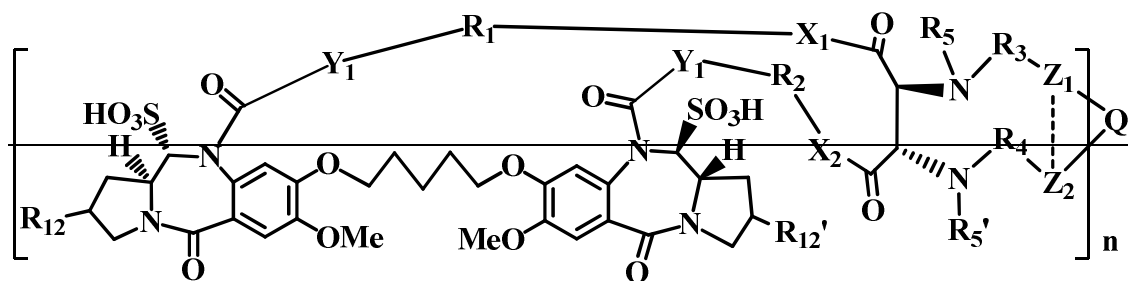
~~PB13,~~



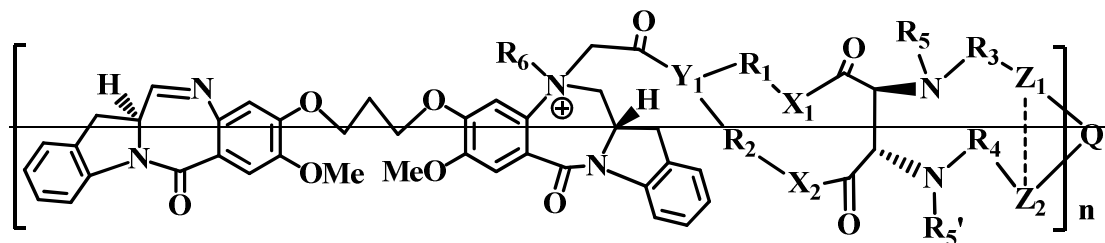
~~PB14,~~



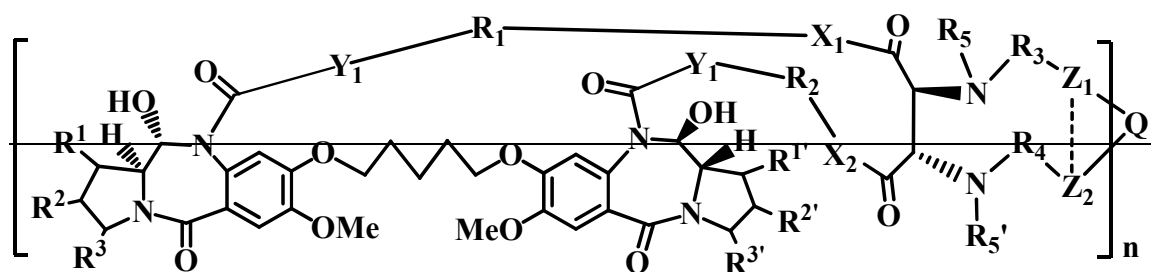
~~PB15,~~



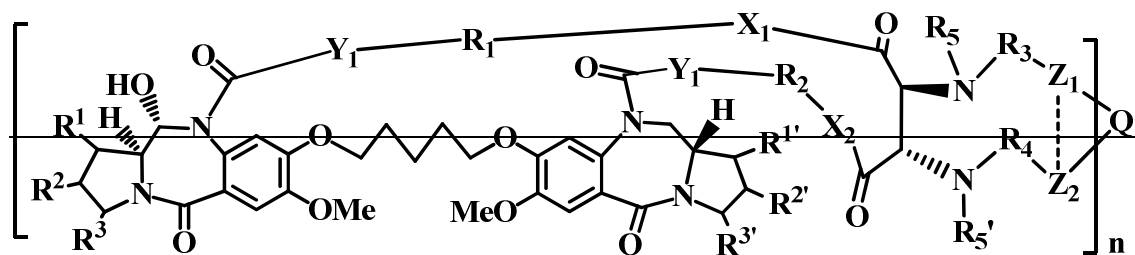
PB16,



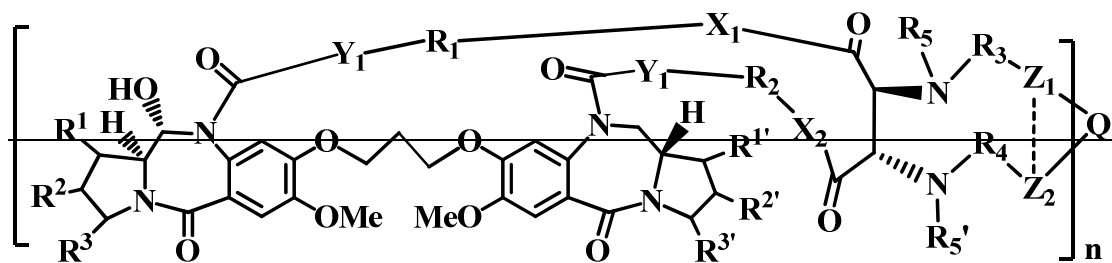
PB17,



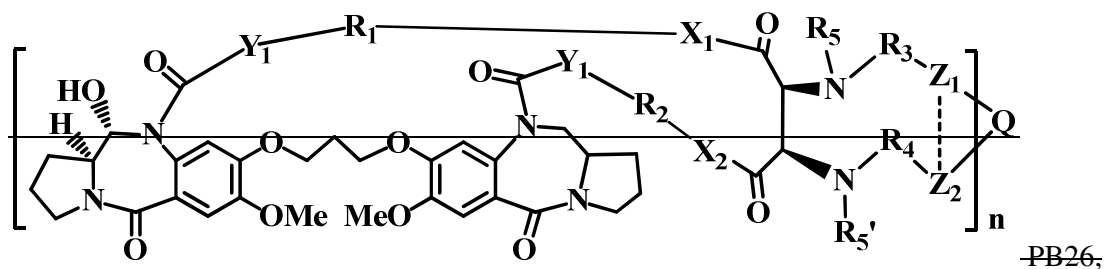
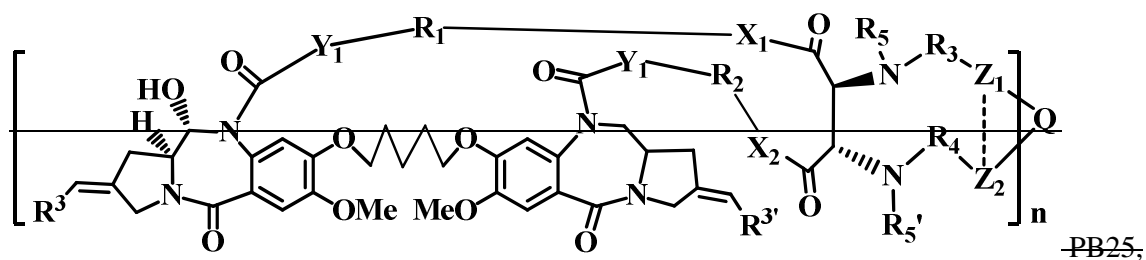
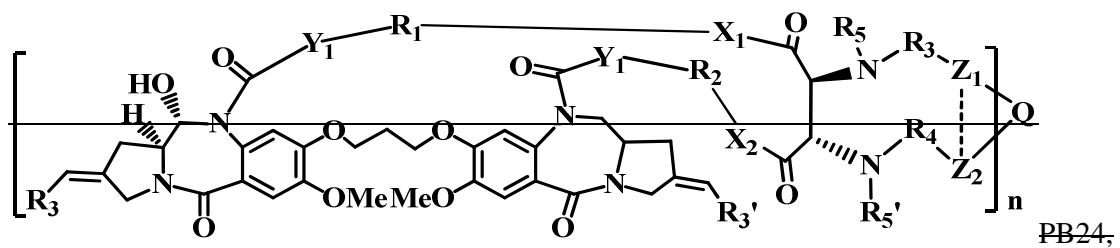
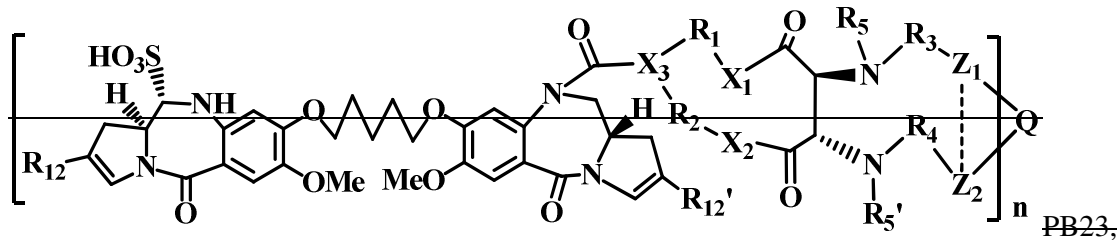
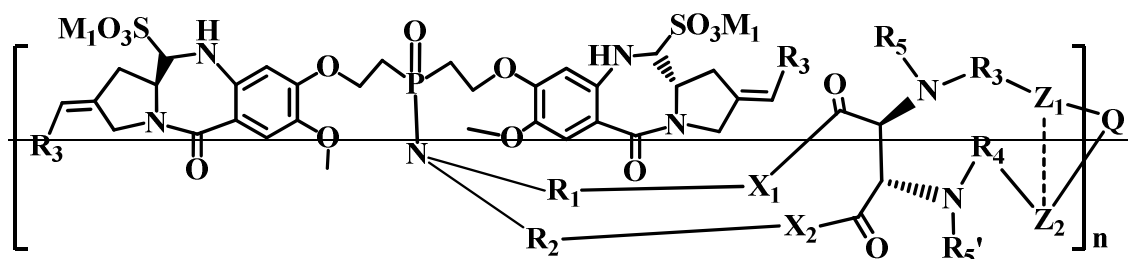
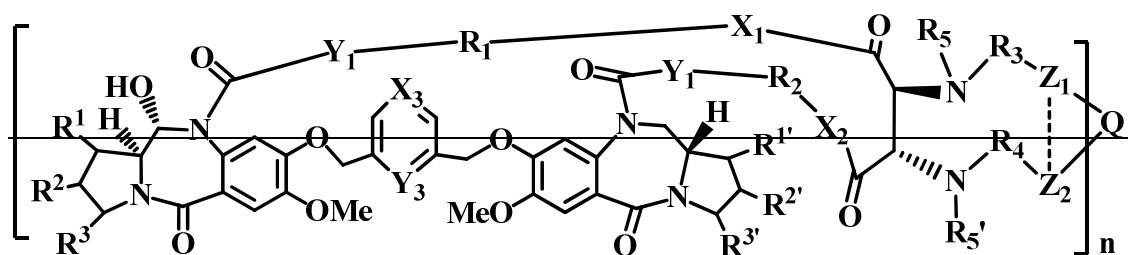
PB18,

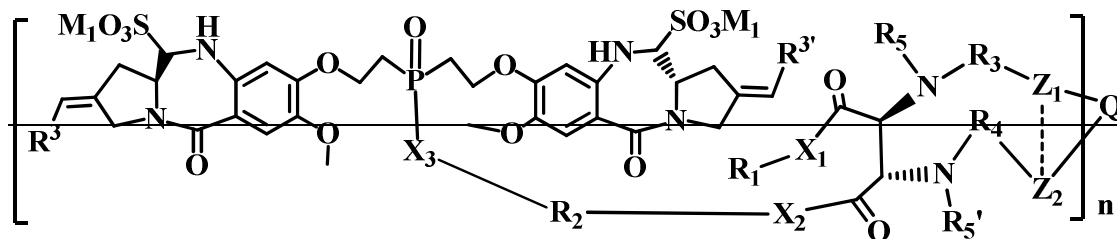


PB19,

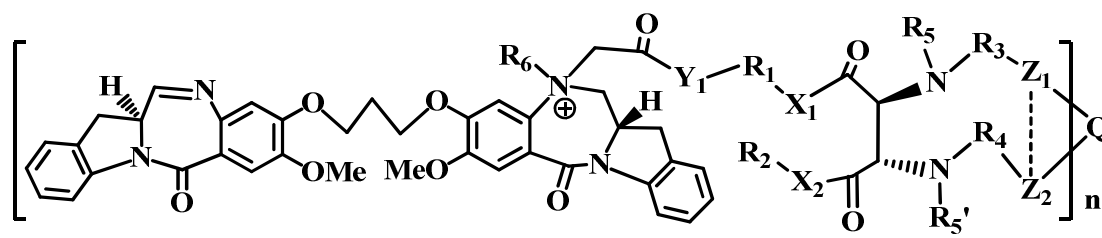


PB20,

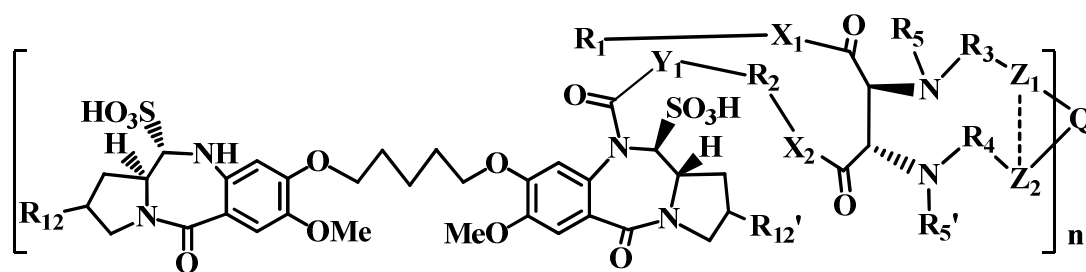




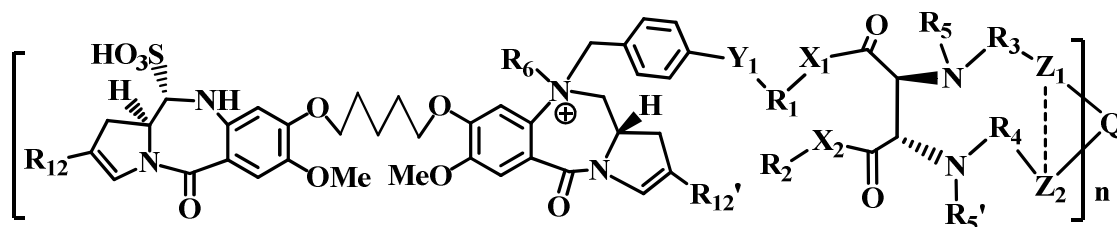
PB27,



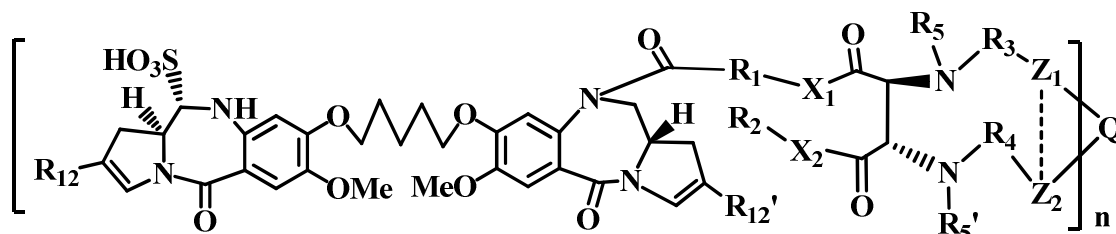
PB28,



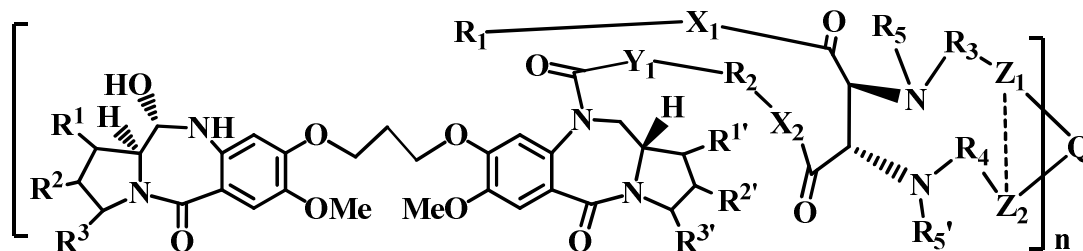
PB29,



PB30,



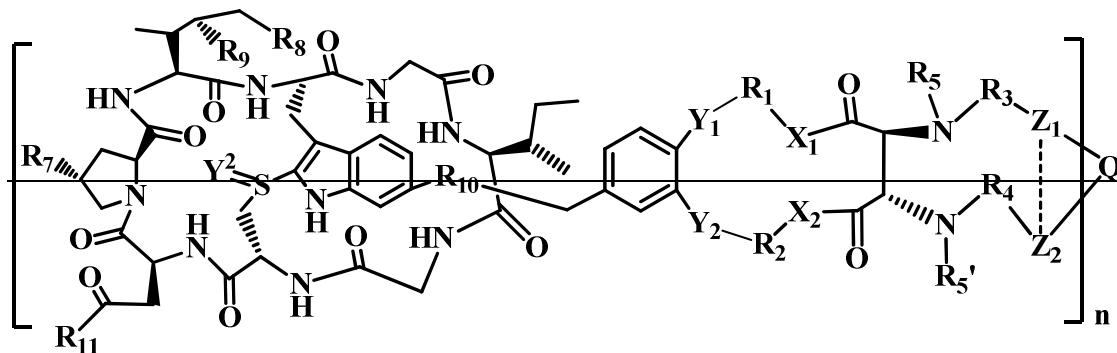
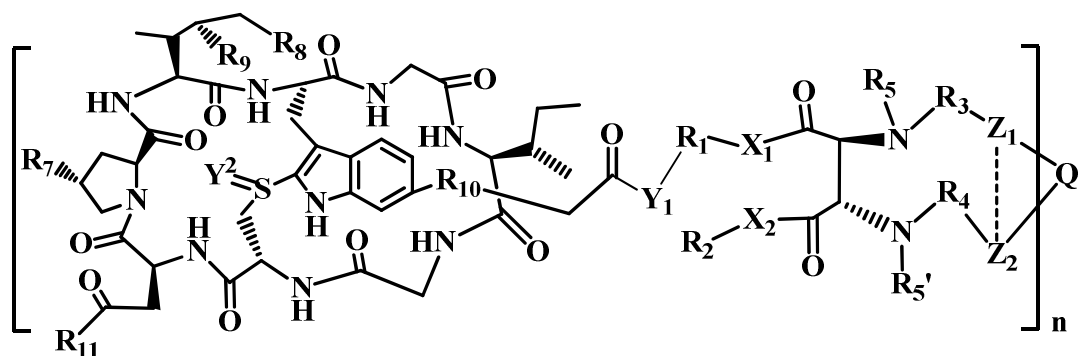
PB31,



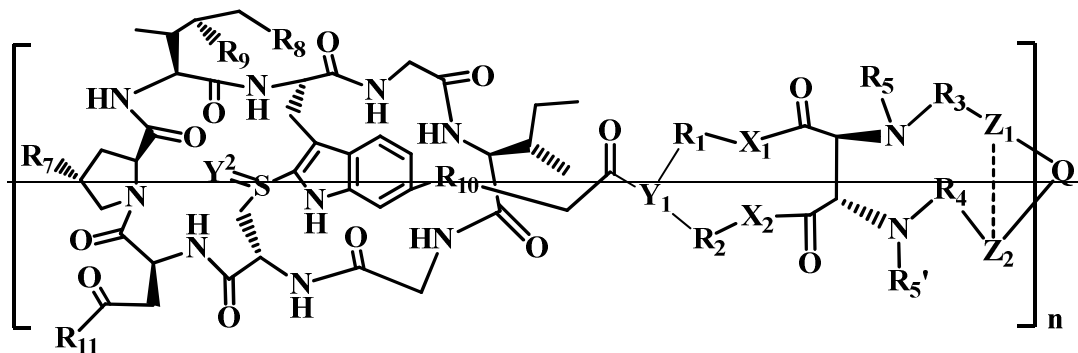
PB32,

wherein “-----”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R₅', Z₁, Z₂, and n are defined the same above; Preferably X₁, X₂, Y₁ and Y₂ are independently O, N, NH, NHNH, NR₅, S, C(O)O, C(O)NH, OC(O)NH, OC(O)O, NHC(O)NH, NHC(O)S, OC(O)N(R₁), N(R₁)C(O)N(R₁), CH, C(O)NHNHC(O) and C(O)NR₁; R¹, R², R³, R^{1'}, R^{2'}, and R^{3'} are independently H; F; Cl; =O; =S; OH; SH; C₁-C₈ lineal or branched alkyl, aryl, alkenyl, heteroaryl, heteroalkyl, alkylcycloalkyl, ester (COOR₅ or -OC(O)R₅), ether (OR₅), amide (CONR₅), carbamate (OCONR₅), amines (NHR₅, NR₅R₅'), heterocycloalkyl, or acyloxylamines (-C(O)NHOH, -ONHC(O)R₅); or peptides containing 1-20 natural or unnatural aminoacids, or polyethyleneoxy unit of formula (OCH₂CH₂)_p or (OCH₂CH(CH₃))_p, wherein p is an integer from 1 to about 5000. The two R₅: R¹R², R²R³, R¹R³, R^{1'}R^{2'}, R^{2'}R^{3'}, or R^{1'}R^{3'} can independently form 3~8 member cyclic ring of alkyl, aryl, heteroaryl, heteroalkyl, or alkylcycloalkyl group; X₃ and Y₃ are independently N, NH, CH₂ or CR₅, wherein R₅, R₆, R₁₂ and R₁₂' are independently H, OH, NH₂, NH(CH₃), NHNH₂, COOH, SH, OZ₃, SZ₃, F, Cl, or C₁-C₈ lineal or branched alkyl, aryl, heteroaryl, heteroalkyl, alkylcycloalkyl, acyloxylamines; Z₃ is H, OP(O)(OM₁)(OM₂), OCH₂OP(O)(OM₁)(OM₂), OSO₃M₁, or O-glycoside (glucoside, galactoside, mannoside, glucuronoside/glucuronide, alloside, fructoside, etc.), NH-glycoside, S-glycoside or CH₂-glycoside; M₁ and M₂ are independently H, Na, K, Ca, Mg, NH₄, NR₁R₂R₃.

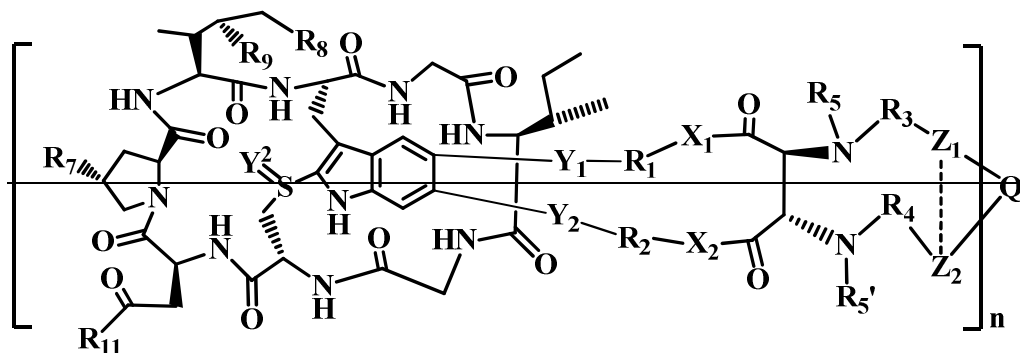
2330. The conjugate compound of claim 1, wherein the Drug₁ or Drug₂ is an amanitin analogue, is selected from structures of Am01, Am02, Am03, Am04, Am05, Am06, Am07, Am08 and Am09 below:



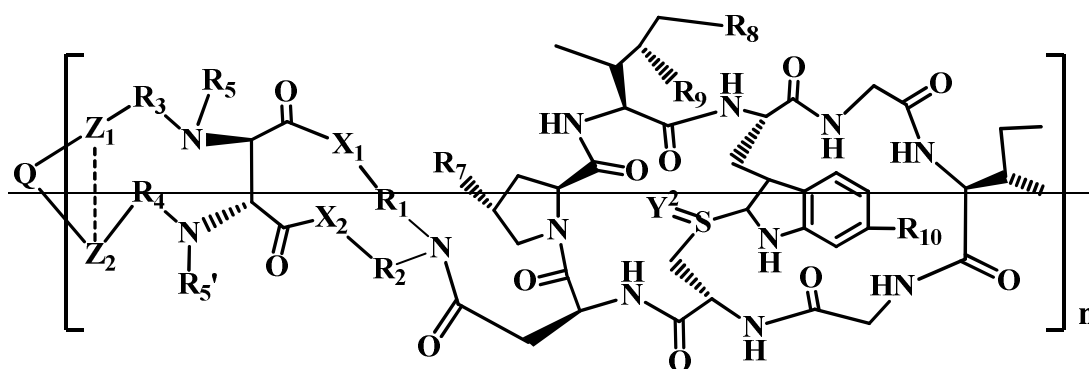
Am01,



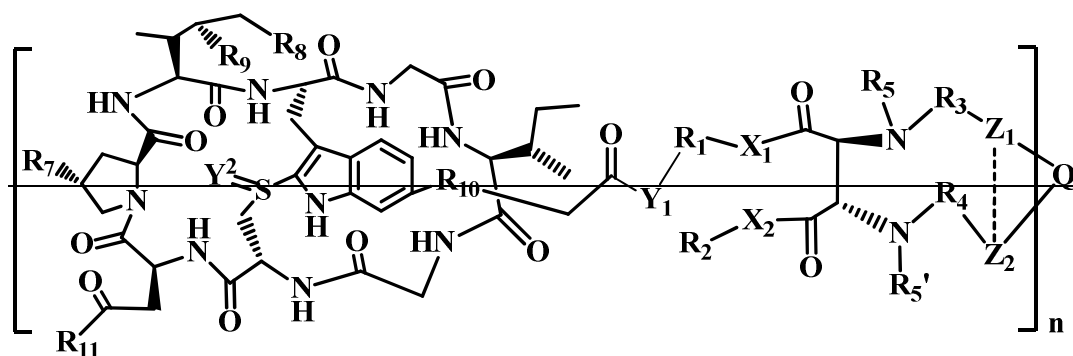
Am02,



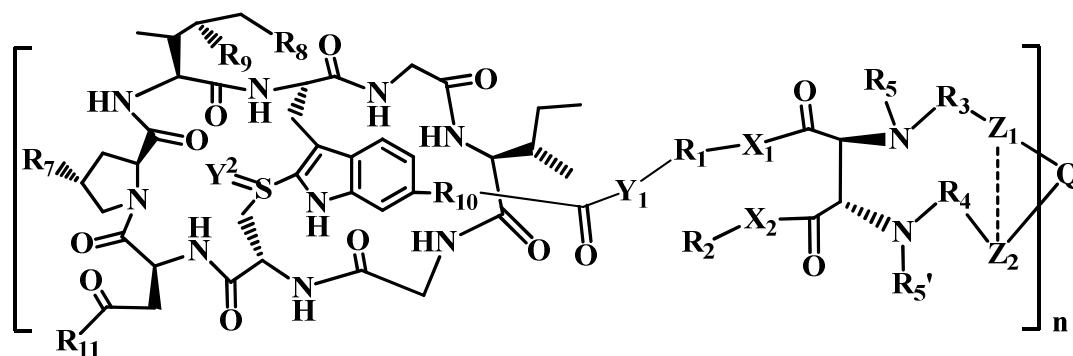
Am03



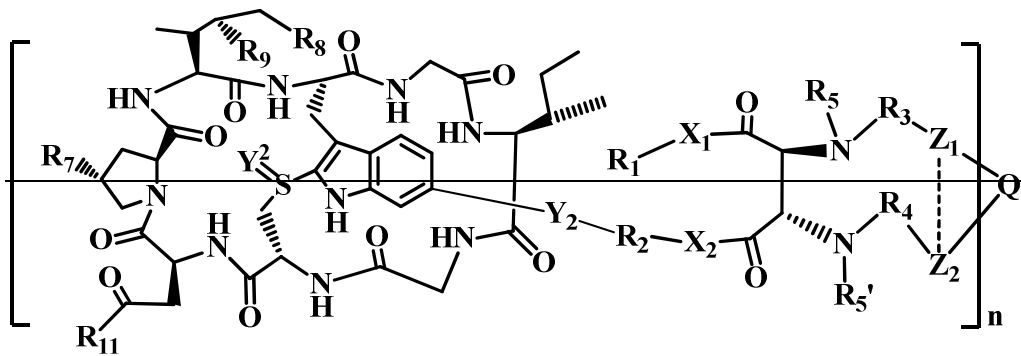
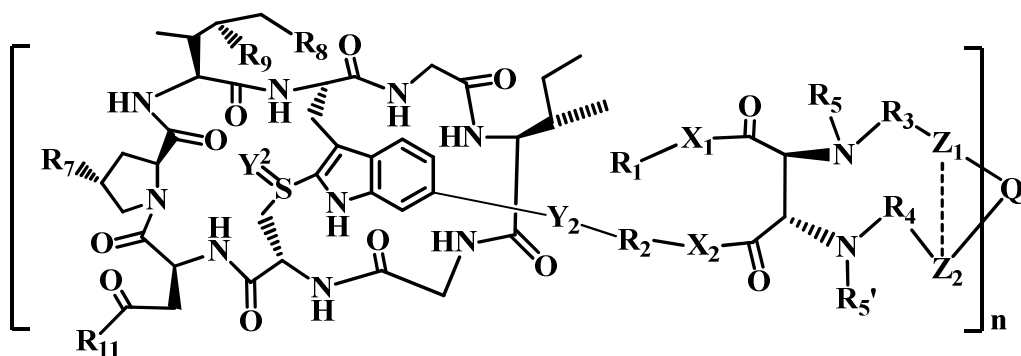
Am04,



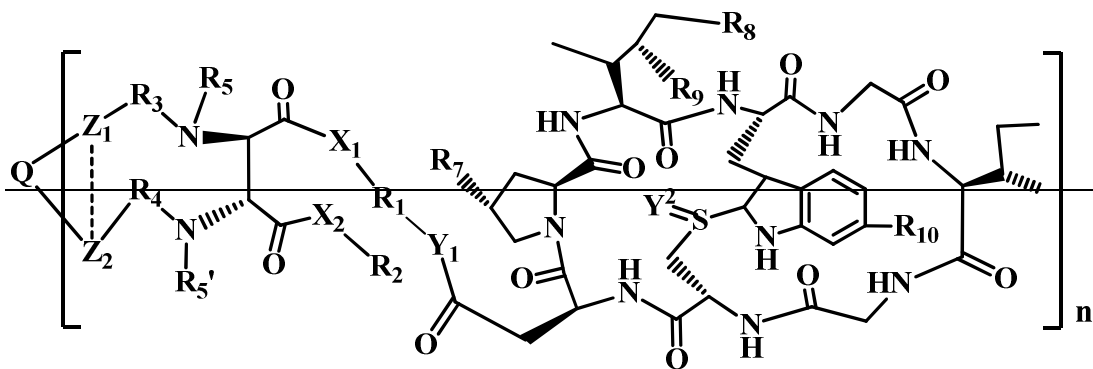
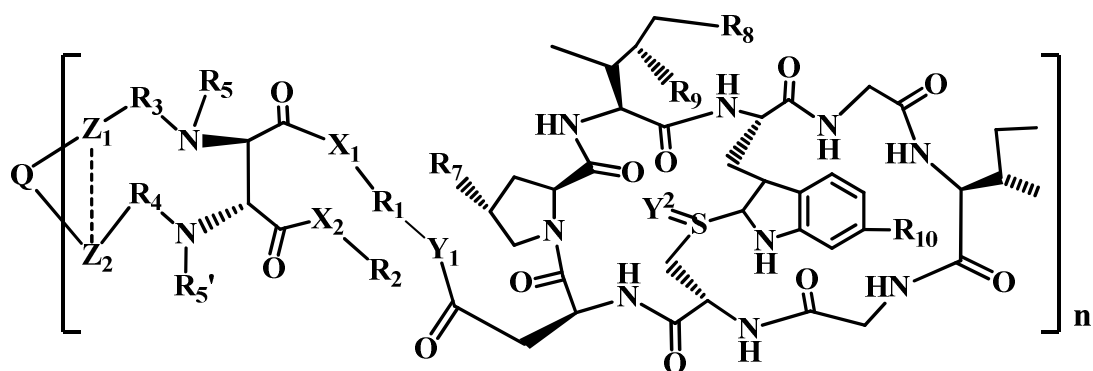
Am05,



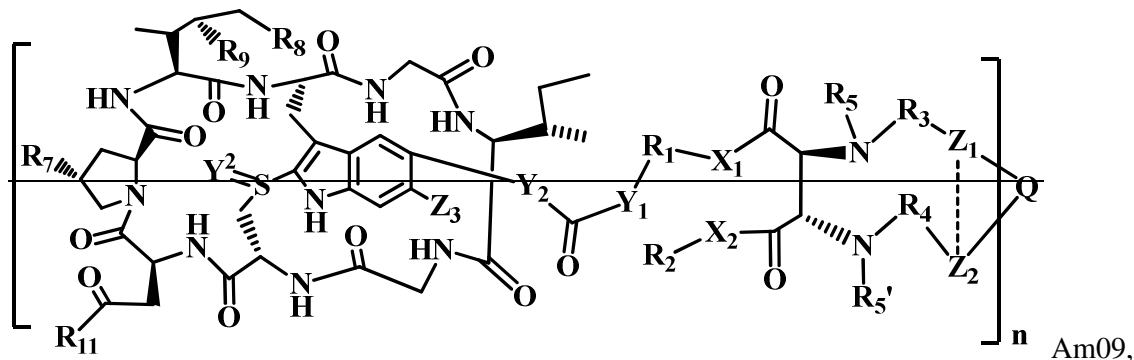
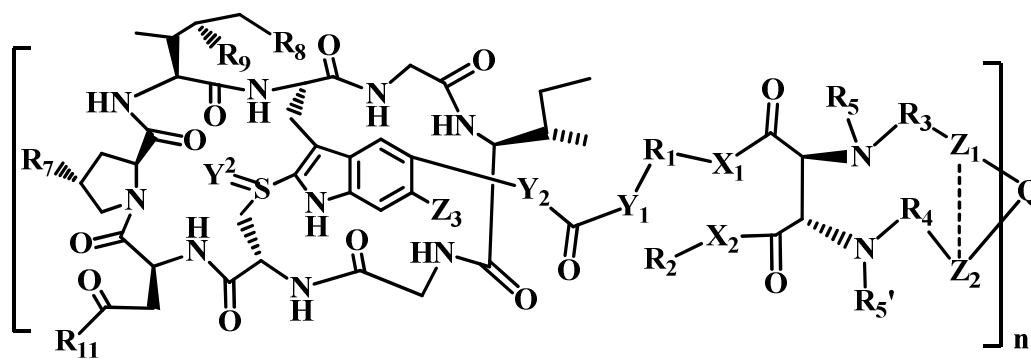
Am06,



Am07,



Am08,



wherein “-----”, X_1 , X_2 , Q , Y_1 , Y_2 , R_1 , R_2 , R_3 , R_4 , R_5 , R_5' , Z_1 , Z_2 , and n are defined the same above;

preferably ~~Preferably~~ X_1 , X_2 , Y_1 and Y_2 are independently O, N, NH, NHNH, NR_5 , S,

$C(O)O$, $C(O)NH$, $OC(O)NH$, $OC(O)O$, $NHC(O)NH$, $NHC(O)S$, $OC(O)N(R_1)$,

$N(R_1)C(O)N(R_1)$, CH , $C(O)NH-NHC(O)$, $C(O)NR_1$ or absent; R_7 , R_8 , and R_9 are independently

H, OH, OR_1 , NH_2 , NHR_1 , C_1 - C_6 alkyl, or absent; Y^2 is O, O_2 , NR_1 , NH, or absent; R_{10} is CH_2 ,

O, NH, NR_1 , $NHC(O)$, $NHC(O)-NH$, $NHC(O)O$, $OC(O)O$, $C(O)$, $OC(O)$, $OC(O)(NR_1)$,

$(NR_1)C(O)(NR_1)$, $C(O)R_1$ or absent; R_{11} is OH, NH_2 , NHR_1 , $NHNH_2$, $NHNHCOOH$, $O-R_1$ -

$COOH$, $NH-R_1-COOH$, $NH-(Aa)_nCOOH$, $O(CH_2CH_2O)_pCH_2CH_2OH$,

$O(CH_2CH_2O)_pCH_2CH_2NH_2$, $NH(CH_2CH_2O)_pCH_2CH_2NH_2$, NR_1R_1' ,

$O(CH_2CH_2O)_pCH_2CH_2COOH$, $NH(CH_2CH_2O)_pCH_2CH_2COOH$, $NH-Ar-COOH$, $NH-Ar-NH_2$,

$O(CH_2CH_2O)_pCH_2CH_2NHSO_3H$, $NH(CH_2CH_2O)_pCH_2CH_2NHSO_3H$, R_1-NHSO_3H , $NH-R_1$ -

$NHSO_3H$, $O(CH_2CH_2O)_pCH_2CH_2NHPO_3H_2$, $NH(CH_2CH_2O)_pCH_2CH_2NHPO_3H_2$, OR_1 , R_1 -

$NHPO_3H_2$, $R_1-OPO_3H_2$, $O(CH_2CH_2O)_pCH_2CH_2OPO_3H_2$, $OR_1-NHPO_3H_2$, $NH-R_1-NHPO_3H_2$, or

$NH(CH_2CH_2O)_pCH_2CH_2NHPO_3H_2$, wherein Aa is 1-8 aminoacids; n and m_1 are independently

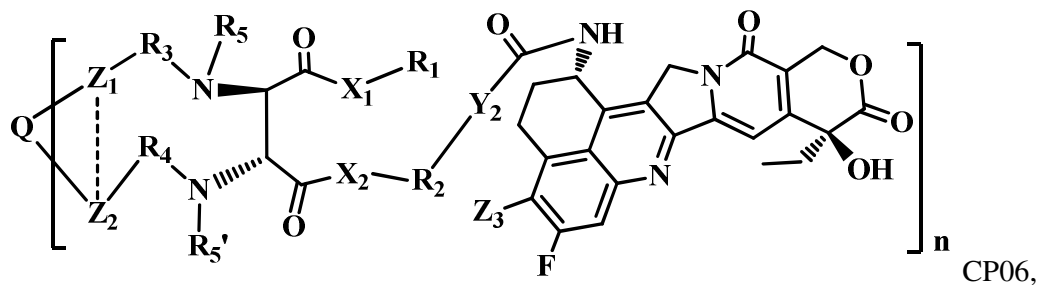
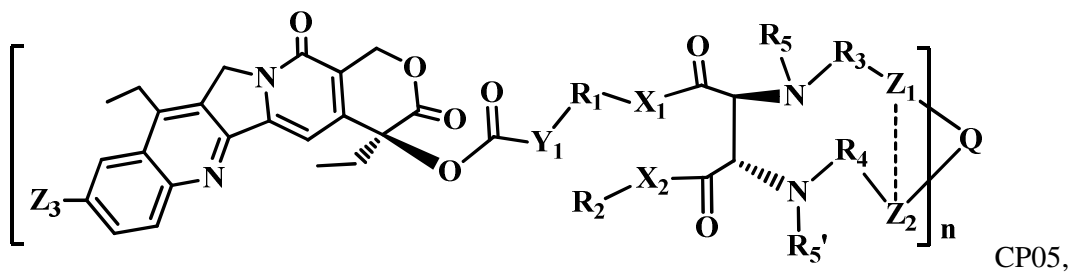
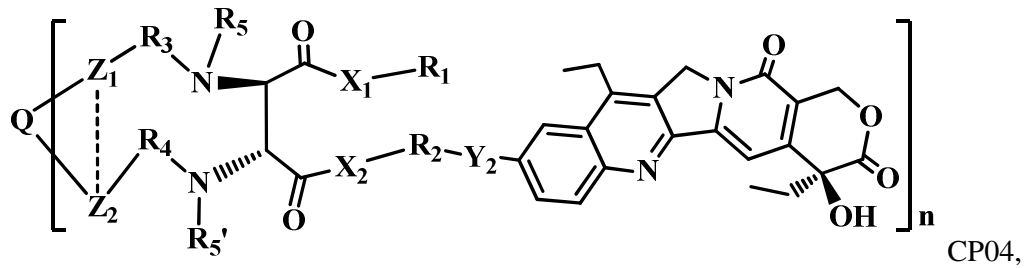
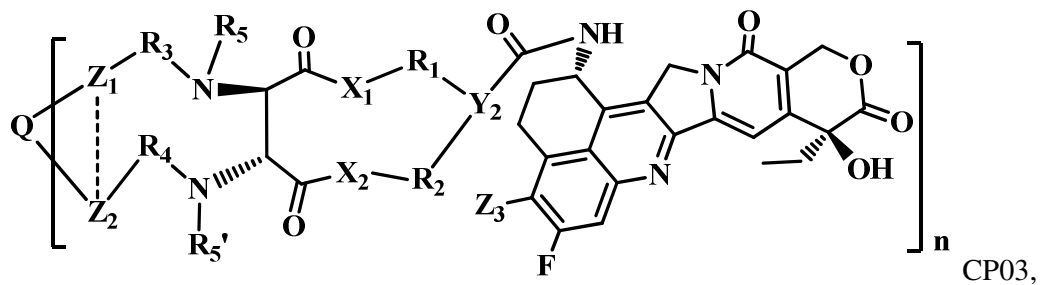
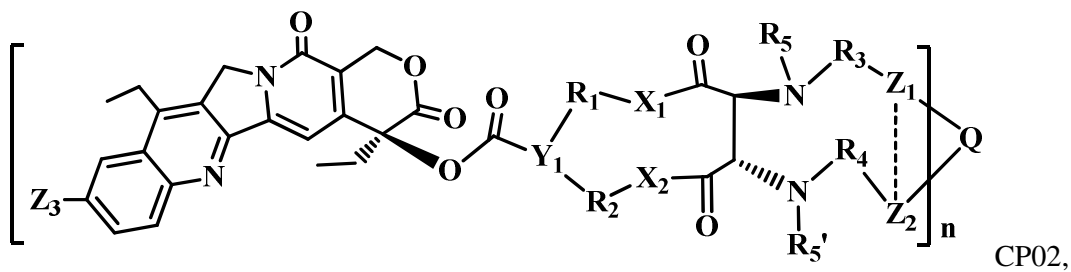
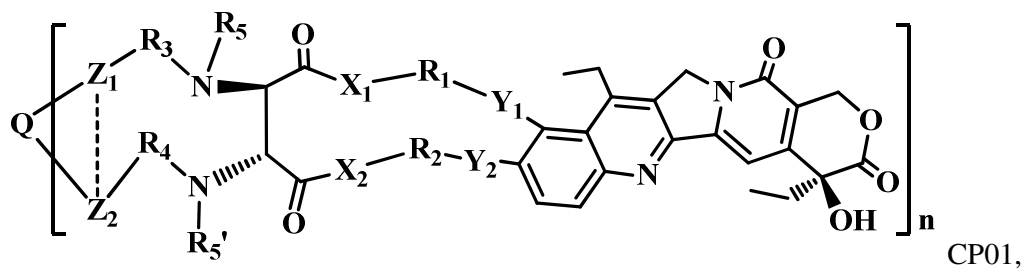
1-30; p is 1-5000; Z_3 is H, OH, $COOR_1$, NH_2 , NHR_1 , OR_1 , $CONHR_1$, $NHCOR_1$, $OCOR_1$,

$OP(O)(OM_1)(OM_2)$, $OCH_2OP(O)(OM_1)(OM_2)$, OSO_3M_1 , R_1 , or O-glycoside (glucoside,

galactoside, mannoside, glucuronoside/glucuronide, alloside, fructoside, etc.), NH-glycoside, S-

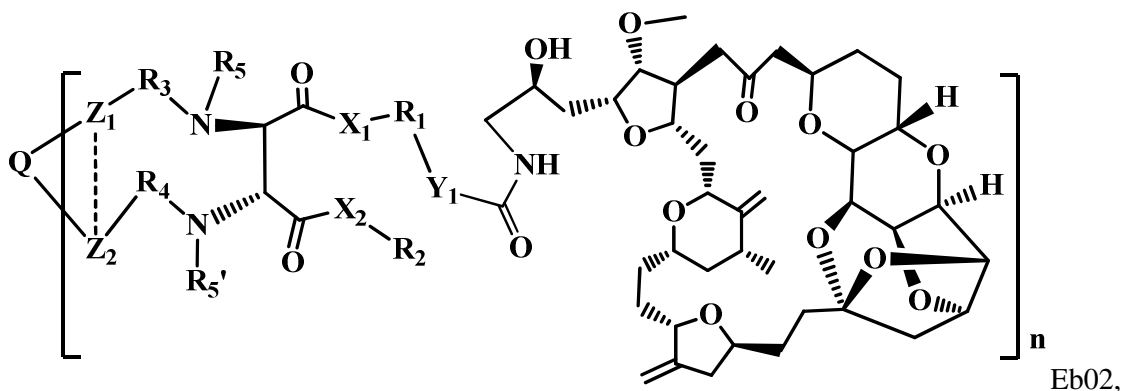
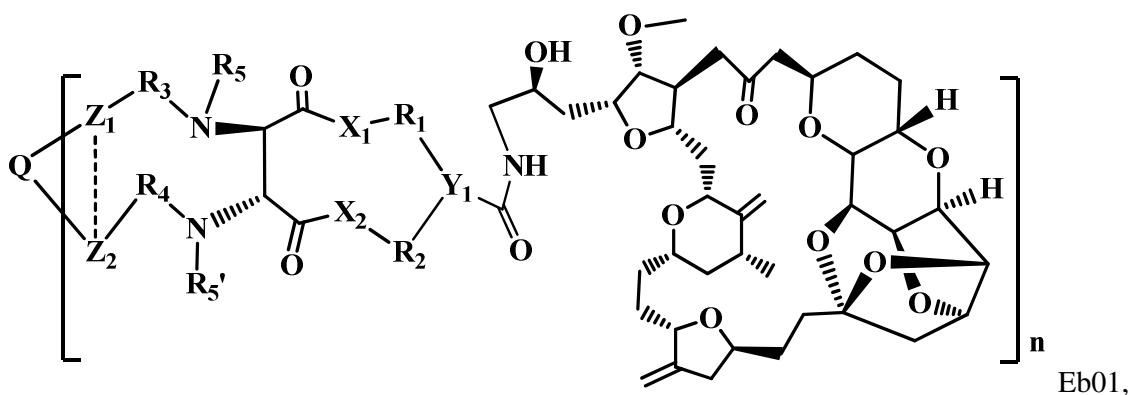
glycoside or CH_2 -glycoside; M_1 and M_2 are independently H, Na, K, Ca, Mg, NH_4 , $NR_1R_2R_3$.

