CLAIM

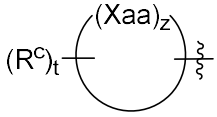
1. A compound having the structure of formula R-I:

$$LG{-}RG{-}L^{RM}{-}MOI,$$

(R-I)

or a salt thereof, wherein:

LG is $R^{LG}{-}L^{LG}$;

R^{LG} is , $R^{c}{-}(Xaa)z{-}$, a nucleic acid moiety, or a small molecule moiety;

each Xaa is independently a residue of an amino acid or an amino acid analog;

t is 0-50;

z is 1-50;

each R^{c} is independently $-L^{a}-R'$;

each L^{a} is independently a covalent bond, or an optionally substituted bivalent group selected from C_1-C_{20} aliphatic or C_1-C_{20} heteroaliphatic having 1-5 heteroatoms, wherein one or more methylene units of the group are optionally and independently replaced with $-C(R')_2-$, −Cy−, −O−, −S−, −S−S−, −N(R')−, −C(O)−, −C(S)−, −C(NR')−, −C(O)N(R')−, −N(R')C(O)N(R')−, −N(R')C(O)O−, −S(O)−, $-S(O)_2-$, $-S(O)_2N(R')-$, −C(O)S−, or −C(O)O−;

each −Cy− is independently an optionally substituted bivalent monocyclic, bicyclic or polycyclic group wherein each monocyclic ring is independently selected from a C_{3-20} cycloaliphatic ring, a C_{6-20} aryl ring, a 5-20 membered heteroaryl ring having 1-10 heteroatoms, and a 3-20 membered heterocyclyl ring having 1-10 heteroatoms;

L^{LG} is $-L^{LG1}-$, $-L^{LG1}-L^{LG2}-$, $-L^{LG1}-L^{LG2}-L^{LG3}-$, or $-L^{LG1}-L^{LG2}-L^{LG3}-L^{LG4}-$;

RG is $-L^{RG1}-L^{RG2}-$, $-L^{LG4}-L^{RG1}-L^{RG2}-$, $-L^{LG3}-L^{LG4}-L^{RG1}-L^{RG2}-$, or $-L^{LG2}-L^{LG3}-L^{LG4}-L^{RG1}-L^{RG2}-$;

each of L^{LG1}, L^{LG2}, L^{LG3}, L^{LG4}, L^{RG1}, L^{RG2}, and L^{RM} is independently L;

each L is independently a covalent bond, or a bivalent optionally substituted, linear or branched C_{1-100} group comprising one or more aliphatic moieties, aryl moieties, heteroaliphatic moieties each independently having 1-20 heteroatoms, heteroaromatic moieties each independently having 1-20 heteroatoms, or any combinations of any one or more of such moieties, wherein one or more methylene units of the group are optionally and independently replaced with C_{1-6} alkylene, C_{1-6} alkenylene, a bivalent C_{1-6} heteroaliphatic group having 1-5 heteroatoms, $-C\equiv C-$, −Cy−,

−$C(R')_2$−, −O−, −S−, −S−S−, −N(R')−, −C(O)−, −C(S)−, −C(NR')−, −C(O)N(R')−, −C(O)$C(R')_2$N(R')−, −N(R')C(O)N(R')−, −N(R')C(O)O−, −S(O)−, −$S(O)_2$−, −$S(O)_2$N(R')−, −C(O)S−, −C(O)O−, −P(O)(OR')−, −P(O)(SR')−, −P(O)(R')−, −P(O)(NR')−, −P(S)(OR')−, −P(S)(SR')−, −P(S)(R')−, −P(S)(NR')−, −P(R')−, −P(OR')−, −P(SR')−, −P(NR')−, an amino acid residue, or −[(−O−$C(R')_2$−$C(R')_2$−)$_n$]−, wherein n is 1-20;

each R' is independently −R, −C(O)R, −CO_2R, or −SO_2R;

each R is independently −H, or an optionally substituted group selected from C_{1-30} aliphatic, C_{1-30} heteroaliphatic having 1-10 heteroatoms, C_{6-30} aryl, C_{6-30} arylaliphatic, C_{6-30} arylheteroaliphatic having 1-10 heteroatoms, 5-30 membered heteroaryl having 1-10 heteroatoms, and 3-30 membered heterocyclyl having 1-10 heteroatoms, or

two R groups are optionally and independently taken together to form a covalent bond, or:

two or more R groups on the same atom are optionally and independently taken together with the atom to form an optionally substituted, 3-30 membered, monocyclic, bicyclic or polycyclic ring having, in addition to the atom, 0-10 heteroatoms; or

two or more R groups on two or more atoms are optionally and independently taken together with their intervening atoms to form an optionally substituted, 3-30 membered, monocyclic, bicyclic or polycyclic ring having, in addition to the intervening atoms, 0-10 heteroatoms; and

MOI is a moiety of interest.

