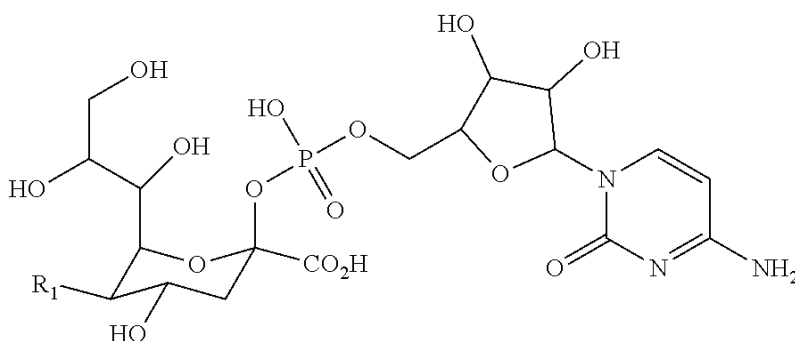


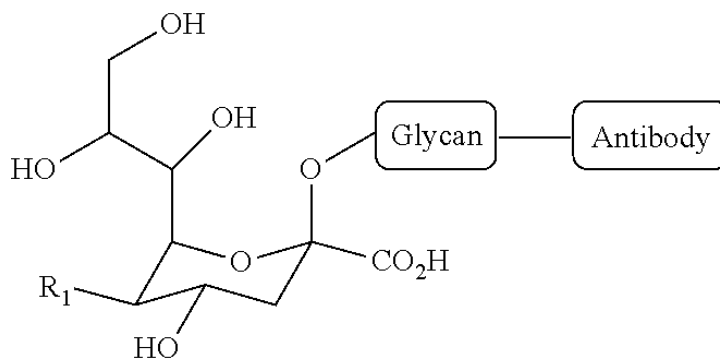
CLAIMS

1. A method of making an effector moiety conjugated antibody or antigen-binding fragment thereof comprising the steps of:

(a) reacting a cytidine monophosphate-sialic acid (CMP-sialic acid) derivative having the structure:



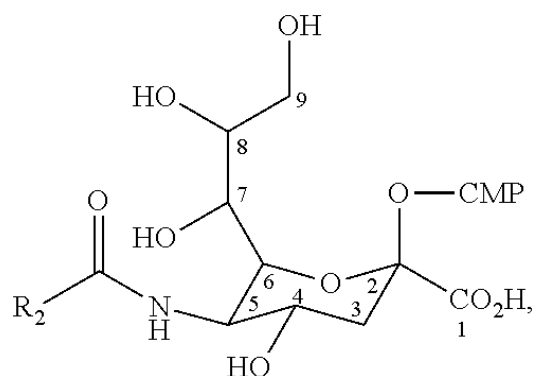
with a glycan attached to a glycosylation site of an antibody or antigen-binding fragment thereof to form a sialic acid derivative-conjugated antibody having the structure:



or antigen-binding fragment thereof through a sialylation reaction, wherein R_1 is selected from the group consisting of $-\text{NHC}(\text{O})\text{CH}_3$, $-\text{NHC}(\text{O})\text{CH}_2\text{OH}$, $-\text{NHC}(\text{O})\text{CH}_2\text{CH}_2\text{C}(\text{O})\text{CH}_3$, $-\text{NHC}(\text{O})\text{CH}_2\text{N}_3$, and $-\text{NHC}(\text{O})\text{SH}$; and

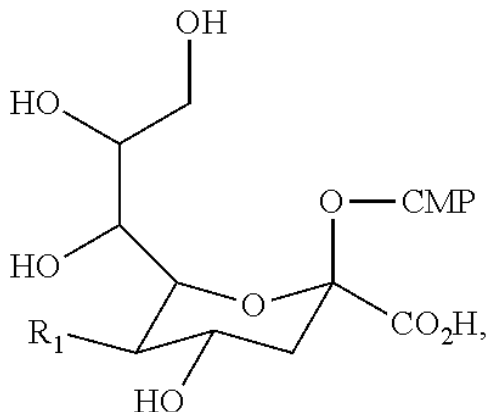
- (b) reacting the R_1 group of the sialic acid derivative-conjugated antibody or antigen-binding fragment thereof from step (a) with an effector moiety selected from the group consisting of: a drug moiety, a cytotoxic agent, a targeting agent, a diagnostic agent, an anti-cancer agent, an anti-inflammatory agent, an anti-cancer agent, an anti-infective agent, and an anesthetic agent, to form the effector moiety conjugated antibody or antigen-binding fragment thereof, wherein an imine bond is formed, and wherein neither the antibody or antigen-binding fragment thereof nor the sialic acid derivative-conjugated antibody or antigen-binding fragment thereof are treated with an oxidizing agent during step (a) and step (b), resulting in a hydrazone or oxime linkage.
2. The method of claim 1, wherein the sialic acid derivative-conjugated antibody or antigen-binding fragment thereof comprises a terminal keto or aldehyde moiety.