2431. The conjugate compound of claim 1, wherein the Drug₁ or Drug₂ is a camptothecin and its derivative, is selected from structures of CP01, CP02, CP03, CP04, CP05, and CP06 below:



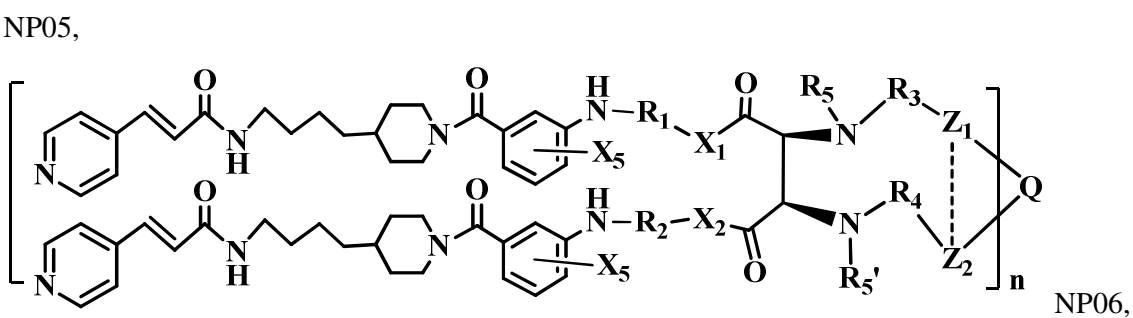
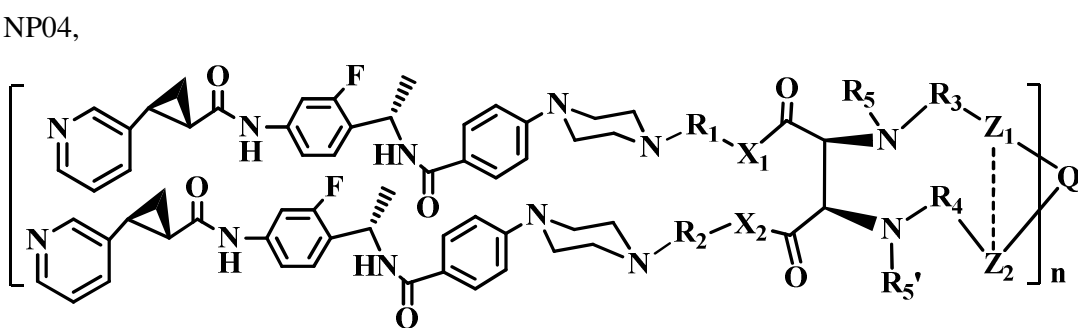
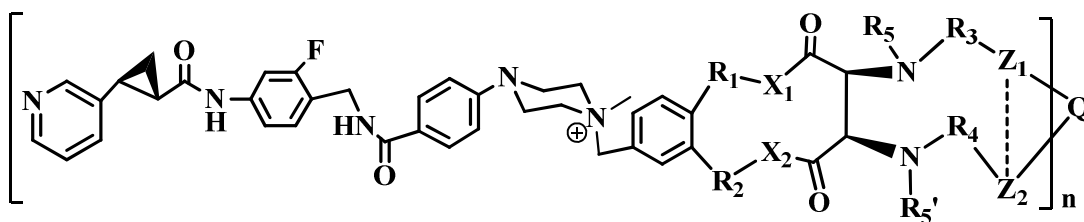
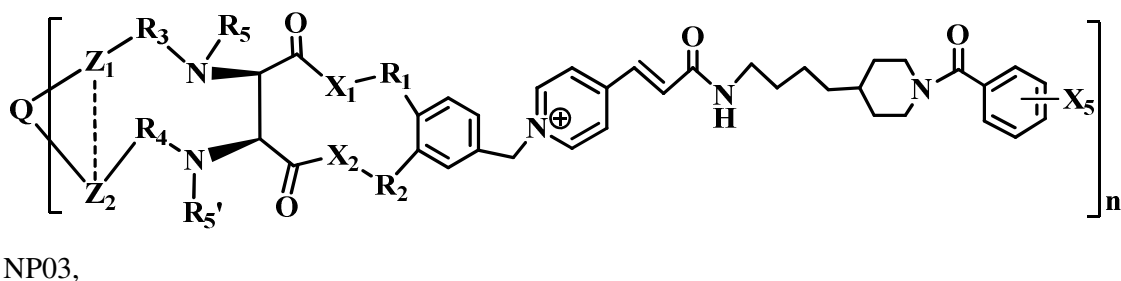
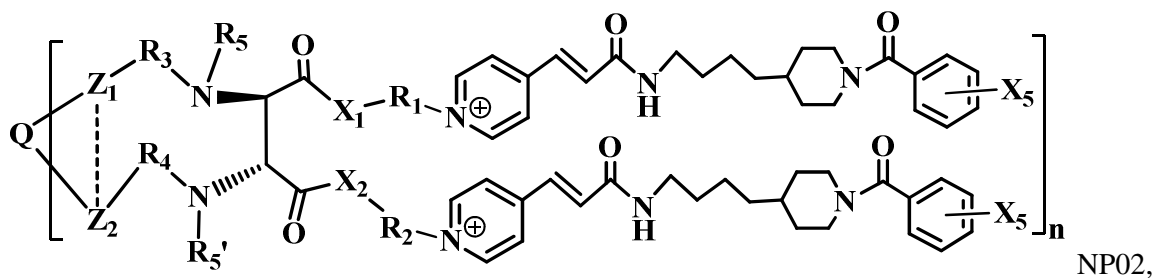
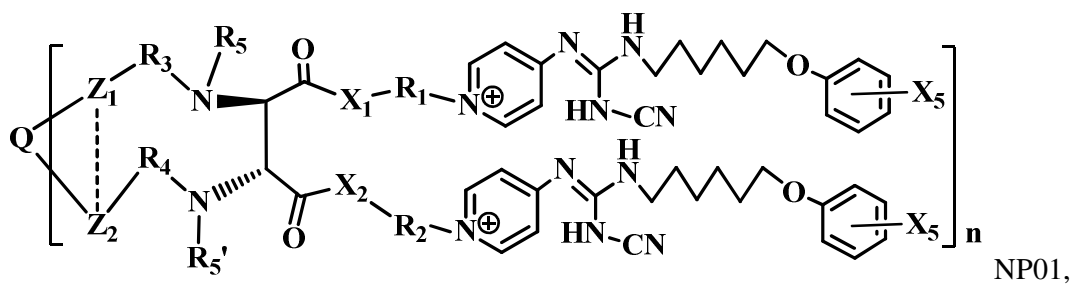
wherein “-----”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R₅', Z₁, Z₂, and n are defined the same above; ~~preferably~~ Preferably X₁, X₂, Y₁ and Y₂ are independently O, N, NH, NHNH, NR₅, S, C(O)O, C(O)NH, OC(O)NH, OC(O)O, NHC(O)NH, NHC(O)S, OC(O)N(R₁), N(R₁)C(O)N(R₁), CH, CH₂, C(O)NHNHC(O), C(O)NR₁ or absent; Z₃ is H, OH, COOR₁, NH₂, NHR₁, OR₁, CH₃, CONHR₁, NHCOR₁, OCOR₁, OP(O)(OM₁)(OM₂), OCH₂OP(O)(OM₁)(OM₂), OSO₃M₁, R₁, or O-glycoside (glucoside, galactoside, mannoside, glucuronoside/glucuronide, alloside, fructoside, etc.), NH-glycoside, S-glycoside or CH₂-glycoside; M₁ and M₂ are independently H, Na, K, Ca, Mg, NH₄, NR₁R₂R₃.

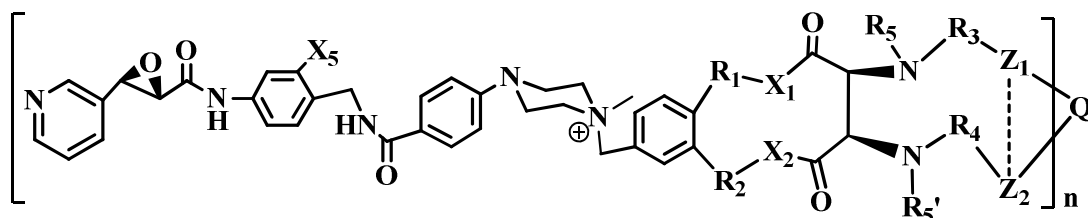
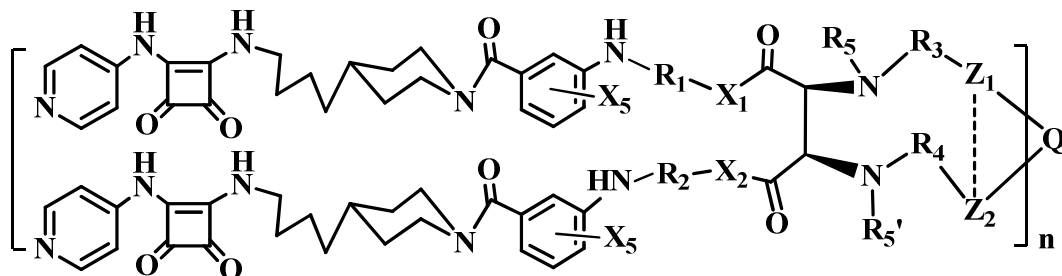
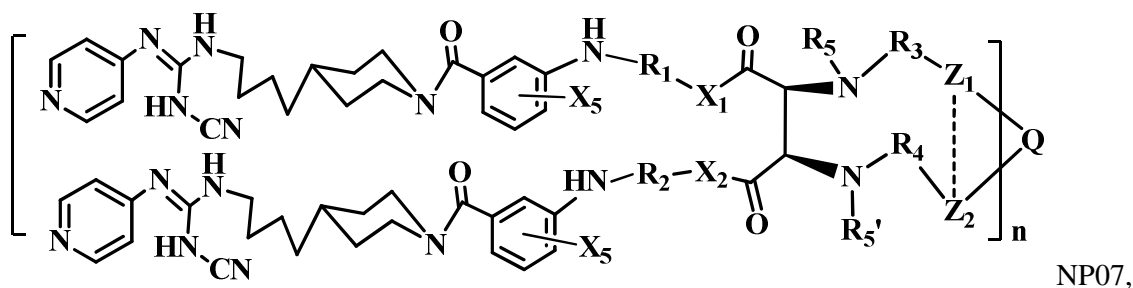
2532. The conjugate compound of claim 1, wherein the Drug₁ or Drug₂ is an eribulin and its derivative, is selected from structures of Eb01, and Eb02 below:



wherein “-----”, Q, X₁, X₂, Y₁, R₁, R₂, R₃, R₄, R₅, R₅', Z₁, Z₂, and n are defined the same above; Preferably X₁, X₂, Y₁ and Y₂ are independently O, N, NH, NHNH, NR₅, S, C(O)O, C(O)NH, OC(O)NH, OC(O)O, NHC(O)NH, NHC(O)S, OC(O)N(R₁), N(R₁)C(O)N(R₁), CH, CH₂, C(O)NHNHC(O), C(O)NR₁ or absent.

2633. The conjugate compound of claim 1, wherein the Drug₁ or Drug₂ is an inhibitor of nicotinamide phosphoribosyltransferases, is selected from structures of NP01, NP02, NP03, NP04, NP05, NP06, NP07, NP08, and NP09 below:



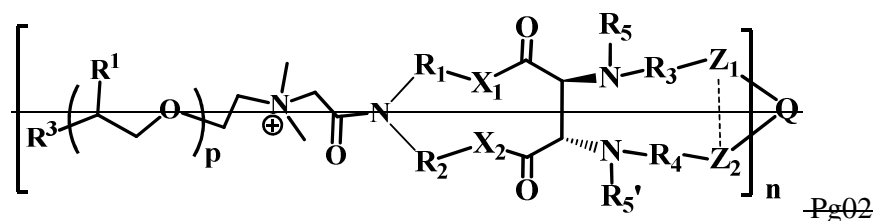
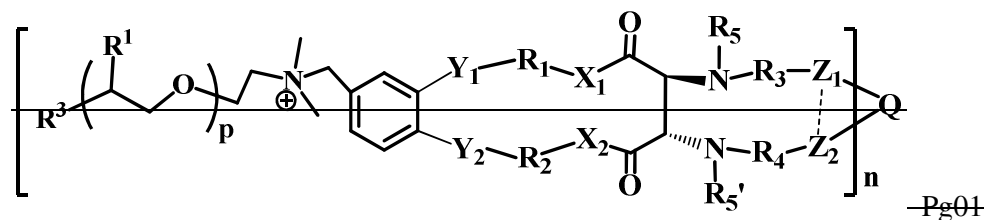


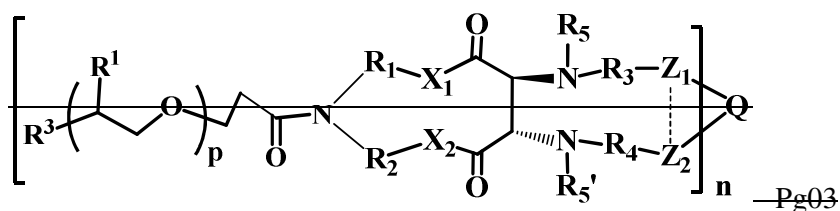
NP09,

wherein “-----”, Q, X₁, X₂, Y₁, R₁, R₂, R₃, R₄, R₅, R₅', Z₁, Z₂, and n are defined the same above; X₅ is F, Cl, Br, I, OH, OR₁, R₁, OPO₃H₂, OSO₃H, NHR₁, OCOR₁, NHCOR₁;

Preferably X₁, X₂, Y₁ and Y₂ are independently O, N, NH, NHNH, NR₅, S, C(O)O, C(O)NH, OC(O)NH, OC(O)O, NHC(O)NH, NHC(O)S, OC(O)N(R₁), N(R₁)C(O)N(R₁), CH, CH₂, C(O)NHNHC(O), C(O)NR₁ or absent.

~~27.34.~~ The conjugate compound of claim 1 or 14, wherein the Drug₁ or Drug₂ is a polyalkylene glycol analog, is selected from structures of Pg01, Pg02, and Pg03.

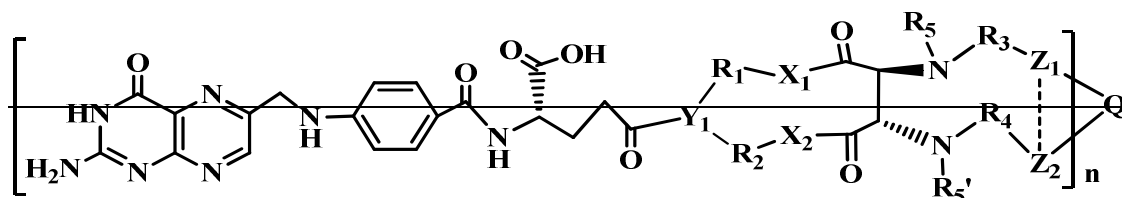




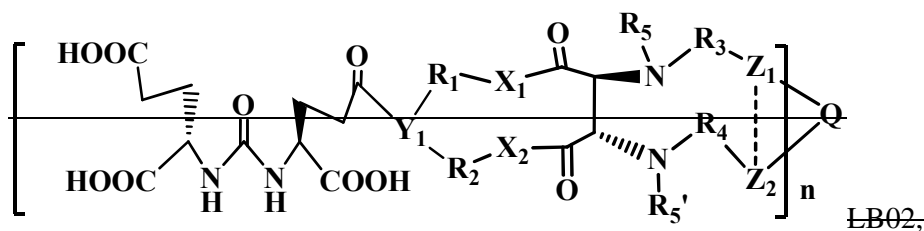
wherein “—”, Q, X₁, X₂, Y₁, Y₂, R₁, R₂, R₃, R₄, R₅, R₅', Z₁, Z₂, and n are defined the same above; Preferably Y₁ and Y₂ are independently O, NH, NHNH, NR₅, S, C(O)O, C(O)NH, OC(O)NH, OC(O)O, NHC(O)NH, NHC(O)S, OC(O)N(R₁), N(R₁)C(O)N(R₁), CH₂C(O)NH, NHC(O) and C(O)NR₁; p is 1–5000; R¹ and R³ are defined the same as R₁ above, and preferably R¹ and R³ are H, OH, OCH₃, CH₃, or OC₂H₅ independently.

35. The conjugate compound of claim 1, wherein Drug₁ or Drug₂ is a cell binding ligand or cell receptor agonist and its analogs, is selected from structures of: LB01 (Folate conjugate), LB02 (PMSA ligand conjugate), LB03 (PMSA ligand conjugate), LB04 (PMSA ligand conjugate), LB05 (Somatostatin conjugate), LB06 (Somatostatin conjugate), LB07 (Oetreotide, a Somatostatin analog conjugate), LB08 (Lanreotide, a Somatostatin analog conjugate), LB09 (Vapreotide (Sanvar), a Somatostatin analog conjugate), LB10 (CAIX ligand conjugate), LB11 (CAIX ligand conjugate), LB12 (Gastrin-releasing peptide receptor (GRPr), MBA conjugate), LB13 (luteinizing hormone-releasing hormone (LH RH) ligand and GnRH conjugate), LB14 (luteinizing hormone-releasing hormone (LH RH) and GnRH ligand conjugate), LB15 (GnRH antagonist, Abarelix conjugate), LB16 (cobalamin, vitamin B12 analog conjugate), LB17 (cobalamin, vitamin B12 analog conjugate), LB18 (for α_vβ₃-integrin receptor, cyclic RGD pentapeptide conjugate), LB19 (hetero-bivalent peptide ligand conjugate for VEGF receptor), LB20 (Neuromedin B conjugate), LB21 (bombesin conjugate for a G-protein coupled receptor), LB22 (TLR₂ conjugate for a Toll like receptor), LB23 (for an androgen receptor), LB24 (Cilengitide/cyclo(RGDfV) conjugate for an α_v-integrin receptor, LB23 (Fludrocortisone conjugate), LB25 (Rifabutin analog conjugate), LB26 (Rifabutin analog conjugate), LB27 (Rifabutin analog conjugate), LB28 (Fludrocortisone conjugate), LB29 (Dexamethasone conjugate), LB30 (fluticasone propionate conjugate), LB31 (Beclometasone dipropionate conjugate), LB32 (Triamcinolone acetone conjugate), LB33 (Prednisone conjugate), LB34 (Prednisolone conjugate), LB35 (Methylprednisolone conjugate), LB36 (Betamethasone conjugate), LB37 (Irinotecan analog conjugate), LB38 (Crizotinib analog conjugate), LB39 (Bortezomib analog conjugate), LB40 (Carfilzomib analog conjugate), LB41 (Carfilzomib analog conjugate), LB42 (Leuprolide analog conjugate), LB43 (Triptorelin analog conjugate), LB44 (Clindamycin conjugate), LB45 (Liraglutide analog conjugate), LB46 (Semaglutide analog conjugate), LB47 (Retapamulin analog conjugate), LB48 (Indibulin analog

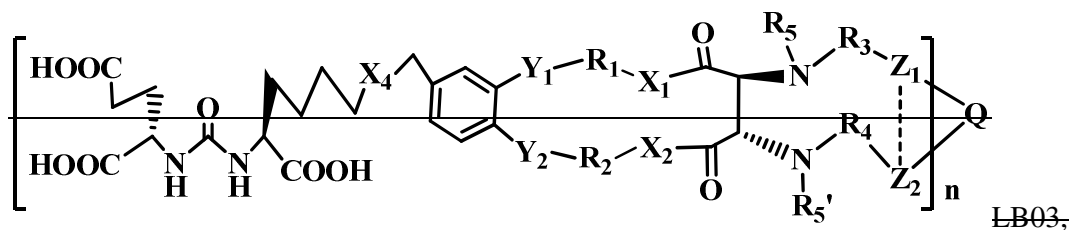
conjugate), LB49 (Vinblastine analog conjugate), LB50 (Lixisenatide analog conjugate), LB51 (Osimertinib analog conjugate), LB52 (a nucleoside analog conjugate), LB53 (Erlotinib analog conjugate) and LB54 (Lapatinib analog conjugate) as shown in the following structures:



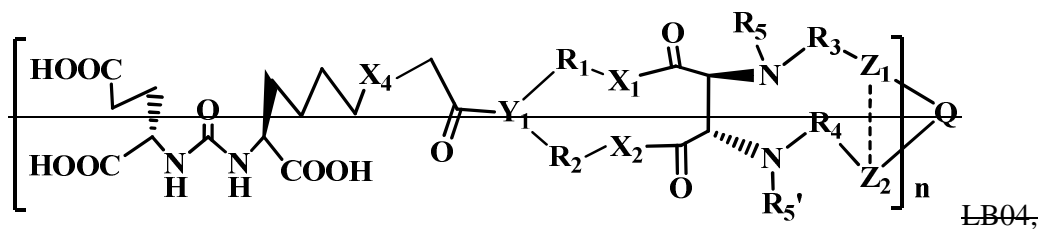
LB01,



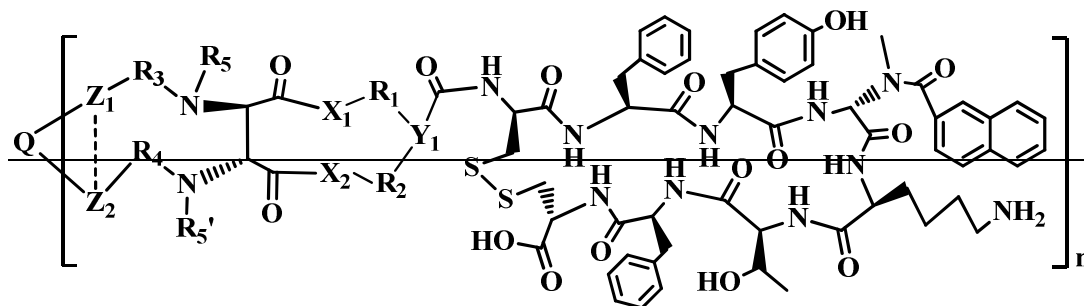
LB02,



LB03,

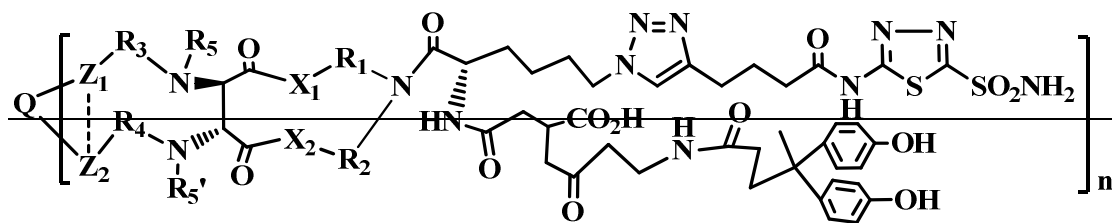


LB04,

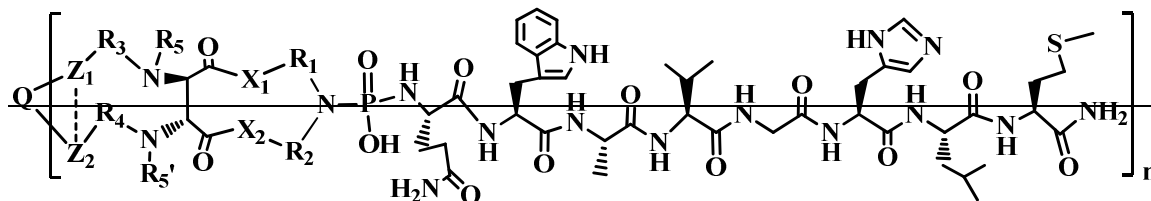


LB05,

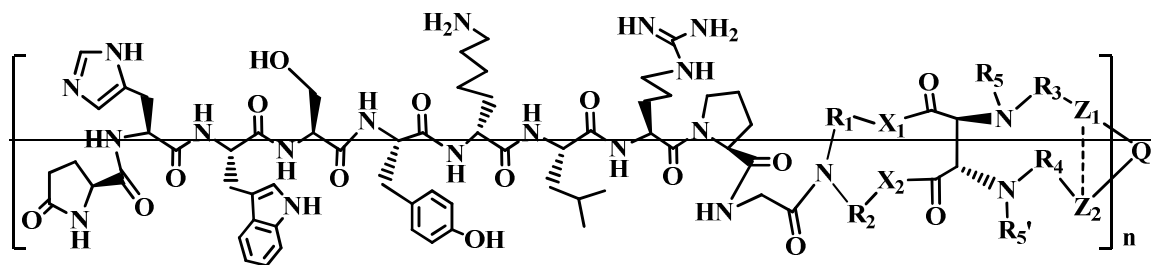




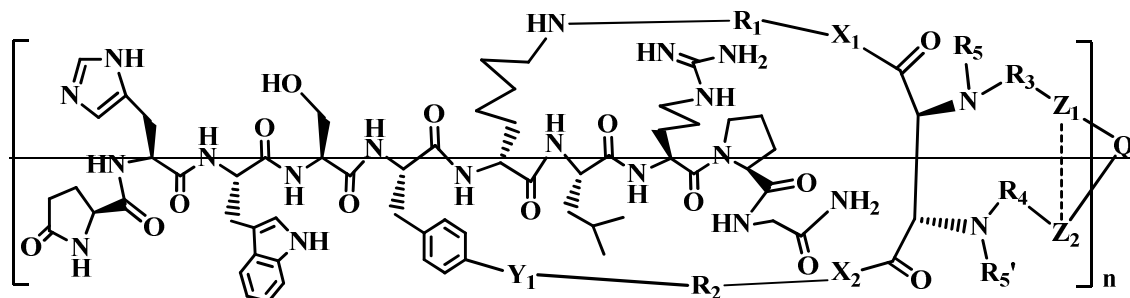
LB11,



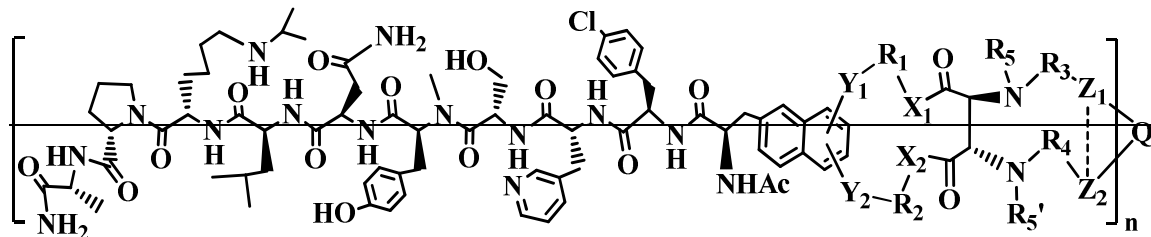
LB12,



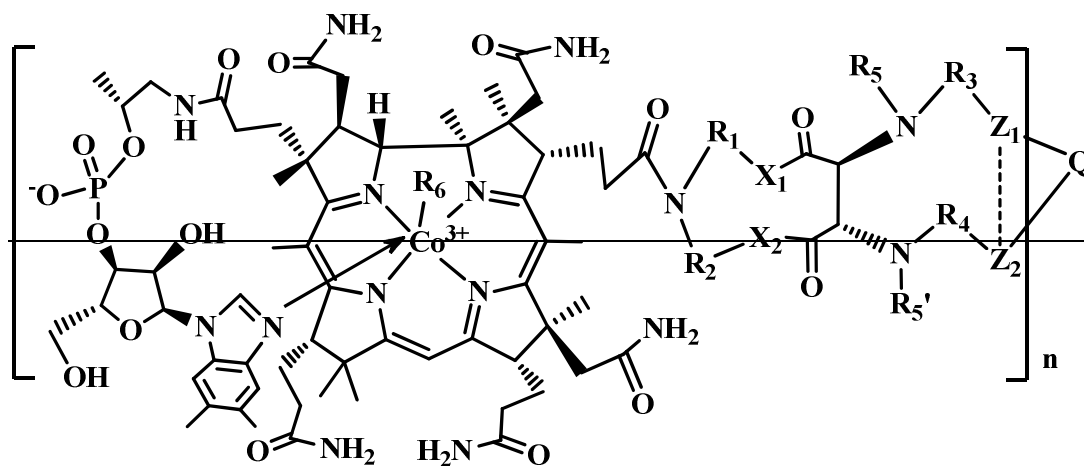
LB13,



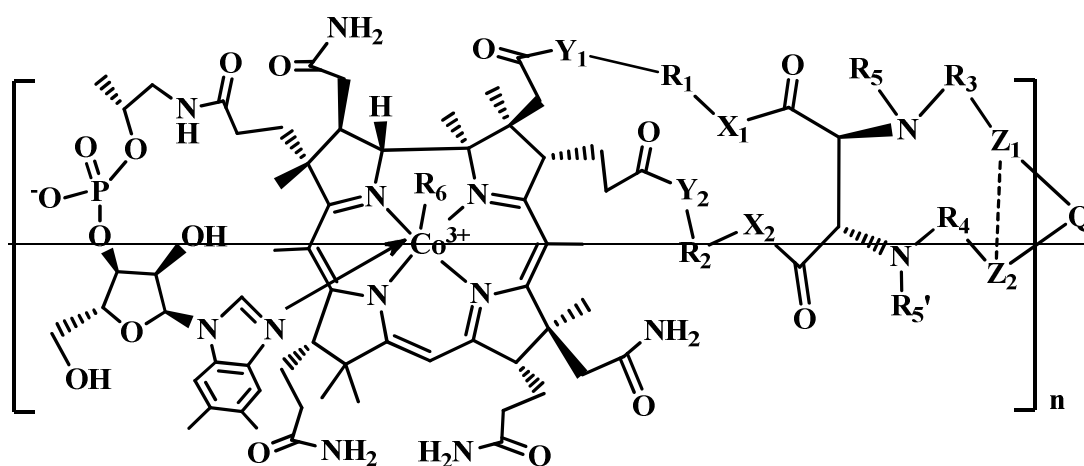
LB14,



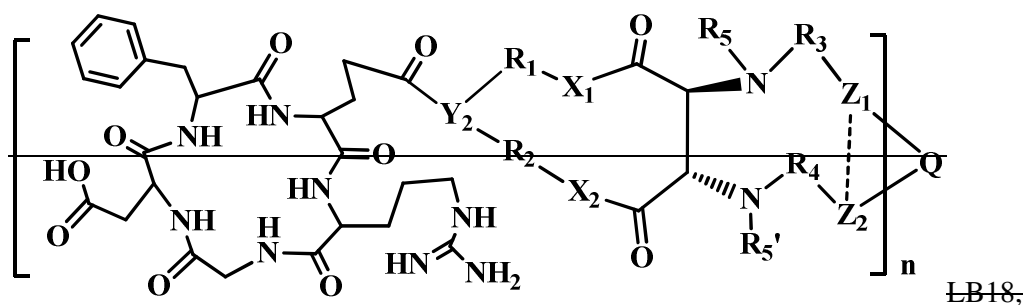
LB15,



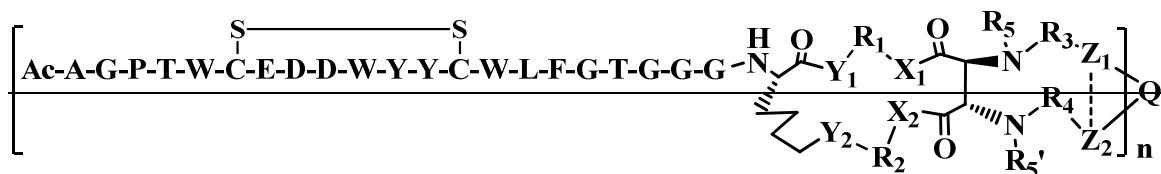
LB16,



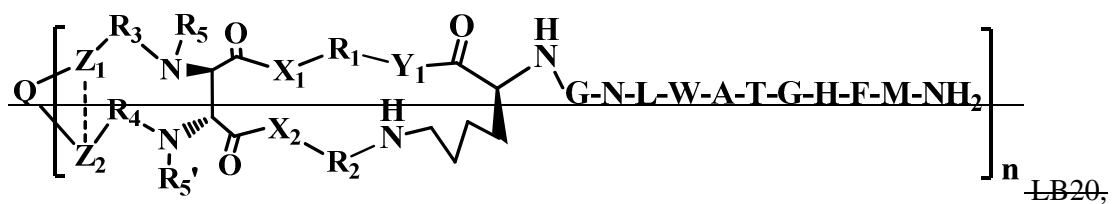
LB17,



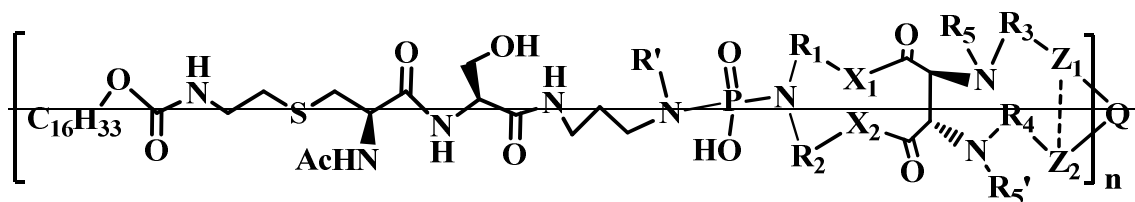
LB18,



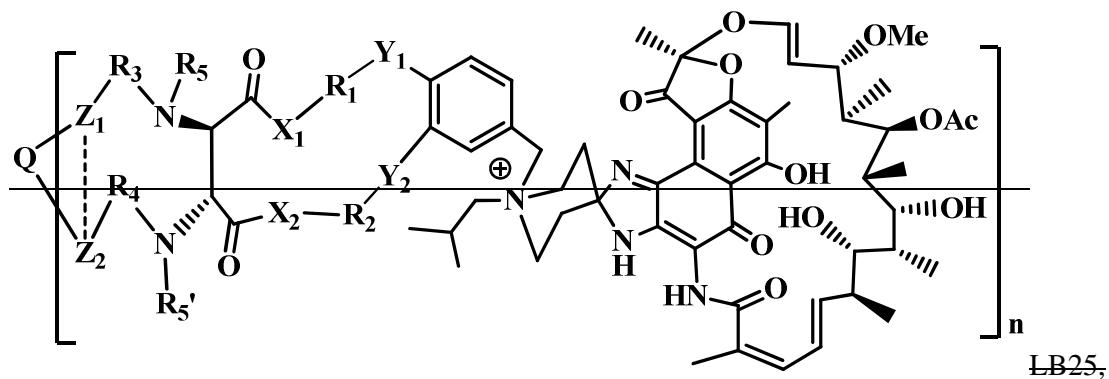
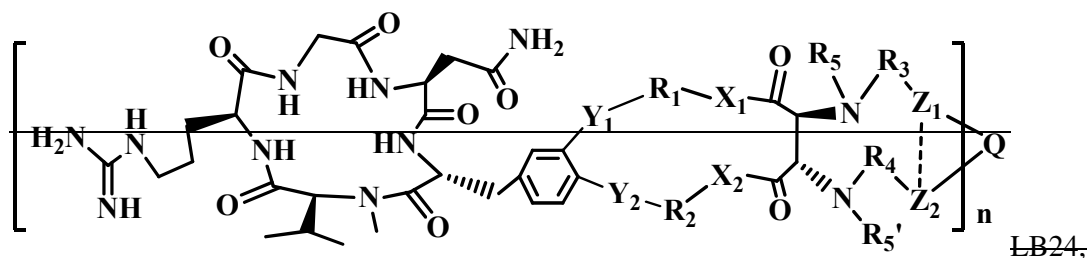
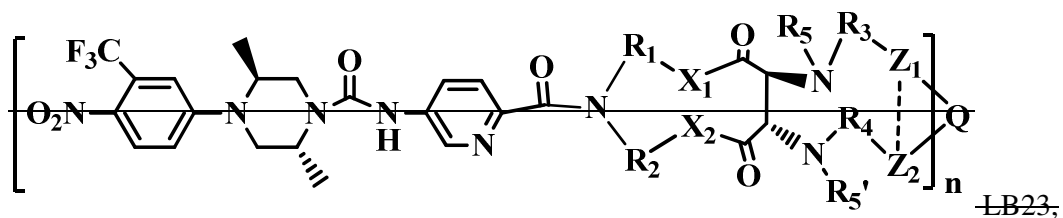
LB19,

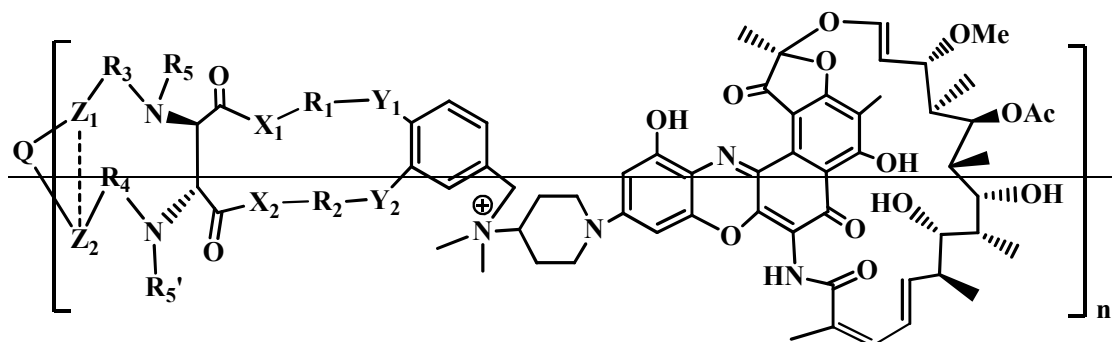


LB21,

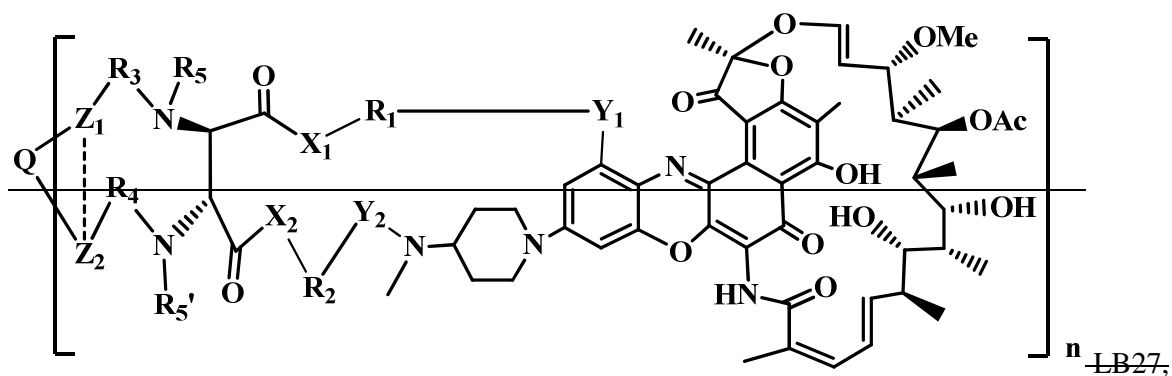


LB22,

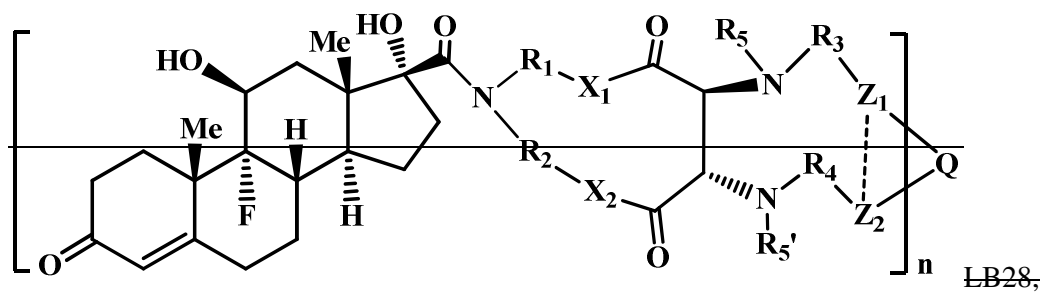




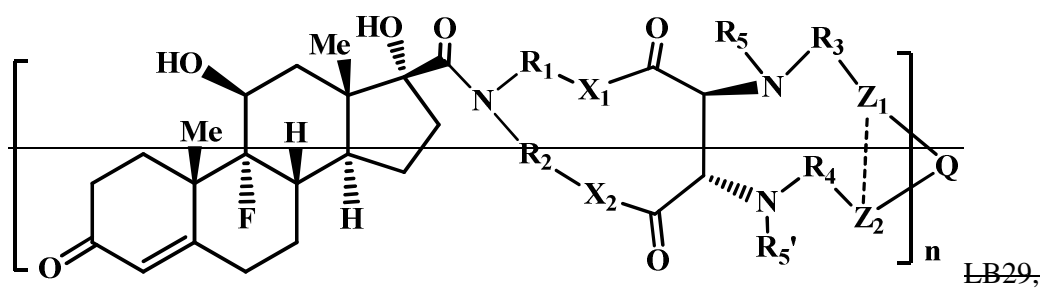
LB26,



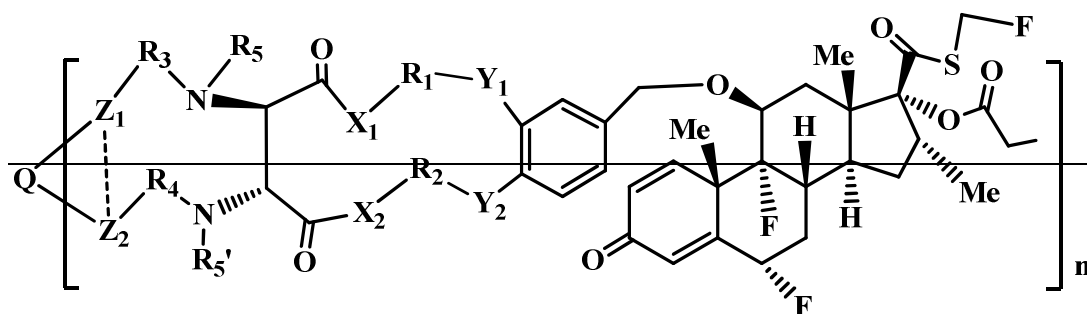
LB27,



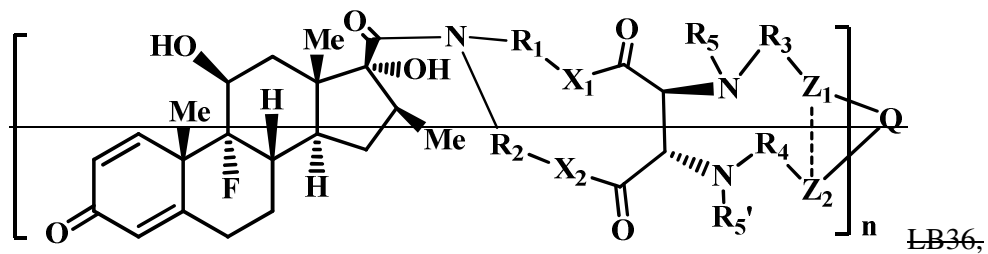
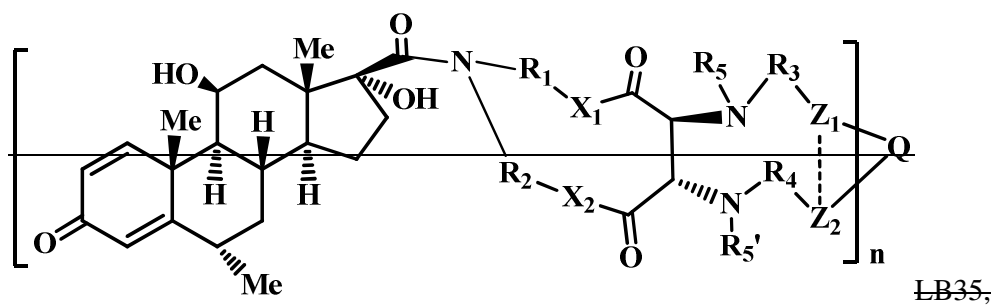
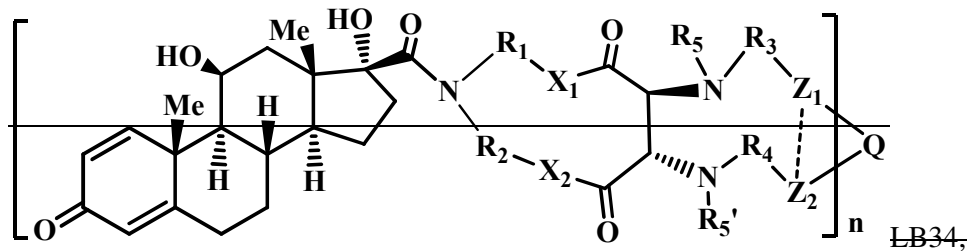
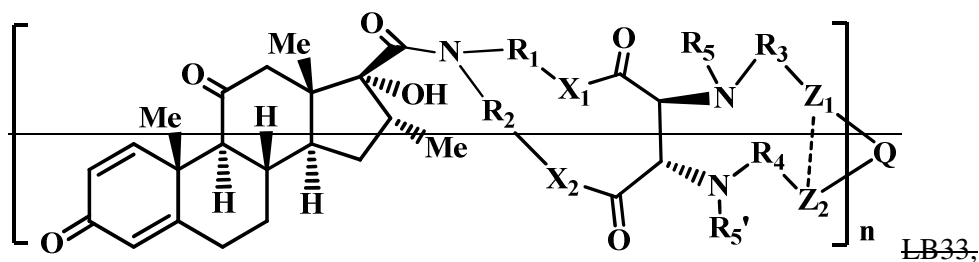
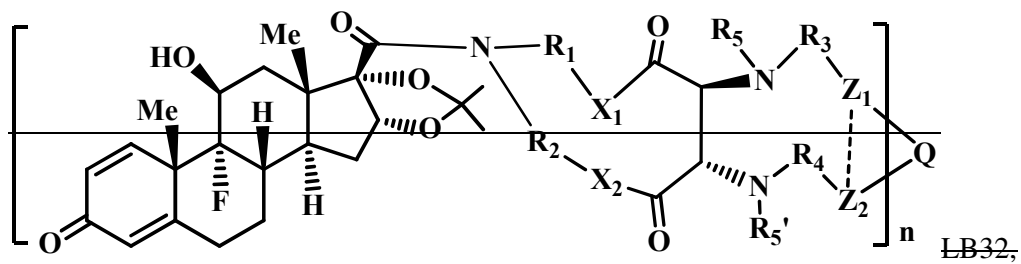
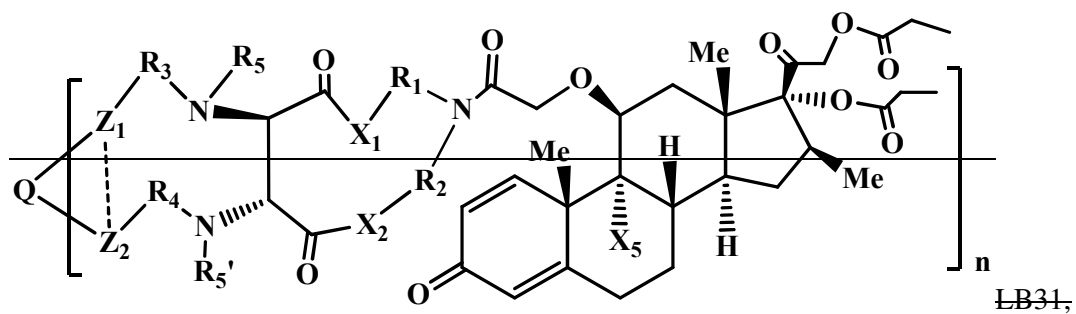
LB28,