2. The compound of claim 1, wherein LG is or comprises a target binding moiety that binds to a target agent, wherein the target agent is an antibody agent.

3. The compound of claim 1, wherein LG is or comprises a target binding moiety that binds to a Fc region, and/ or R^{LG} is or comprises DCAWXLGELVWCT, wherein the two cysteine residues optionally form a disulfide bond, and X is an amino acid residue.

4. The compound of claim 1, wherein at least one of the following conditions is met:

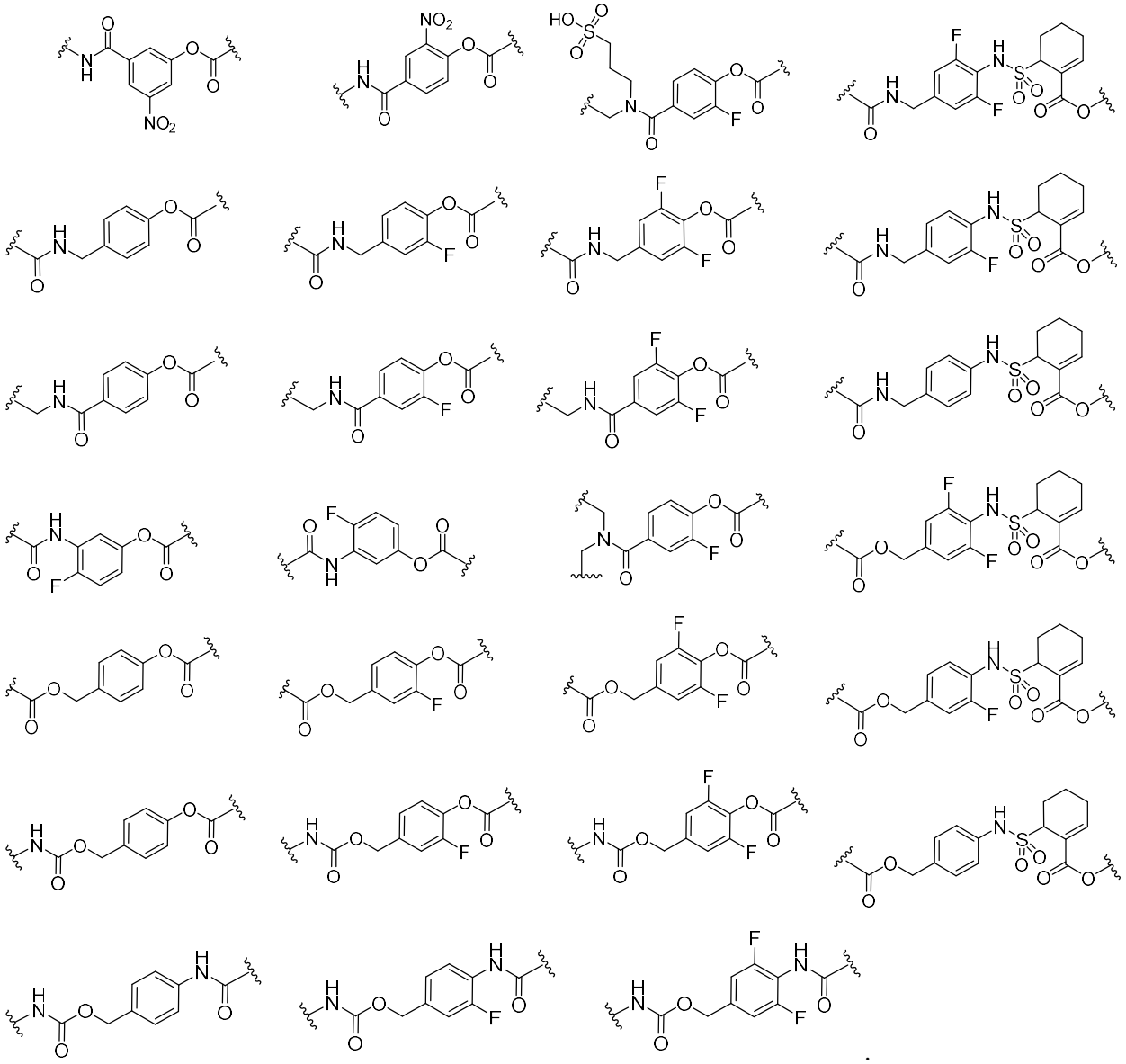
(a) the moiety of interest is or comprises a detectable moiety;