3. The method of claim 1, wherein the effector moiety comprises a terminal aminoxy moiety or is bound to a moiety comprising an aminoxy derivative.
4. The method of claim 1, wherein step (b) results in the formation of an oxime bond.
5. The method of claim 1, wherein step (b) results in the formation of a hydrazone linkage.
6. The method of claim 1, wherein the CMP-sialic acid derivative has the structure of:



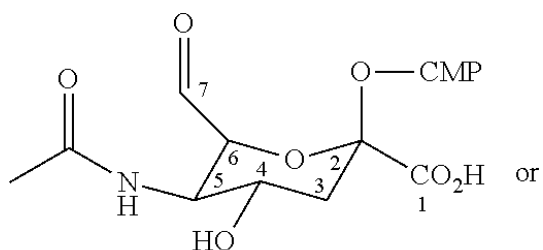
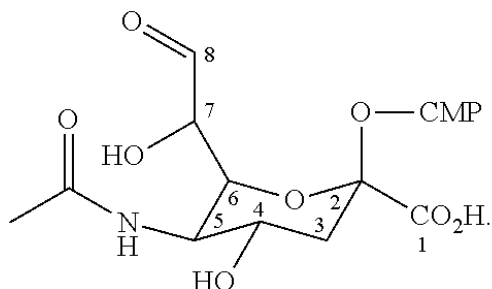
wherein R_2 is CH_3 , $\text{CH}_2\text{CH}_2(\text{C}=\text{O})\text{CH}_3$, CH_2OH , OH or H .