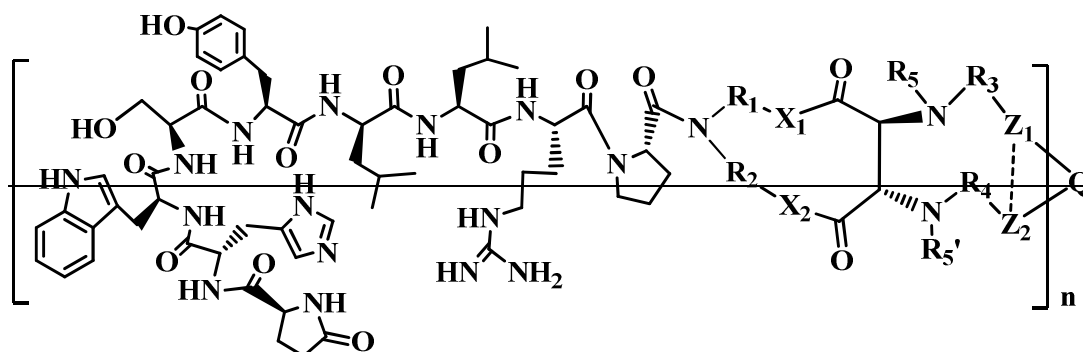
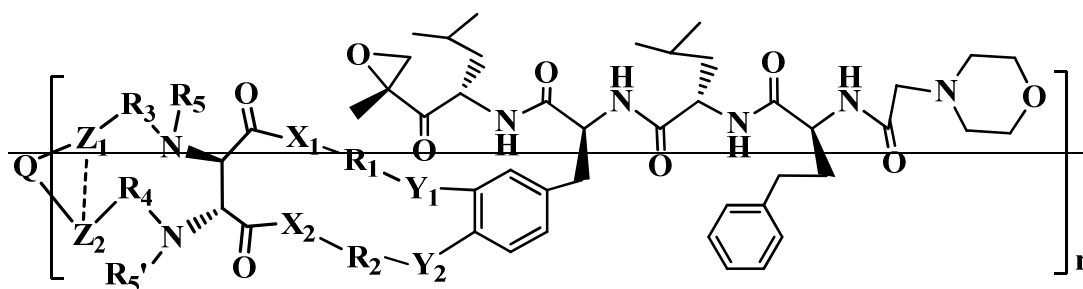
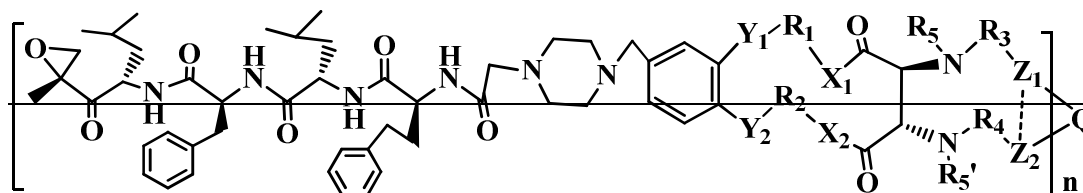
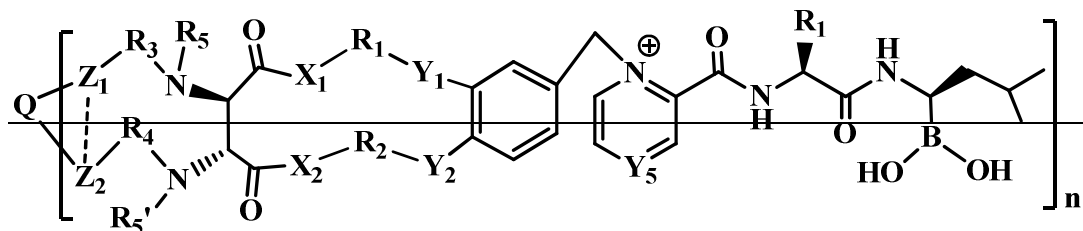
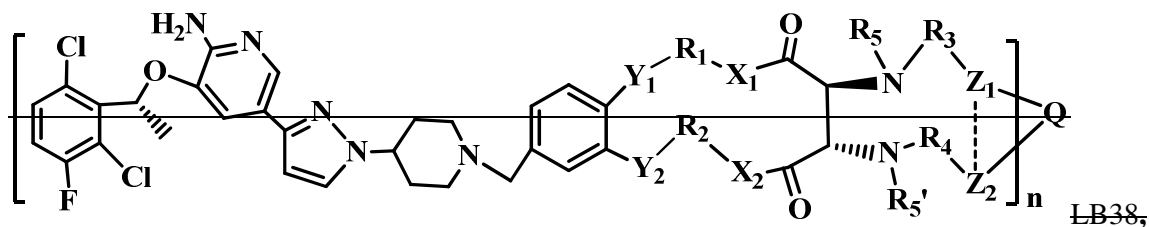
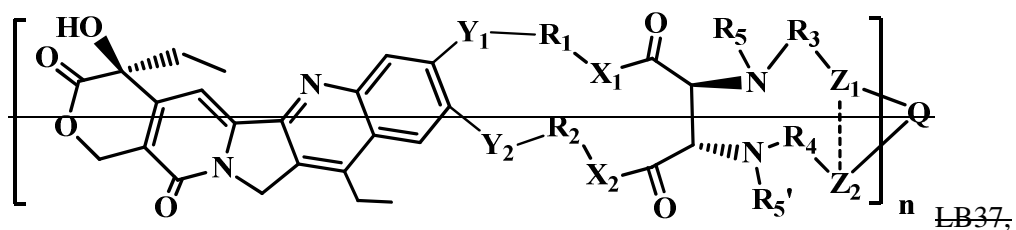


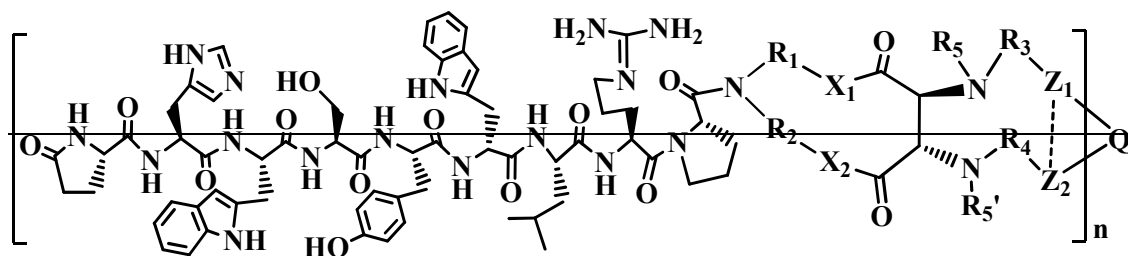
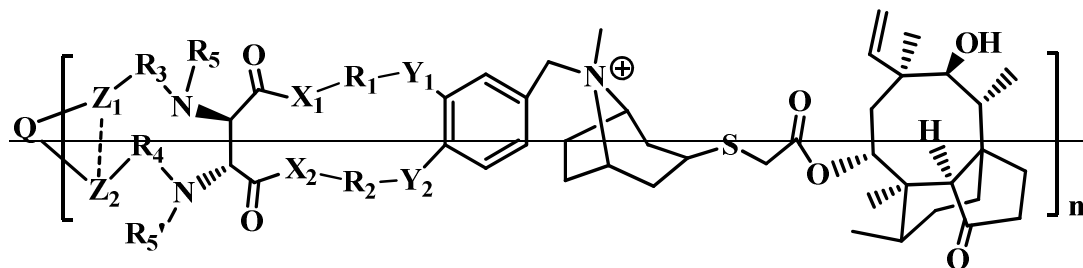
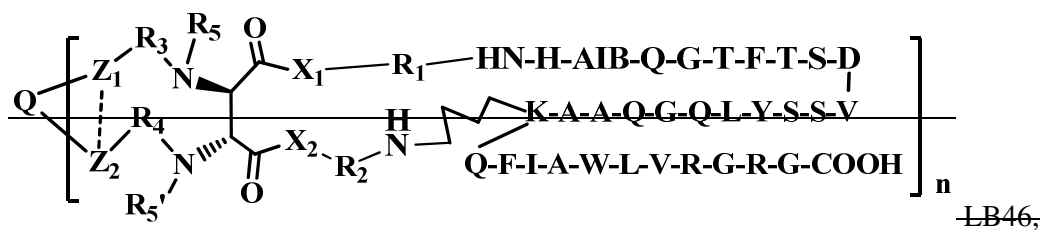
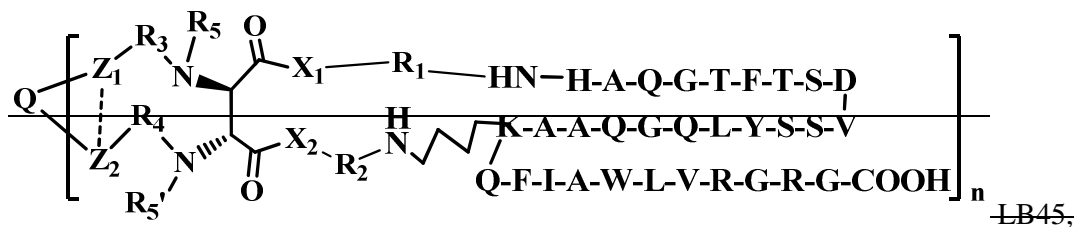
LB29,



LB30,

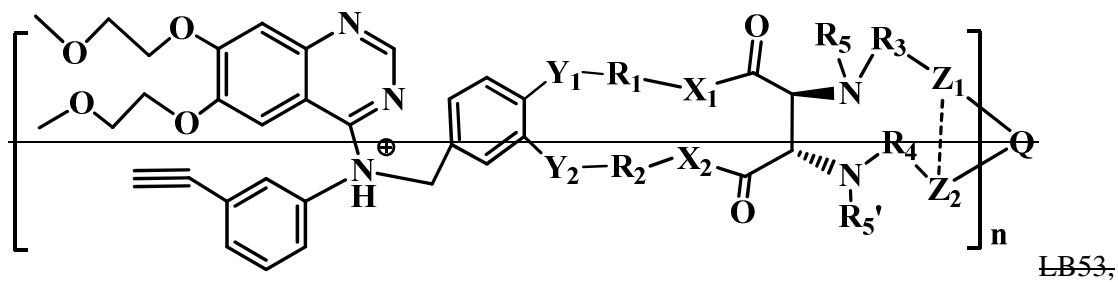
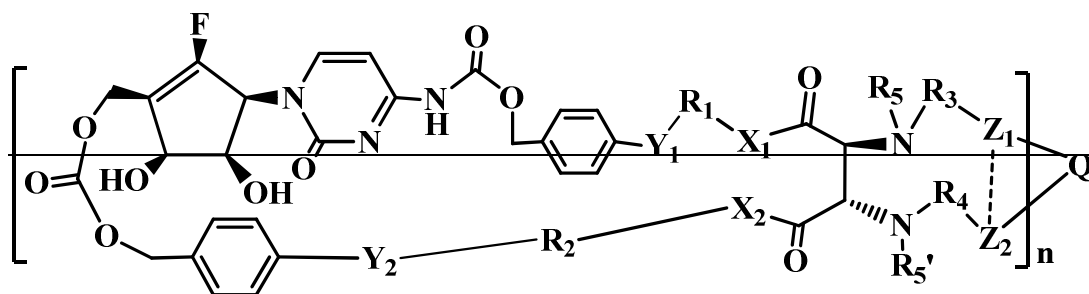
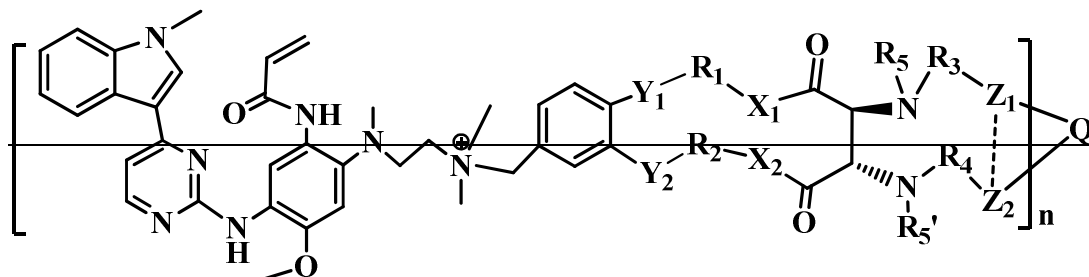
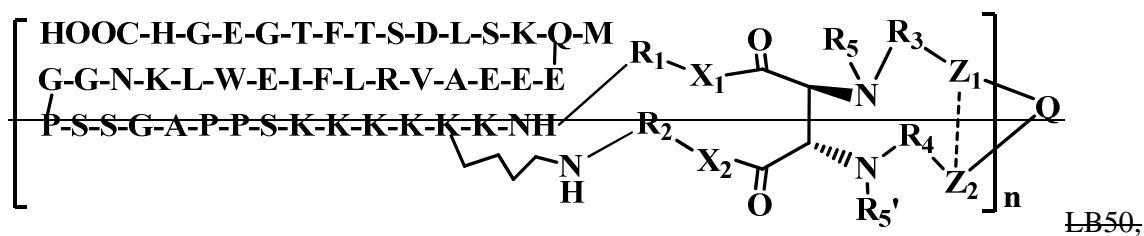
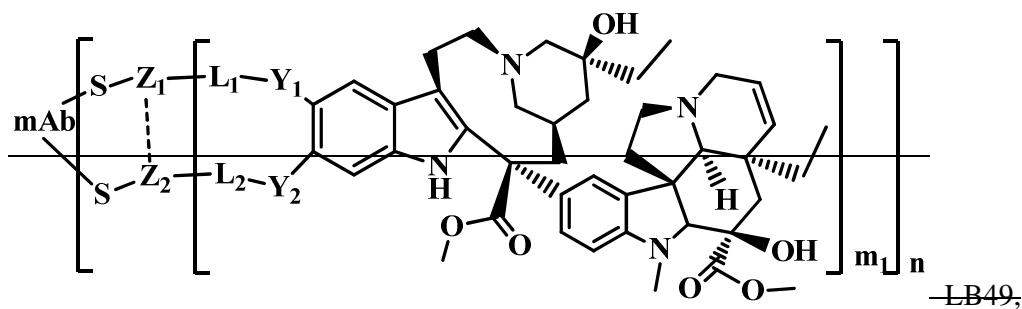





$$\left[\begin{array}{c} \text{Q} \left[\begin{array}{c} \text{Z}_1 \text{---} \text{R}_3 \text{---} \text{R}_5 \\ \text{Z}_2 \text{---} \text{R}_4 \text{---} \text{N} \text{---} \text{R}_5' \end{array} \right] \begin{array}{c} \text{O} \\ \parallel \\ \text{C} \text{---} \text{X}_1 \text{---} \text{R}_1 \text{---} \text{Y}_1 \\ \text{C} \text{---} \text{X}_2 \text{---} \text{R}_2 \text{---} \text{Y}_2 \\ \parallel \\ \text{O} \end{array} \end{array} \right]_n \text{---} \text{LB44}$$

$$\left[\text{O} \left[\begin{array}{c} \text{Z}_1 \text{---} \text{R}_3 \text{---} \text{N}^{\text{R}_5} \\ \text{Z}_2 \text{---} \text{R}_4 \text{---} \text{N}^{\text{R}_5'} \end{array} \right] \begin{array}{c} \text{C(=O)X}_1\text{---R}_1\text{---Y}_1 \\ \text{C(=O)X}_2\text{---R}_2\text{---Y}_2 \end{array} \text{---} \text{C}_6\text{H}_4 \text{---} \text{N}^{\oplus} \text{C}_5\text{H}_4 \text{---} \text{NH} \text{---} \text{C(=O)C(=O) \text{---} \text{N} \text{---} \text{C}_6\text{H}_4 \text{---} \text{Cl} \end{array} \right]_n$$

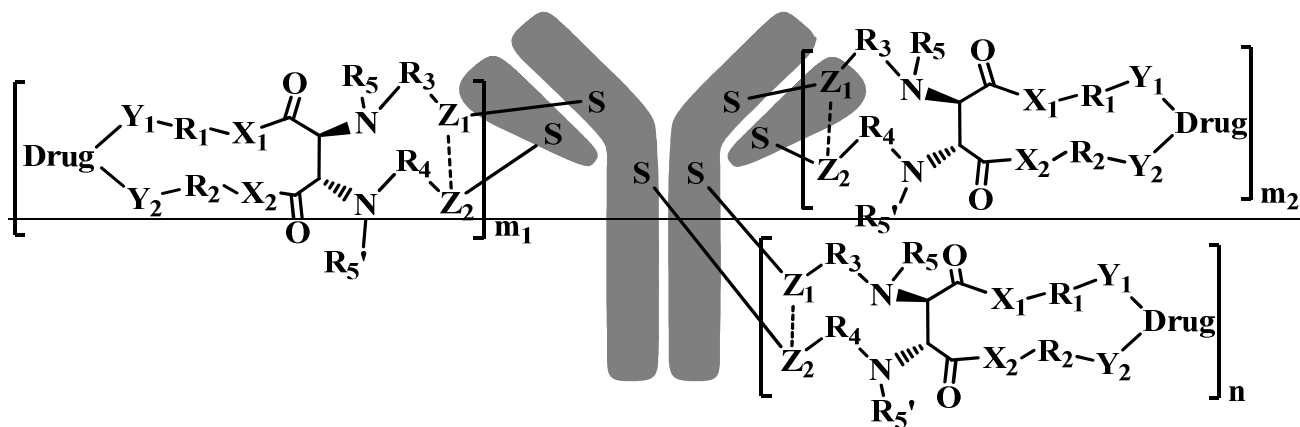
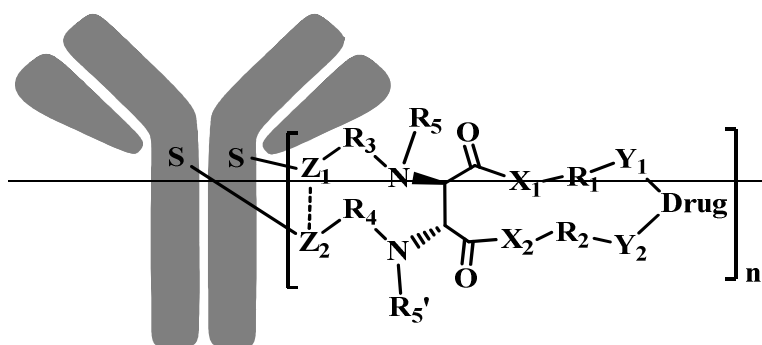
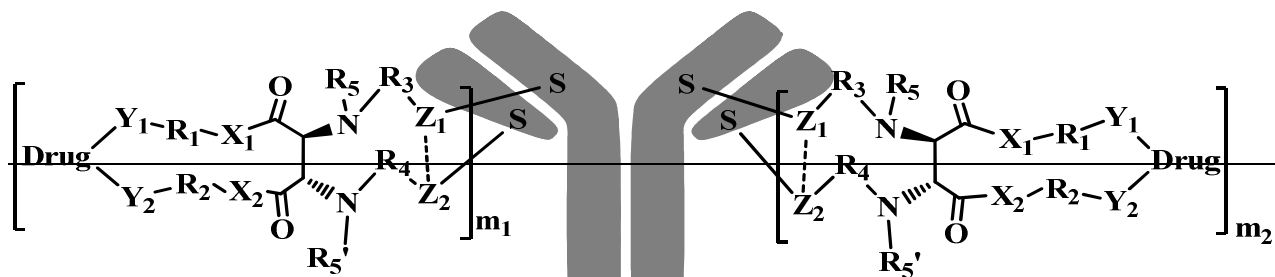
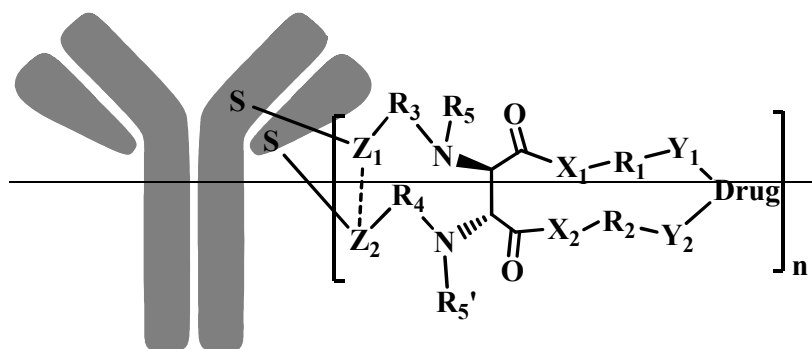
~~LB48,~~

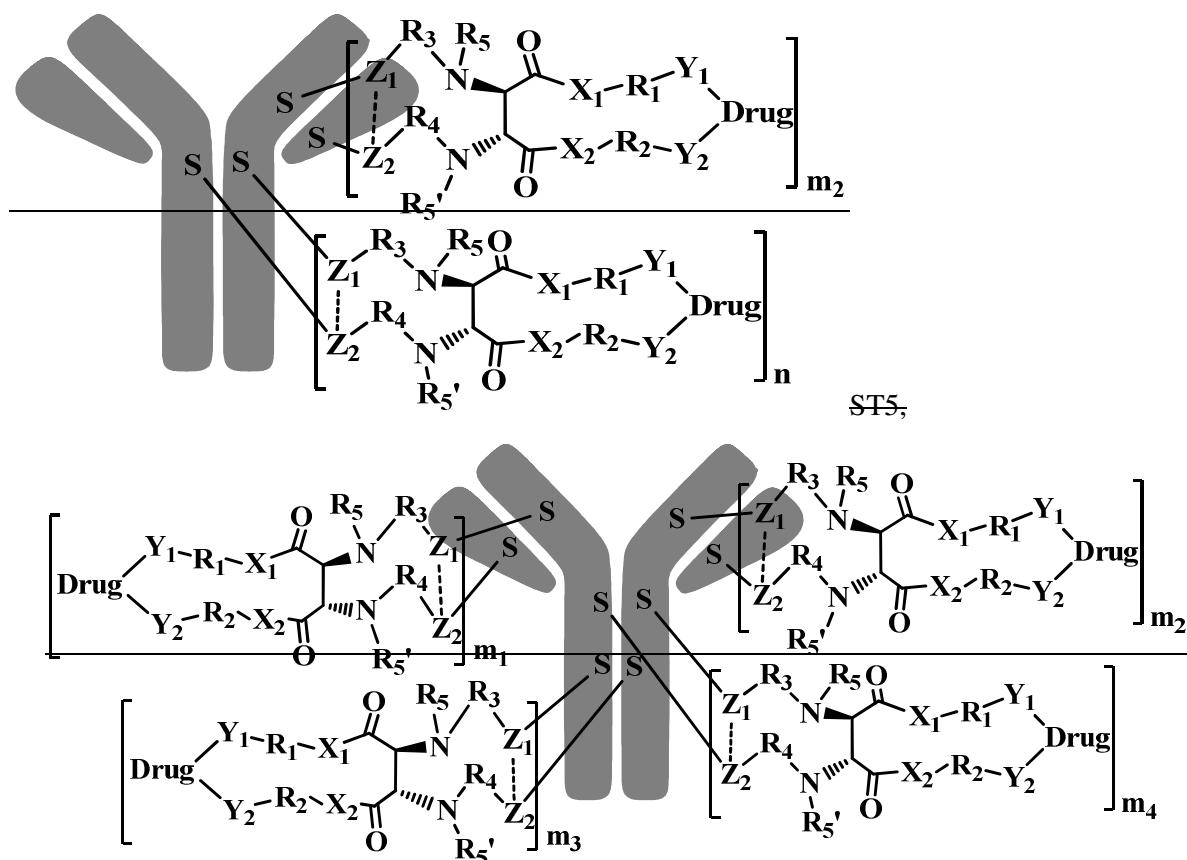
487



$$\left[\text{Polymer} - \text{P}(\text{Y}_1, \text{Y}_2) - \text{N}(\text{R}_1, \text{R}_2) - \text{C}(\text{O}, \text{X}_1) - \text{C}(\text{O}, \text{X}_2) - \text{N}(\text{R}_3, \text{R}_4) - \text{Z}_1, \text{Z}_2 \right]_n \quad \text{SI-1.}$$

~~37. The conjugate according to any one of claim 1, 5, 6, 12, 13, 14, 15, 16, 17, 18, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, or 36, wherein cell binding molecule/agent is selected from an IgG antibody, monoclonal antibody, or an IgG antibody like protein, having the following structure of ST1, ST2, ST3, ST4, ST5, or ST6 below, wherein the conjugate is conjugated specifically to a pair of thiols generated through reduction of the disulfide bonds of the cell binding molecule/agent between the light chain and heavy chain, the upper disulfide bonds between the two heavy chains and the lower disulfide bonds between the two heavy chains:~~





ST6,

wherein “—”, Y_1 , Y_2 , R_1 , R_2 , R_3 , R_4 , R_5 , R_5' , Z_1 , Z_2 , and n are defined the same above;;

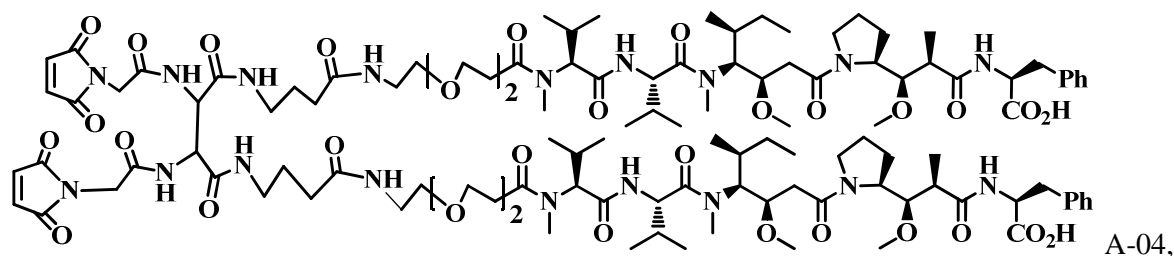
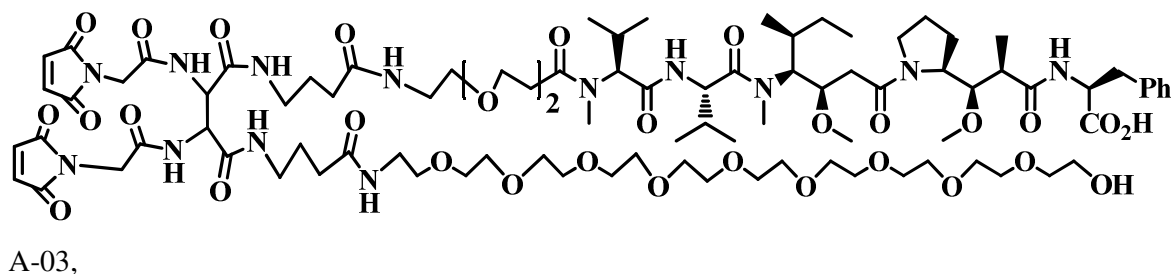
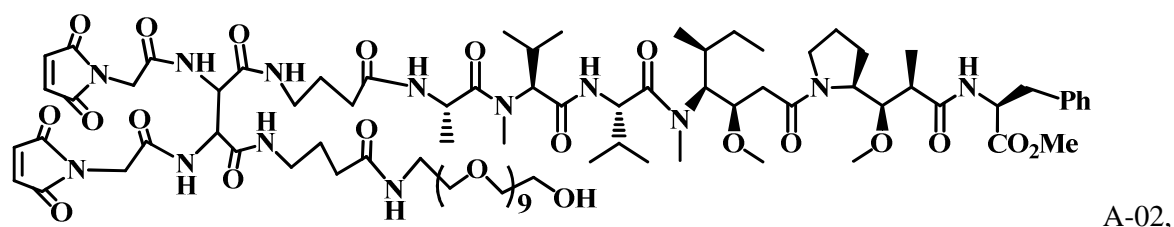
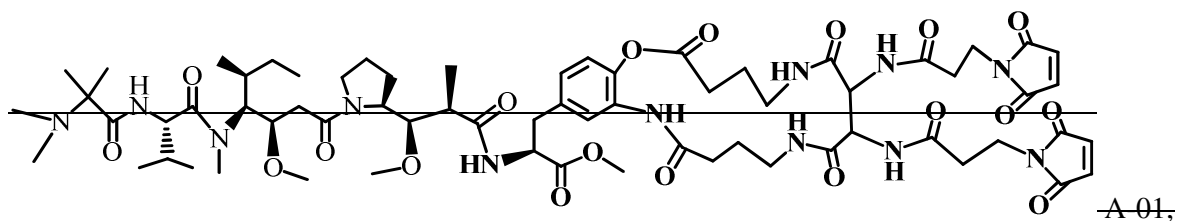
Preferably X_1 , X_2 , Y_1 and Y_2 are independently O, NH, NHNH, NR_5 , S, $C(O)O$, $C(O)NH$, $OC(O)NH$, $OC(O)O$, $NHC(O)NH$, $NHC(O)S$, $OC(O)N(R_1)$, $N(R_1)C(O)N(R_1)$, CH , CH_2 , $C(O)NHNHC(O)$ and $C(O)NR_1$; m_1 , m_2 , m_3 , and m_4 are independently 1–30.

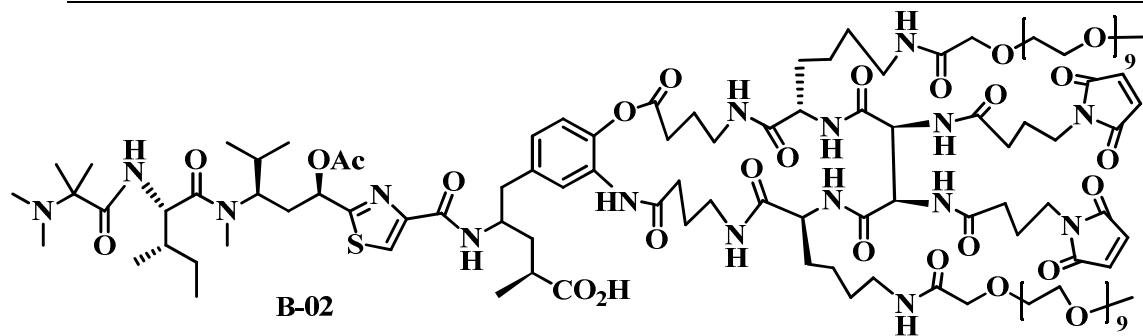
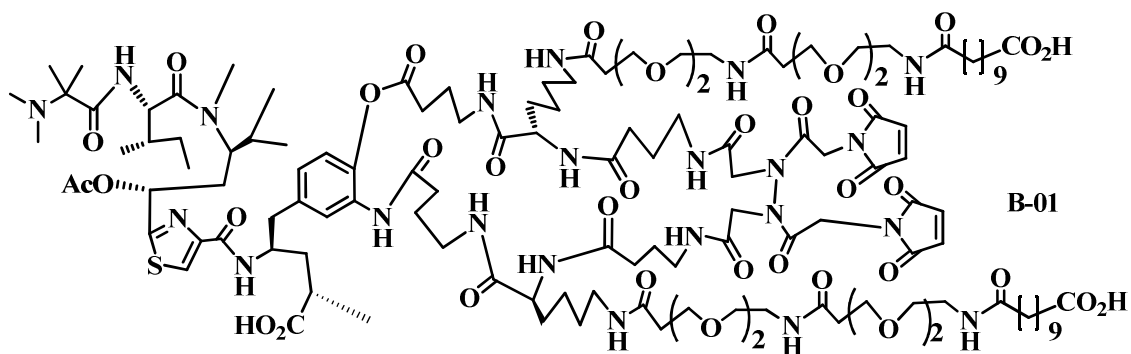
38. The conjugate according to claim 37, wherein the Drug (or cytotoxic molecule) and m_1 at different conjugation site of the cell-binding molecule can be different when the cytotoxic molecules containing the same or different bis-linkers of this invention are conjugated to a cell-binding molecule sequentially or stepwisely.

39. The conjugate according to any one of claim 37 or 38, wherein the Drug is selected from tubulysins, maytansinoids, taxanoids (taxanes), CC-1065 analogs, daunorubicin and doxorubicin compounds, indolecarboxamide, benzodiazepine dimers, pyrrolbenzodiazepine (PBD) dimers, tomaymycin dimers, anthramycin dimers, indolinobenzodiazepines dimers, imidazobenzothiadiazepines dimers, oxazolidinobenzodiazepines dimers, calicheamicins and the enediyne antibiotics, actinomycin, amanitins, amatoxins, azaserines, bleomycins, epirubicin, eribulin, tamoxifen, idarubicin, dolastatins, auristatins (comprising monomethyl auristatin E, MMAE, MMAF, auristatin PYE, auristatin TP, Auristatins 2-AQ, 6-AQ, EB (AEB), EFP (AEFP) and their analogs), duocarmycins, geldanamycins, HSP90 inhibitors,

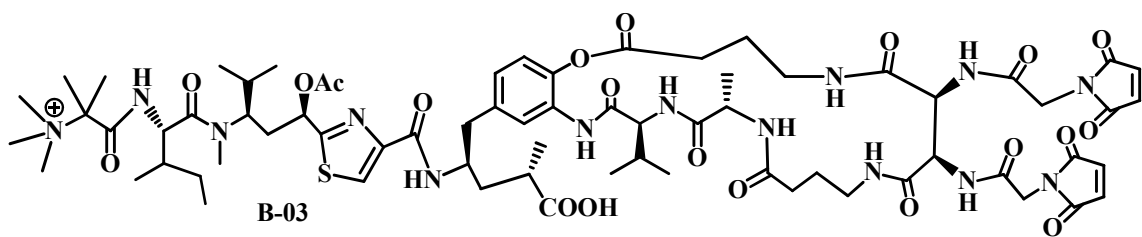
inhibitor of nicotinamide phosphoribosyltransferases, centanamycin, methotrexates, thiotepa, vindesines, vincristines, hemiasterlins, nazumamides, microginins, radiosumins, streptonigtin, SN38 or other analogs or metabolites of camptothecin, alterobactins, microsclerodermins, theonellamides, esperamicins, PNU 159682, and their analogues or derivatives, pharmaceutically acceptable salts, acids, derivatives, hydrate or hydrated salt, a crystalline structure, an optical isomer, racemate, diastereomer or enantiomer of any of the above drugs thereof; or a cytotoxic molecule/compound described in Claim 312.

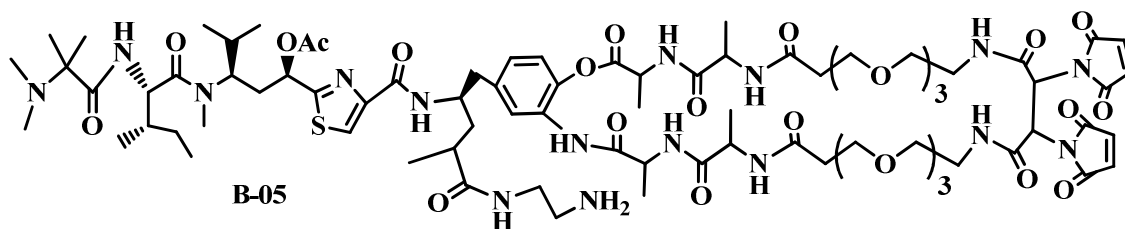
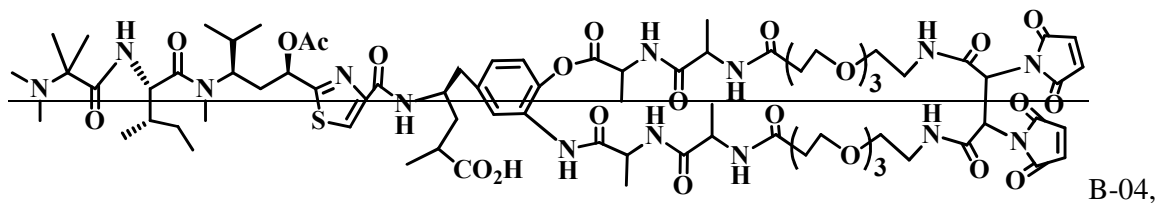
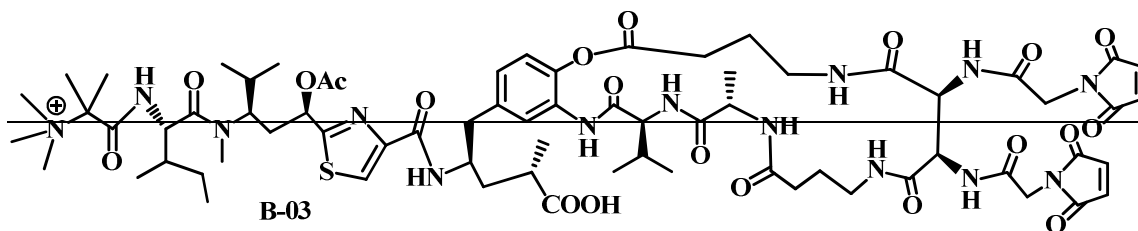
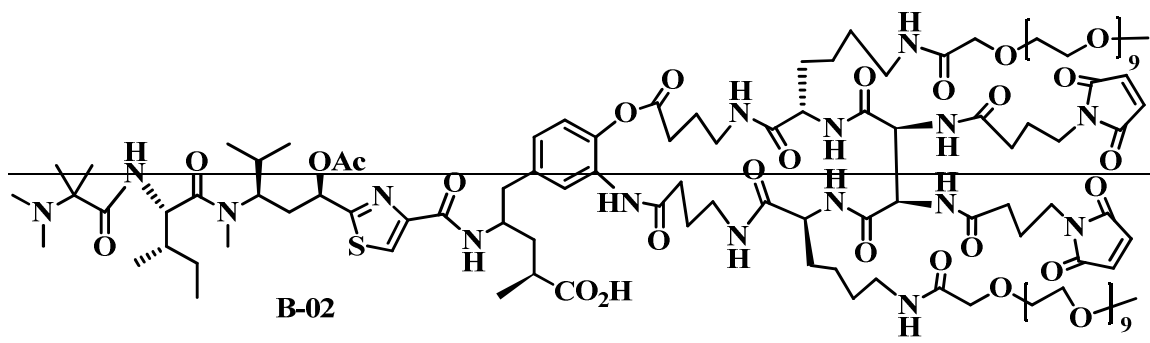
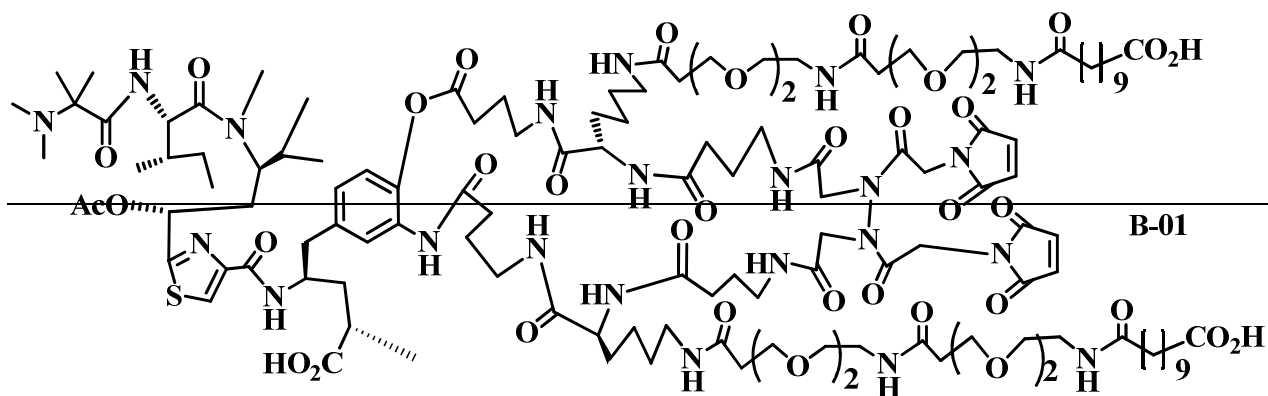
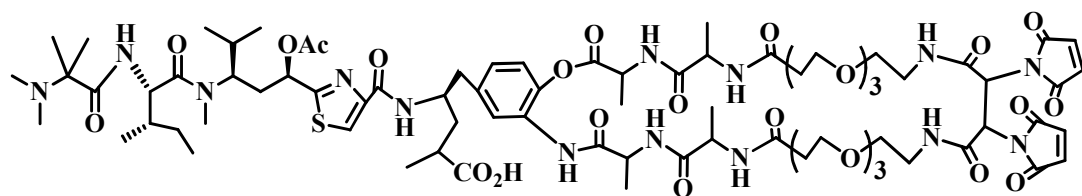
40.—The compound according to Claim 2, having the formula of ~~A-01~~, A-02, A-03, A-04, B-01, B-02, B-03, B-04, B-05, B-06, B-07, B-08, B-09, B-10, B-11, B-12, B-13, B-14, B-15, B-16, C-01, C-02, C-03, C-04, C-05, C-06, C-07, C-08, C-09, C-10, C-11, C-12, D-01, D-02, D-03, D-04, D-05, D-06, Pg-04, 97, 98, 116, 125, 129, 133, 135, 157a, 157b, 157c, 157d, 157e, 157f, 162, 163, 235a, 235b, 235c, 236a, 236b, 236c, 238a, 238b, 238c, 255, 256, 258a, 258b, 258c, 260, 262, 267, 271, 272, 274, 276, 278, 282, 284, 286, 287, 306, 309, 314, 318, and 325, as illustrated below~~shown~~ following structures:

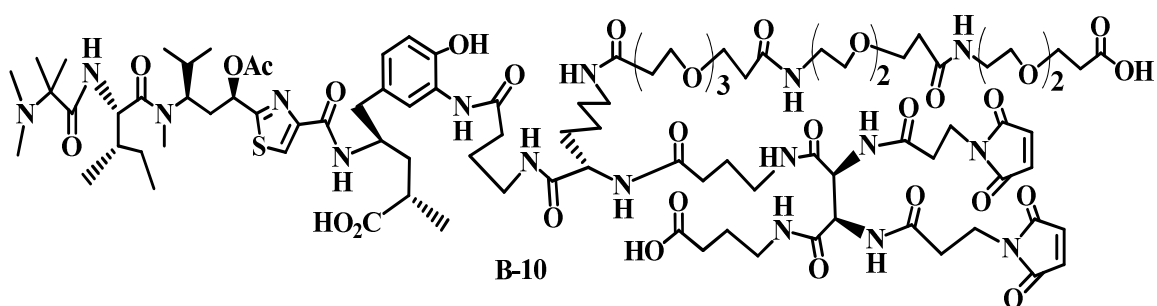
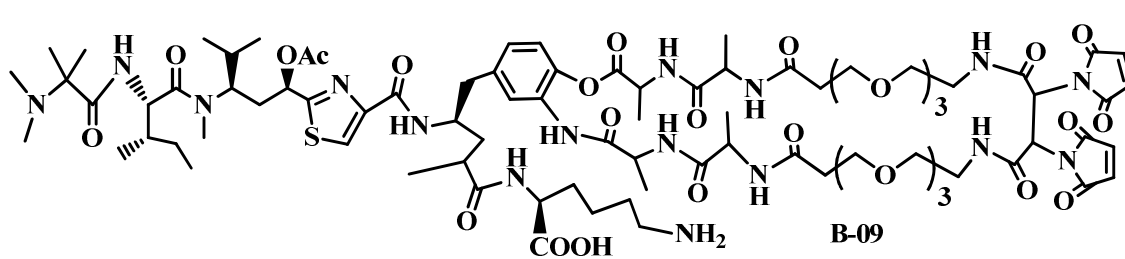
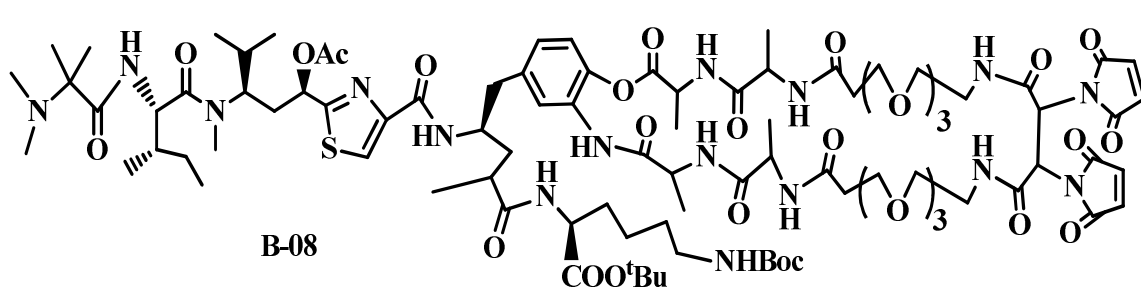
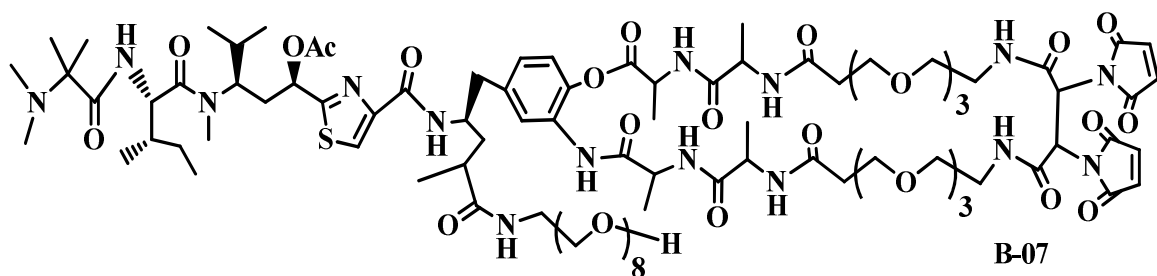
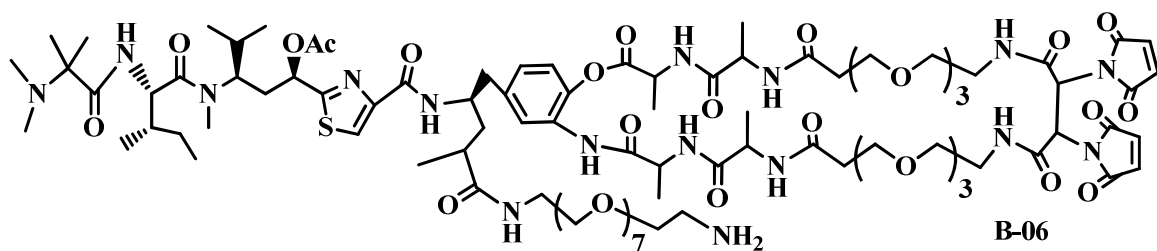


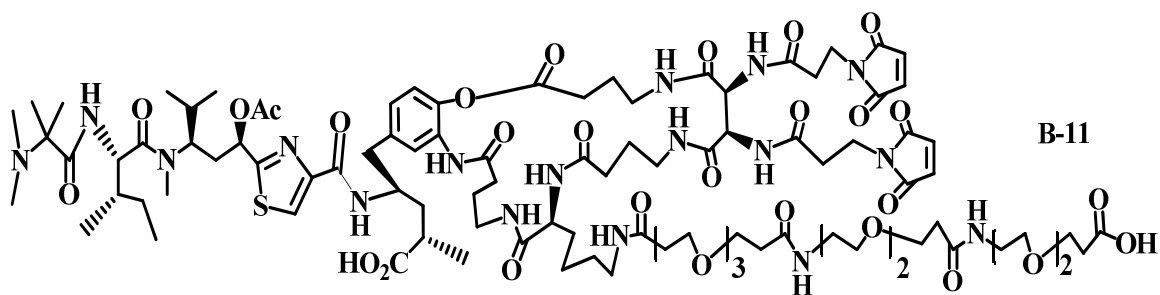


2

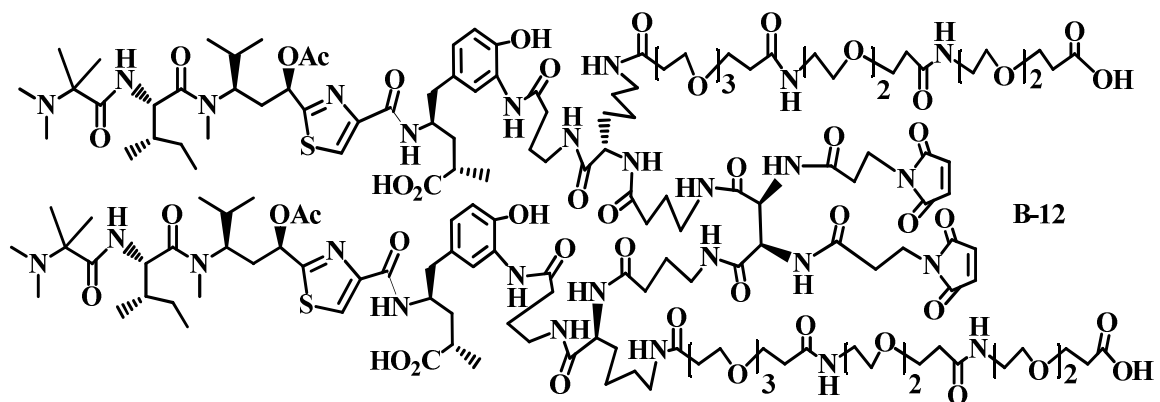




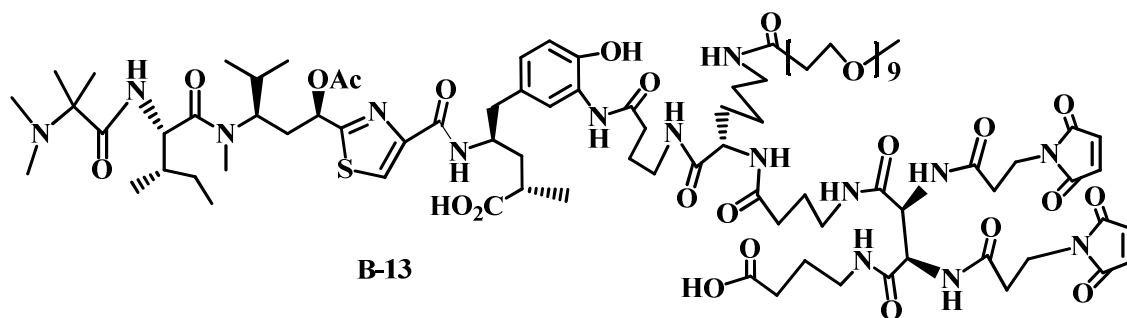




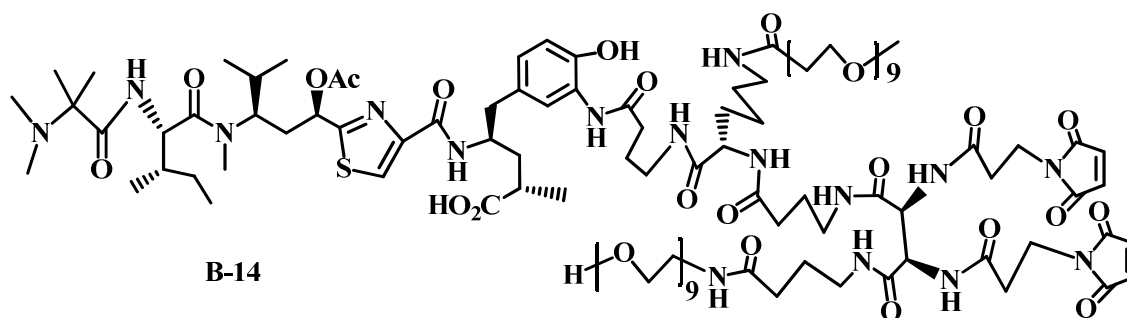
2



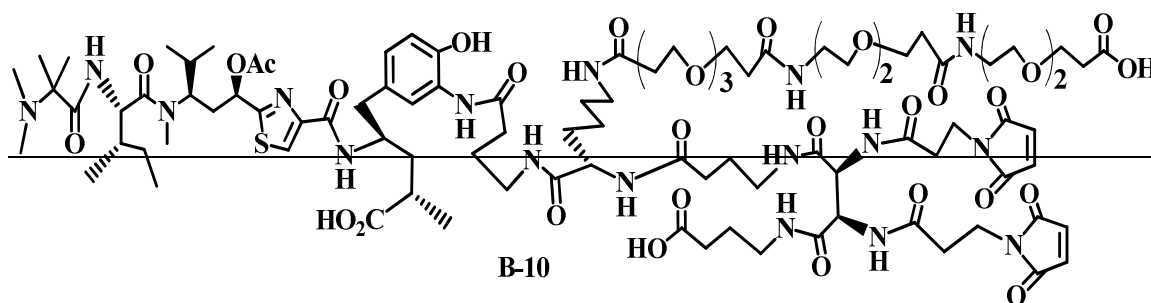
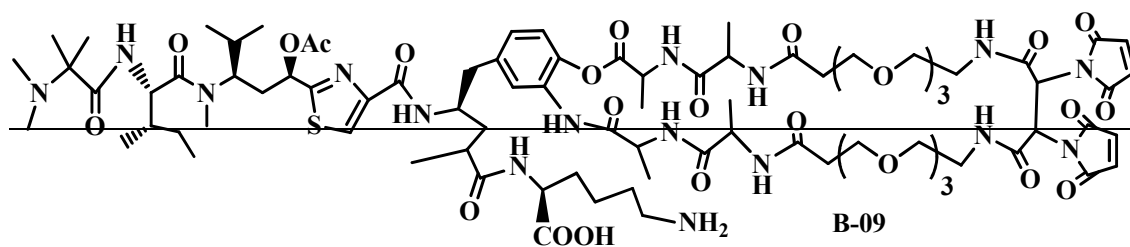
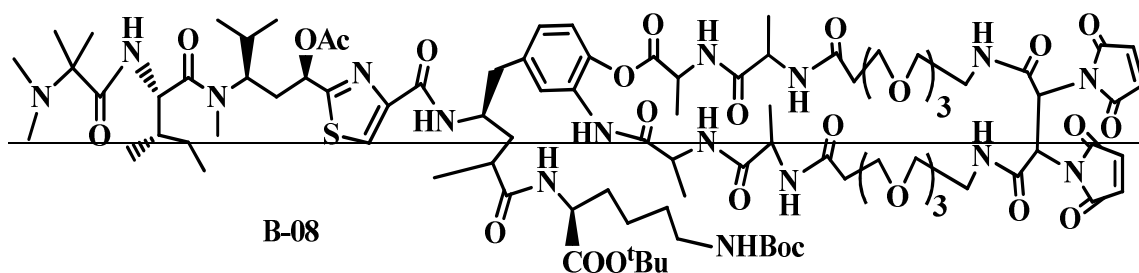
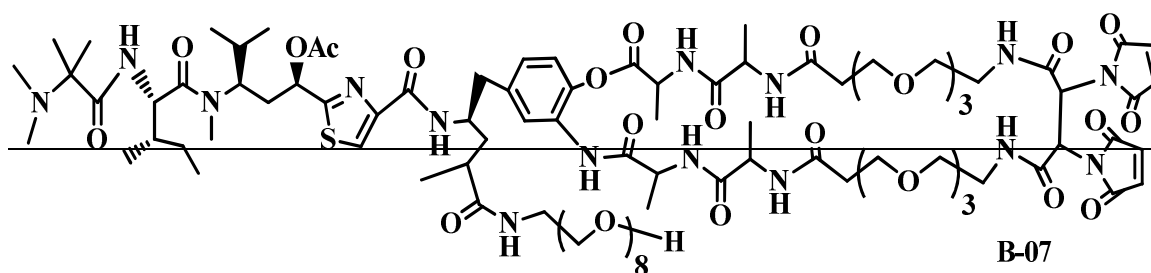
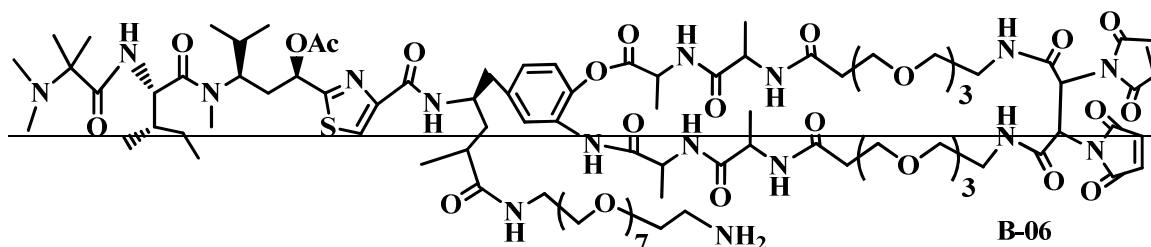
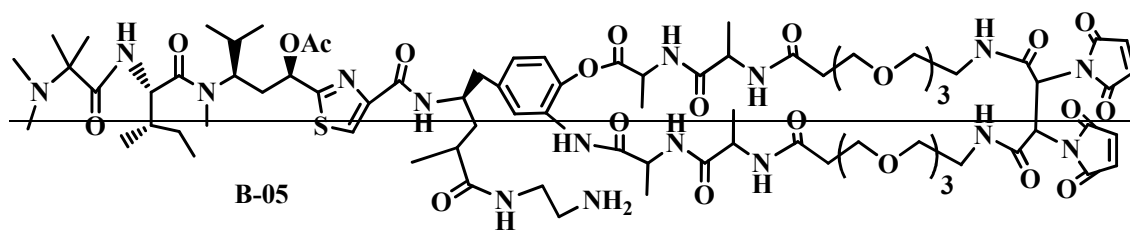
2

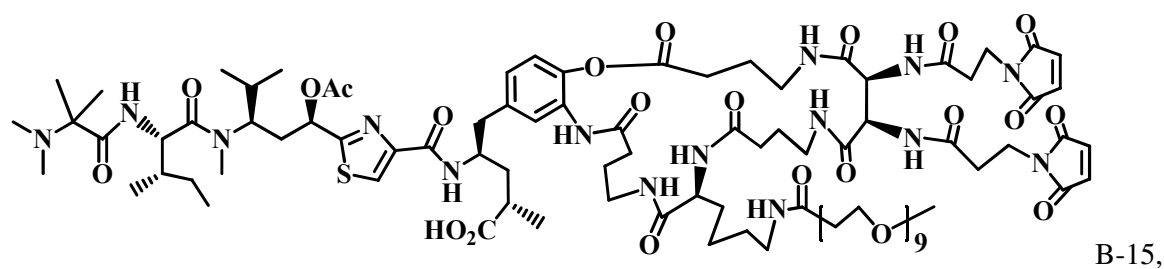
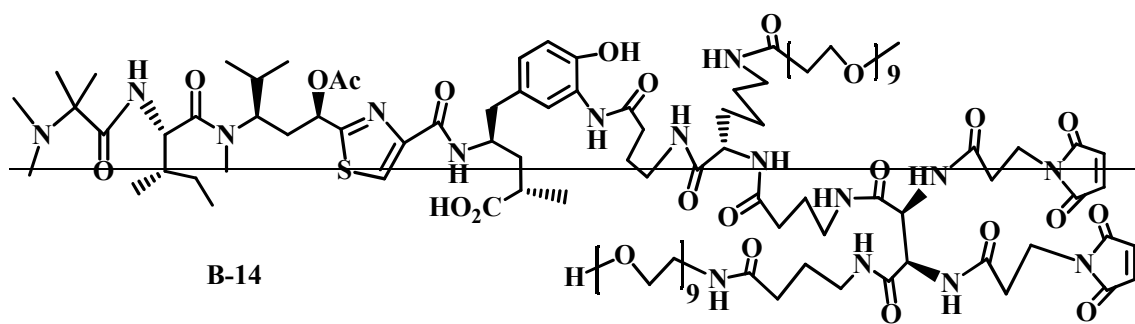
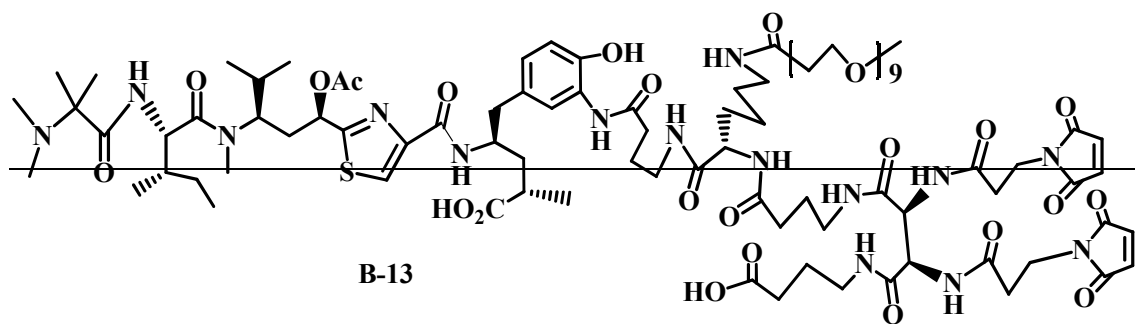
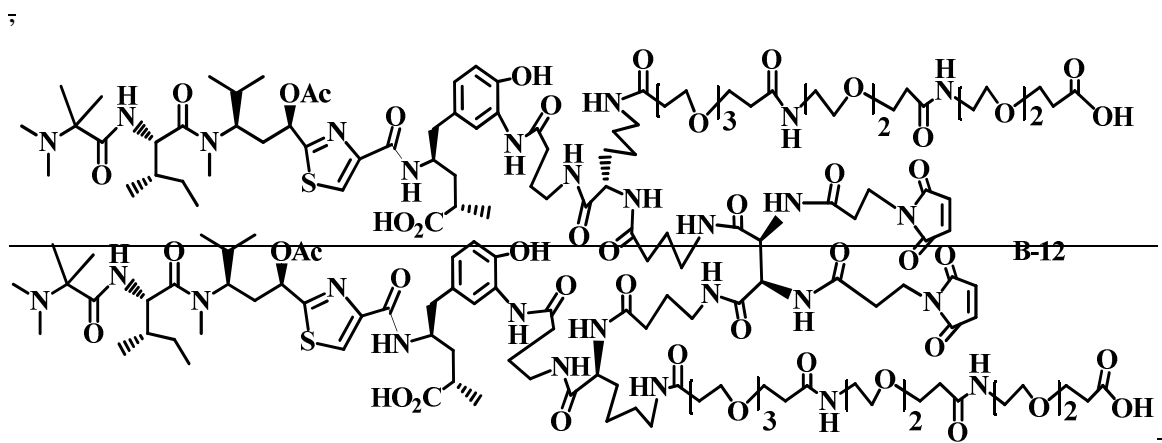
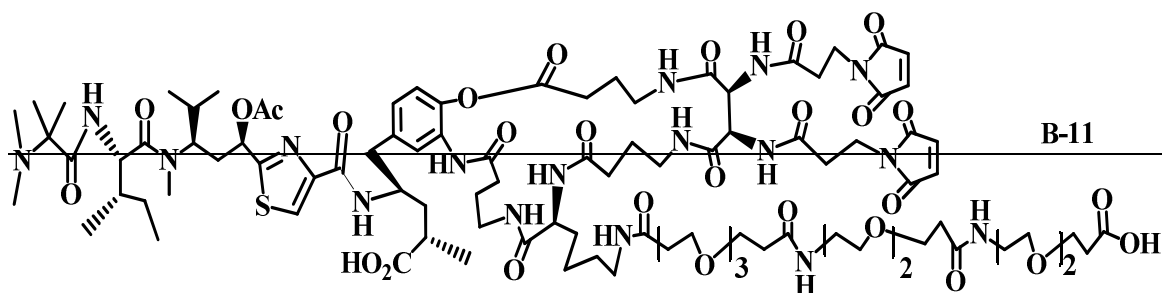


2

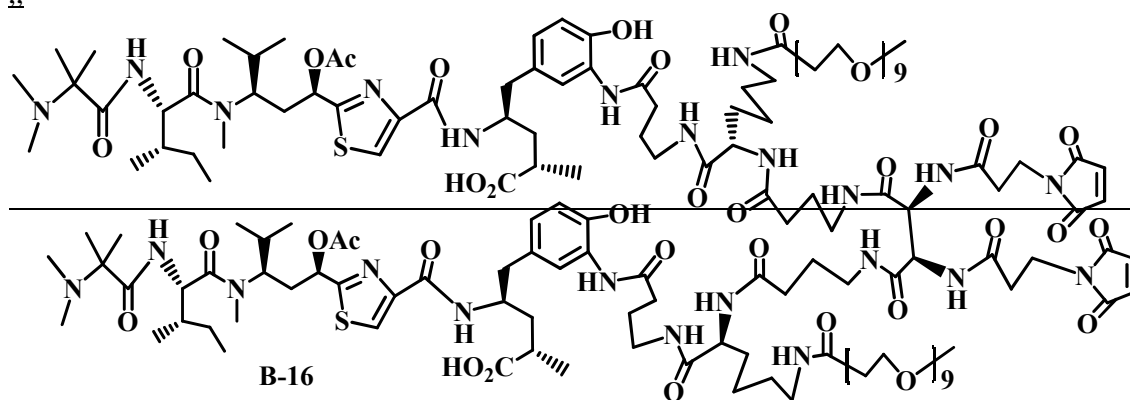


2

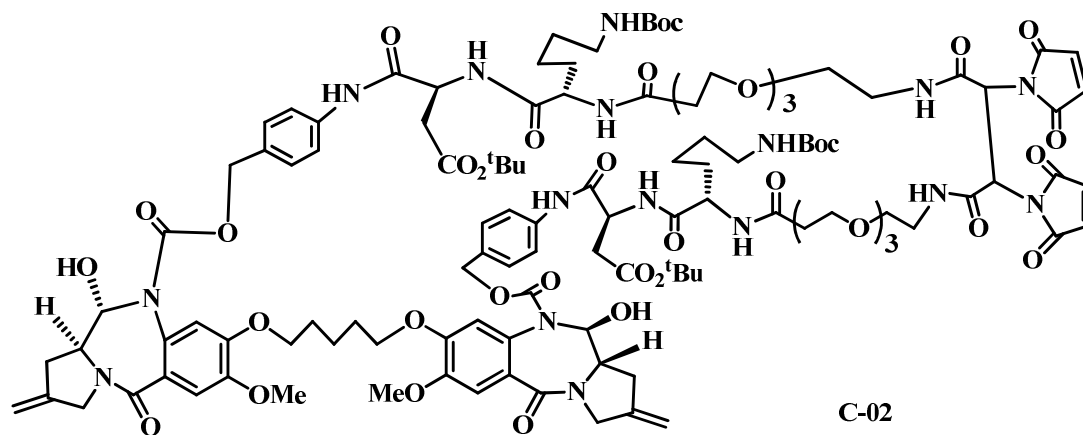
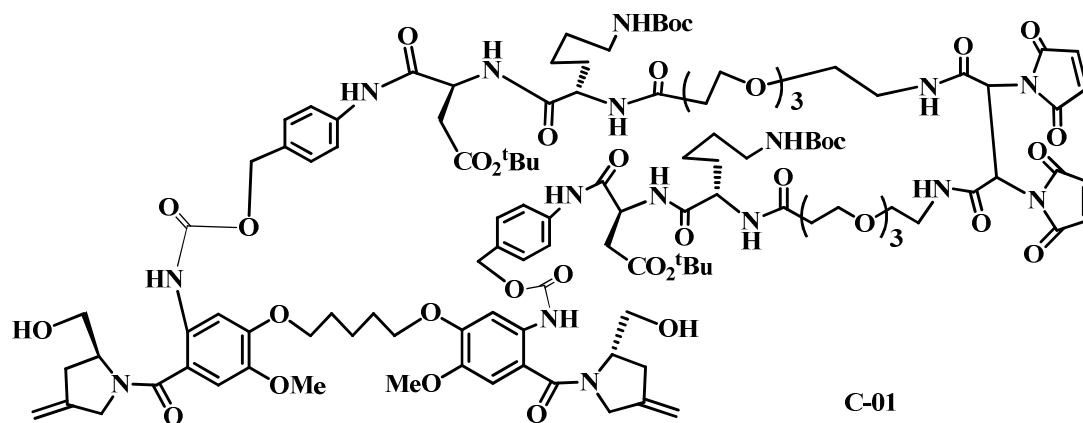


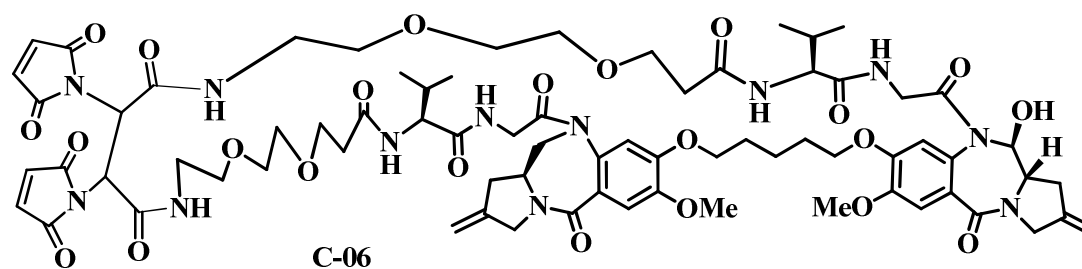
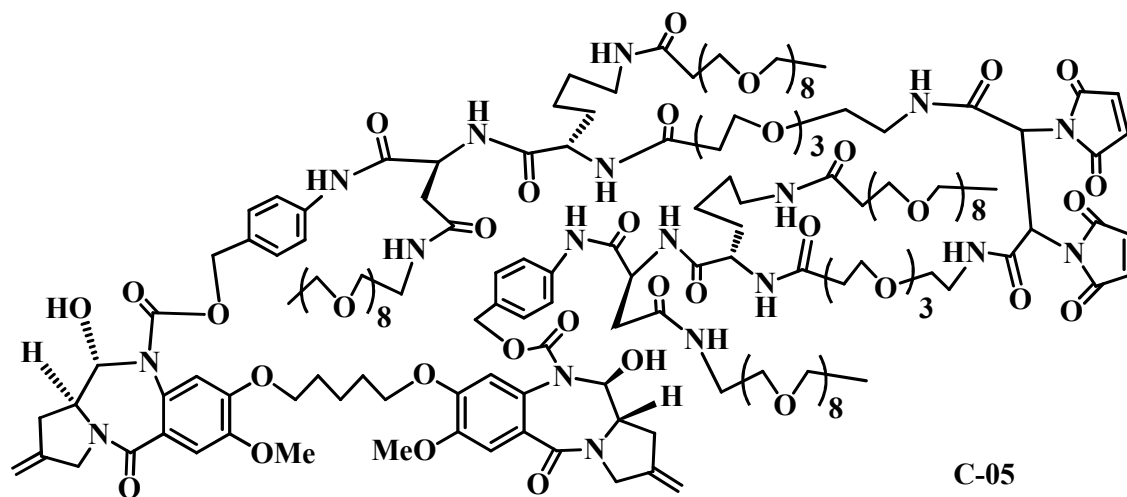
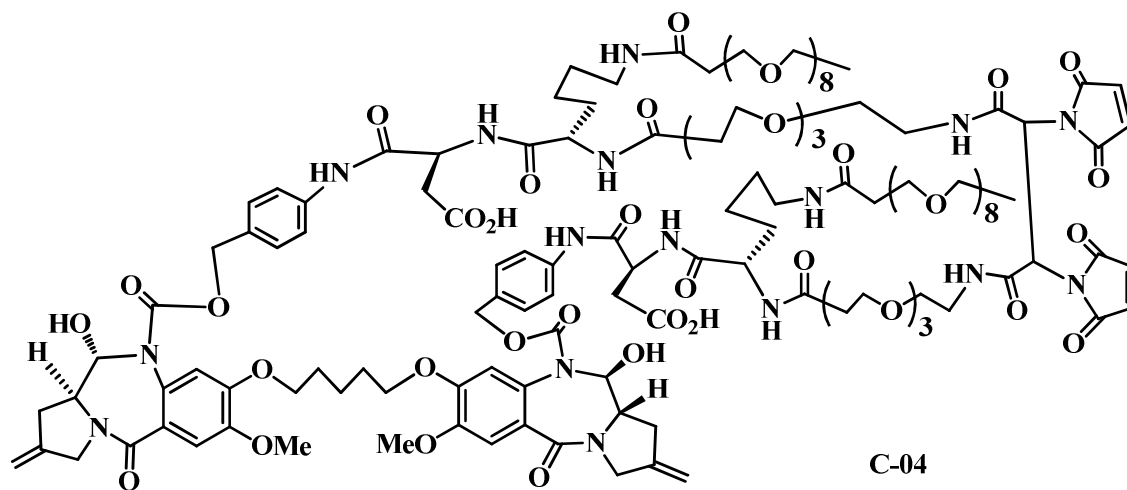
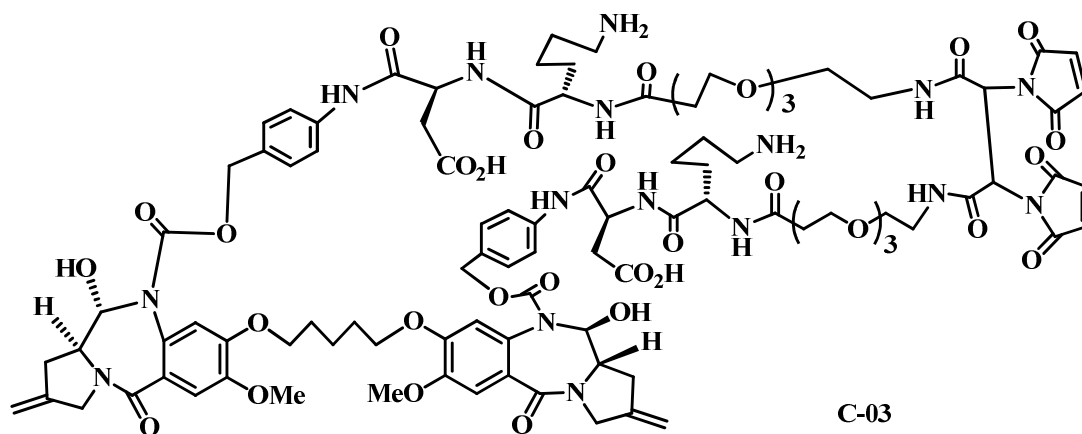


22



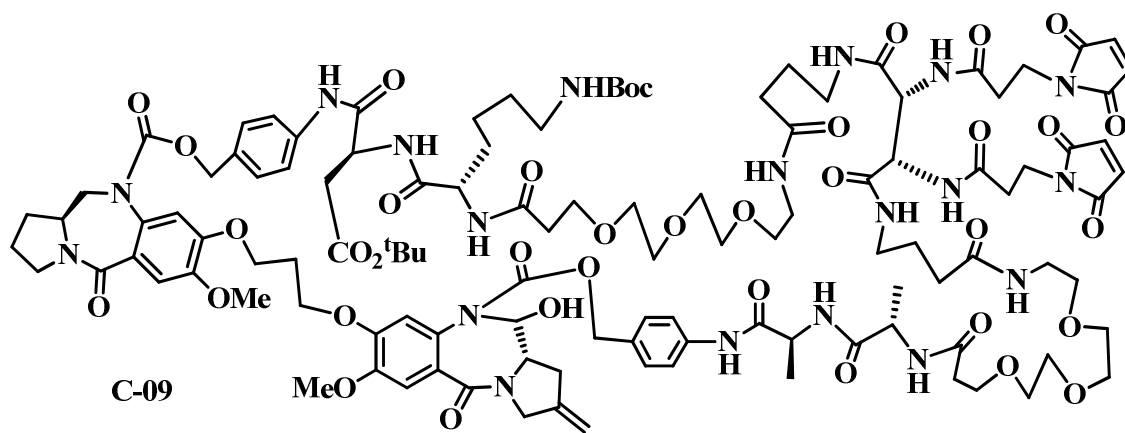
22



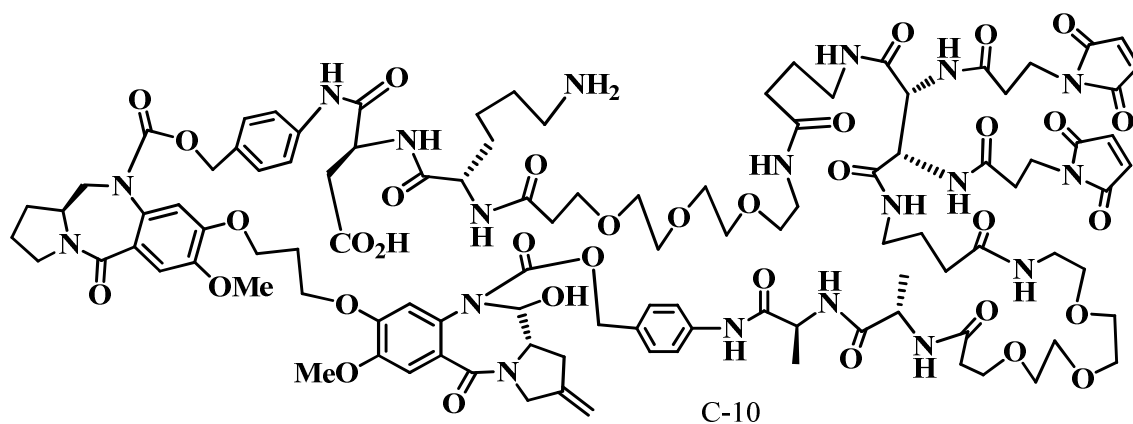


[illegible]

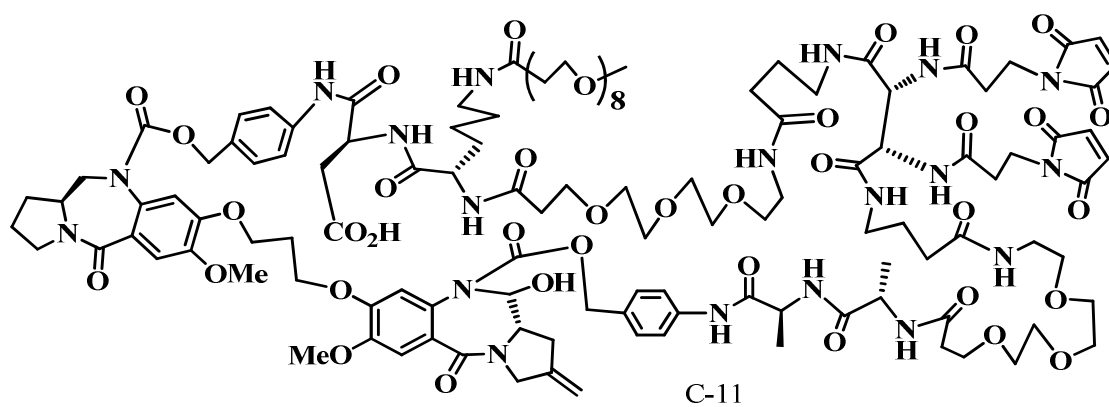
2



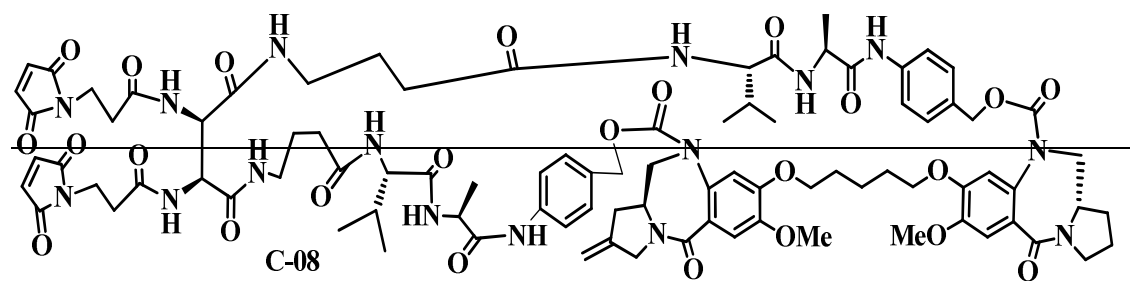
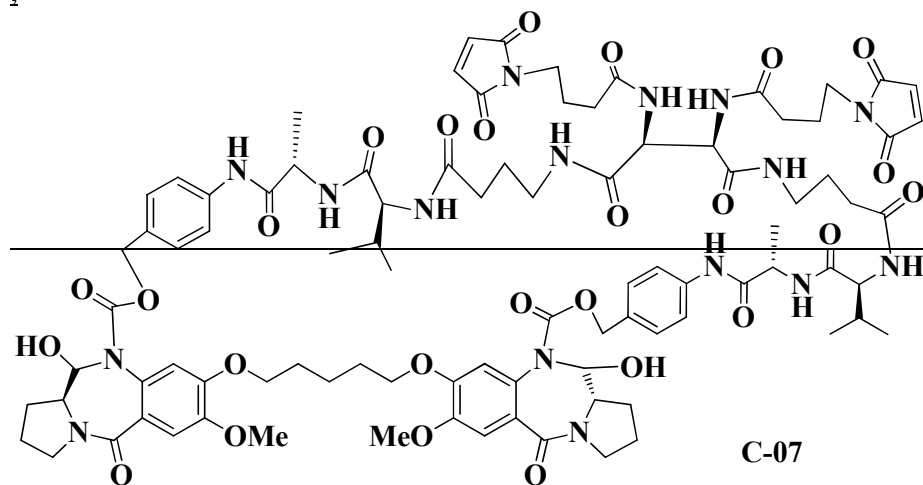
2



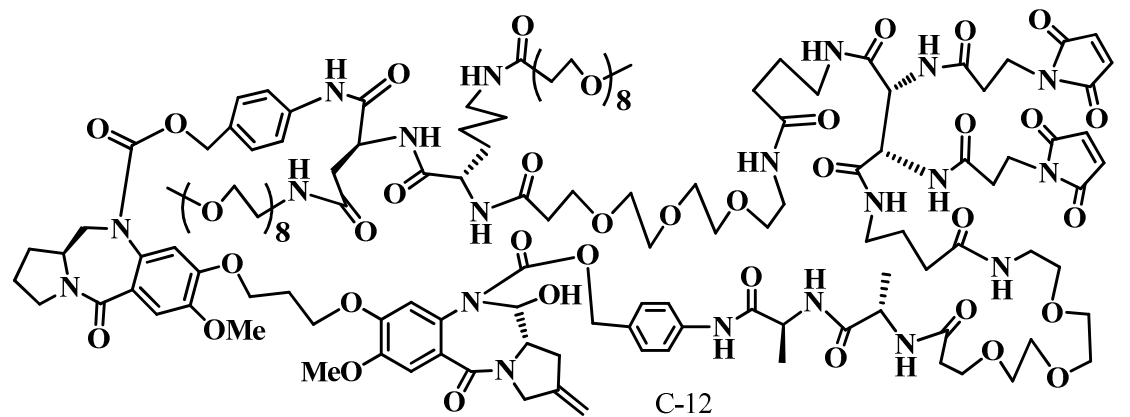
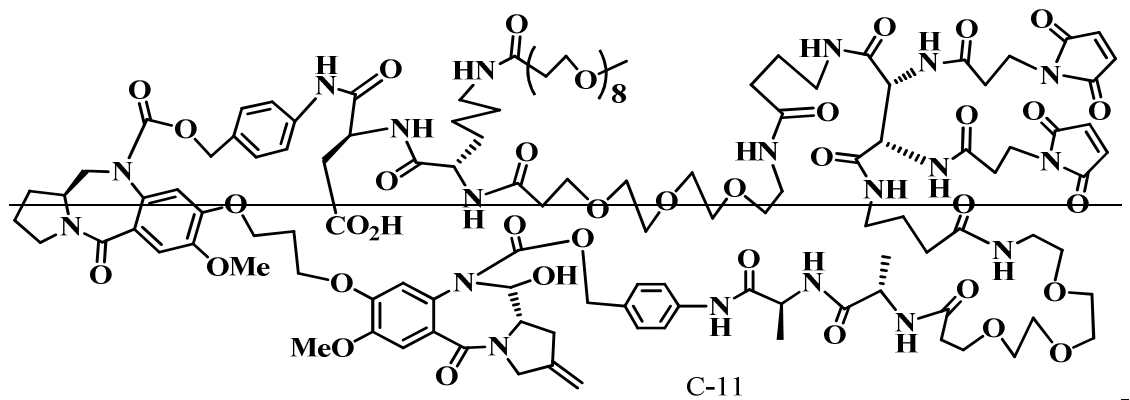
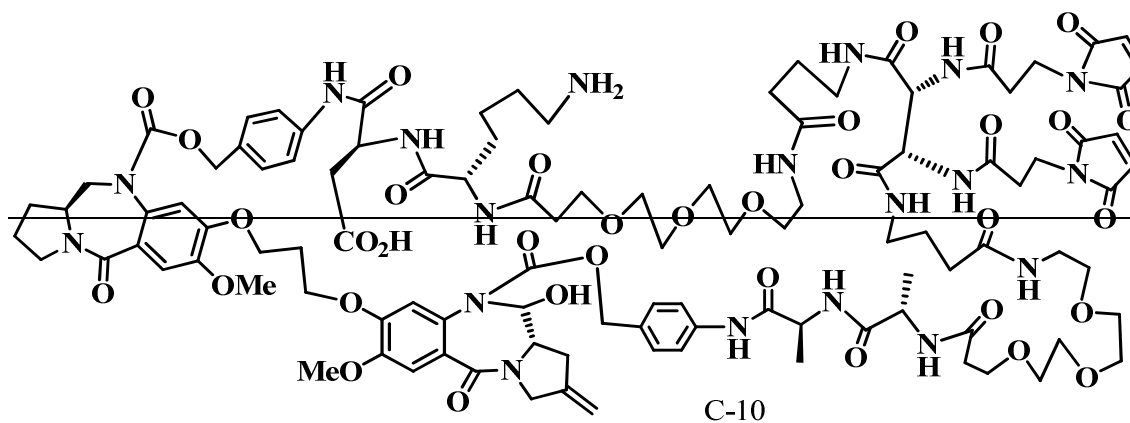
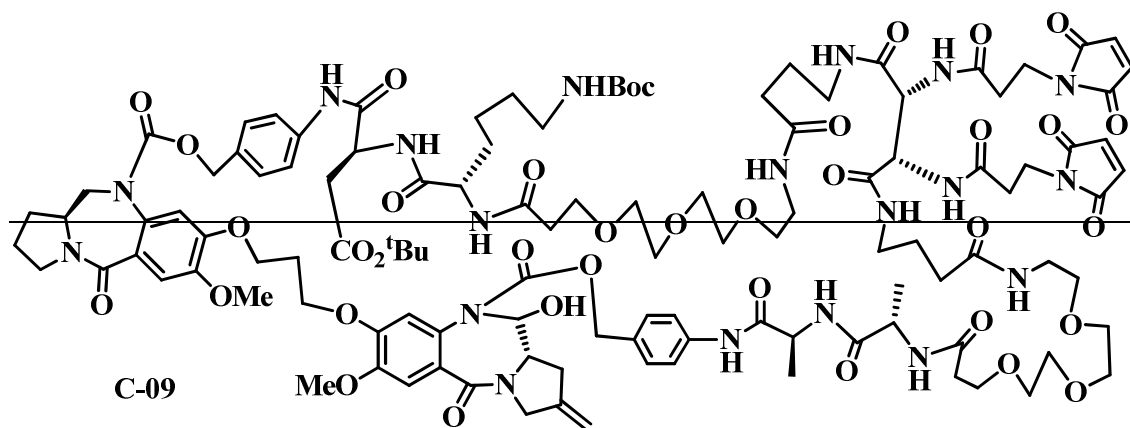
2

