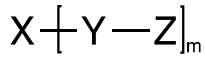
WHAT IS CLAIMED IS

1. A compound of Formula 1:



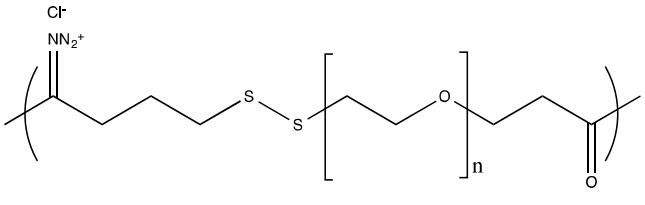
Formula 1

wherein:

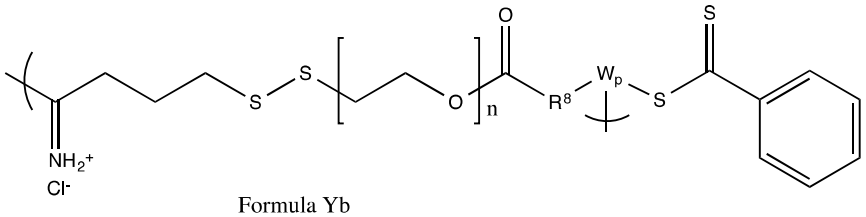
m is an integer from about 1 to 10;

X comprises an antigen against which a patient develops an unwanted immune response;

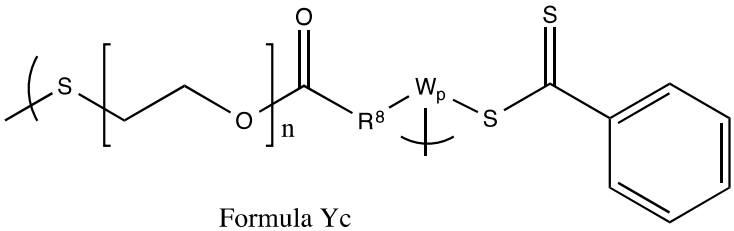
Y is of a linker moiety comprising one or more of a disulfanyl ethyl ester, a sulfide of a disulfide bond, and/or having a formula selected from the group consisting of:



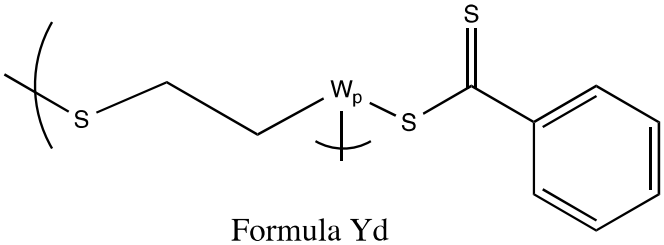
Formula Ya



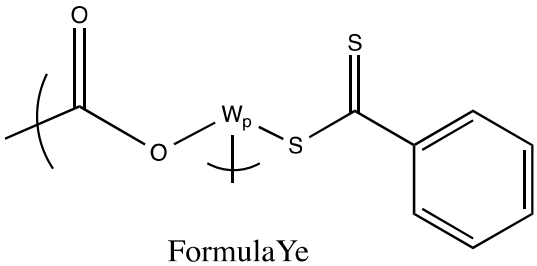
Formula Yb



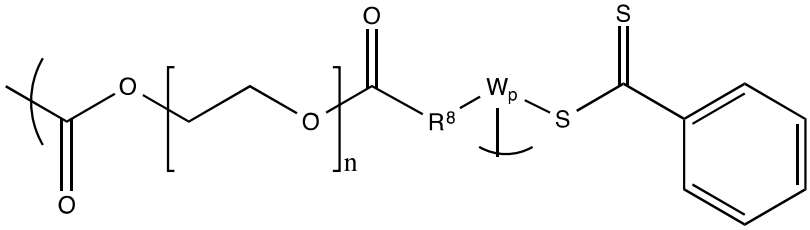
Formula Yc



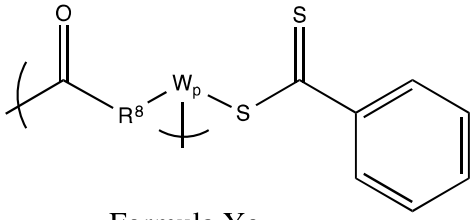
Formula Yd



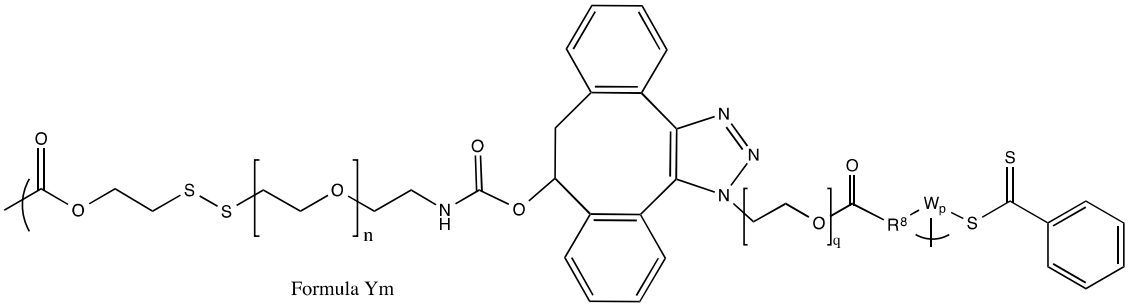
FormulaYe



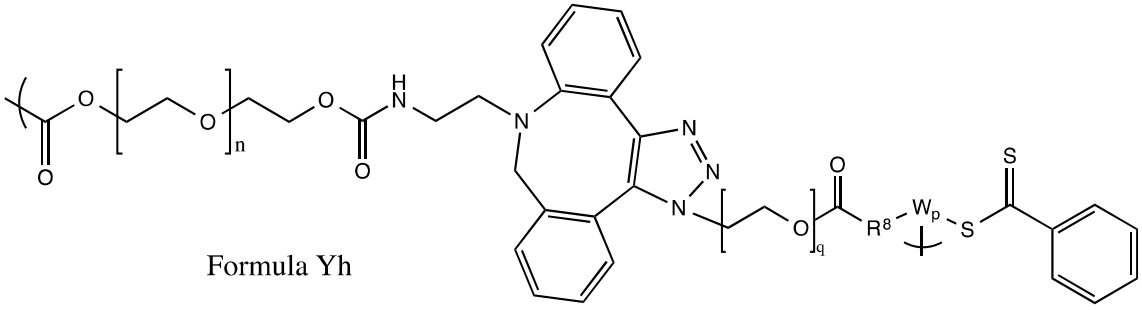
Formula Yf



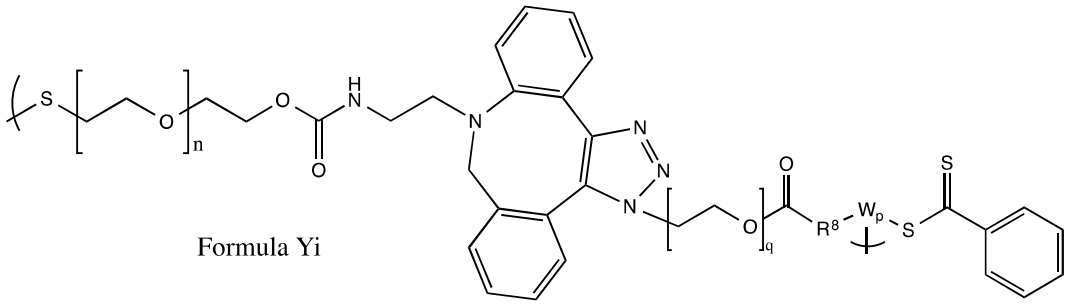
Formula Yg



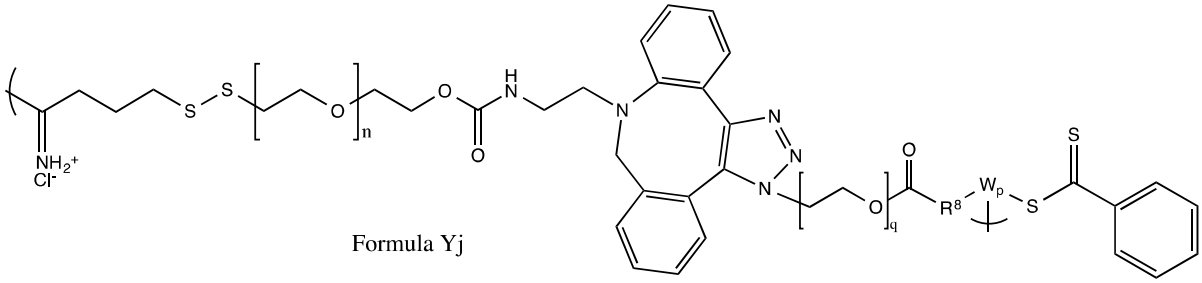
Formula Ym



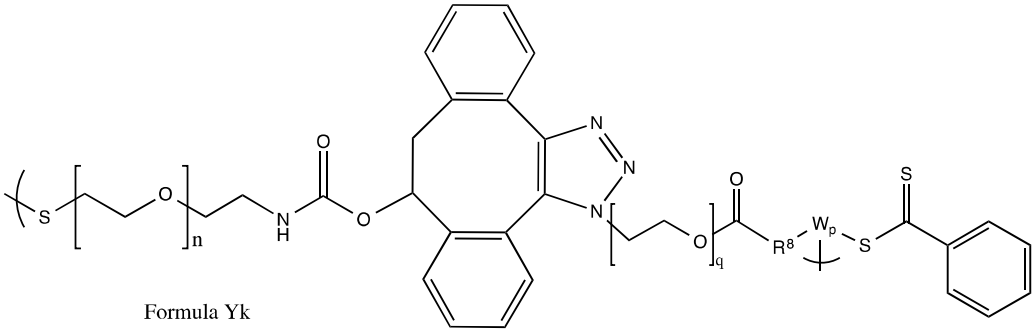
Formula Yh



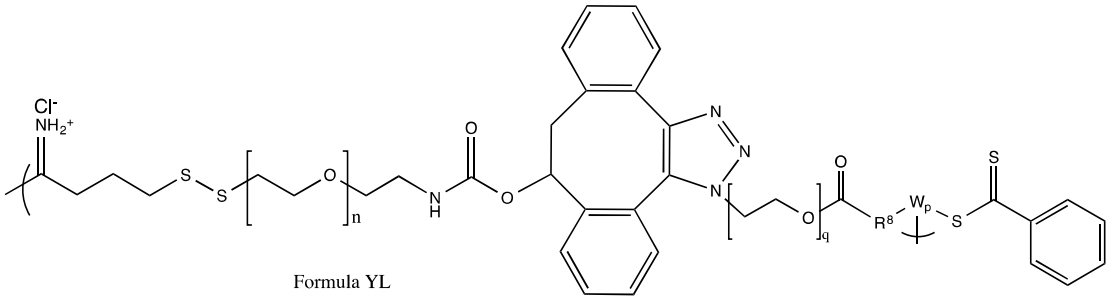
Formula Yi



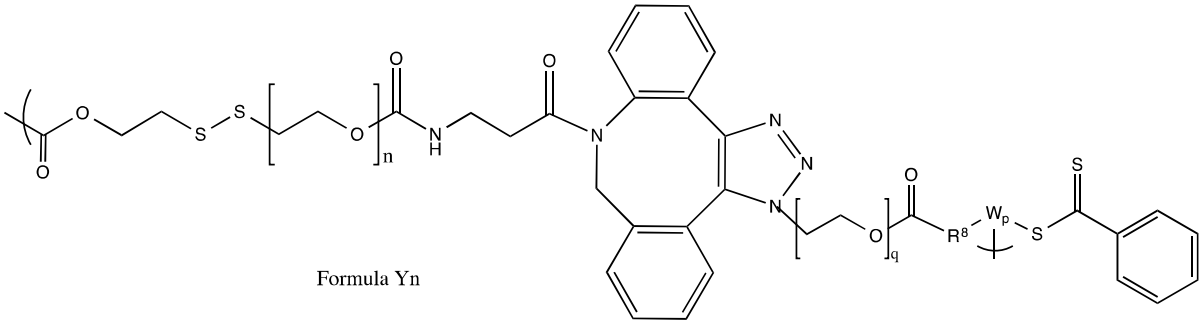
Formula Yj



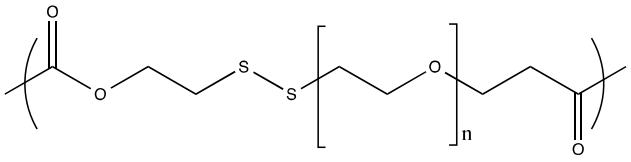
Formula Yk



Formula YL

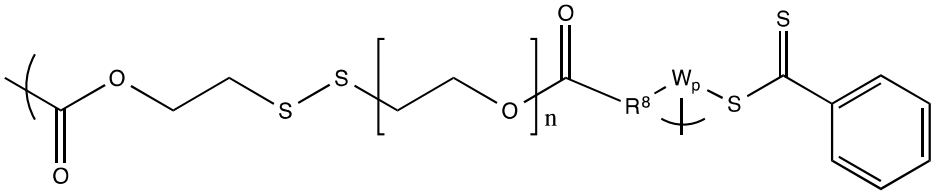


Formula Yn



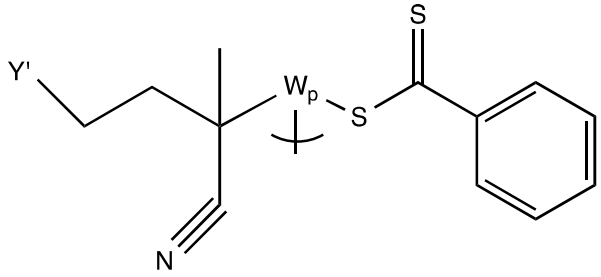
Formula Yo

and



Formula Yp

or Y has a portion represented by Formula Y'-CMP:



Formula Y'-CMP

where:

the left bracket "(" indicates the bond between X and Y;

the right or bottom bracket and ")" indicates the bond between Y and Z;

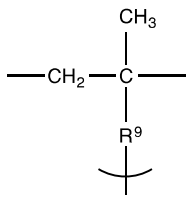
n is an integer from about 1 to 100;

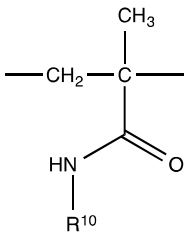
q is an integer from about 1 to 44;

R^8 is $–CH_2–$ or $–CH_2-CH_2-C(CH_3)(CN)–$;

Y' represents the remaining portion of Y; and

W represents a polymer of the same W^1 group, or W is a copolymer or a random copolymer of the same or different W^1 and W^2 groups, where:

W^1 = 

and W^2 = 

where:

p is an integer from 2 to about 150;

R^9 is a direct bond, $–C(O)-NH–CH_2-CH_2-$, or $-C(O)-NH-(CH_2-CH_2-O-)_t-CH_2-CH_2-$;

t is an integer from 1 to 5; and

R^{10} is an aliphatic group, an alcohol or an aliphatic alcohol; and

Z comprises a liver targeting moiety selected from glucose, glucosamine, and N-acetylglucosamine.

2. The compound of Claim 1, wherein:
n is about 40 to 80;
q is about 3 to 20;
R^8 is $–CH_2\text{-}CH_2\text{-}C(CH_3)(CN)–$;
when R^9 is $–C(O)\text{-}NH–CH_2\text{-}CH_2\text{-}$; and
when W is a copolymer, R^{10} is 2-hydroxypropyl.

3. The compound of Claim 1 or 2, wherein Y comprises Formula Yc.

4. The composition of any one of Claims 1 to 3, wherein Y comprises Formula Ya, Formula Yb, Formula Ym or Formula Yn.

5. The compound of any one of Claims 1 to 4, wherein X comprises:
a foreign transplant antigen against which transplant recipients develop an unwanted immune response;
a foreign food, animal, plant or environmental antigen against which patients develop an unwanted immune response;
a foreign therapeutic agent against which patients develop an unwanted immune response; or
a synthetic self-antigen against the endogenous version of which patients develop an unwanted immune response,
or a tolerogenic portion thereof.