7. The method of claim 1, wherein the CMP-sialic acid derivative has the structure of:

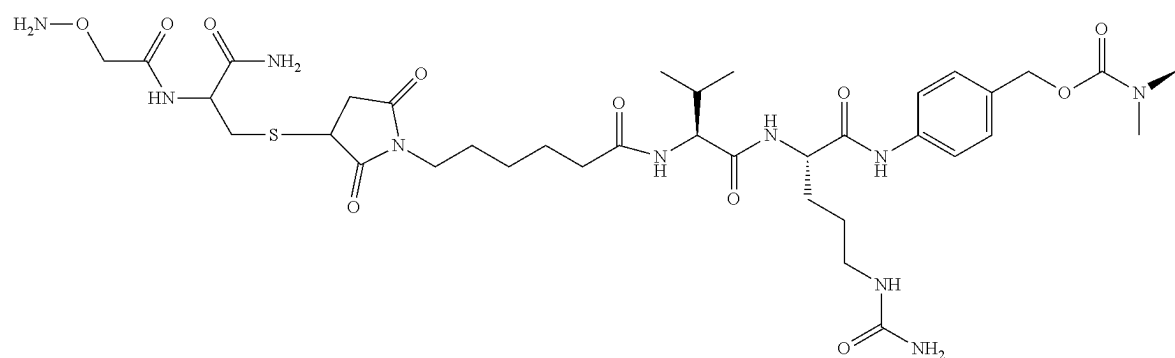
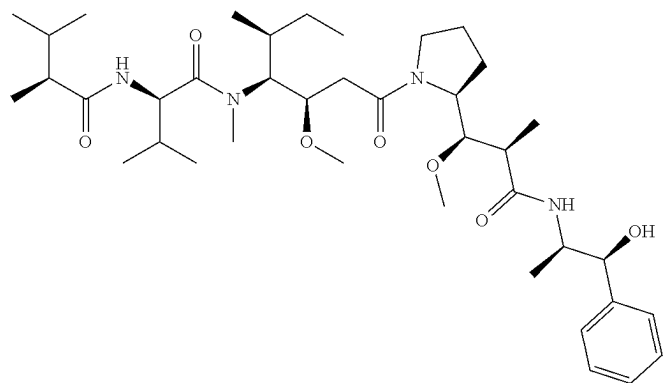
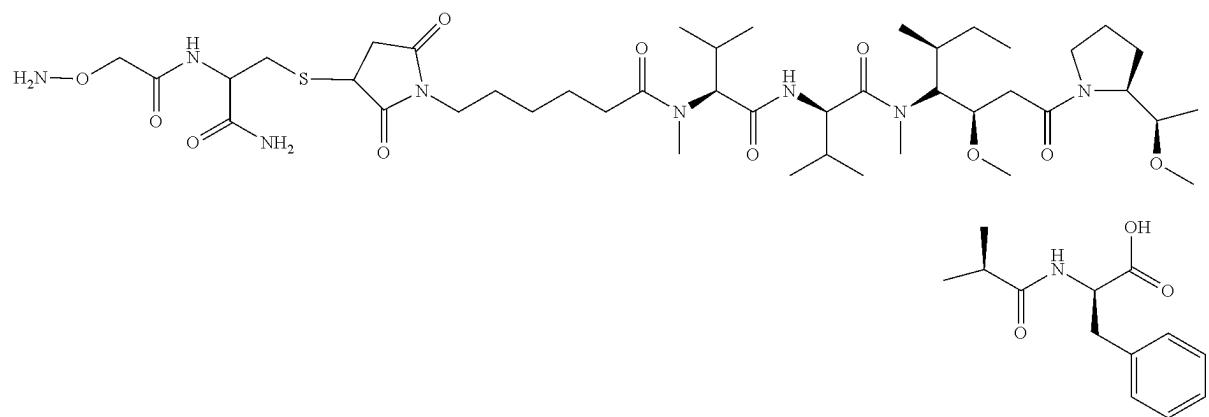
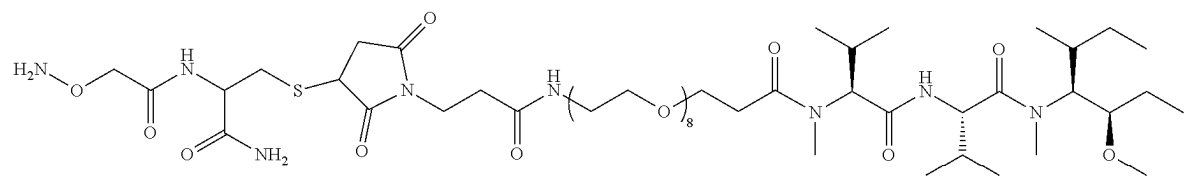
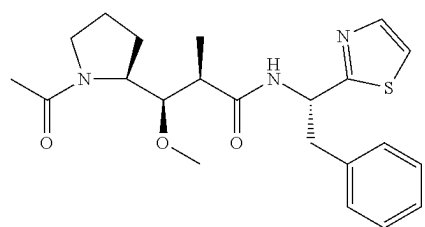