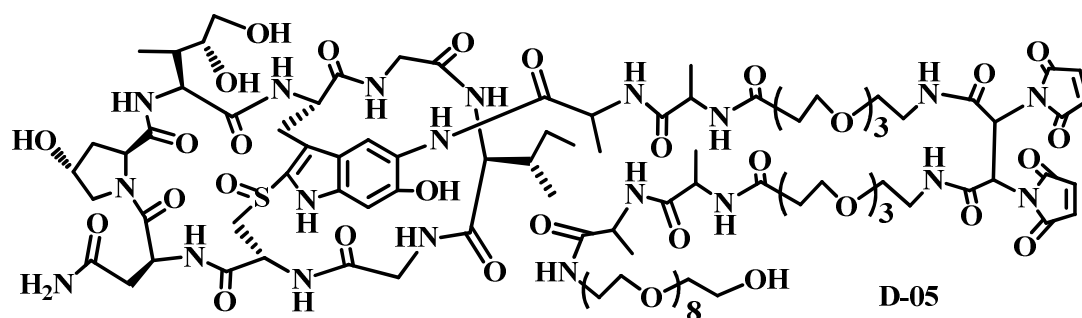
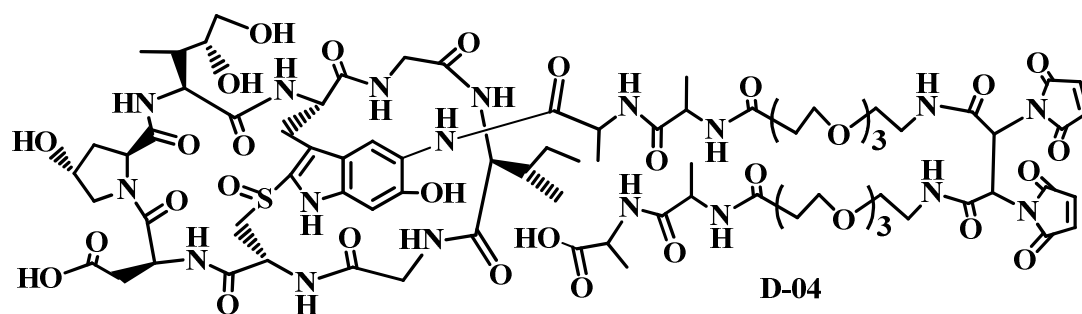
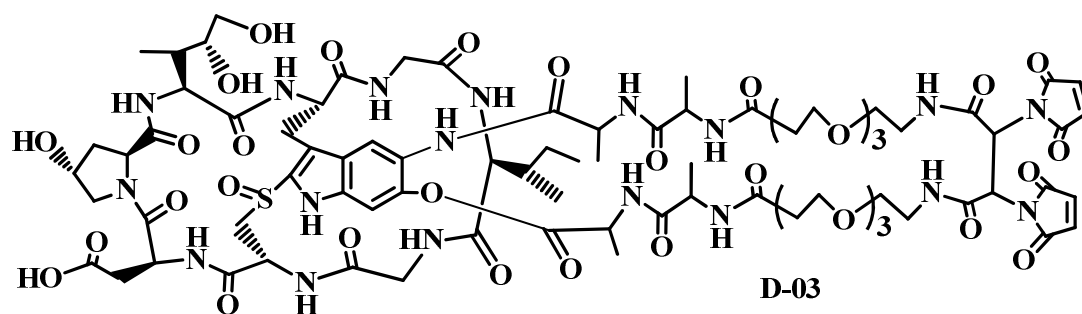
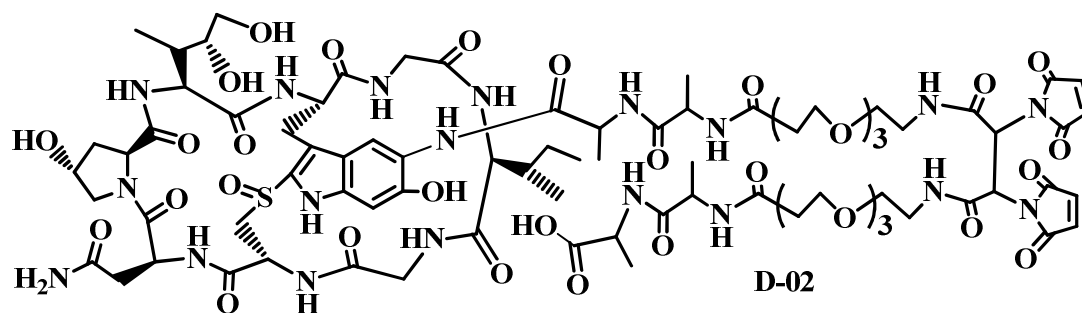
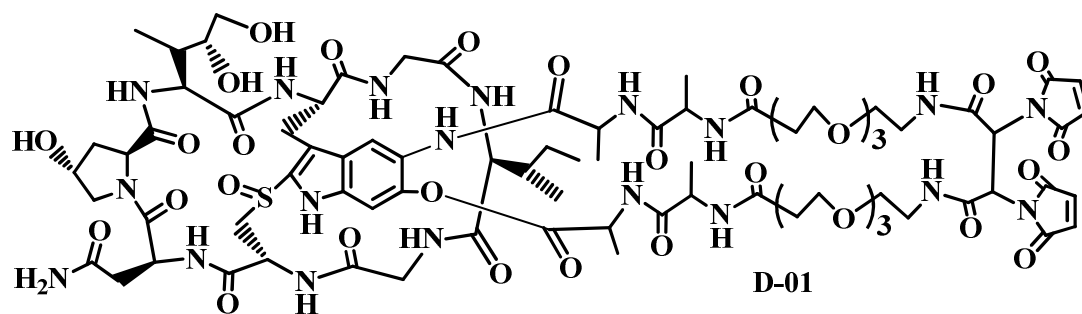


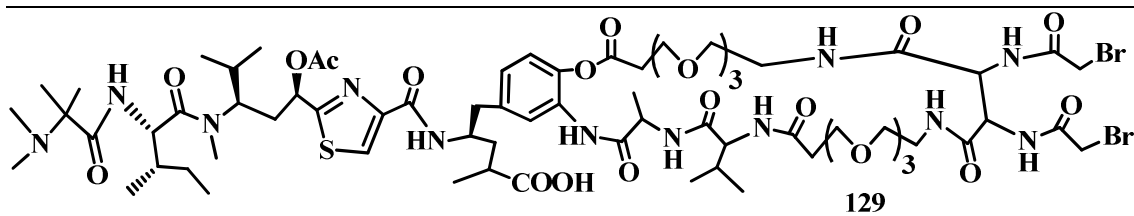
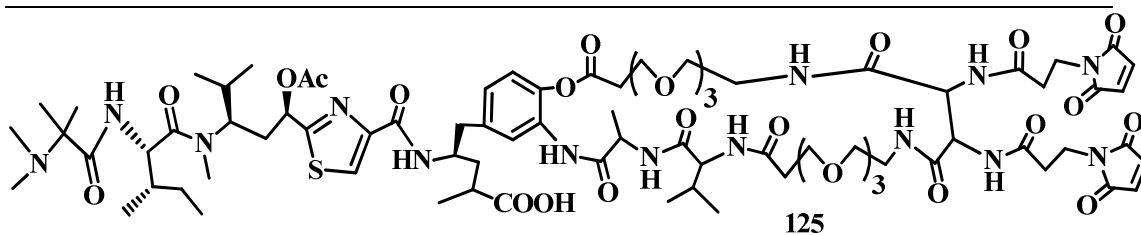
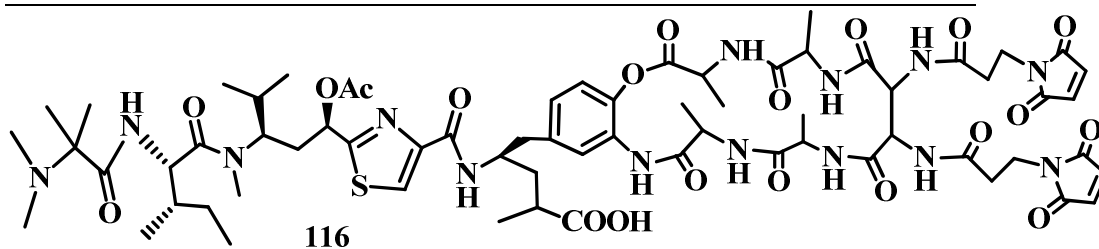
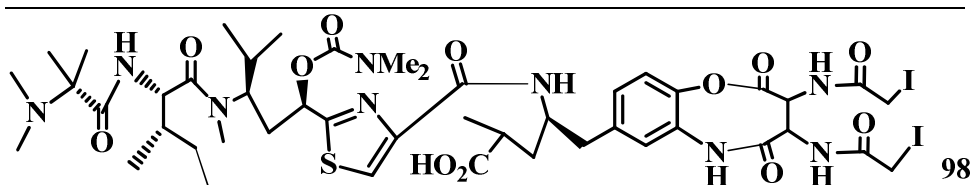
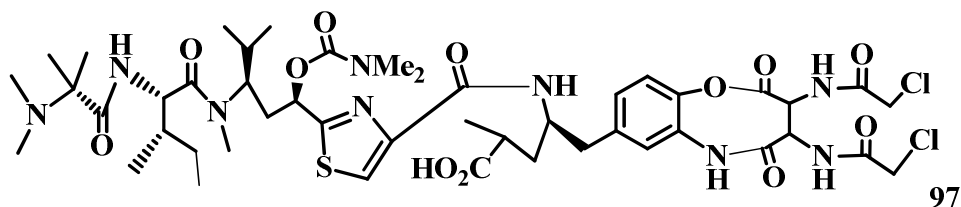
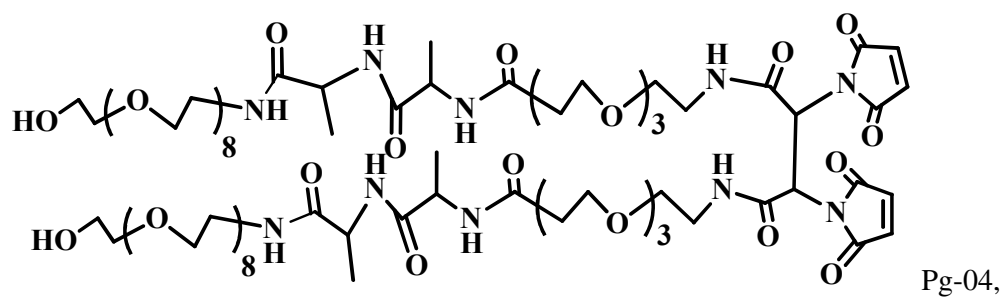
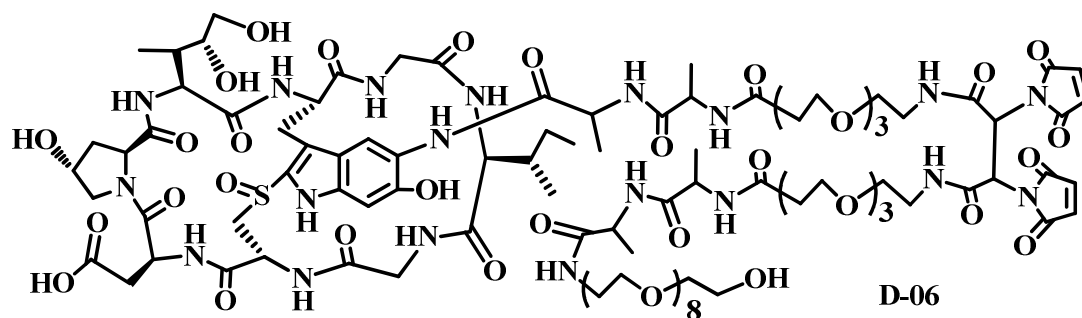
2

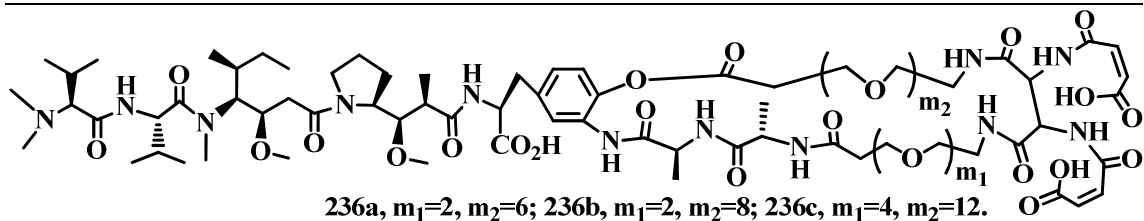
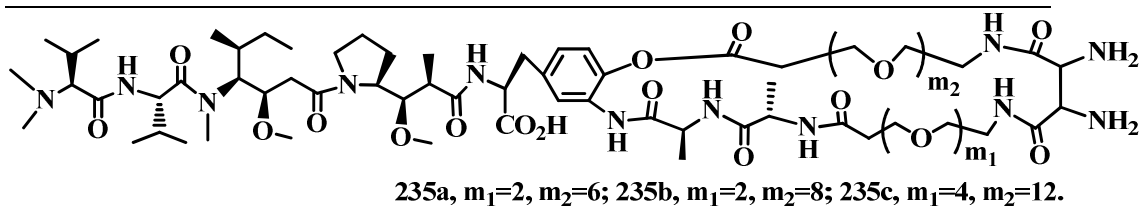
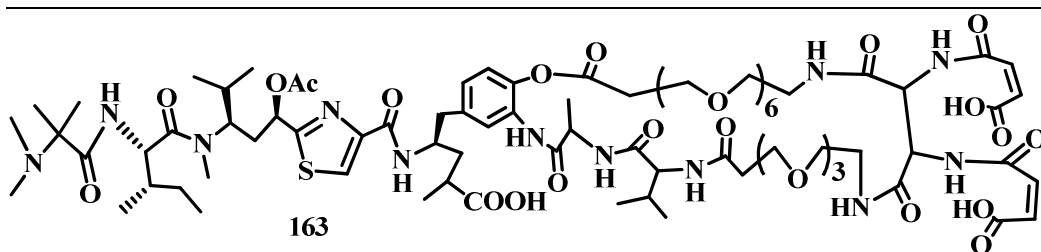
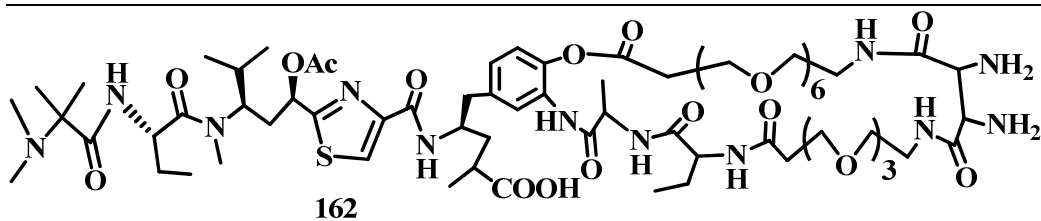
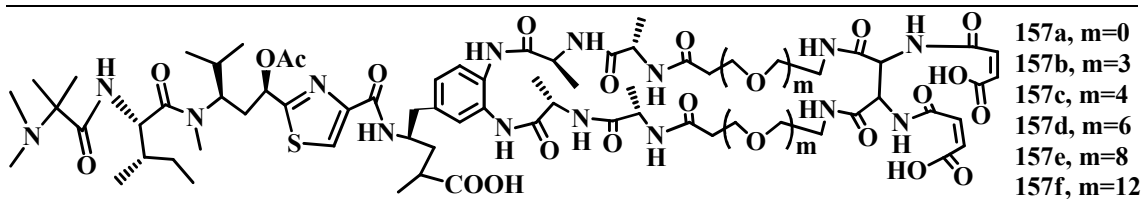
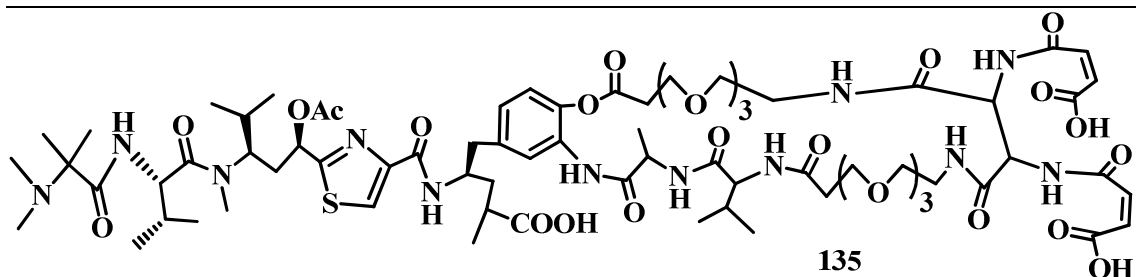
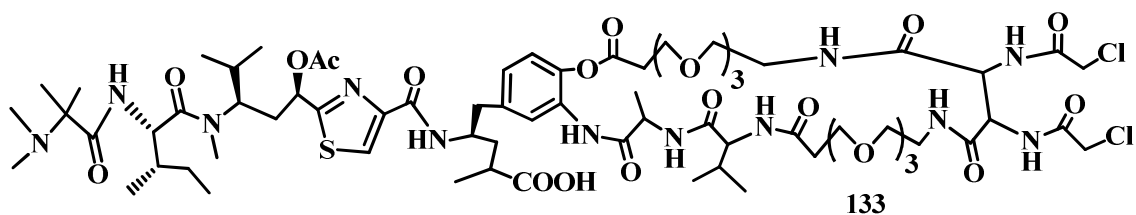


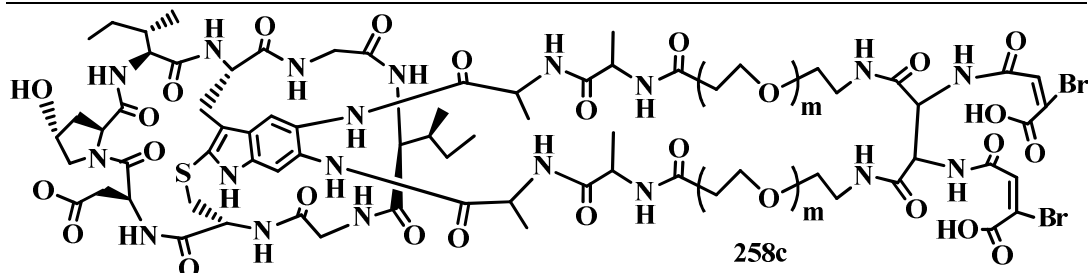
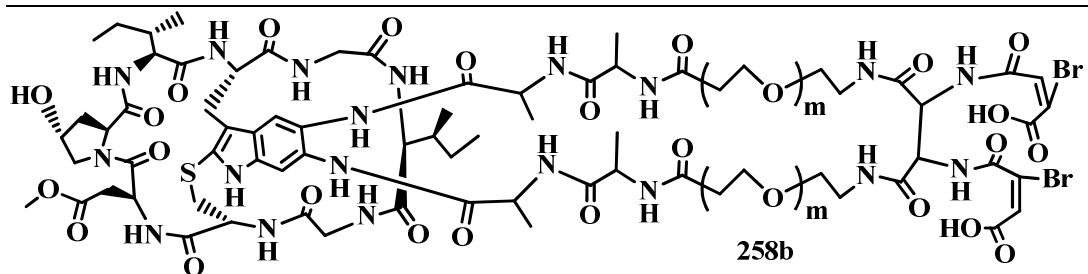
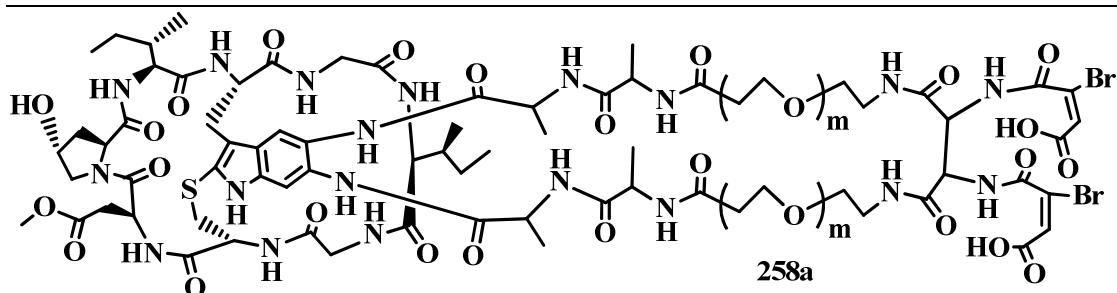
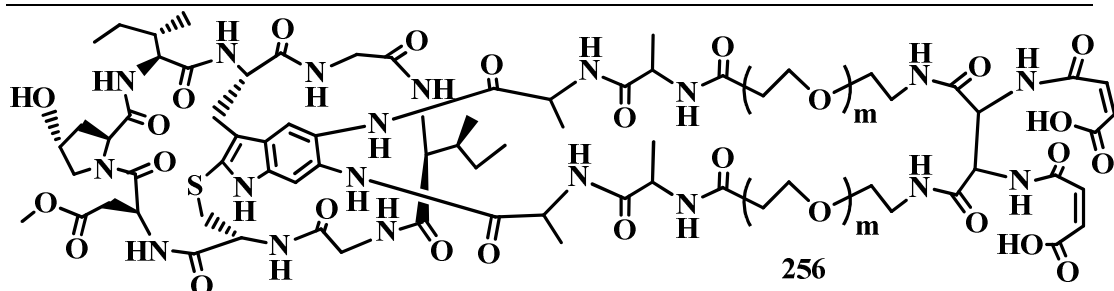
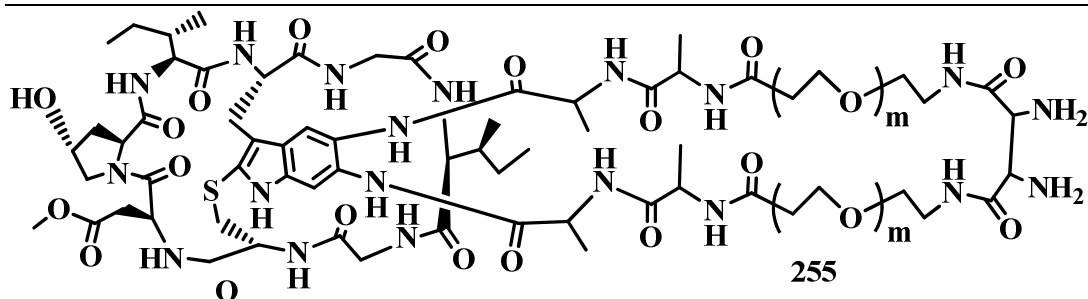
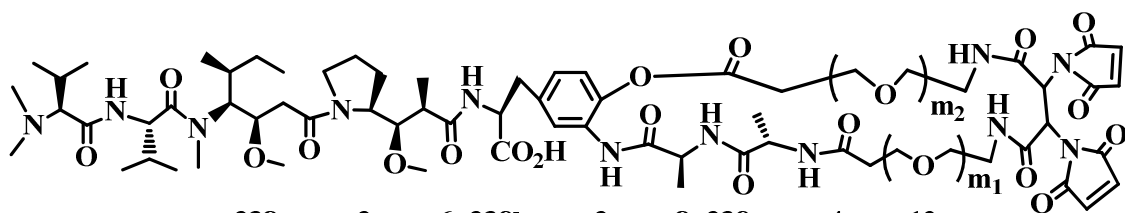
5

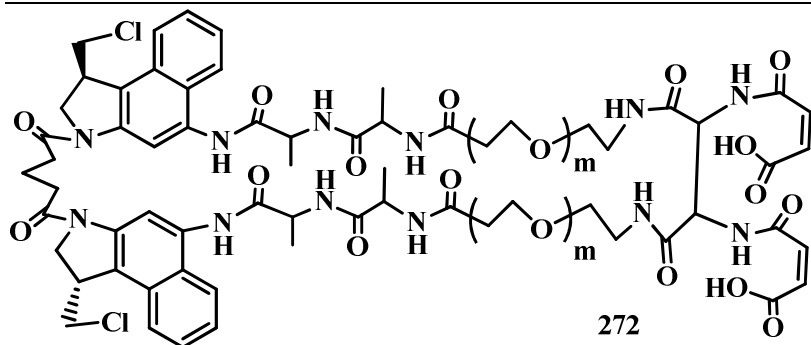
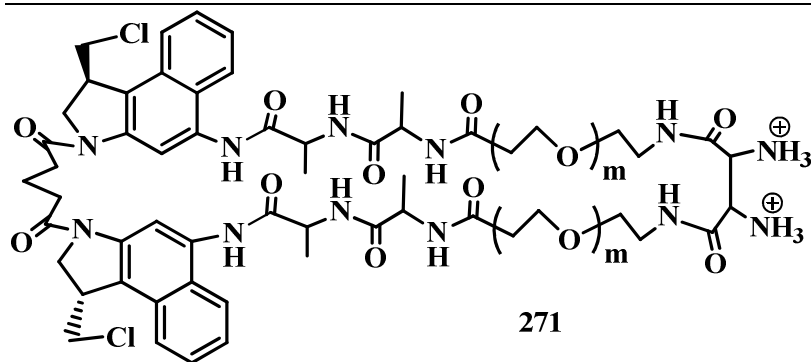
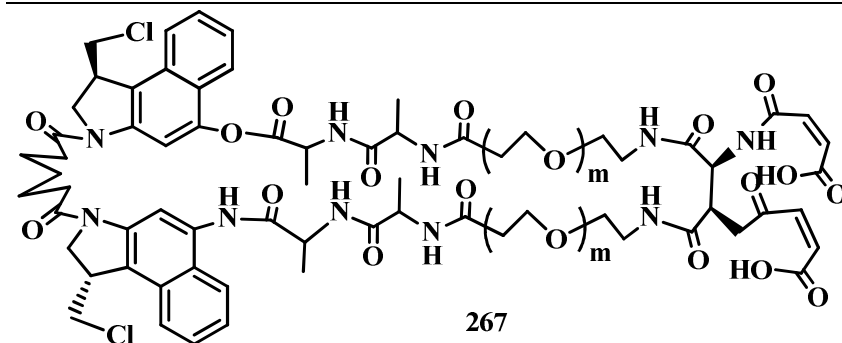
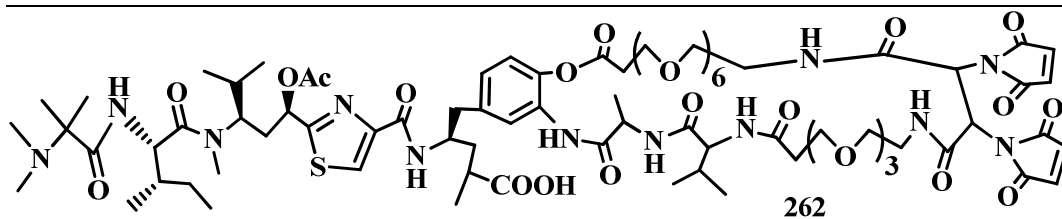
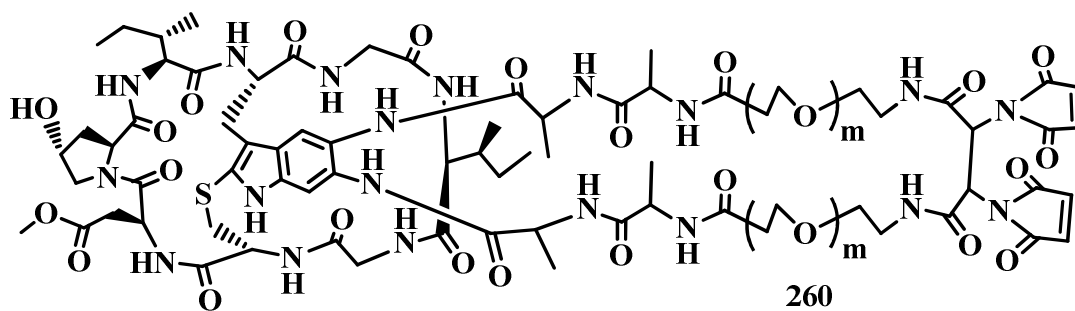


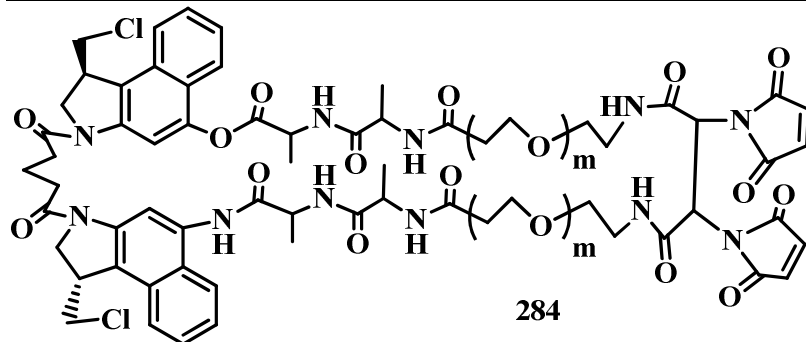
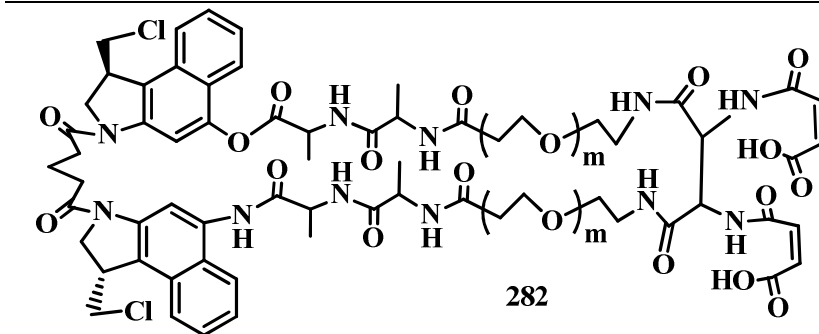
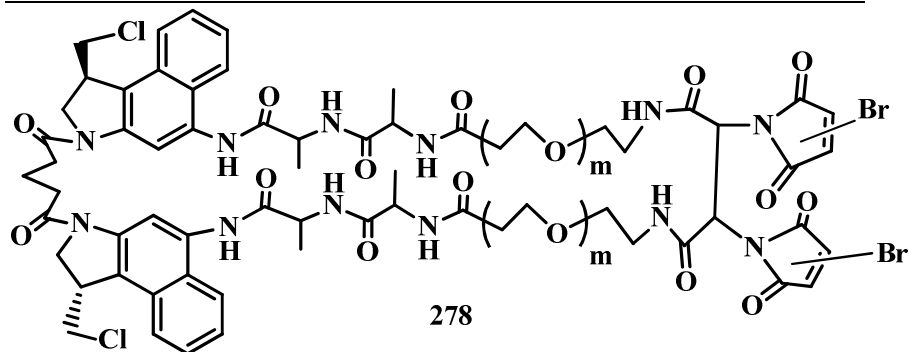
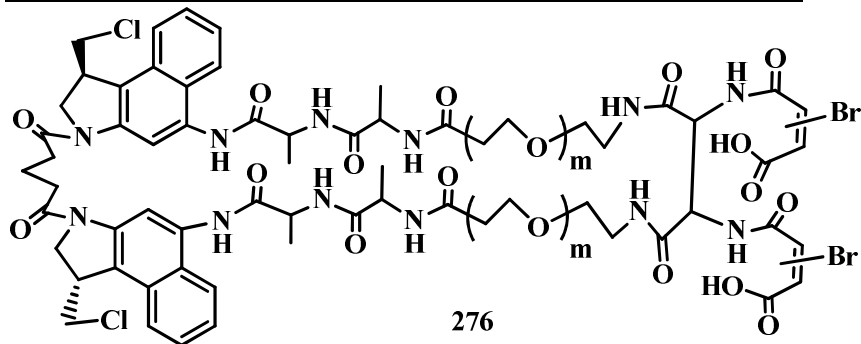
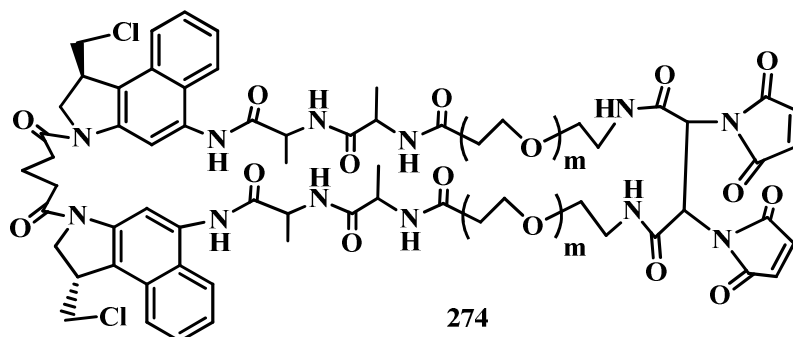




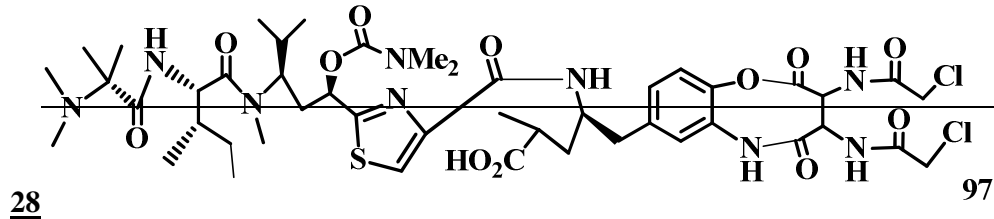
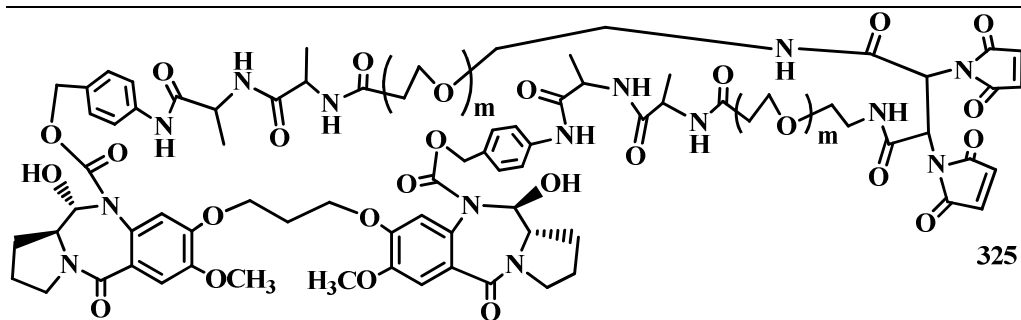
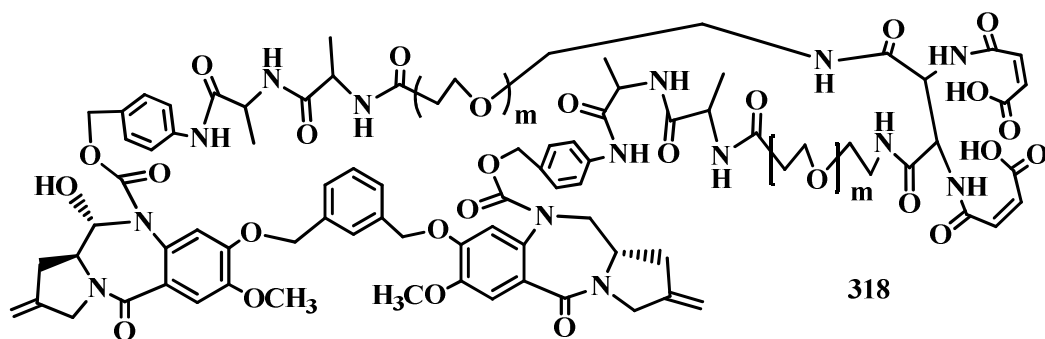




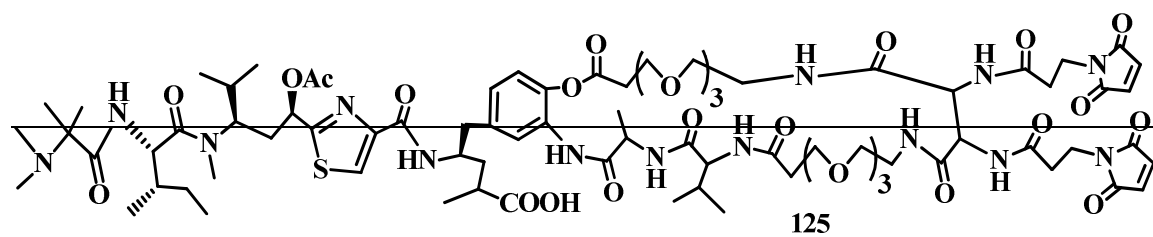
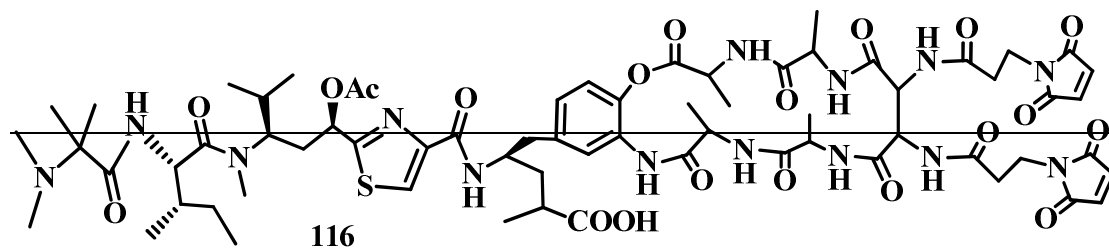
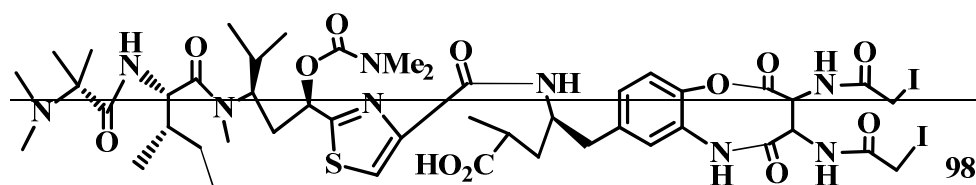


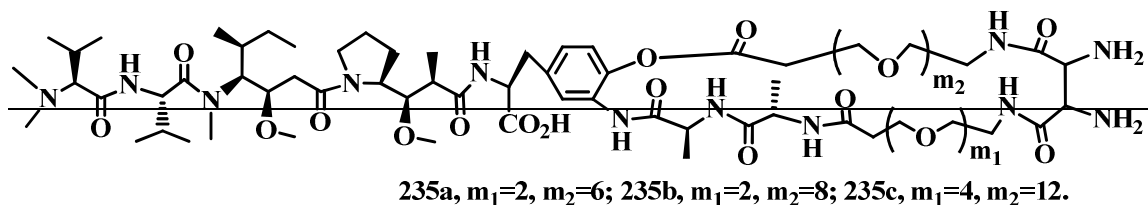
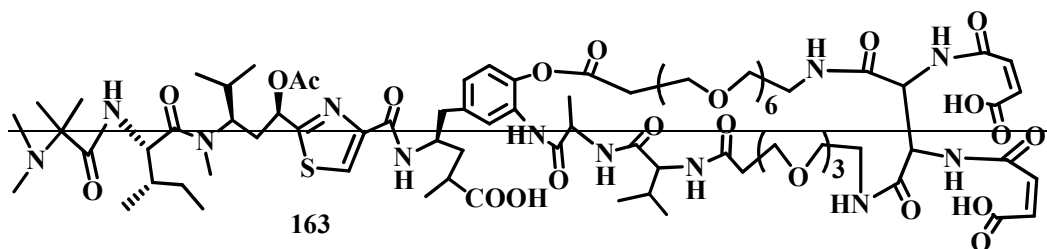
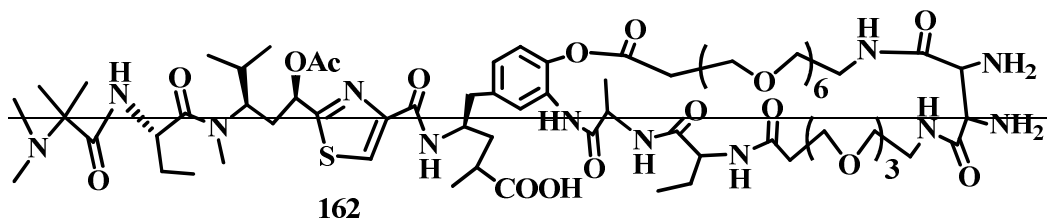
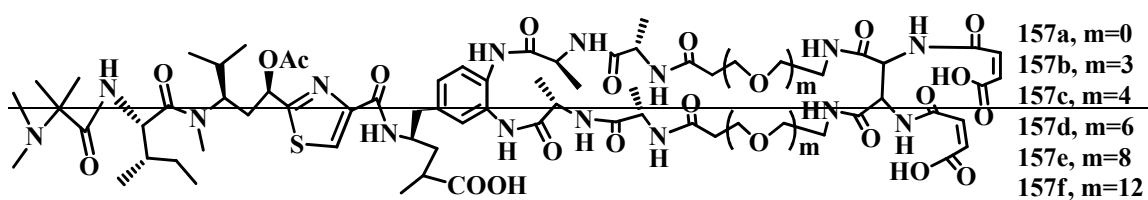
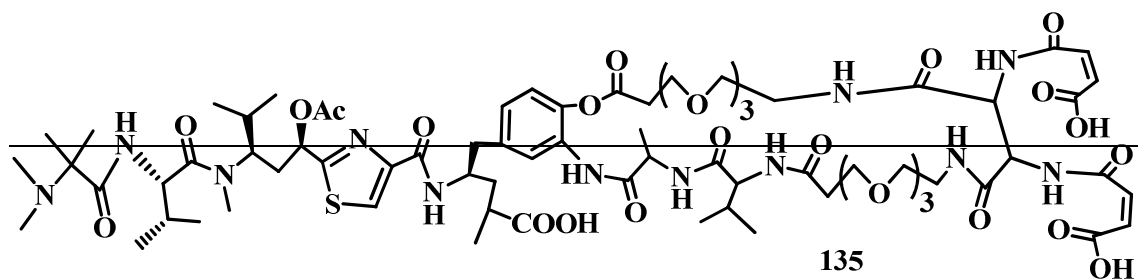
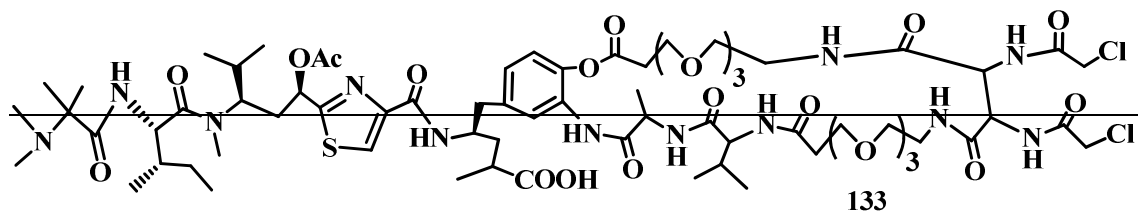
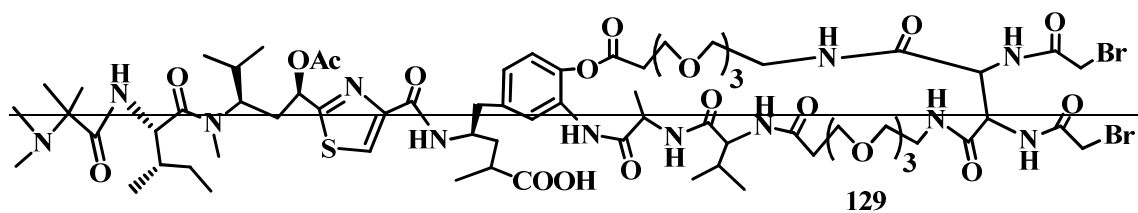