(b) the moiety of interest is or comprises a therapeutic agent;

(c) the moiety of interest is or comprises a moiety that can bind to a protein, nucleic acid, or a cell; and/ or

(d) the moiety of interest is or comprises a reactive moiety suitable for a bioorthogonal reaction.

5. The compound of claim 1, 2, or 3, wherein the compound comprises one or more groups selected from:



6. A method of preparing an agent having the structure of P-I:

$$P{-}L^{PM}{-}MOI,$$

(P-I)

or a salt thereof, wherein:

P is a target agent moiety;

L^{PM} is a linker; and

MOI is a moiety of interest, the method comprising steps of:

1) contacting a target agent with a reaction partner having the structure of formula R-I:

$$LG–RG–L^{RM}–MOI,$$

(R-I)

or a salt thereof, wherein:

LG is a group comprising a target binding moiety that binds to a target agent,

RG is a reactive group;

L^{RM} is a linker; and

MOI is a moiety of interest; and

2) forming an agent having the structure of formula P-I; or

a method of preparing an agent having the structure of P-II:

$$P–N–L^{PM}–MOI,$$

(P-II)

wherein:

P-N is a protein agent moiety comprising a lysine residue;

L^{PM} is a linker; and

MOI is a moiety of interest;

the method comprising:

contacting P-N with a reaction partner having a structure of formula R-I:

$$LG–RG–L^{RM}–MOI,$$

(R-I)

or a salt thereof, wherein:

LG is a group comprising a protein-binding moiety that binds to P-N,

RG is a reactive group;

L^{RM} is a linker; and

MOI is a moiety of interest.

7. The method of claim 6, wherein the target agent is or comprises an antibody agent.

8. The method of claim 7, wherein at least one of the following conditions is met:

(a) the moiety of interest is selectively attached to the antibody agent at K246 or K248 of an IgG1 heavy chain or a corresponding location;

(b) the moiety of interest is selectively attached to the antibody agent at K251 or K253 of an IgG2 heavy chain or a corresponding location; or

(c) the moiety of interest is selectively attached to the antibody agent at K239 or K241 of an IgG4 heavy chain or a corresponding location.

9. The method of claim 7, wherein the contacting and forming steps are performed in one chemical reaction.

10. A composition comprises a plurality of agents, each agent independently

comprising:

a target agent moiety,

a moiety of interest, and

optionally a linker moiety linking the target agent moiety and the moiety of interest;

wherein the agents of the plurality share the same or substantially the same target agent moiety, and a common modification independently at least one common location; and

wherein about 1%-100% of all agents that comprise the target agent moiety and the moiety of interest are the agents of the plurality.

11. The composition of claim10, wherein:

each target agent moiety is a protein agent moiety, and

optionally a linker moiety linking the protein agent moiety and the moiety of interest;

wherein the protein agent moieties of the agents of the plurality comprise a common amino acid sequence, and the agent of the plurality shares a common modification, independently at least one common amino acid residue of protein agent moieties; and

wherein about 1%-100% of all agents that comprise the protein agent moiety that comprise the common amino acid sequence and the moiety of interest are the agents of the plurality.

12. The composition of claim 10, wherein:

the target agent moiety is an antibody agent moiety, and

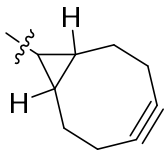
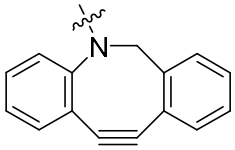
optionally a linker moiety linking the antibody agent moiety and the moiety of interest;

wherein the antibody agent moieties of agents of the plurality comprise a common amino acid sequence or can bind to a common antigen, and the agents of the plurality share a common modification independently at least one common amino acid residue of the protein agent moieties; and

wherein about 1%-100% of all agents that comprise an antibody agent moiety that comprise the common amino acid sequence or can bind to the common antigen and the moiety of interest are the agents of the plurality.