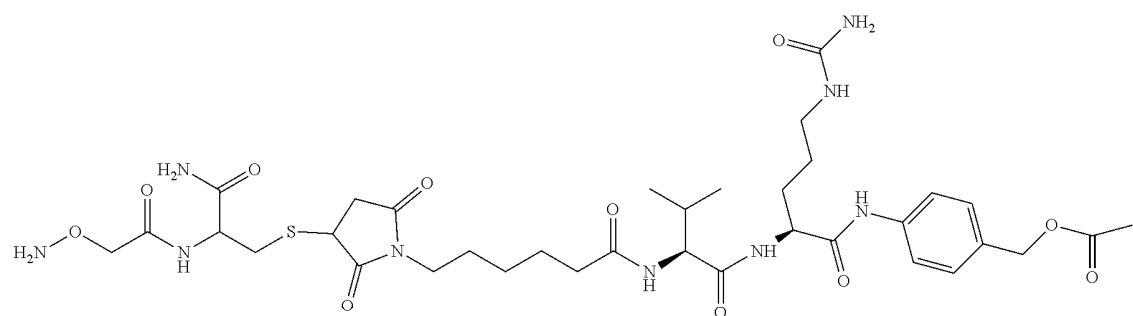
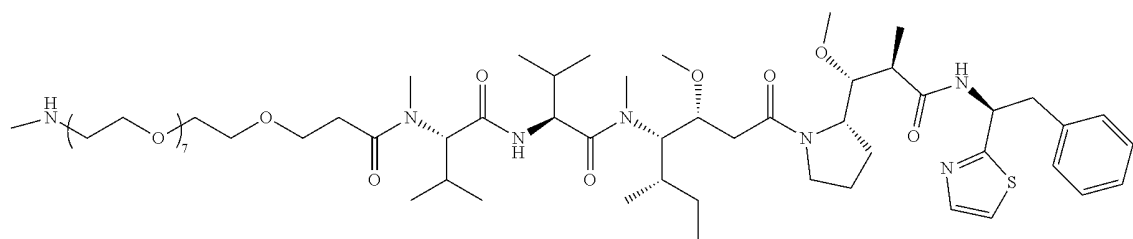
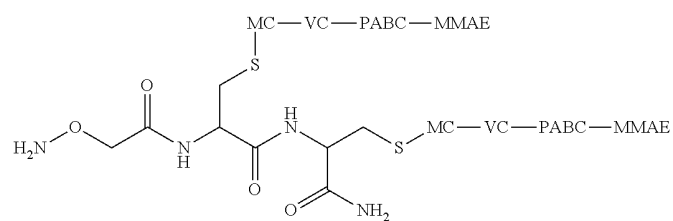
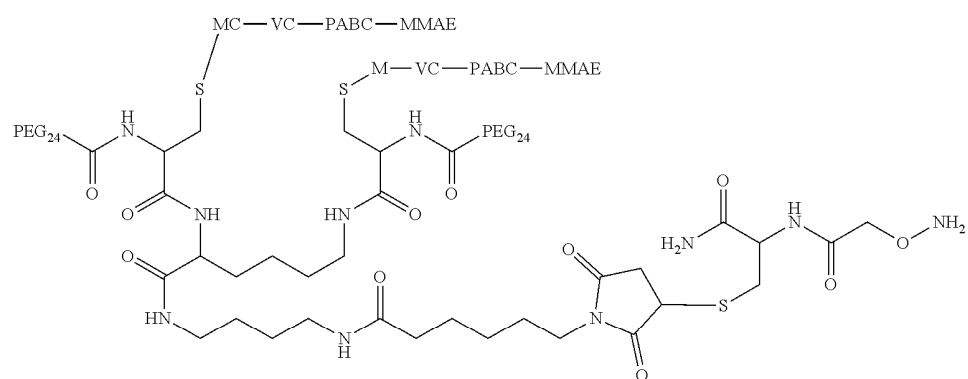
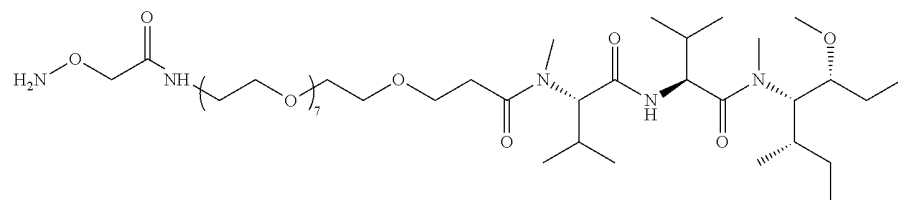
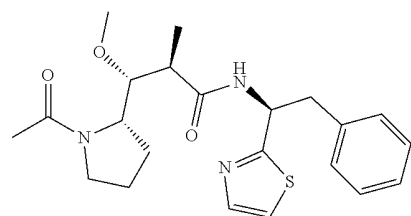
wherein R_1 is $\text{NH}(\text{C}=\text{O})\text{CH}_3$, $\text{NH}(\text{C}=\text{O})\text{CH}_2\text{CH}_2(\text{C}=\text{O})\text{CH}_3$, $\text{NH}(\text{C}=\text{O})\text{CH}_2\text{OH}$, $\text{NH}(\text{C}=\text{O})\text{CH}_2\text{N}_3$, or $\text{NH}(\text{C}=\text{O})\text{SH}$.