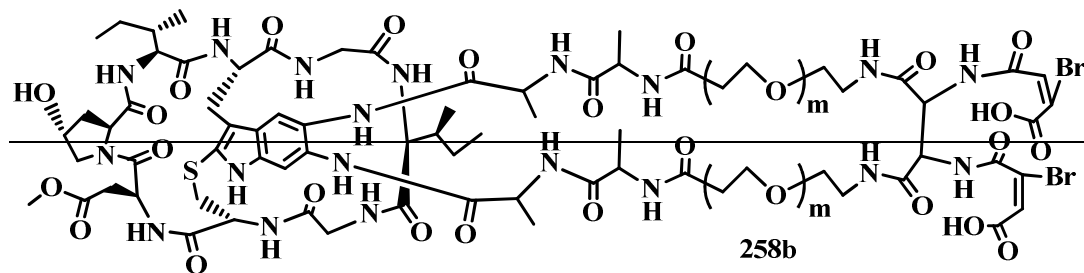
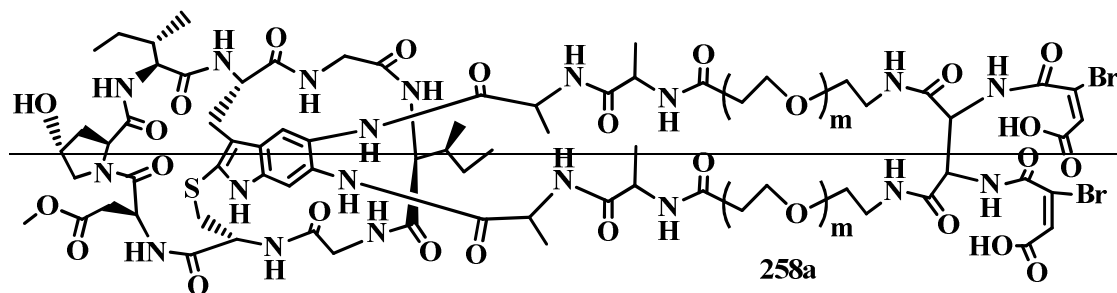
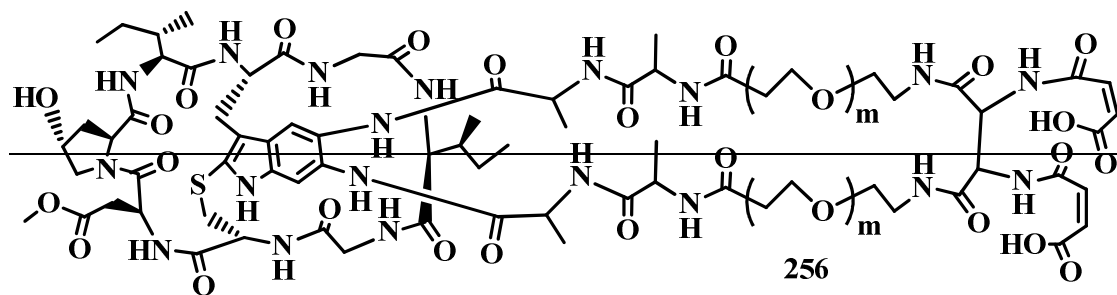
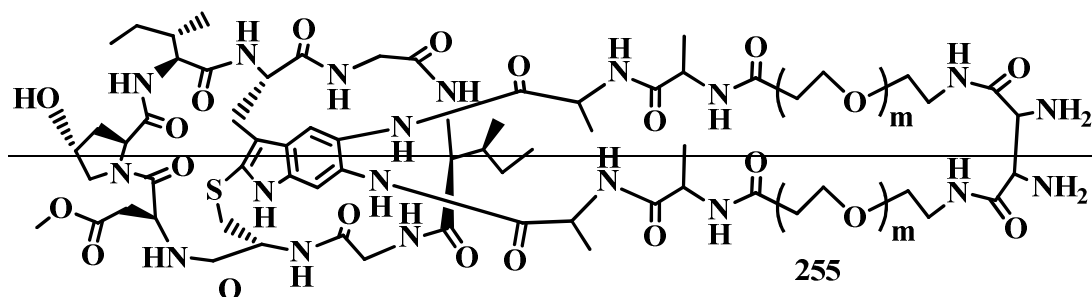
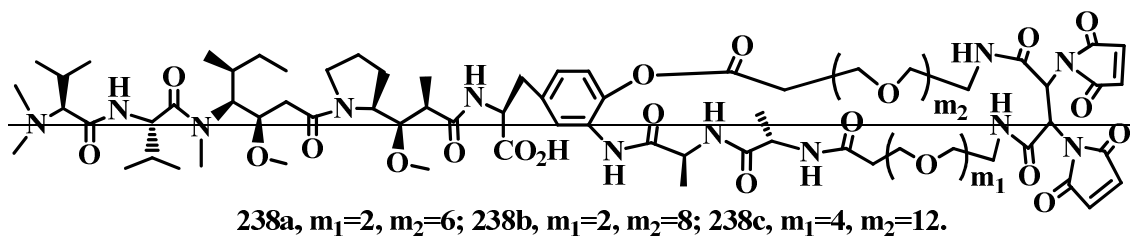
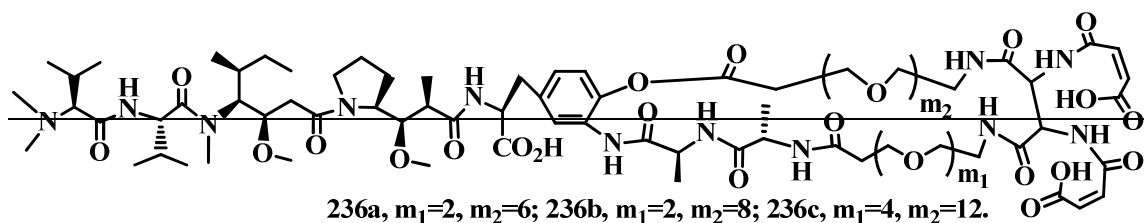


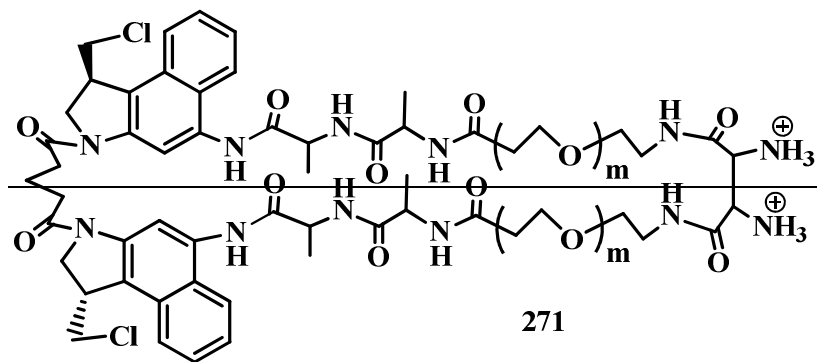
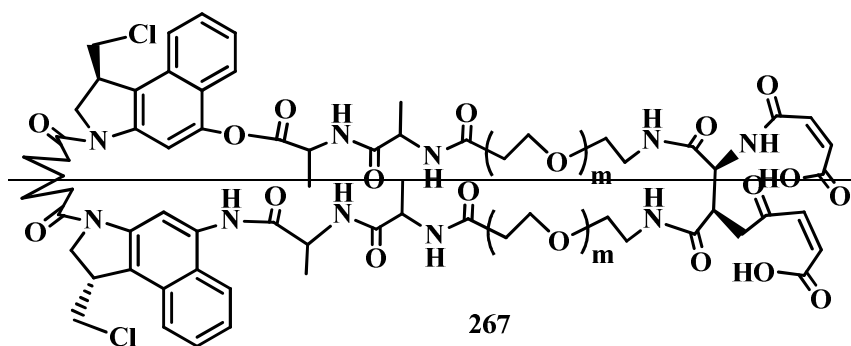
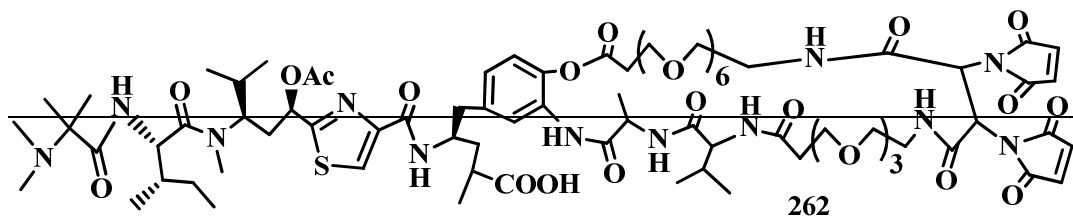
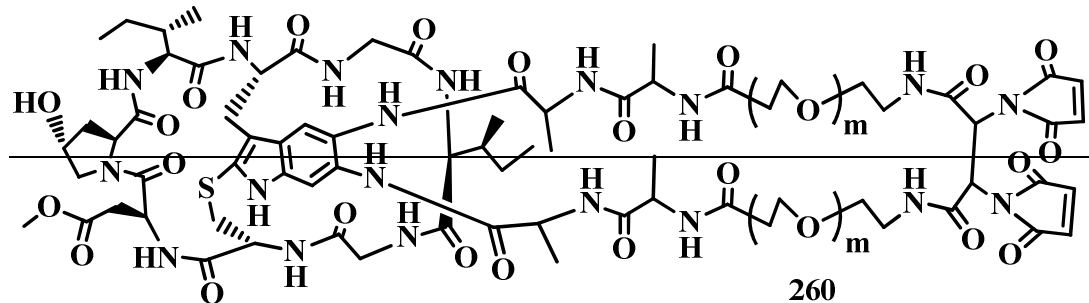
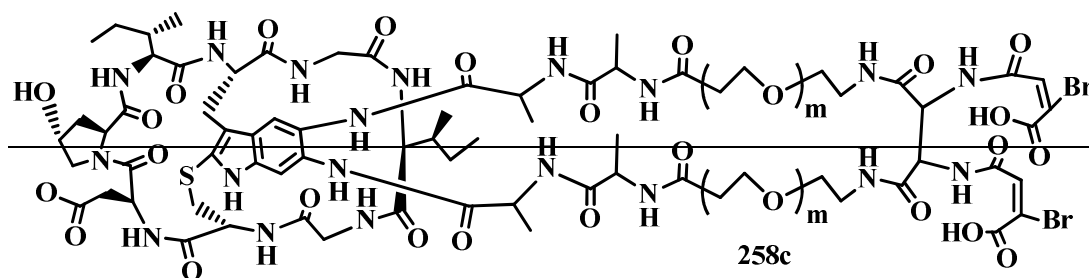


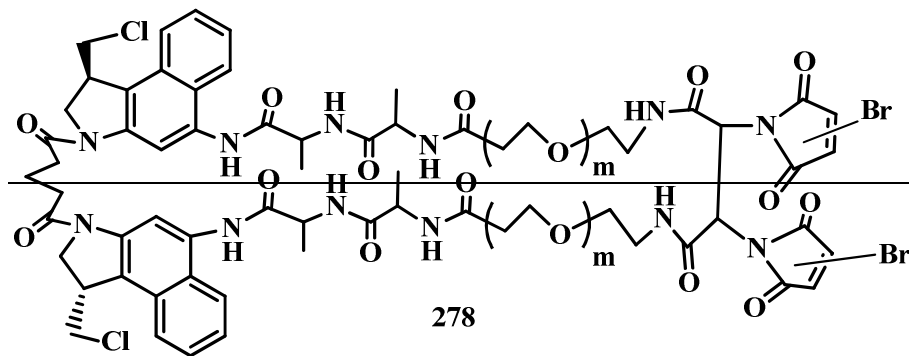
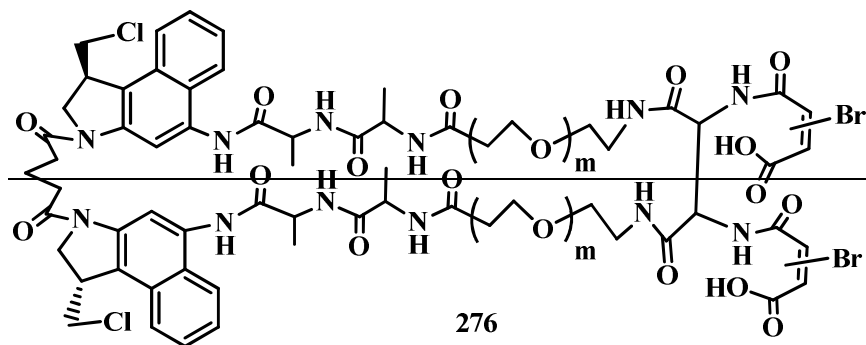
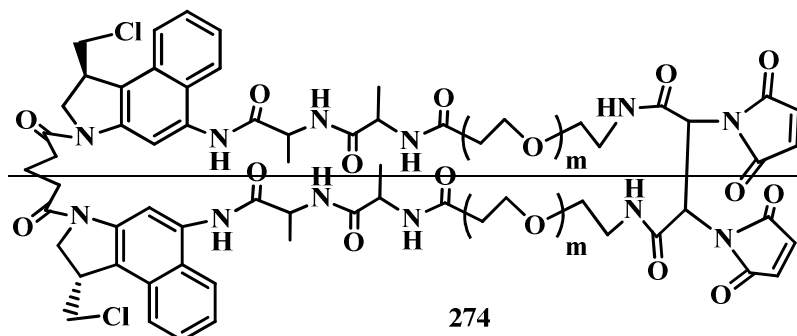
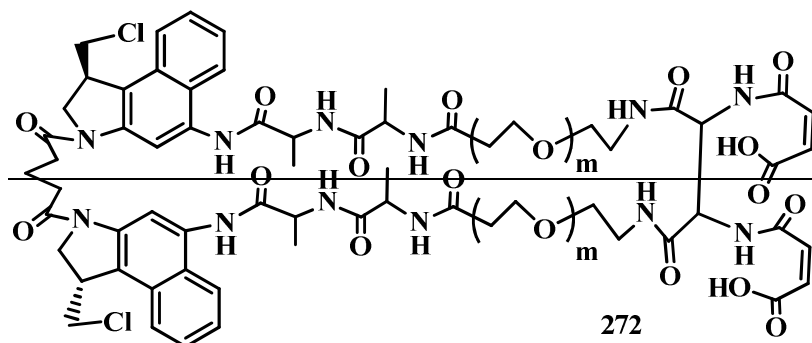
28

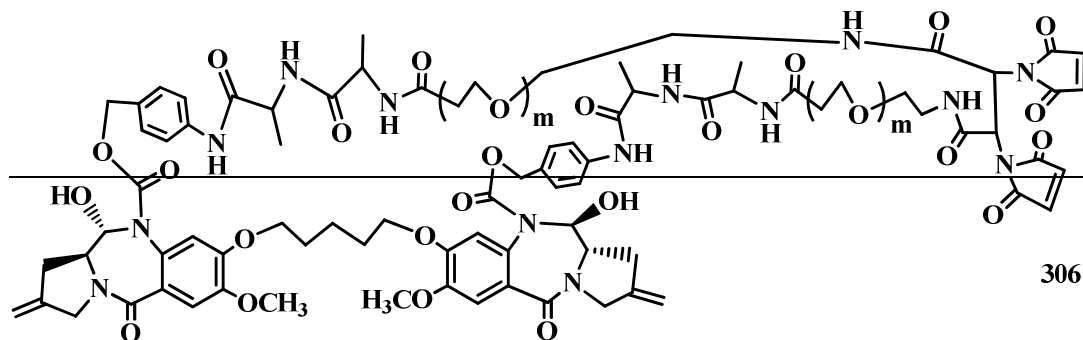
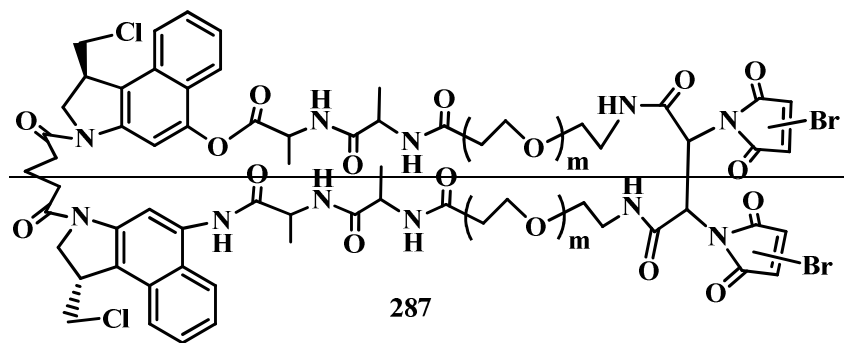
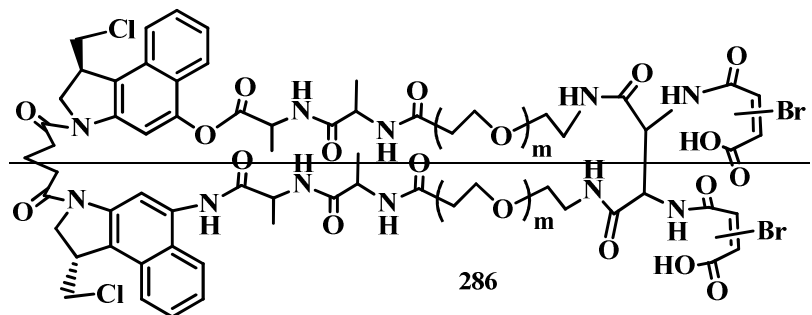
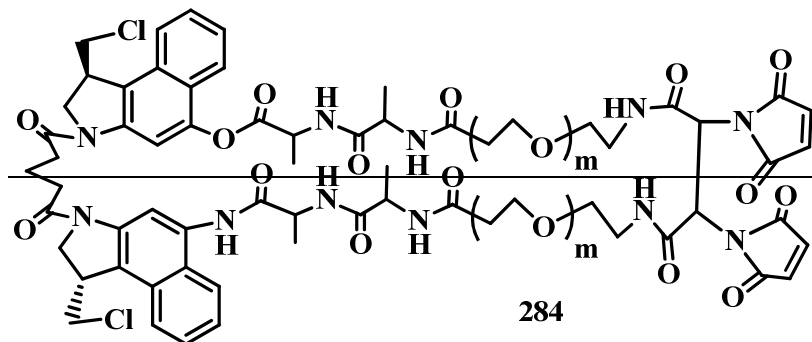
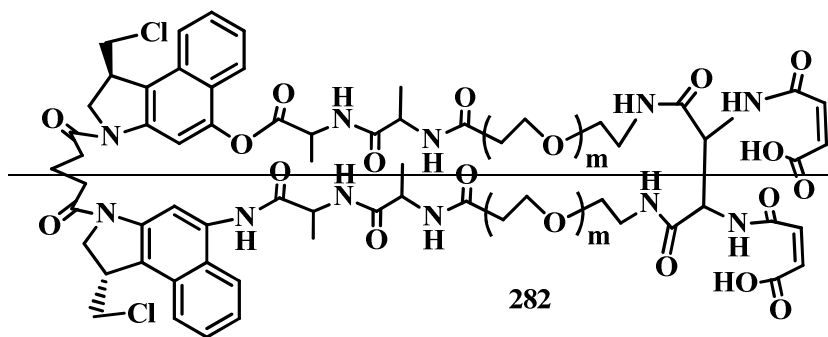




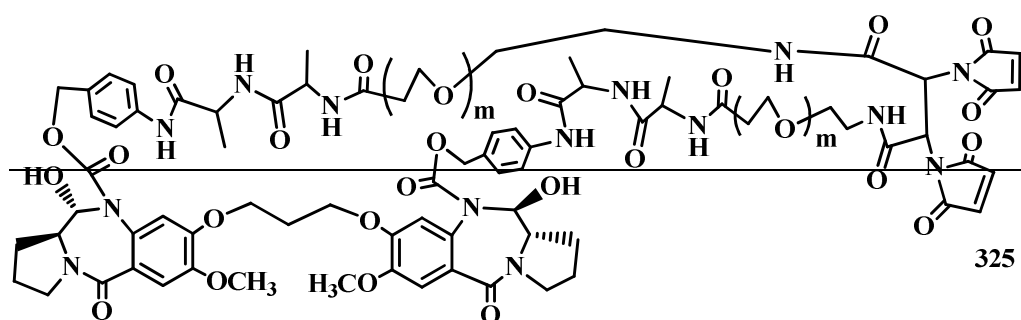
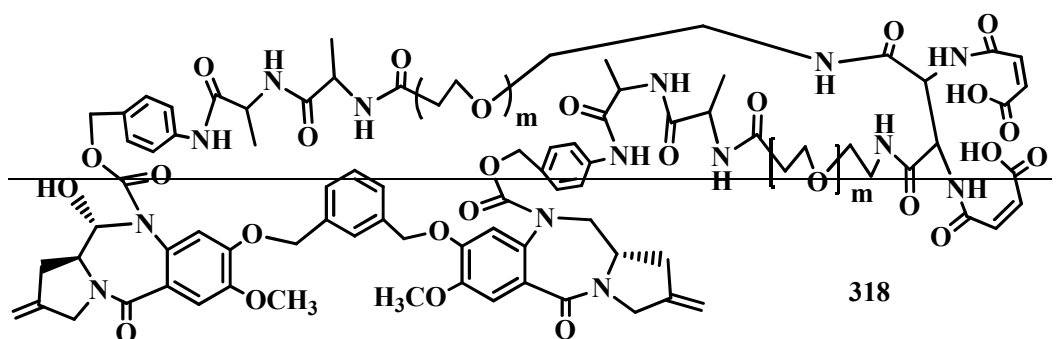
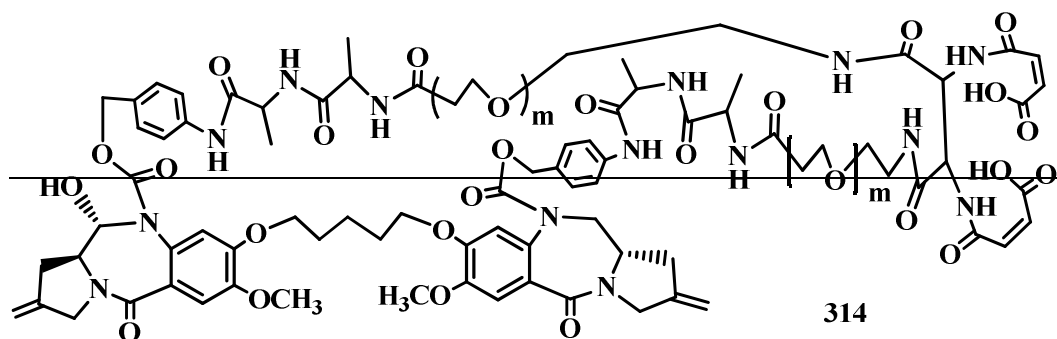
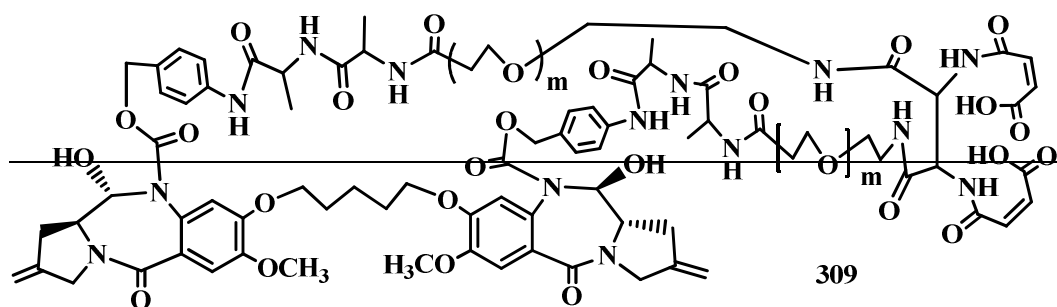




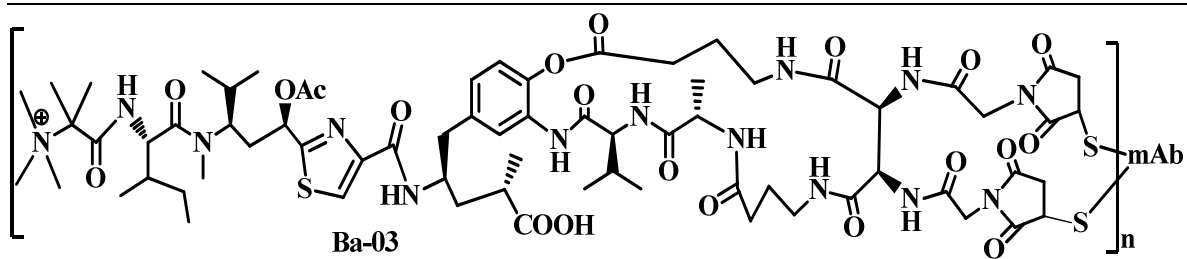
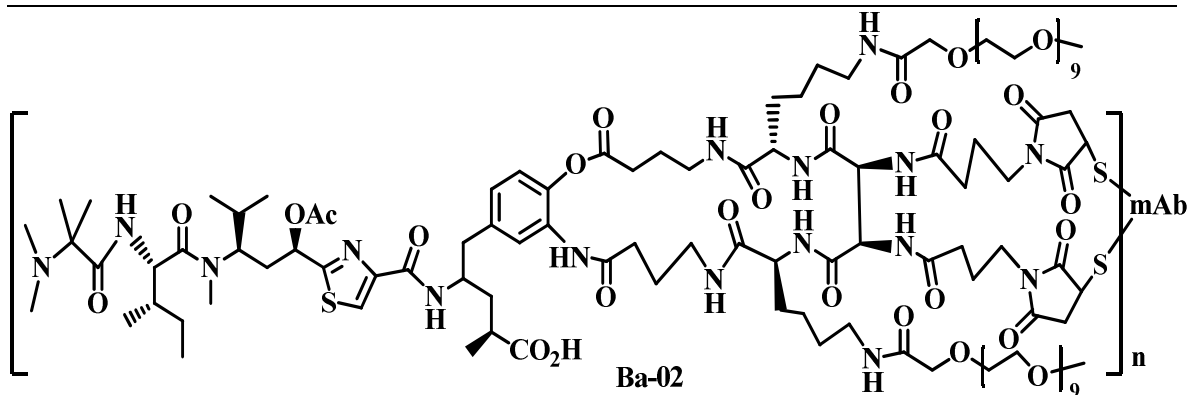
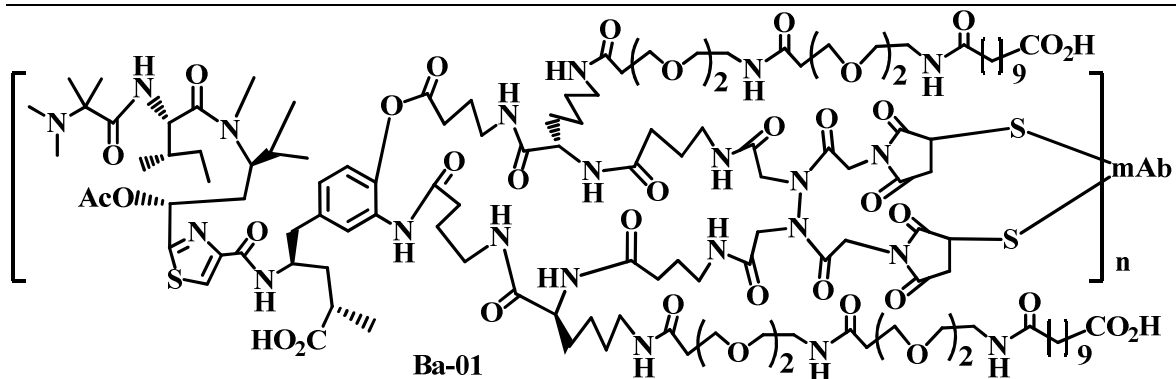
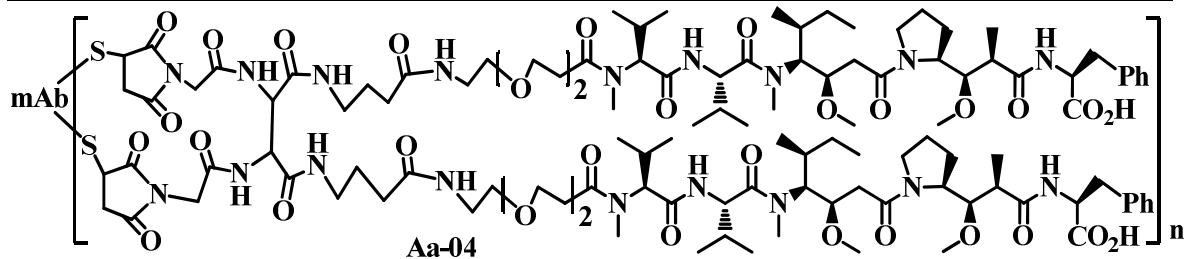
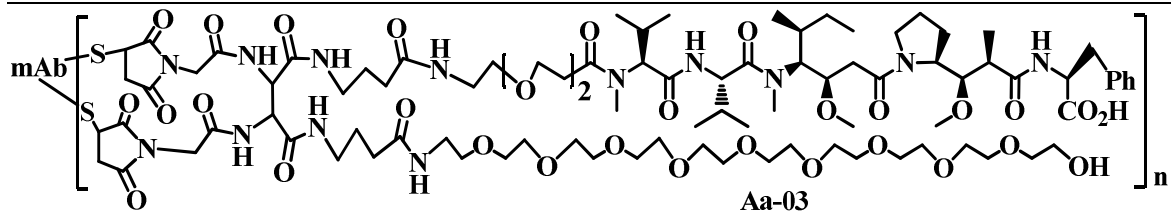
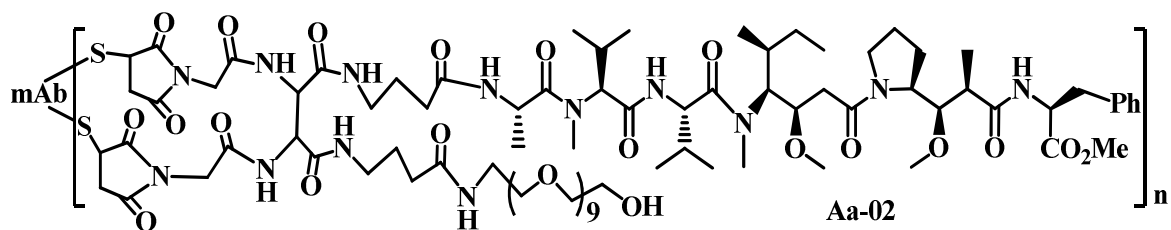


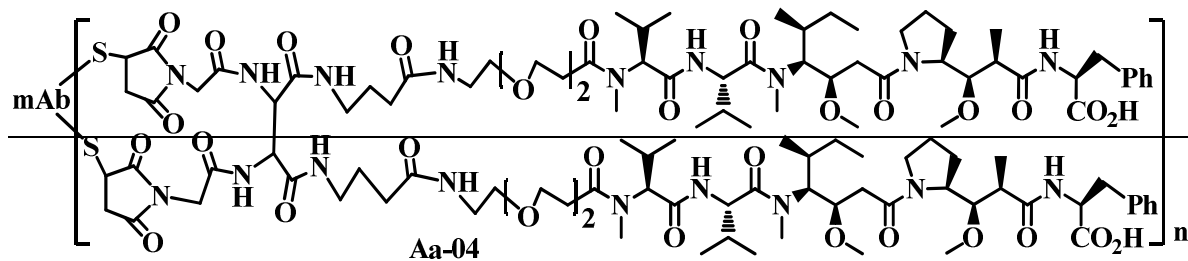
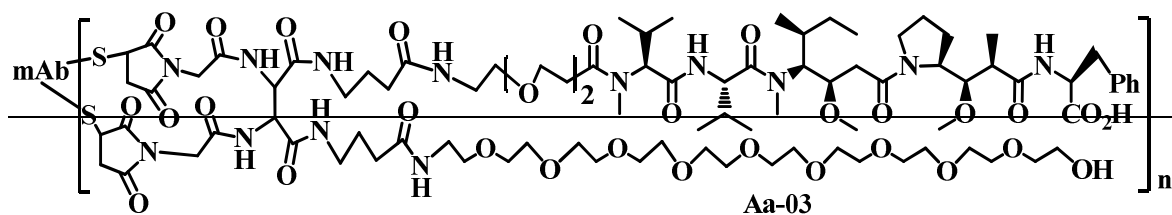
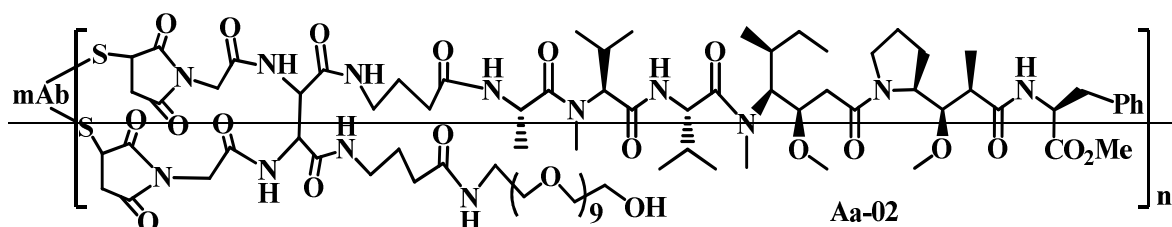
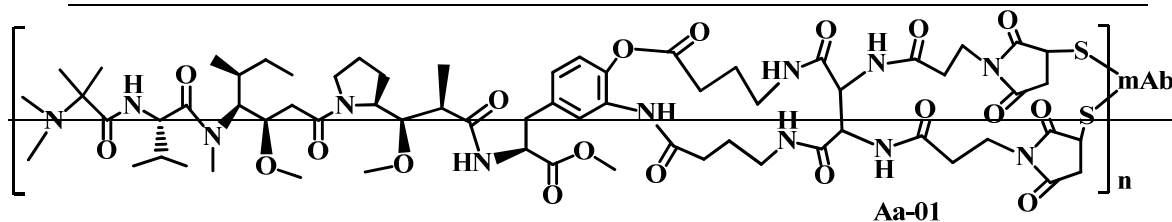
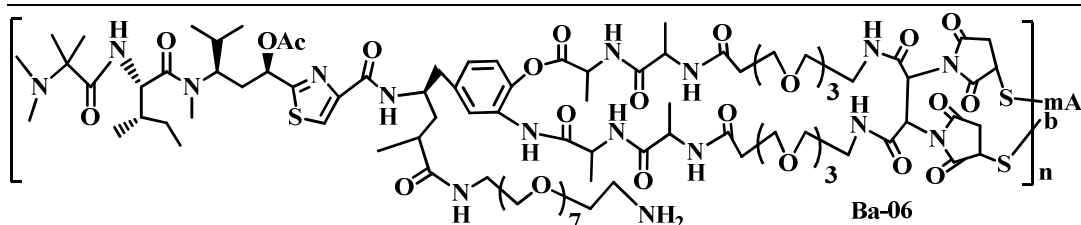
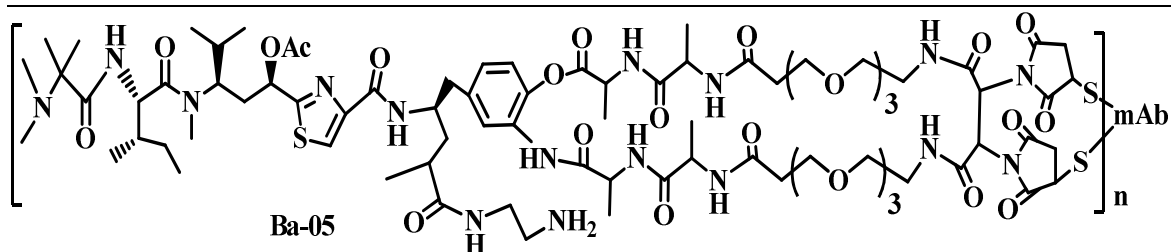
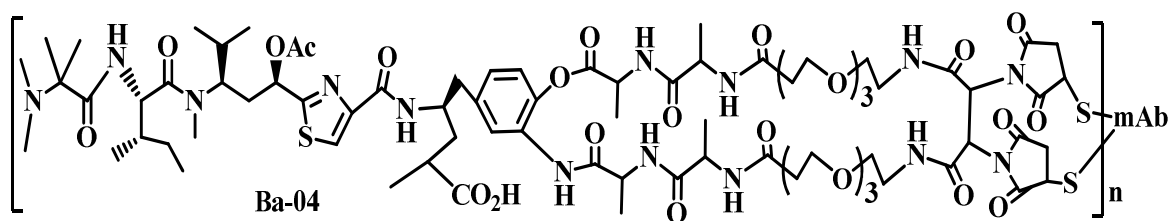


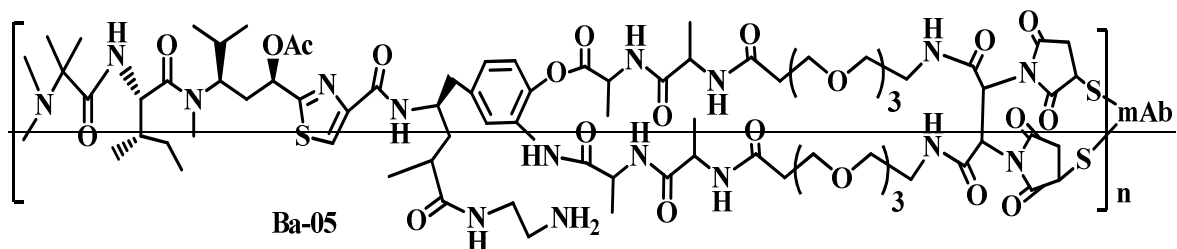
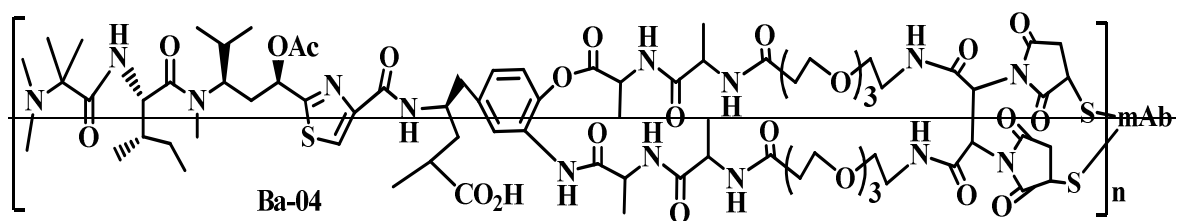
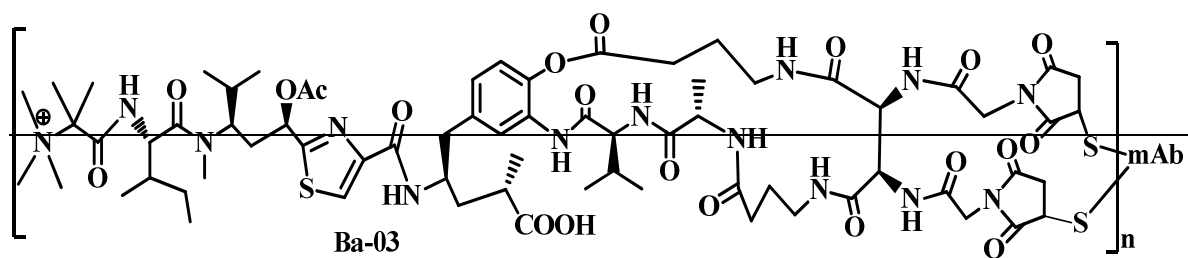
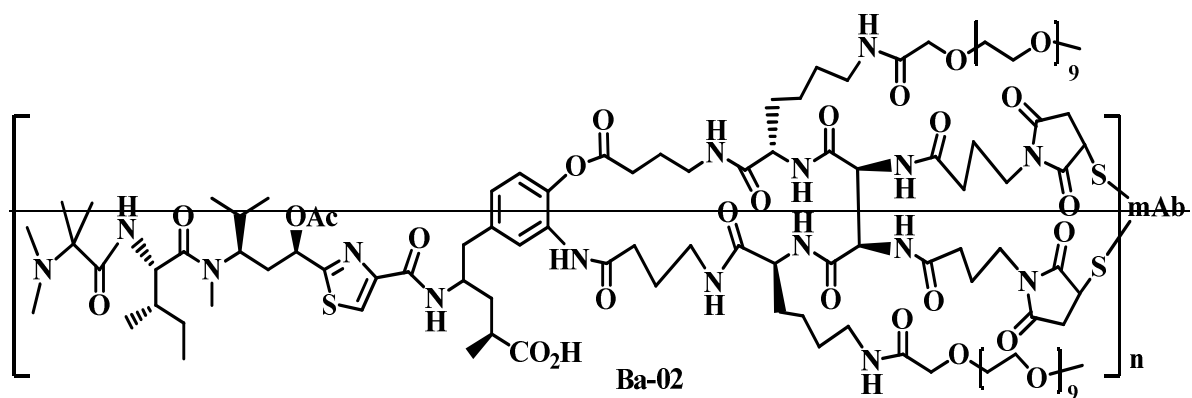
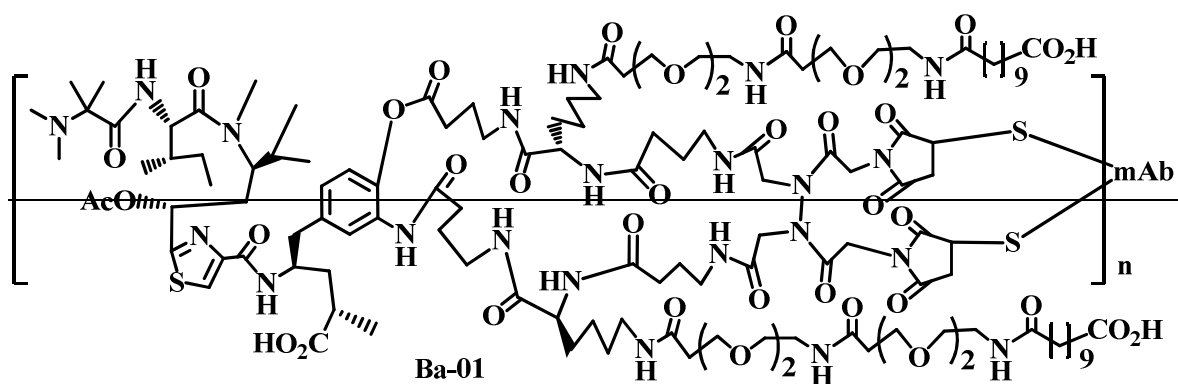
516