6. The compound of any one of claims 1 to 5, wherein Z is the beta anomer.

7. The compound of any one of claims 1 to 6, wherein Z is conjugated at its C1, C2 or C6 to Y.

8. The compound of any one of claims 1 to 7, wherein Y is prepared using a linker precursor selected from N-hydroxysuccinamidyl-based linkers, malaemide-based linkers, vinylsulfone-based linkers, pyridyl di-thiol-poly(ethylene glycol) -based linkers, pyridyl di-thiol-based linkers, n-nitrophenyl carbonate-based linkers, NHS-ester-based linkers, and nitrophenoxy poly(ethylene glycol)ester-based linkers.

9. The compound of any one of claims 1 to 8, wherein X comprises a food antigen, wherein the food antigen is selected from the group consisting of conarachin (Ara h 1), allergen II (Ara h 2), arachis agglutinin, conglutin (Ara h 6), 31 kda major allergen/disease resistance protein homolog (Mal d 2), lipid transfer protein precursor (Mal d 3), major allergen Mal d 1.03D (Mal d 1), a-lactalbumin (ALA), lactotransferrin, actinidin (Act c 1, Act d 1), phytocystatin, thaumatin-like protein (Act d 2), kiwellin (Act d 5), ovomucoid, ovalbumin, ovotransferrin, and lysozyme, livetin, apovitillin, vosvetin, 2S albumin (Sin a 1), 1 lS globulin (Sin a 2), lipid transfer protein (Sin a 3), profilin (Sin a 4), profilin (Api g 4), high molecular weight glycoprotein (Api g 5), Pen a 1 allergen (Pen a 1), allergen Pen m 2 (Pen m 2), tropomyosin fast isoform, high molecular weight glutenin, low molecular weight glutenin, alpha-, gamma- and omega-gliadin, hordein, secalin, avenin, major strawberry allergy Fra a 1-E (Fra a 1), profilin (Mus xp 1), a portion of any of said antigens, and a mimetic of any of said antigens.

10. The compound of claim 9, wherein the food antigen is selected from the group consisting of high molecular weight glutenin, low molecular weight glutenin, alpha-, gamma- and omega-gliadin, hordein, secalin, avenin, a portion of any of said antigens, and a mimetic of any of said antigens.

11. The compound of any one of claims 1 to 8, wherein X comprises a self-antigen, wherein the self-antigen is selected from insulin, proinsulin, preproinsulin, glutamic acid decarboxylase-65 (GAD-65), GAD-67, insulinomaassociated protein 2 (IA-2), and insulinoma-associated protein 213 (IA-213), ICA69, ICA12 (SOX-13), carboxypeptidase H, Imogen 38, GLIMA 38, chromogranin- A, HSP-60, caboxypeptidase E, peripherin, glucose transporter 2, hepatocarcinoma-intestinepancreas/pancreatic associated protein, S100β, glial fibrillary acidic protein, regenerating gene II, pancreatic duodenal homeobox 1, dystrophia myotonica kinase, islet-specific glucose-6- phosphatase catalytic subunit-related protein, SST G-protein coupled receptors 1-5, and a portion of any of said antigens, and a mimetic of any of said antigens.

12. The compound of claim 11, wherein X comprises a self-antigen, wherein the self-antigen is selected from myelin basic protein, myelin oligodendrocyte glycoprotein and proteolipid protein, a portion of any of said antigens, and a mimetic of any of said antigens.

13. The compound of any one of claims 1 to 8, wherein X comprises a therapeutic agent, wherein the therapeutic agent is selected from Abciximab, Adalimumab, Agalsidase alfa, Agalsidase beta, Aldeslukin, Alglucosidase alfa, Factor VIII, Factor IX, Infliximab, L-asparaginase, Laronidase, Natalizumab, Octreotide, Phenylalanine ammonia-lyase (PAL), or Rasburicase (uricase), a

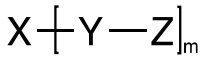
portion of any of said antigens, and a mimetic of any of said antigens.