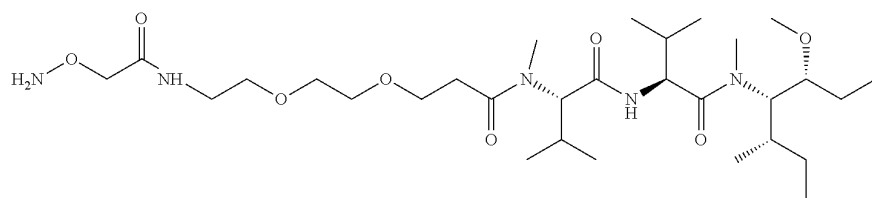
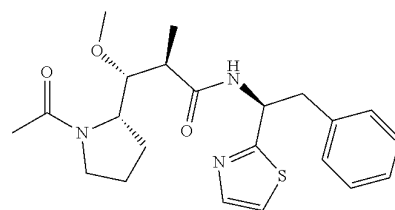
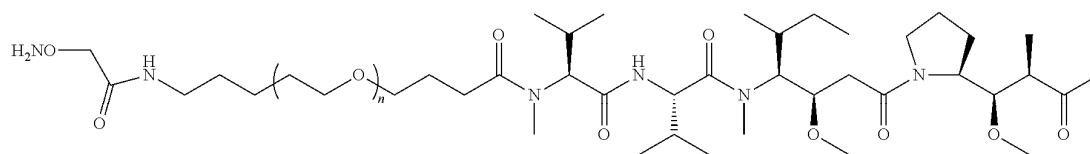
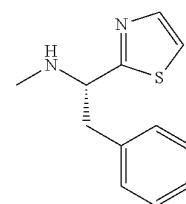
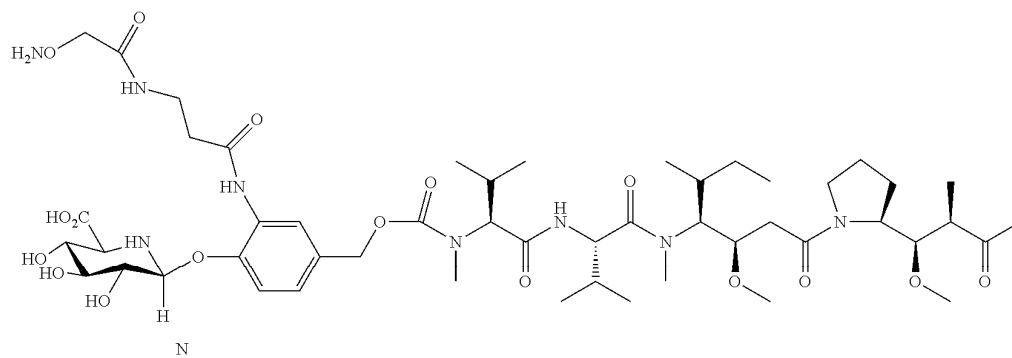
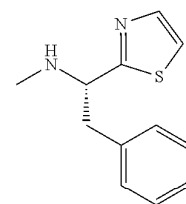
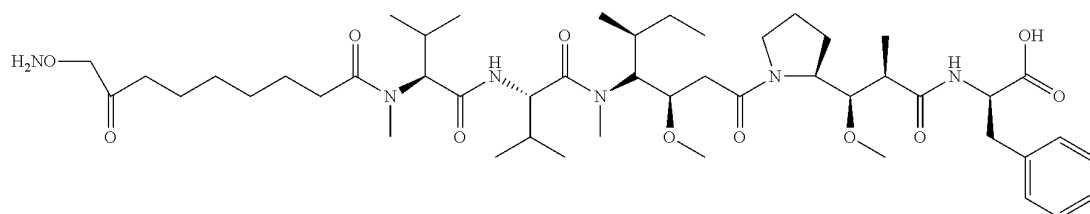
8. The method of claim 1, wherein the CMP-sialic acid derivative has one of the following structures:

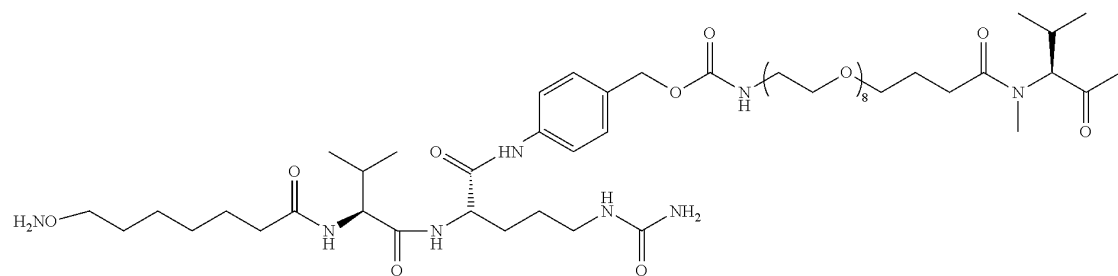
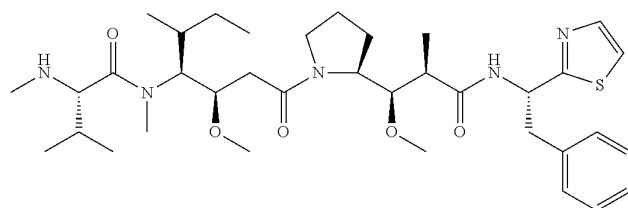
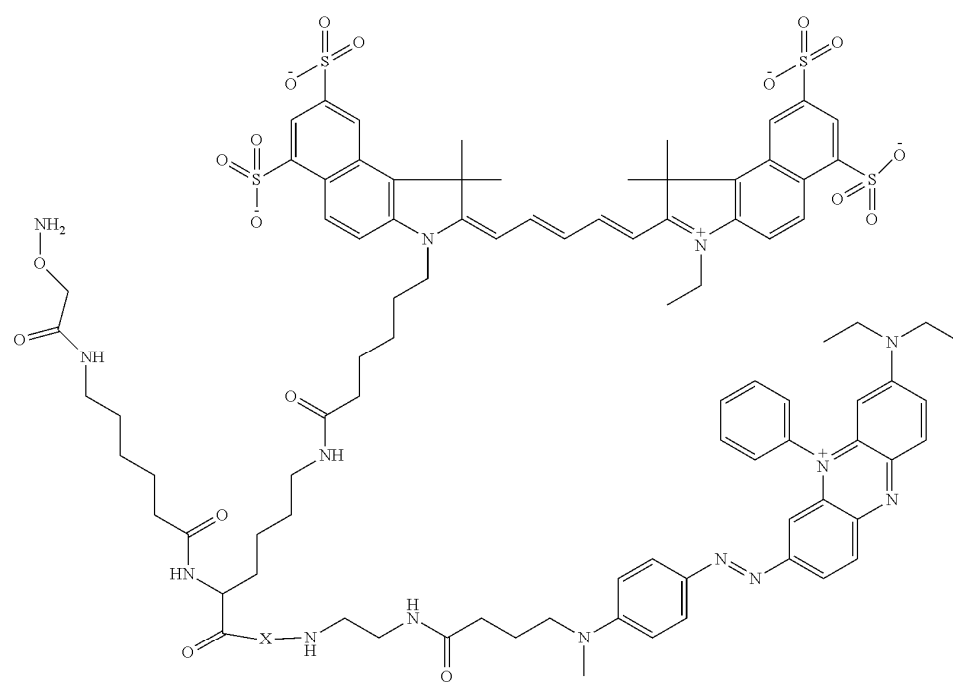
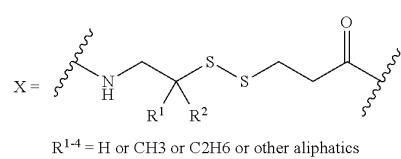
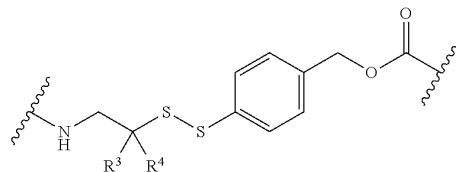
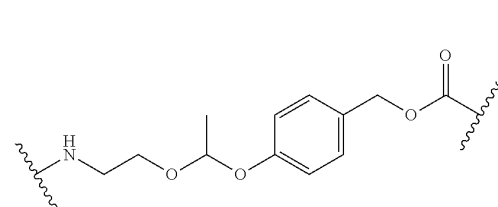
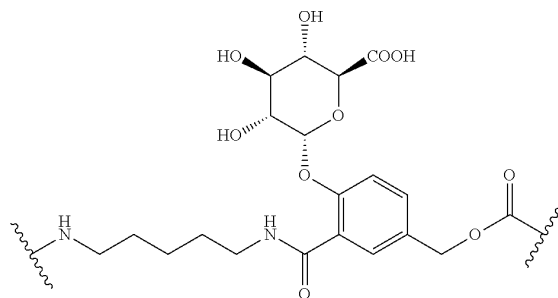