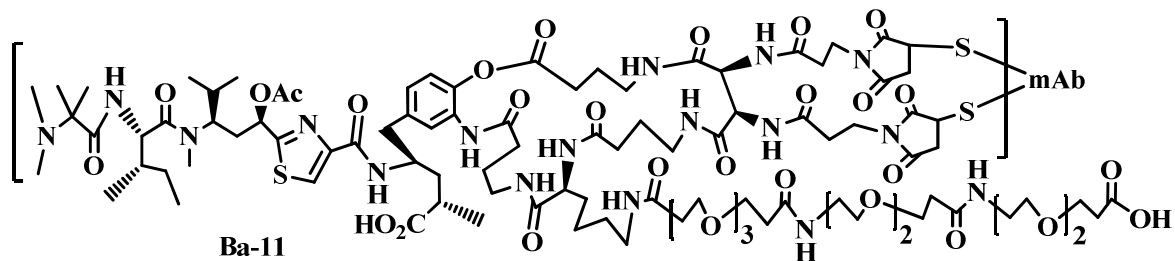
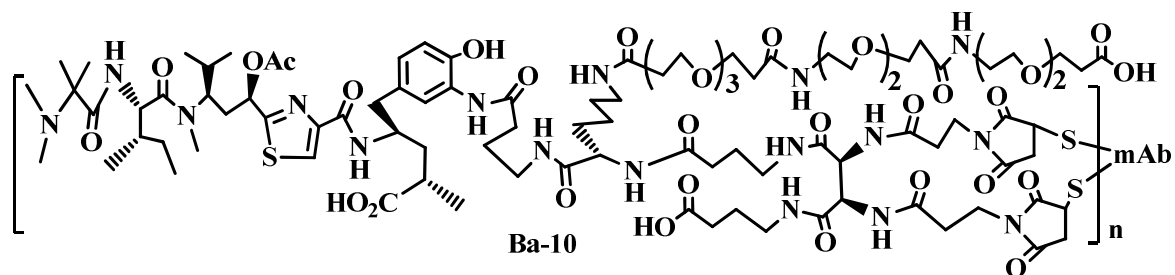
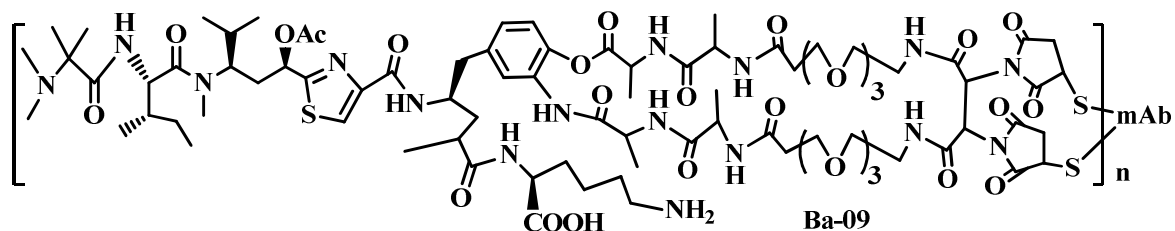
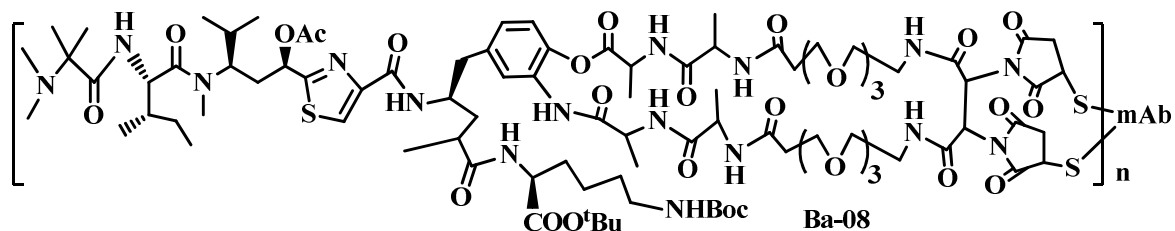
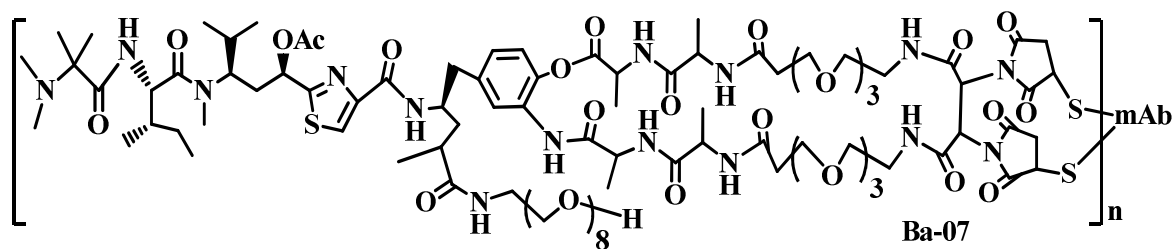
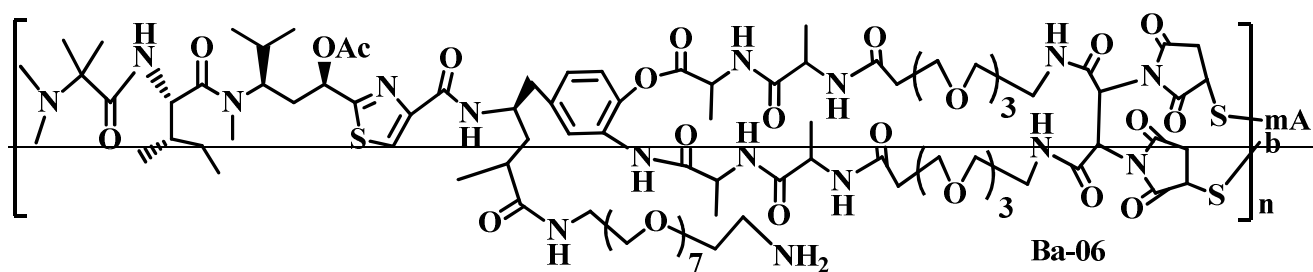


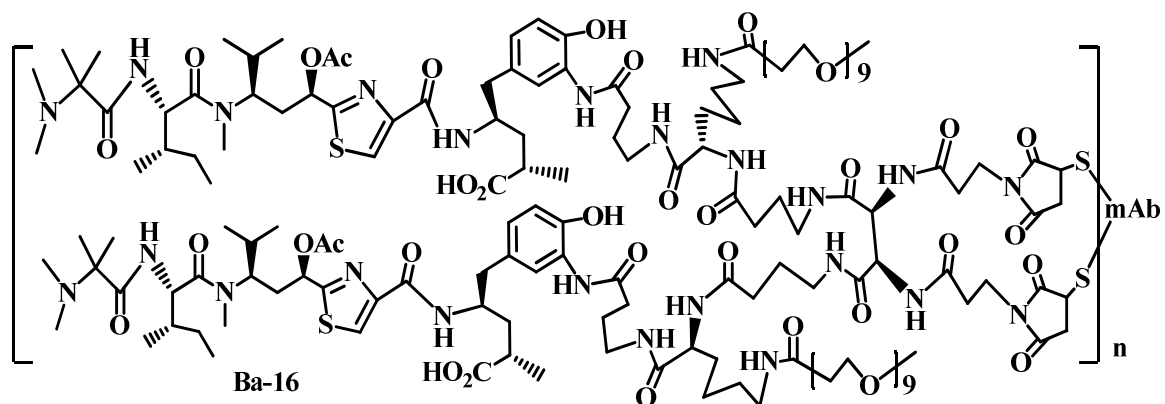
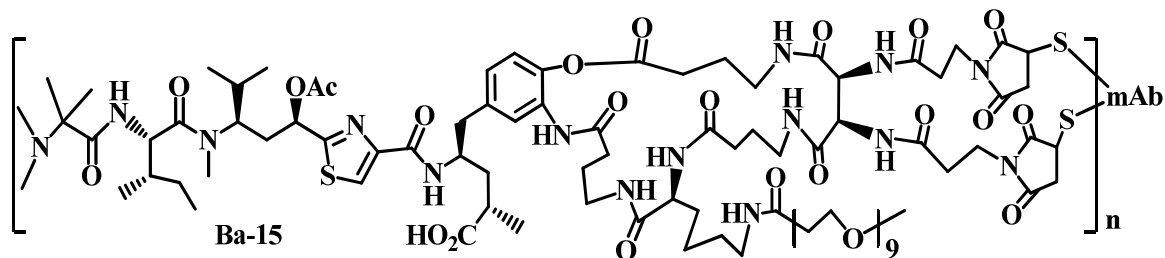
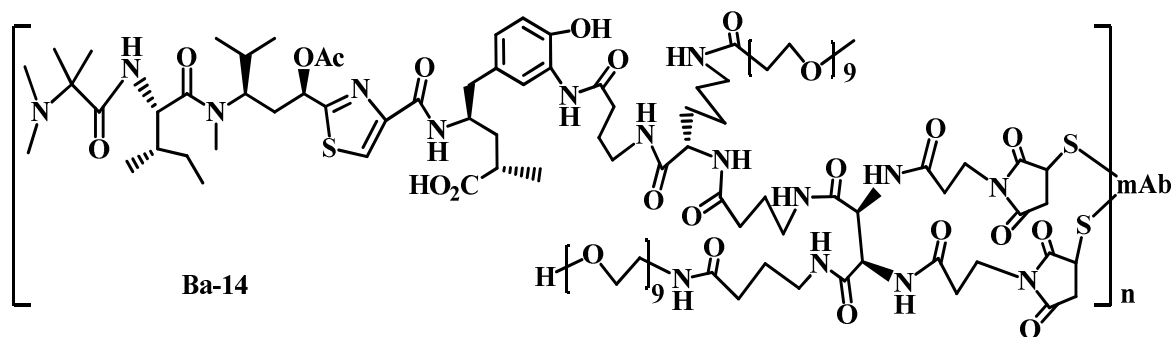
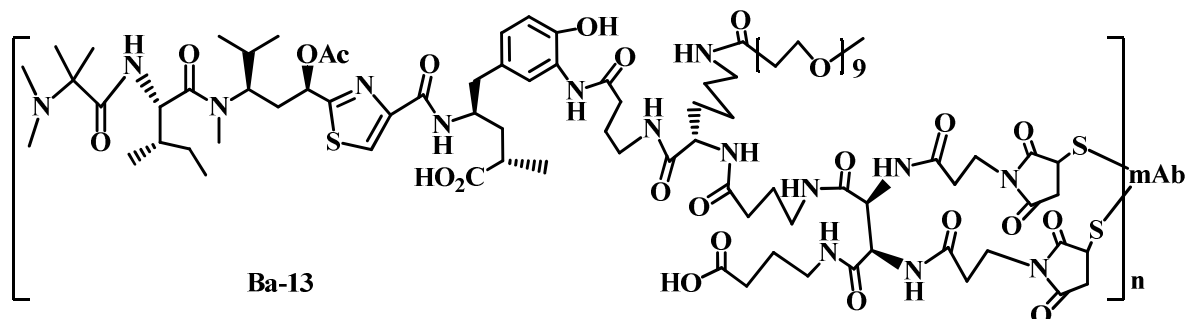
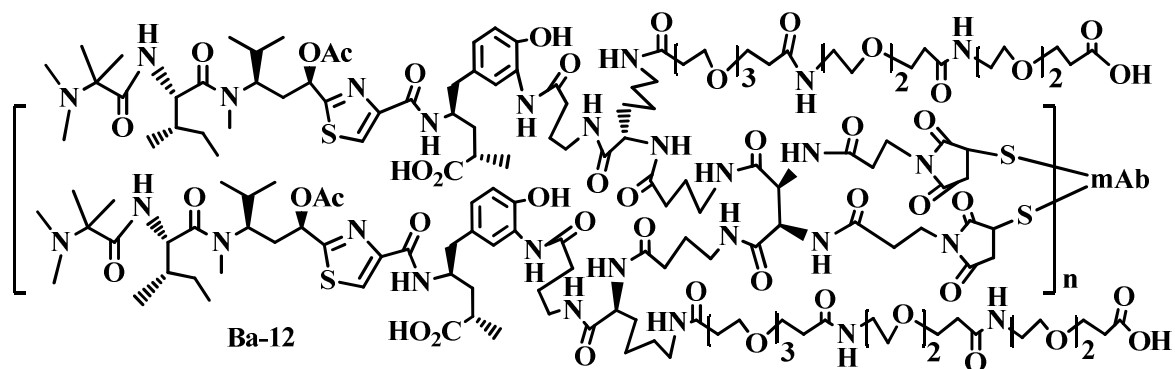
41. The conjugates of Claim 1, having the Formula of Aa-01, Aa-02, Aa-03, Aa-04, Ba-01, Ba-02, Ba-03, Ba-04, Ba-05, Ba-06, Ba-07, Ba-08, Ba-09, Ba-10, Ba-11, Ba-12, Ba-13, Ba-14, Ba-15, Ba-16, Ca-02, Ca-03, Ca-04, Ca-05, Ca-06, Ca-07, Ca-08, Ca-09, Ca-10, Ca-11, Ca-12, Da-01, Da-02, Da-03, Da-04, Da-05 or Da-06, 99, 117, 126, 130, 136, 158a, 158b, 158c, 158d, 158e, 158f, 164, 237a, 237b, 237c, 239a, 239b, 239c, 257, 259, 261, 263, 268, 273, 275, 277, 279, 283, 285, 288, 307, 310, 315, 319, and 326, as shown in the following structures:



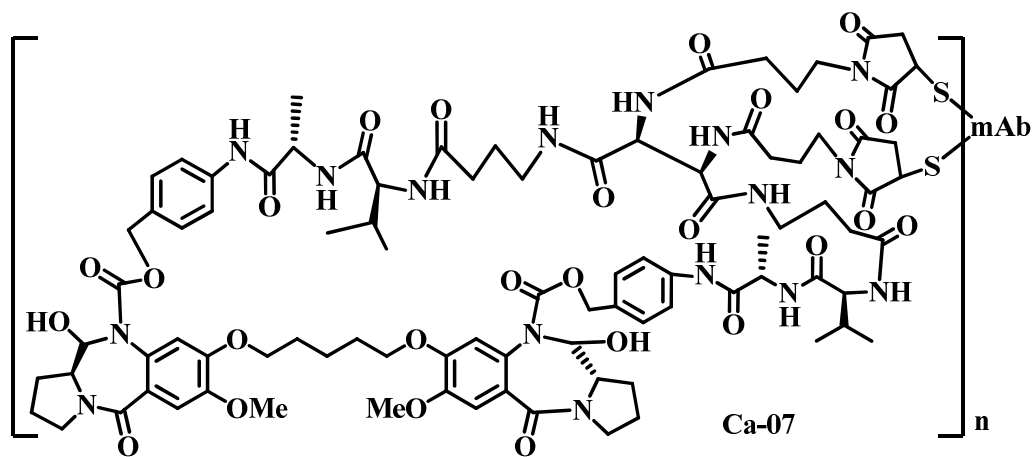
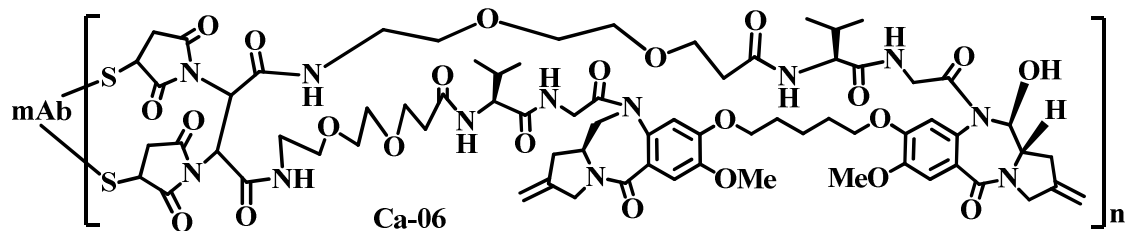
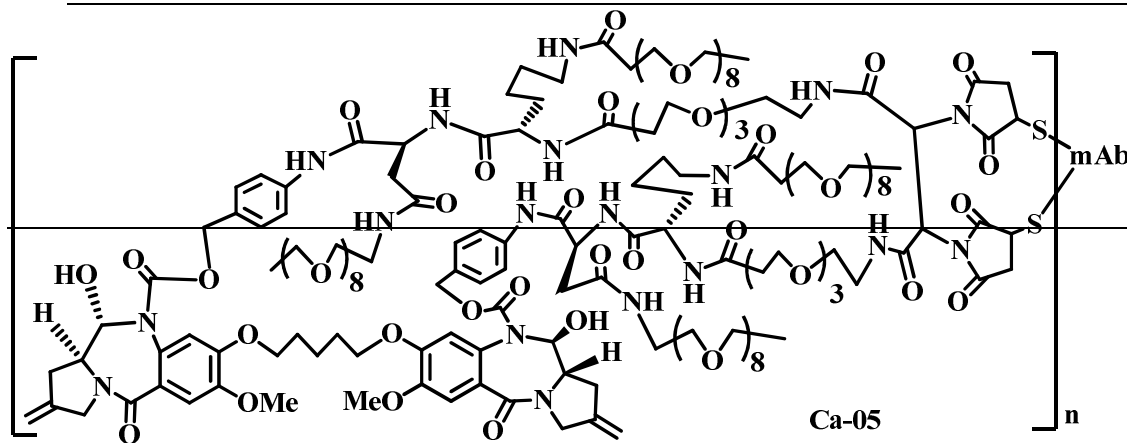
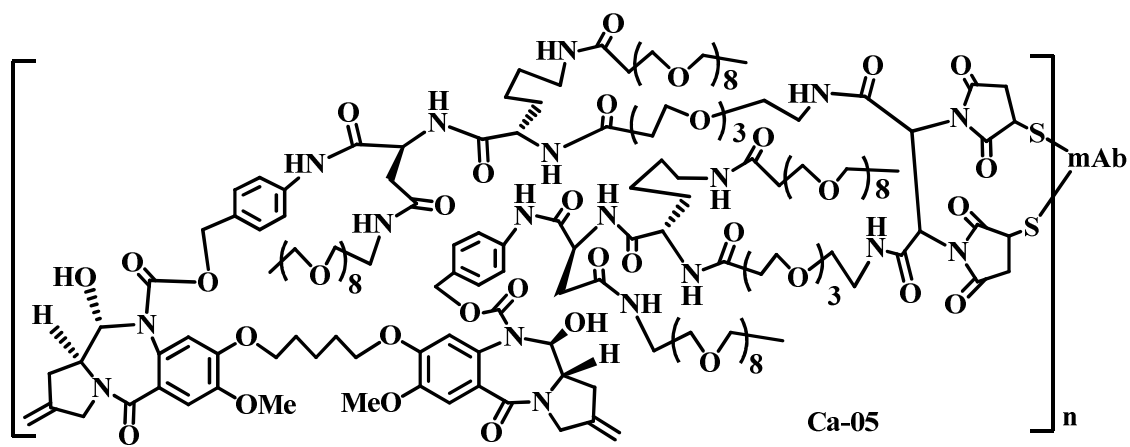


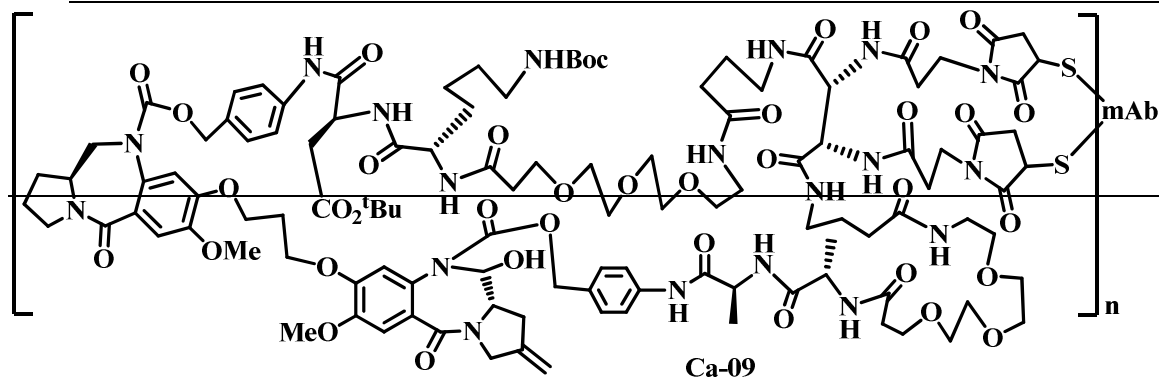
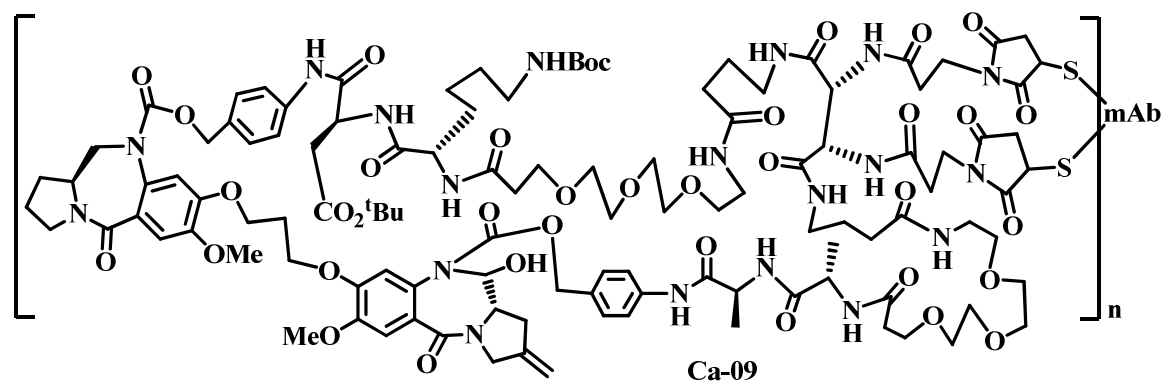
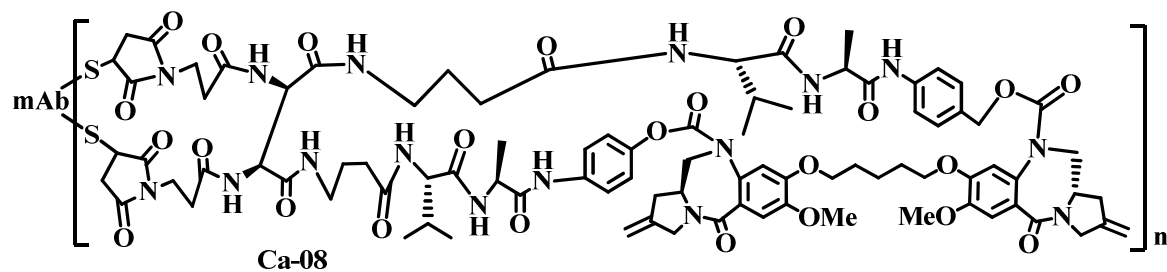
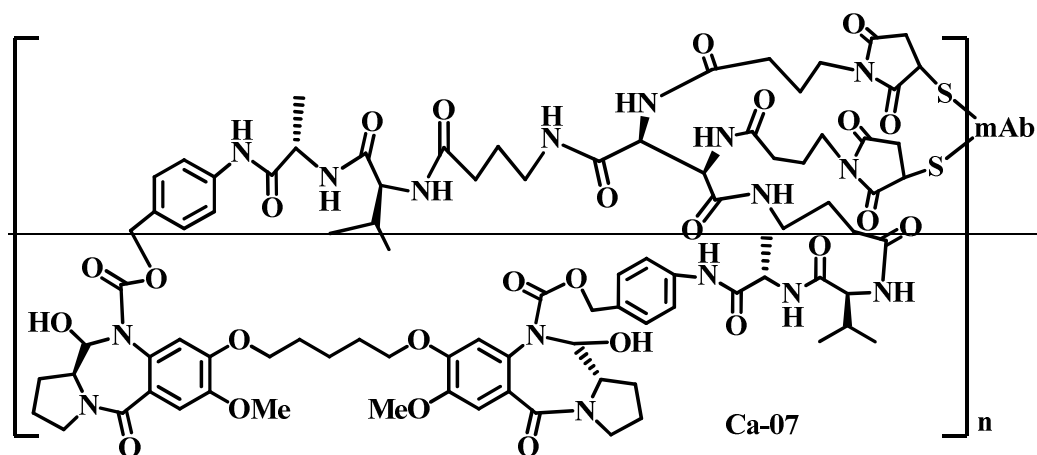


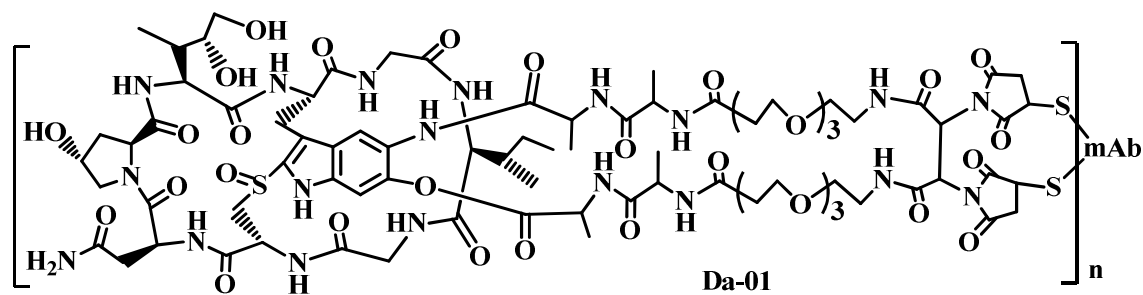
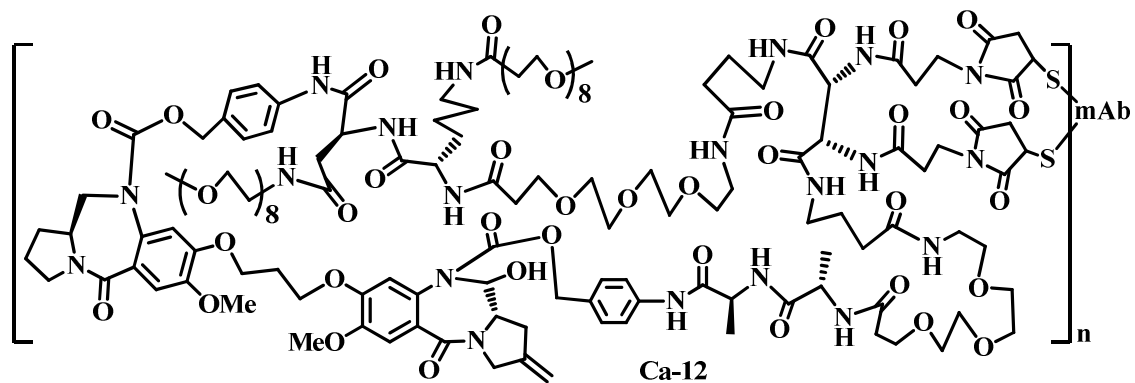
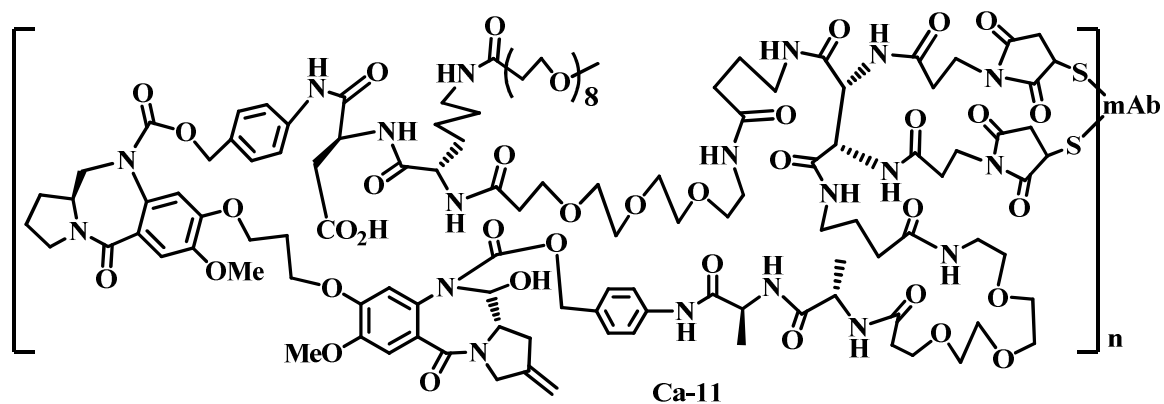
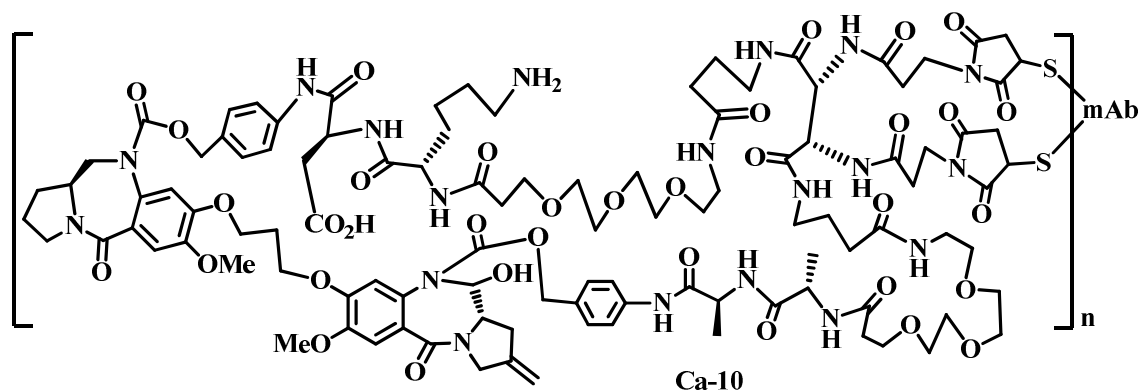


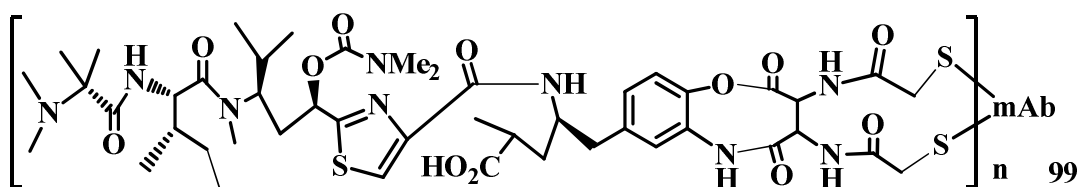
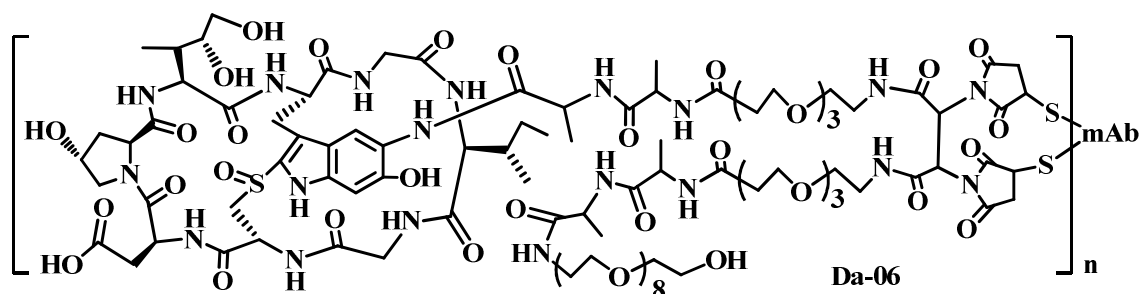
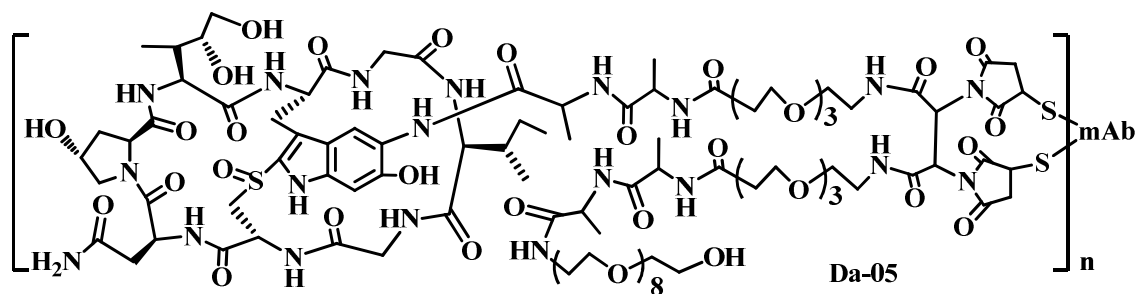
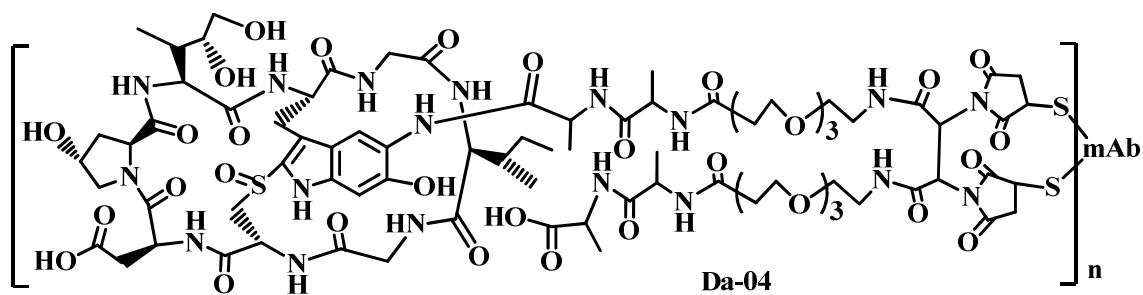
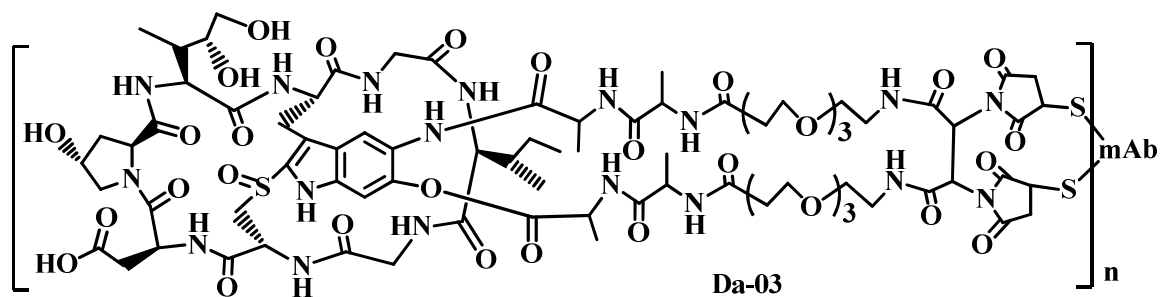
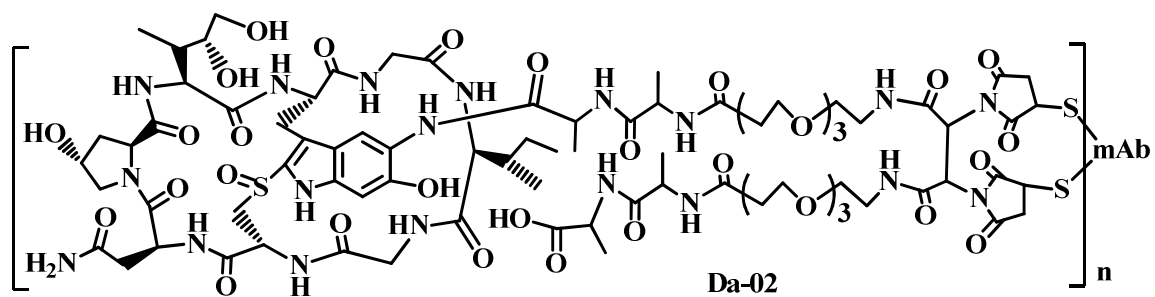


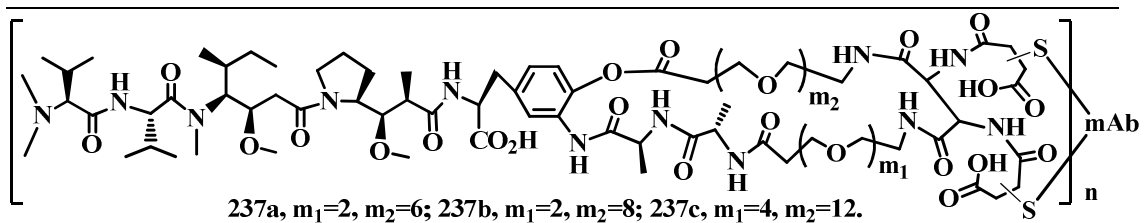
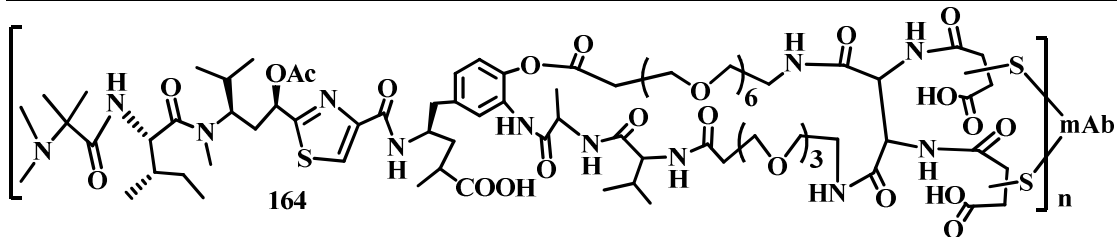
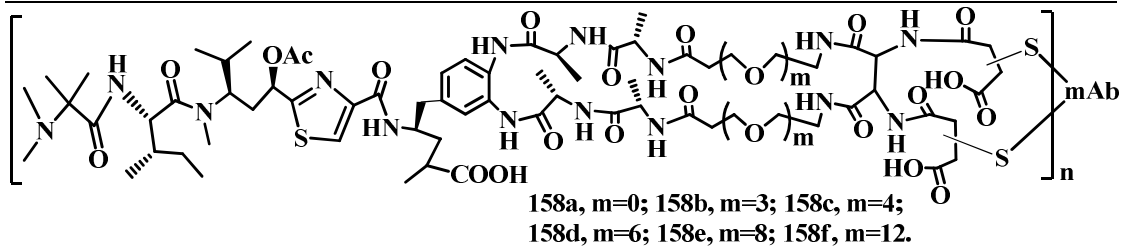
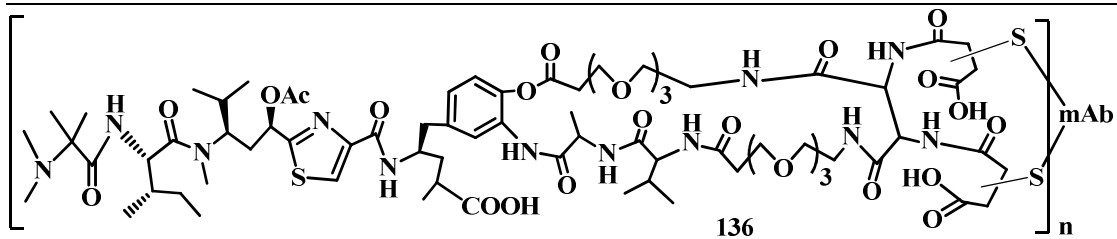
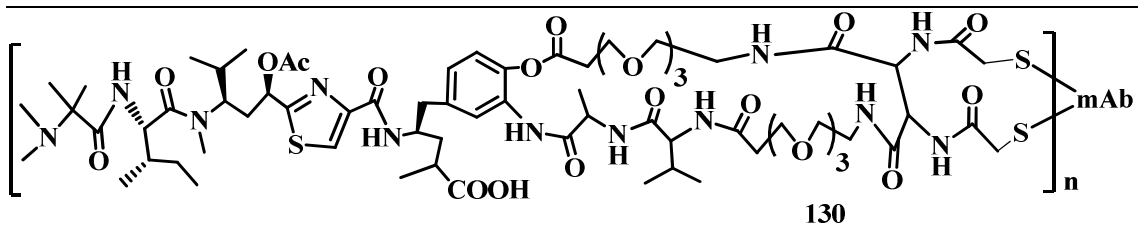
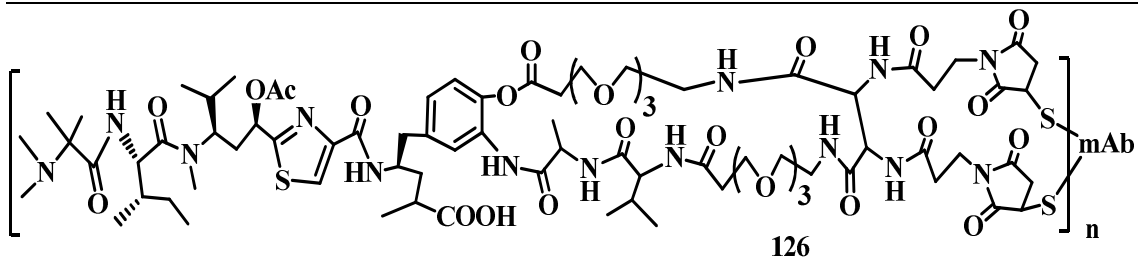
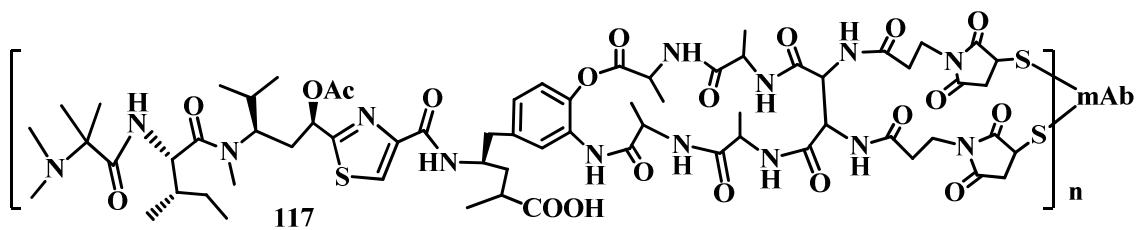


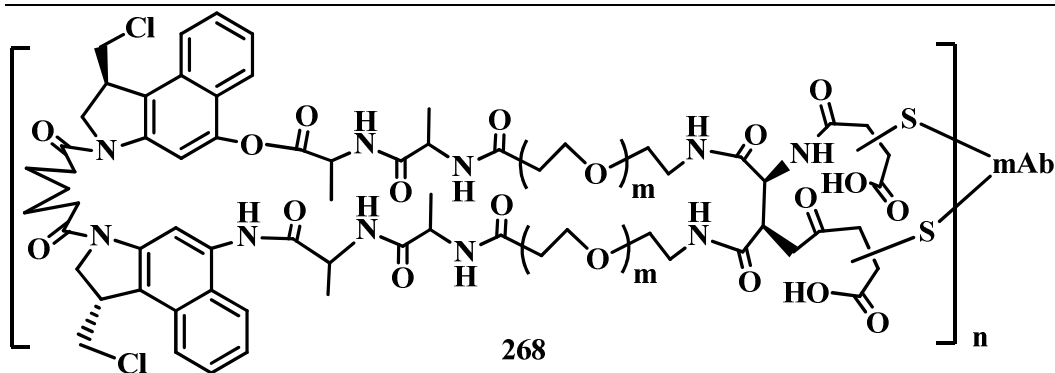
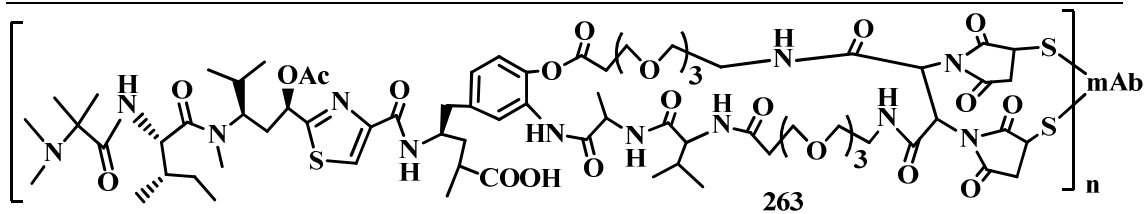
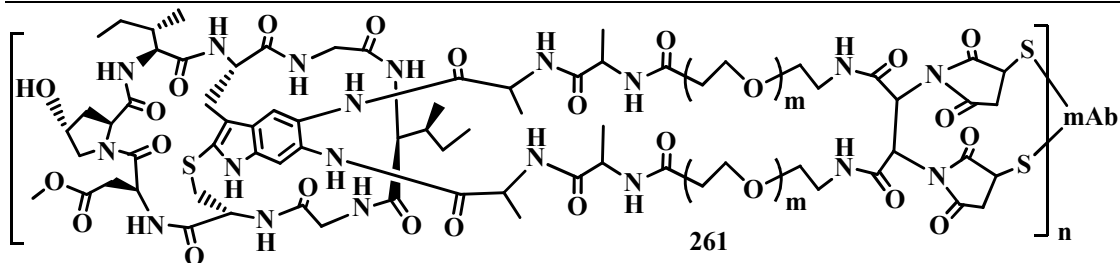
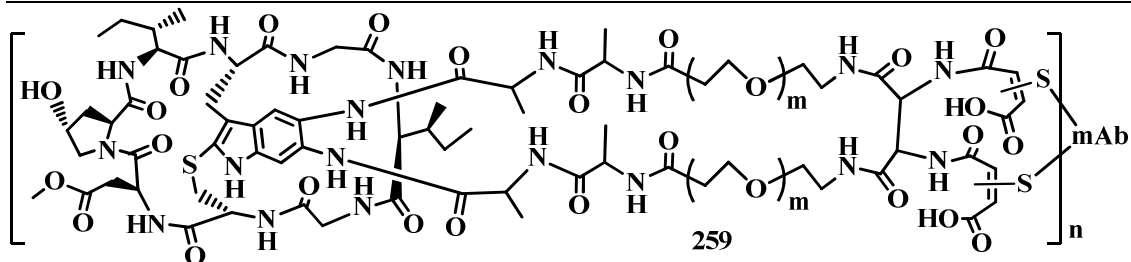
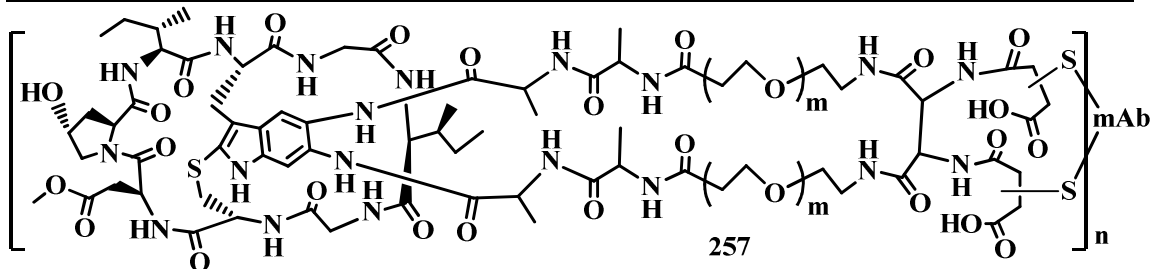
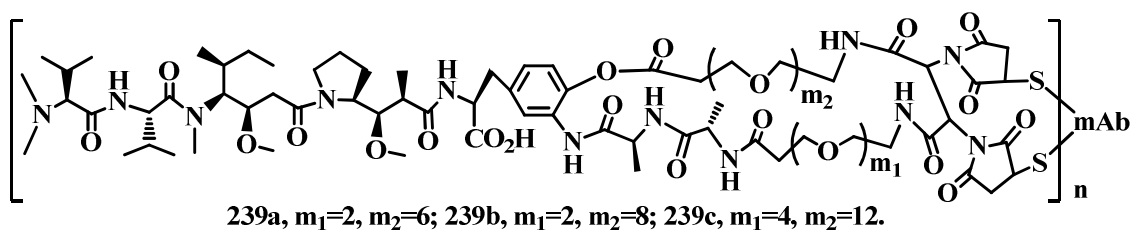