13. The composition of claim 12, wherein antibody agent moieties of agents of the plurality can bind to a common antigen.

14. The composition of claim 12, wherein antibody agent moieties of agents of the plurality can bind to two or more different antigens.

15. The composition of claim 12, wherein the moiety of interest is or comprises a reactive moiety; wherein the reactive moiety is $-N_3$; $-\equiv-$; ; or .

16. The composition of claim 12, wherein the moiety of interest is or comprises a therapeutic agent moiety and/or an antibody agent.

17. The composition of claim 12, wherein at least one of the following conditions is met:

(a) the common amino acid residue is K246 or K248 of an IgG1 antibody heavy chain or an amino acid residue corresponding thereto;

(b) the common amino acid residue is K251 or K253 of an IgG2 antibody heavy chain or an amino acid residue corresponding thereto; or

(c) the common amino acid residue is K239 or K241 of an IgG4 antibody heavy chain or an amino acid residue corresponding thereto.

18. The composition of claim 12, wherein:

(a) each agent of the plurality does not contain −S−Cy−, wherein −Cy− is optionally substituted 5-membered monocyclic ring, does not contain −S−S− which is not formed by cysteine residues and does not contain −SH or salt form thereof that is not of a cysteine residue; or

(b) each agent of the plurality does not contain $-S-CH_2-CH_2-$.

19. A compound, agent, product, composition, or method described in the present disclosure, or of any one of embodiments 1-335.

20. A compound having the structure of formula R-I:

$$LG-RG-L^{RM}-MOI,$$

(R-I)

or a salt thereof, wherein:

LG is a group comprising a target binding moiety that binds to a target agent,

RG is a reactive group;

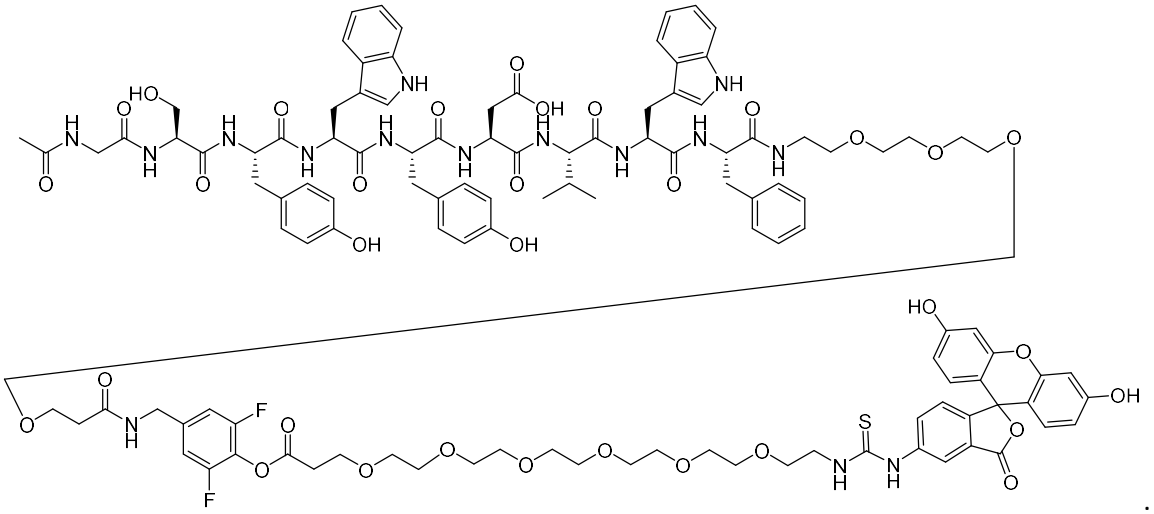
L^{RM} is a linker; and

MOI is a moiety of interest,

wherein the target agent is an antibody comprising an IgG heavy chain comprising K246 or K248, and

wherein the target binding moiety is configured to bind the antibody so as to bring the reactive group in proximity with K246 or K248 of the IgG heavy chain to enable a reaction between K246 or K248 and the reactive group that results in attachment of a moiety comprising L^{RM}−MOI to K246 or K248 and expulsion of the group containing a target binding moiety from the compound.

21. A compound or salt thereof of claim 1, wherein the compound is a compound of the formula:



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