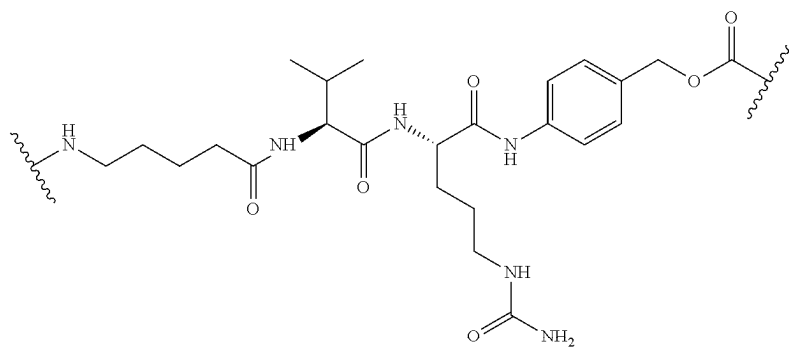
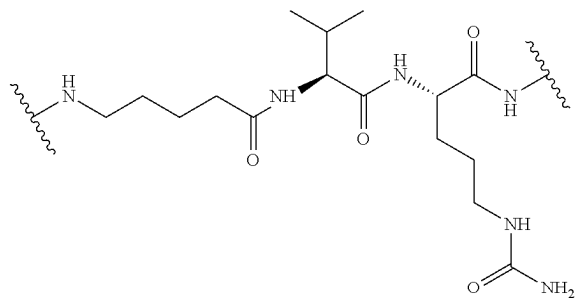
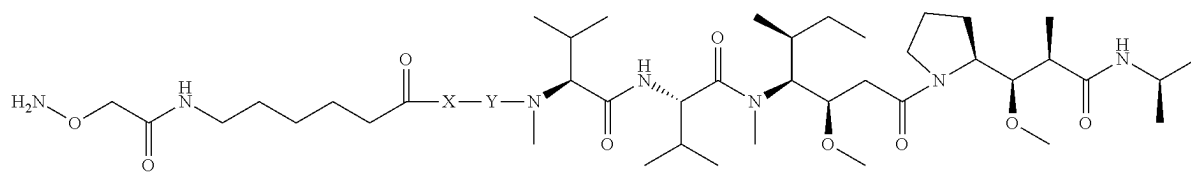
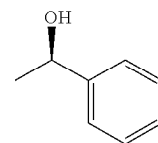
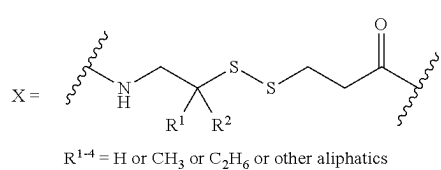
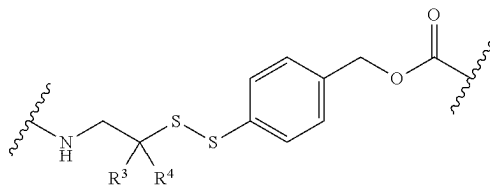
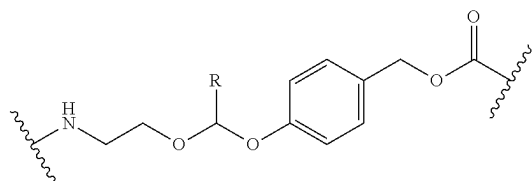
9. The method of claim 1, wherein the antibody or antigen-binding fragment comprises a S298N mutant.
10. The method of claim 1, wherein the antibody or antigen-binding fragment comprises an A114N mutant in the CH1 domain.
11. The method of claim 1, wherein the antibody or antigen-binding fragment comprises a Y300S mutant.
12. The method of claim 1, wherein the antibody comprises a heavy chain of SEQ ID NO:14 and a light chain of SEQ ID NO:12.
13. The method of claim 1, wherein step (a) is catalyzed by α 2,6 sialyltransferase.
14. The method of claim 1, wherein the effector moiety comprises a poly(ethylene glycol).
15. The method of claim 1, wherein the effector moiety is selected from the following:











R = H or substituted or unsubstituted alkyl, alkylaryl groups