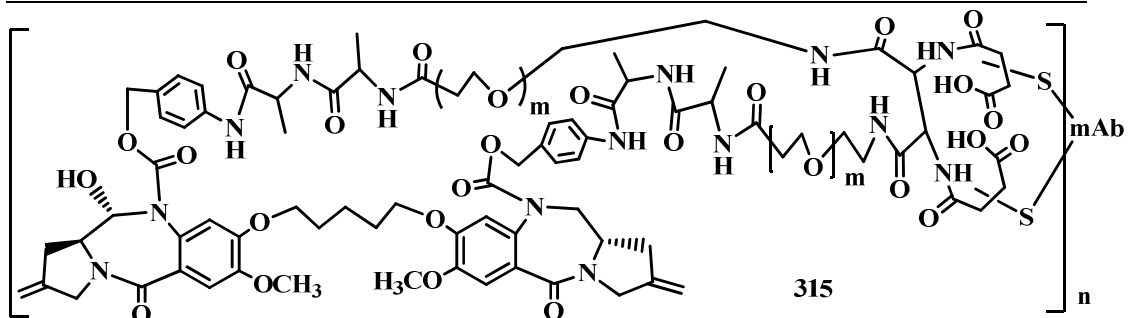
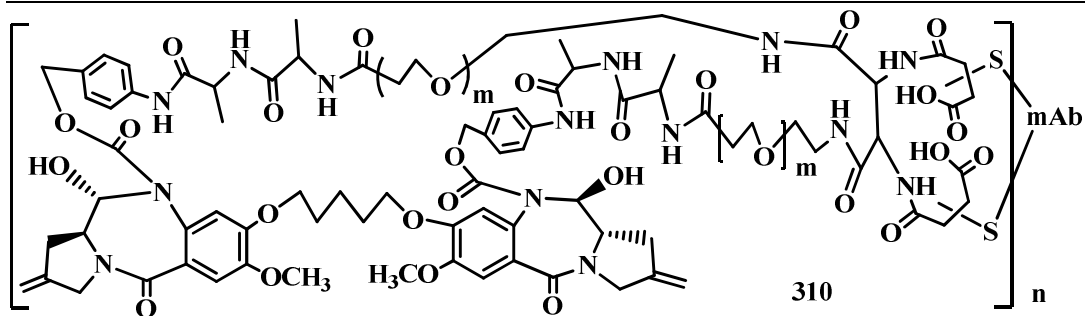
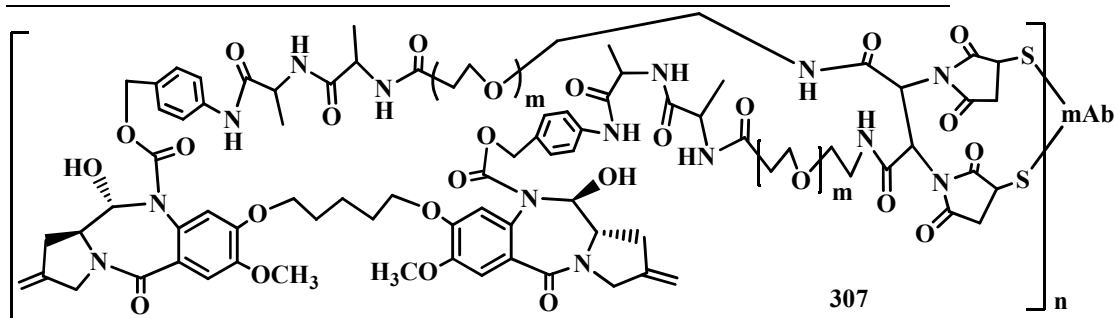
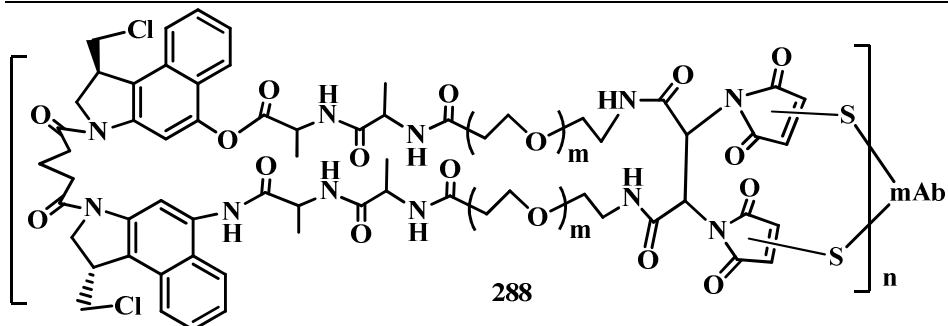
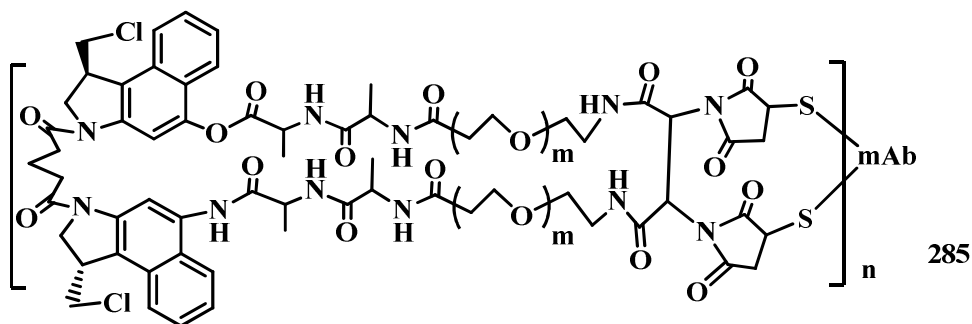




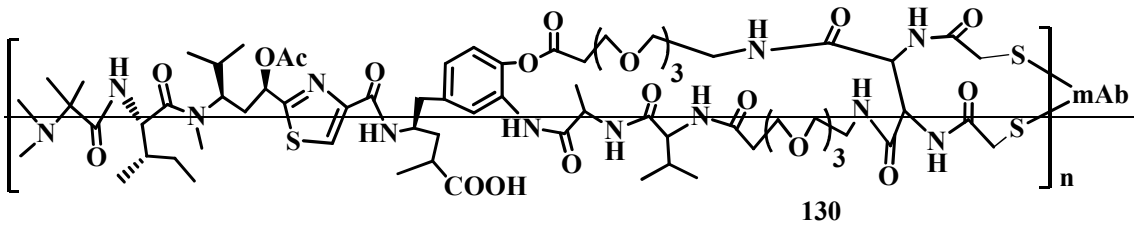
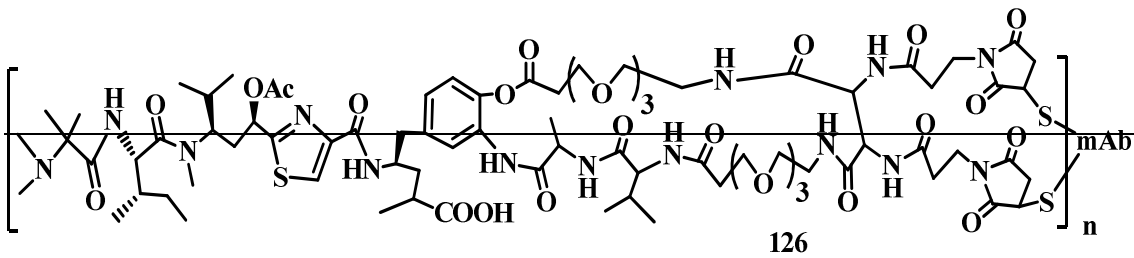
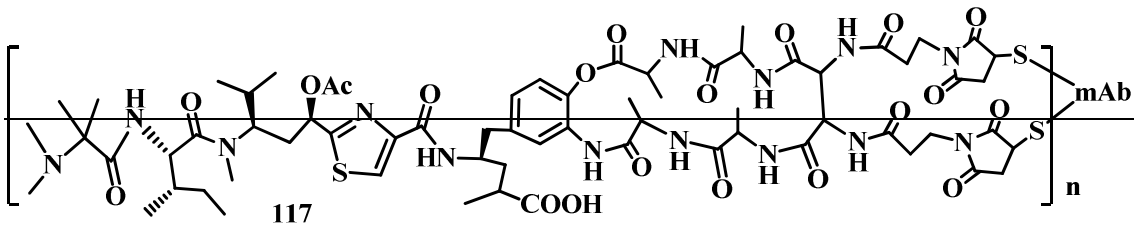
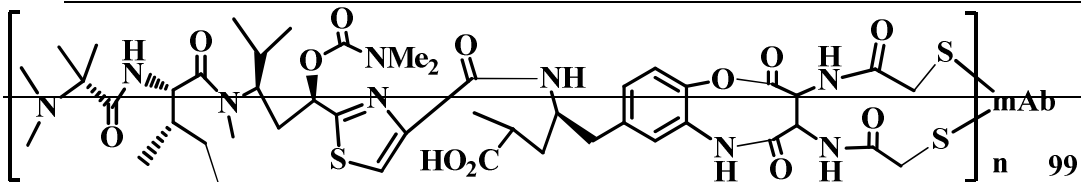
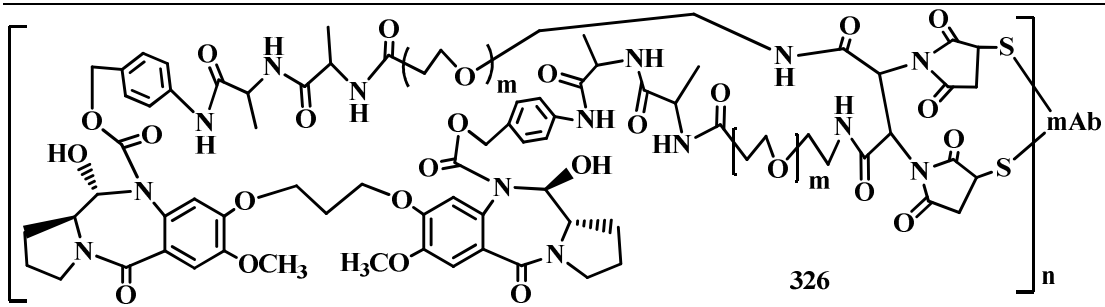
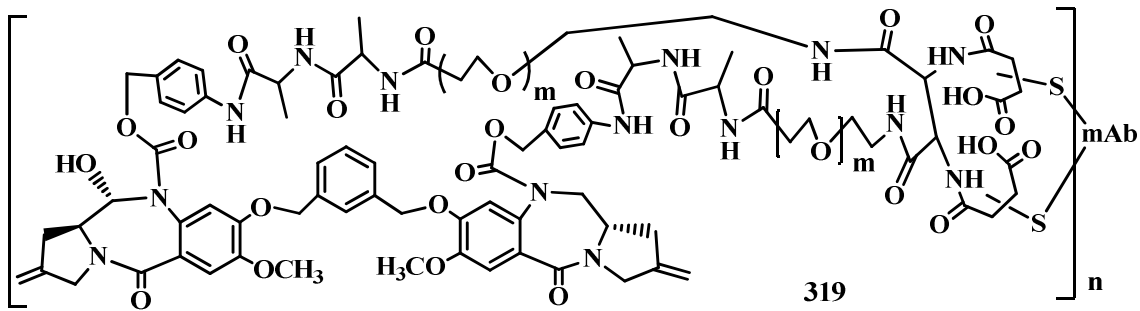


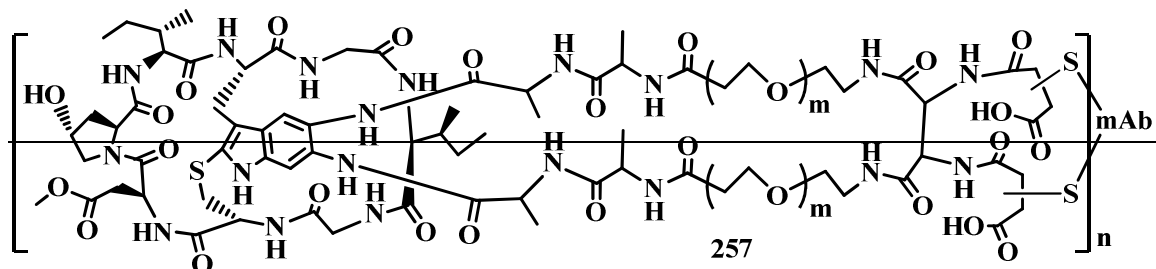
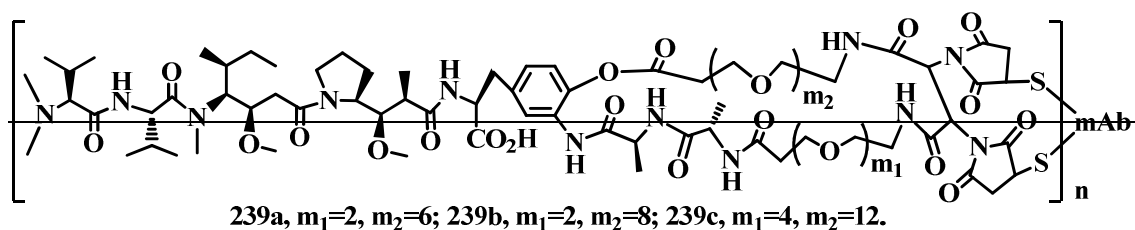
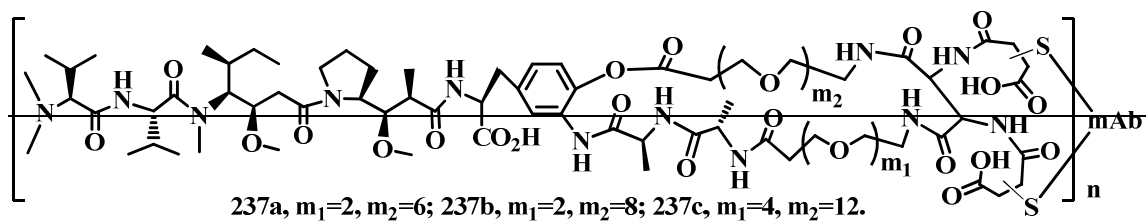
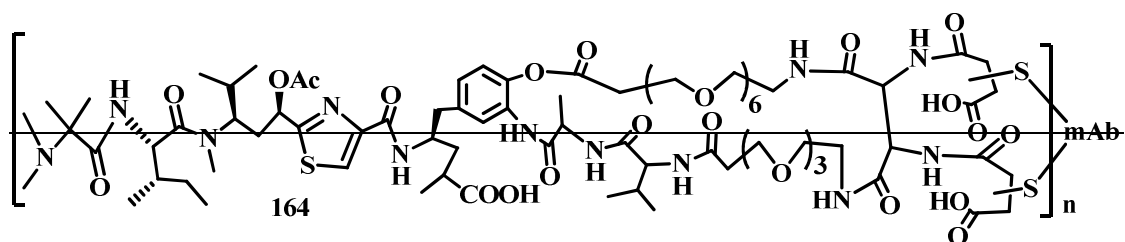
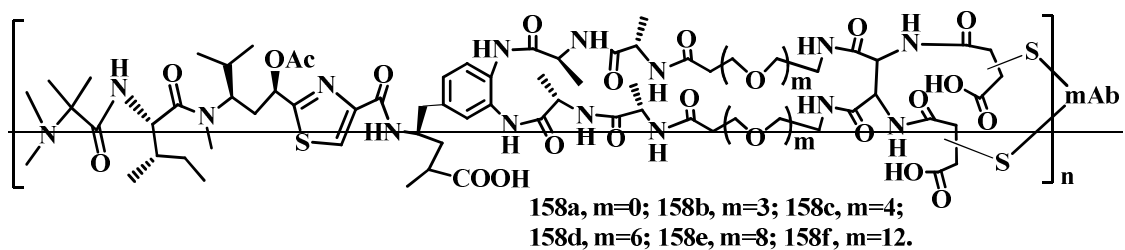
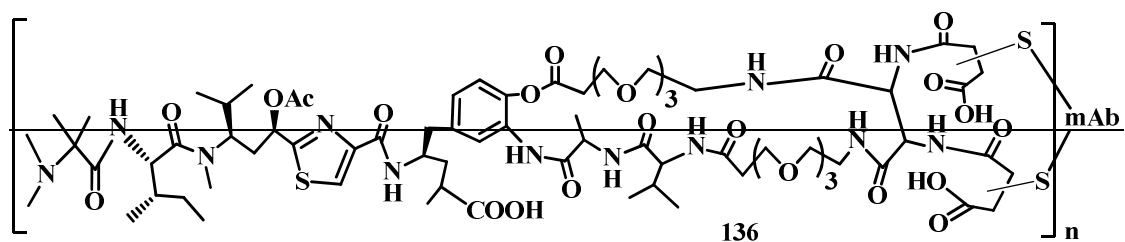


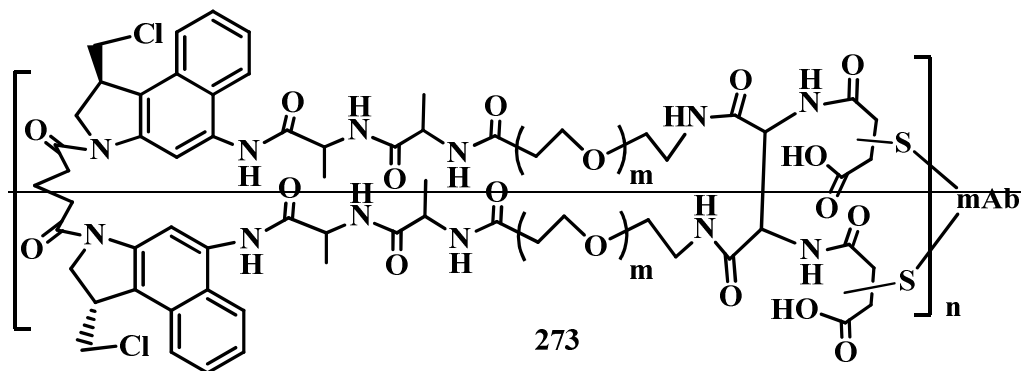
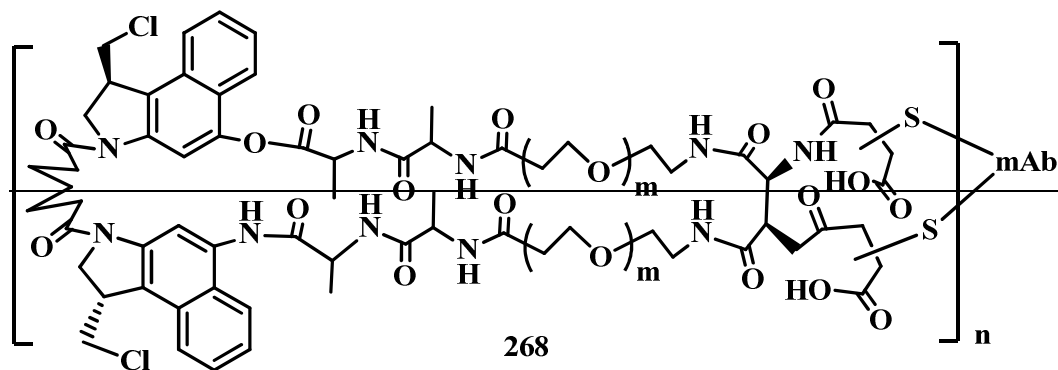
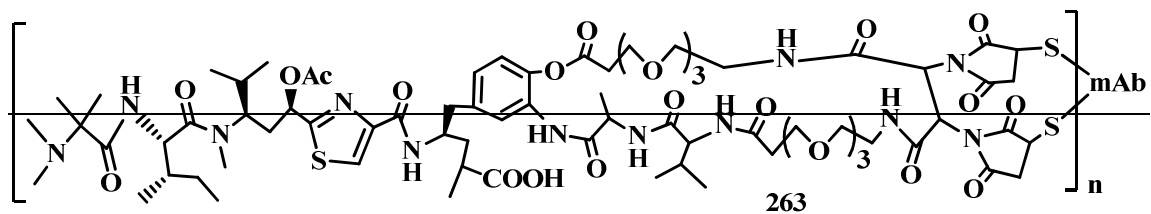
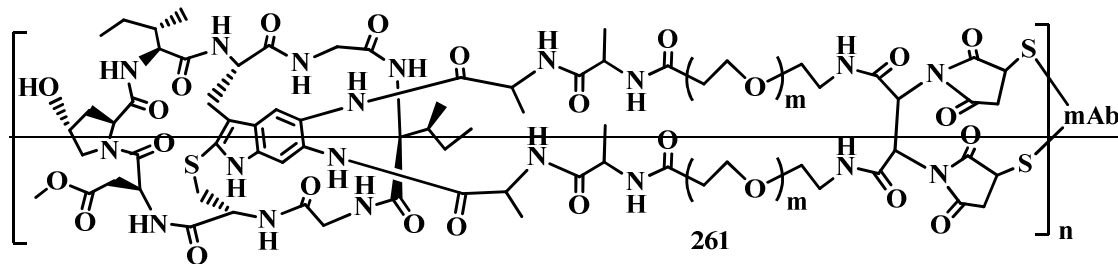
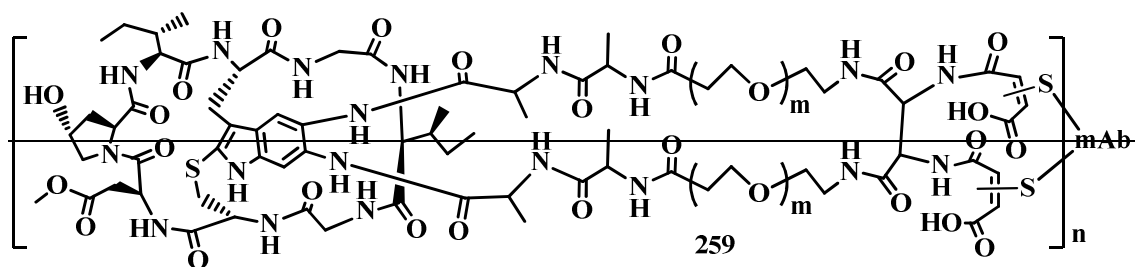


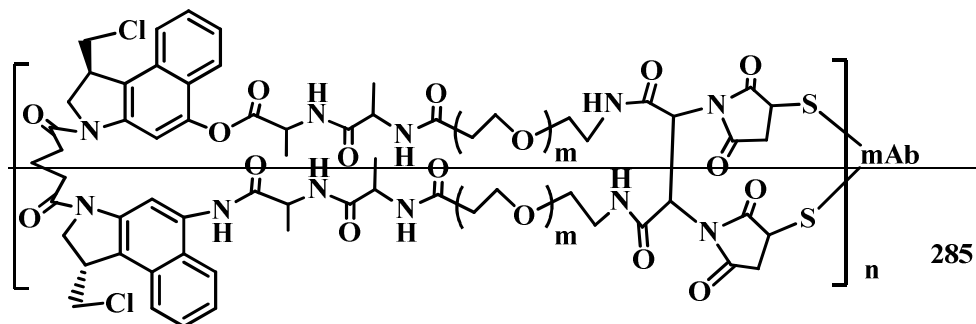
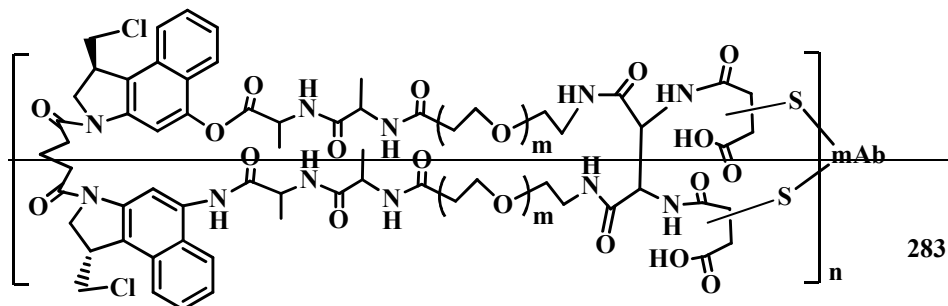
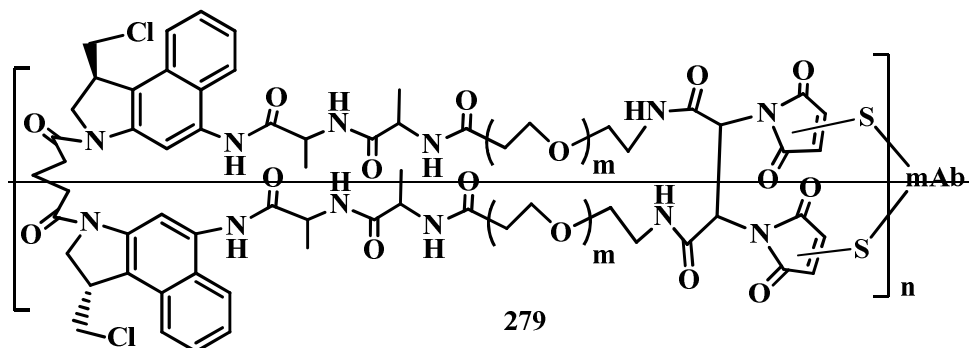
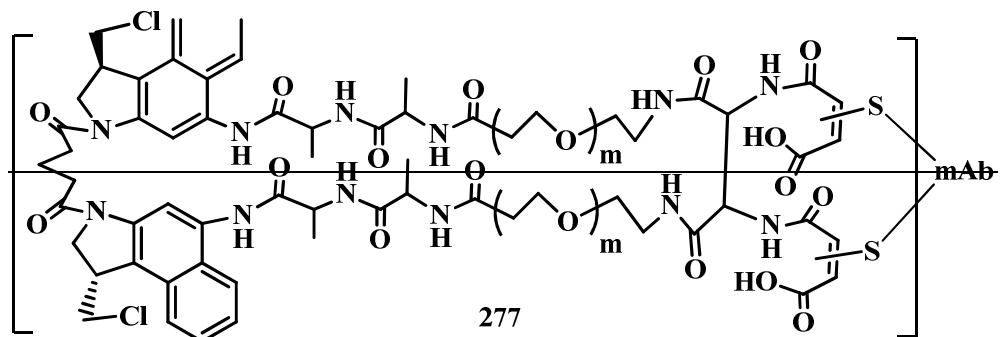
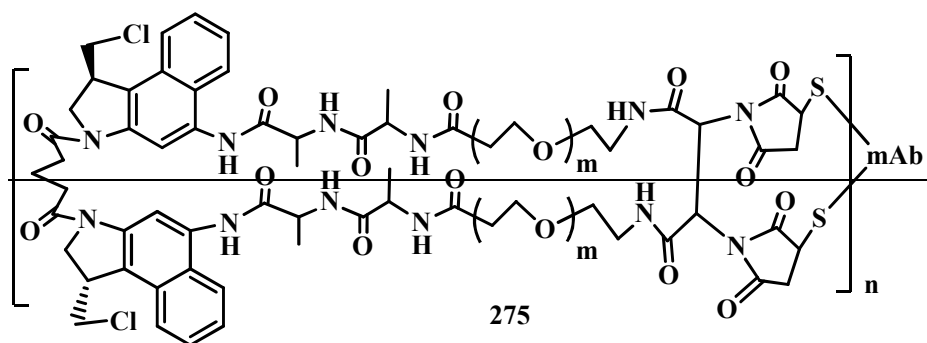


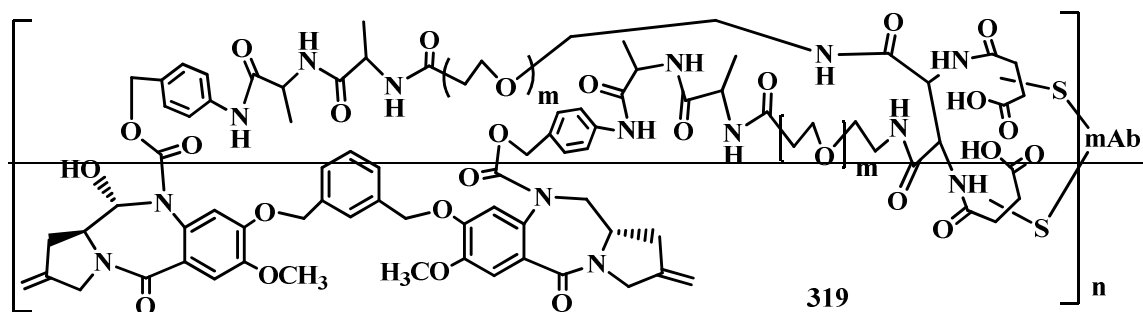
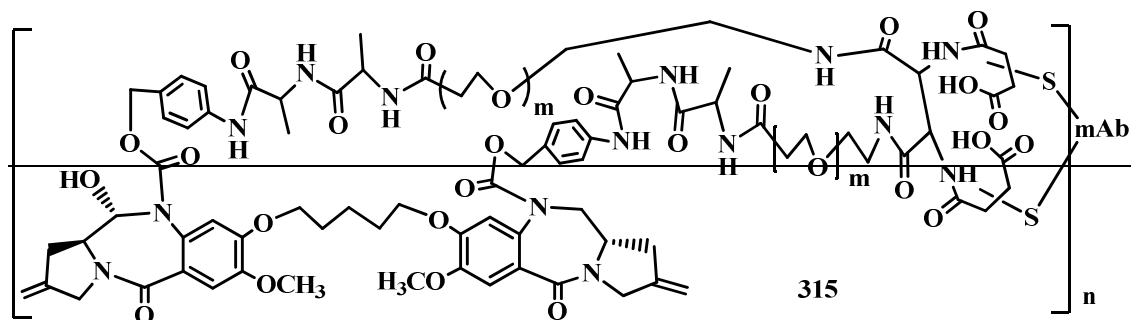
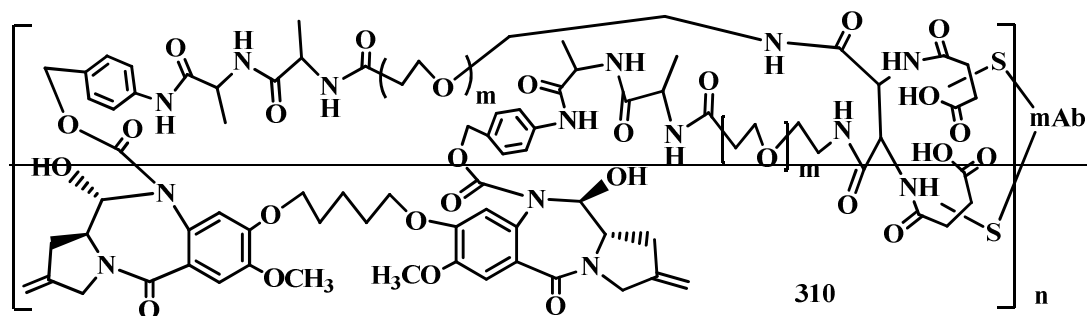
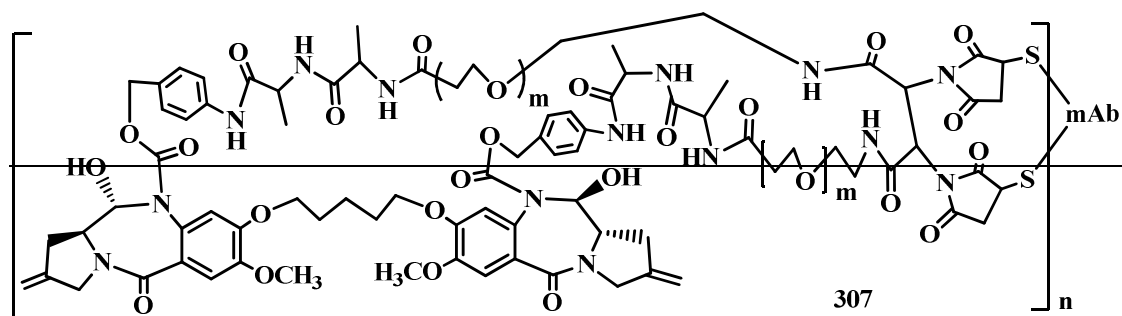
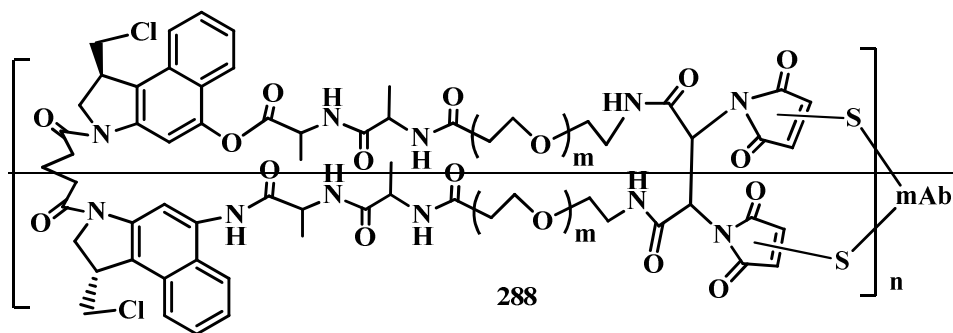
531



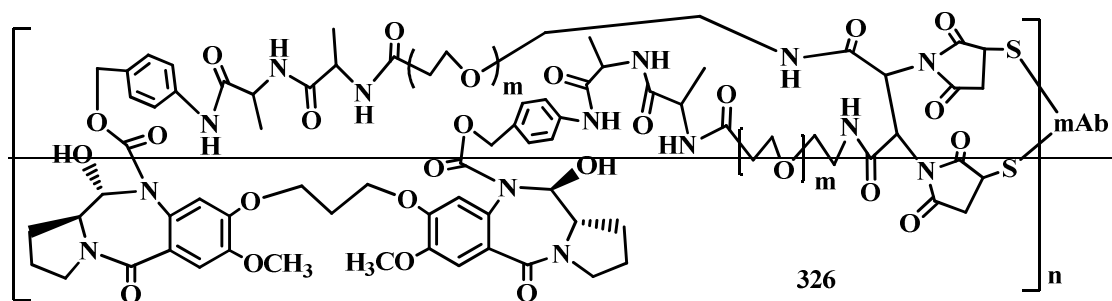








536



wherein m_1 , and n are defined the same as in Claim 1; mAb is an antibody; A cross bond means that it can connect either one of two atoms.

2942. A pharmaceutical composition comprising a therapeutically effective amount of the conjugate compounds of any one of claim 1, 2, 8, 9, 10, 115-6, 12, 13, 14, ~~15, 16, 17~~, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, ~~28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40~~, or 2841, and a pharmaceutically acceptable salt, carrier, diluent, or excipient therefore, or a combination of the conjugates thereof, for the treatment or prevention of a cancer, or an autoimmune disease, or an infectious disease.

3043. The pharmaceutical composition according to Claim 2942 either in in the liquid formula or in the formulated lyophilized solid, comprising by weight of: 0.01%-99% of one or more conjugates of any one of claim 1, 2, 8, 9, 10, 115-6, 12, 13, 14, ~~15, 16, 17~~, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, ~~28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40~~, or 2841, 0.0%-20.0% of one or more polyols; 0.0%-2.0% of one or more surfactants; 0.0% -5.0% of one or more preservatives; 0.0% -30% of one or more amino acids; 0.0% -5.0% of one or more antioxidants; 0.0% -0.3% of one or more metal chelating agents; 0.0% -30.0% of one or more buffer salts for adjusting pH of the formulation to pH 4.5 to 8.5; and 0.0% -30.0% of one or more of isotonic agent for adjusting osmotic pressure bewteen about 250 to 350 mOsm when reconstituted for administration to a patient;

wherein the polyol is selected from fructose, mannose, maltose, lactose, arabinose, xylose, ribose, rhamnose, galactose, glucose, sucrose, trehalose, sorbose, melezitose, raffinose, mannitol, xylitol, erythritol, maltitol, lactitol, erythritol, threitol, sorbitol, glycerol, or L-gluconate and its metallic salts);

wherein the surfactant is selected from polysorbate 20, polysorbate 40, polysorbate 65, polysorbate 80, polysorbate 81, or polysorbate 85, poloxamer, poly(ethylene oxide)-poly(propylene oxide), polyethylene-polypropylene, Triton; sodium dodecyl sulfate (SDS), sodium laurel sulfate; sodium octyl glycoside; lauryl-, myristyl-, linoleyl-, or stearyl-sulfobetaine; lauryl-, myristyl-, linoleyl- or stearyl-sarcosine; linoleyl-, myristyl-, or cetyl-betaine; lauroamidopropyl-, cocamidopropyl-, linoleamidopropyl-, myristamidopropyl-,

palmidopropyl-, or isostearamidopropyl-betaine (lauroamidopropyl); myristamidopropyl-, palmidopropyl-, or isostearamidopropyl-dimethylamine; sodium methyl cocoyl-, or disodium methyl oleyl-taurate; dodecyl betaine, dodecyl dimethylamine oxide, cocamidopropyl betaine and coco ampho glycinate; or isostearyl ethylimidonium ethosulfate; polyethyl glycol, polypropyl glycol, and copolymers of ethylene and propylene glycol;

wherein the preservative is selected from benzyl alcohol, octadecyldimethylbenzyl ammonium chloride, hexamethonium chloride, benzalkonium chloride, benzethonium chloride, phenol, butyl and benzyl alcohol, alkyl parabens, methyl or propyl paraben, catechol, resorcinol, cyclohexanol, 3-pentanol, or m-cresol;

wherein the amino acid is selected from arginine, cystine, glycine, lysine, histidine, ornithine, isoleucine, leucine, alanine, glycine glutamic acid or aspartic acid;

wherein the antioxidant is selected from ascorbic acid, glutathione, cystine or and methionine;

wherein the chelating agent is selected from EDTA or EGTA;

wherein the buffer salt is selected from sodium, potassium, ammonium, or trihydroxyethylamino salts of citric acid, ascorbic acid, gluconic acid, carbonic acid, tartaric acid, succinic acid, acetic acid or phthalic acid; Tris or tromethamine hydrochloride, phosphate or sulfate; arginine, glycine, glycylglycine, or histidine with anionic acetate, chloride, phosphate, sulfate, or succinate salts;

wherein the tonicity agent is selected from mannitol, sorbitol, sodium acetate, potassium chloride, sodium phosphate, potassium phosphate, trisodium citrate, or sodium chloride.

3144. The pharmaceutical composition according to Claim 2942 or 3043, is held in a vial, bottle, pre-filled syringe, or pre-filled auto-injector syringe, in a form of a liquid or lyophilized solid.

3245. The conjugate of Claim 1, 2, 8, 9, 10, 115, ~~6~~, 12, 13, 14, ~~45~~, ~~46~~, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, ~~28~~, ~~29~~, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, or 2841, or in the form of the pharmaceutical composition of Claim 2942 or 3043, having in vitro, in vivo or ex vivo cell killing activity.

3346. A pharmaceutical composition according to Claim 2942 or 3043, administered concurrently with a chemotherapeutic agent, a radiation therapy, an immunotherapy agent, an autoimmune disorder agent, an anti-infectious agents or the other conjugates for synergistically treatment or prevention of a cancer, or an autoimmune disease, or an infectious disease.

3447. The synergistic agents according to claim 3346 are selected from one or several of the following drugs: Abatacept, abemaciclib, Abiraterone acetate, Abraxane, Aducanumab,

Acetaminophen/hydrocodone, Acalabrutinib, aducanumab, Adalimumab, ADXS31-142, ADXS-HER2, afatinib dimaleate, aldesleukin, alectinib, alemtuzumab, allitinib, Alitretinoin, ado-trastuzumab emtansine, Amphetamine/ dextroamphetamine, anastrozole, apatinib, Aripiprazole, anthracyclines, Aripiprazole, Atazanavir, Atezolizumab, Atorvastatin, Avelumab, AVXS-101, Axicabtagene ciloleucel, axitinib, belinostat, BCG Live, Bevacizumab, bexarotene, blinatumomab, Bortezomib, bosutinib, brentuximab vedotin, brigatinib, Brolucizumab, Budesonide, Budesonide/ formoterol, Buprenorphine, BYL719 (alpha-specific PI3K inhibitor), Cabazitaxel, Cabozantinib, capmatinib, Capecitabine, carfilzomib, chimeric antigen receptor-engineered T (CAR-T) cells, Celecoxib, ceritinib, Cetuximab, chiauranib, Chidamide, Ciclosporin, Cinacalcet, crizotinib, Cobimetinib, Cosentyx, crizotinib, Tisagenlecleucel, Dabigatran, dabrafenib, dacarbazine, daclizumab, dacomotinib, daptomycin, Daratumumab, Darbepoetin alfa, Darunavir, dasatinib, denileukin diftitox, Denosumab, Depakote, Dexlansoprazole, Dexmethylphenidate, Dexamethasone, DigniCap Cooling System, L-3,4-dihydroxyphenyl-alanine, Dinutuximab, dornase alfa, Doxycycline, Duloxetine, Duvelisib, durvalumab, elotuzumab, emicizumab, Emtricitabine/Rilpivirine/Tenofovir, disoproxil fumarate, Emtricitabine/tenofovir/efavirenz, Enoxaparin, ensartinib, Enzalutamide, epitinib, Epoetin alfa, erlotinib, Esomeprazole, Eszopiclone, Etanercept, Everolimus, exemestane, everolimus, exenatide ER, Ezetimibe, Ezetimibe/simvastatin, famitinib, Fenofibrate, Filgotinib, Filgrastim, fingolimod, flumatinib, Fluticasone propionate, Fluticasone/salmeterol, fruquintinib, fulvestrant, gazyva, gefitinib, Glatiramer, Goserelin acetate, GSK2857916 (BCMA-ADC), henatinib, Icotinib, Imatinib, Ibritumomab tiuxetan, ibrutinib, icotinib, idelalisib, ifosfamide, Infliximab, imiquimod, ImmuCyst, Immuno BCG, iniparib, Insulin aspart, Insulin detemir, Insulin glargine, Insulin lispro, Interferon alfa, Interferon alfa-1b, Interferon alfa-2a, Interferon alfa-2b, Interferon beta, Interferon beta 1a, Interferon beta 1b, Interferon gamma-1a, lapatinib, Ipilimumab, Ipratropium bromide/ salbutamol, Ixazomib, Kanuma, Lanadelumab, Lanreotide acetate, lenalidomide, lenaliomide, lenvatinib mesylate, letrozole, Levothyroxine, Levothyroxine, Lidocaine, Linezolid, Liraglutide, Lisdexamfetamine, LN-144 (tumor-infiltrating lymphocyte), lorlatinib, lucitanib/delitinib, Memantine, Methoxy polyethylene glycol-epoetin beta, Methylphenidate, Metoprolol, Mekinist, mericitabine/Rilpivirine/ Tenofovir, Modafinil, Mometasone, Mycidac-C, mycophenolic acid, Necitumumab, neratinib, Nilotinib, niraparib, Nivolumab, ofatumumab, obinutuzumab, ocrelizumab, olaparib, Olmesartan, Olmesartan/ hydrochlorothiazide, Omalizumab, Omega-3 fatty acid ethyl esters, Oncorine, Oseltamivir, Osimertinib, Oxycodone, Ozanimod, palbociclib, Palivizumab, panitumumab, panobinostat, pazopanib, pembrolizumab, PD-1 antibody, PD-L1 antibody, Pemetrexed, pertuzumab,

Pirfenidone, Pneumococcal conjugate vaccine, pomalidomide, Pregabalin, ProscarVax, Propranolol, puquitinib, pyrotinib, Quetiapine, Rabeprazole, radium 223 chloride, Raloxifene, Raltegravir, ramucirumab, Ranibizumab, regorafenib, ribociclib, Risankizumab, Rituximab, Rivaroxaban, romidepsin, Rosuvastatin, ruxolitinib phosphate, Salbutamol, savolitinib, semaglutide, Sevelamer, Sildenafil, siltuximab, simotinib, sipatinib/cipatinib, Siponimod, Sipuleucel-T, Sitagliptin, Sitagliptin/metformin, Solifenacin, solanezumab, Sonidegib, Sorafenib, sulfatinib, Sunitinib, tacrolimus, tacrimus, Tadalafil, tamoxifen, Tafenlar, Talimogene laherparepvec, talazoparib, Telaprevir, talazoparib, Temozolomide, temsirolimus, Tenecteplase, Tenofovir/emtricitabine, tenofovir disoproxil fumarate, Testosterone gel, tezacaftor/ivacaftor, Thalidomide, theliatinib, TICE BCG, Tiotropium bromide, Tisagenlecleucel, Tocilizumab, toremifene, trametinib, Trastuzumab, Trabectedin (ecteinascidin 743), trametinib, tremelimumab, Trifluridine/tipiracil, Tretinoin, Upadacitinib, Uro-BCG, Ustekinumab, Valoctocogene roxaparvovec, Valsartan, veliparib, vandetanib, vemurafenib, venetoclax, vismodegib, volitinib, vorinostat, ziv-aflibercept, Zostavax, and their analogs, derivatives, pharmaceutically acceptable salts, carriers, diluents, or excipients thereof, or a combination above thereof.