14. The compound of any one of claims 1 to 8, wherein X comprises a transplant antigen, wherein the transplant antigen is selected from the group consisting of subunits of the MHC class I and MHC class II haplotype proteins, and minor blood group antigens RhCE, Kell, Kidd, Duffy and Ss.

15. A composition comprising the compound of any one of claims 1 to 14.

16. The use of the compound or composition of any one of claims 1 to 15, for treatment for an unwanted immune response.

17. A compound for inducing tolerance to an antigen to which a subject develops an unwanted immune response, the composition comprising a compound of Formula 1:



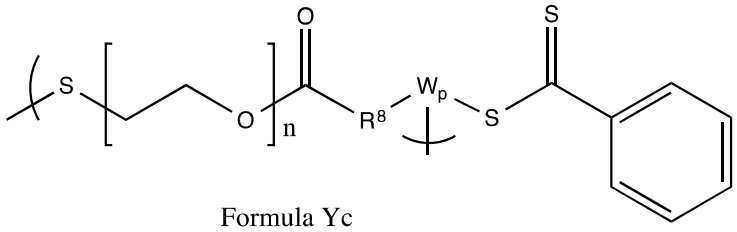
Formula 1

where:

m is an integer from about 1 to 10;

X comprises an antigen to which patients develop an unwanted immune response, wherein the antigen is a food antigen, a therapeutic agent, or a self-antigen;

Y is :



Formula Yc ;

wherein:

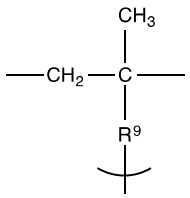
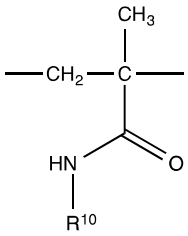
the left bracket "(" indicates a bond to X;

the bottom bracket and ")" indicates the bond between Y and Z;

n is an integer from about 1 to 100;

where present R^8 $–CH_2\text{-}CH_2\text{-}C(CH_3)(CN)–$;

W represents a polymer of the same W^1 group, or W is a copolymer or a random copolymer of the same or different W^1 and W^2 groups, where:

W^1 =  and W^2 = 

where:

p is an integer from 2 to about 150;

where present R^9 is a direct bond, –C(O)-NH–CH_2-CH_2-, or -C(O)-NH-(CH_2-CH_2-O-)$_t$-CH_2-CH_2-;

t is an integer from 1 to 5; and

R^{10} is an aliphatic group, an alcohol, or an aliphatic alcohol; and

Z is a liver targeting moiety.

18. The compound of claim 17, wherein Z comprises one or more of galactose, galactosamine, N-acetylgalactosamine, glucose, glucosamine, or N-acetyl glucosamine.

19. The compound of claim 18, wherein Z is the beta anomer.

20. The compound of claim 18 or 19, where Z conjugated at its C1, C2 or C6 to Y.

21. The compound of any one of claims 17 to 20, wherein X comprises:

a foreign transplant antigen against which transplant recipients develop an unwanted immune response;

a foreign food, animal, plant or environmental antigen against which patients develop an unwanted immune response;

a foreign therapeutic agent against which patients develop an unwanted immune response; or

a synthetic self-antigen against the endogenous version of which patients develop an unwanted immune response,

or a tolerogenic portion thereof.

22. The compound of any one of claims 17 to 20, wherein X is a self-antigen and the unwanted immune response is an autoimmune response.

23. The compound of any one of claims 17 to 20, wherein X is selected from the group consisting of myelin oligodendrocyte glycoprotein, myelin proteolipid protein, and myelin basic protein and wherein the unwanted immune response is associated with multiple sclerosis.

24. The compound of any one of claims 17 to 20, wherein X is a is a food antigen selected from the group consisting of: conarachin (Ara h 1), allergen II (Ara h 2), arachis agglutinin, conglutin (Ara h 6), a-lactalbumin (ALA), lactotransferrin, Pen a 1 allergen (Pen a 1), allergen Pen m 2 (Pen m 2), tropomyosin fast isoform, high molecular weight glutenin, low molecular weight glutenin, alpha- gliadin, gamma-gliadin, omega-gliadin, hordein, secalin, and avenin.

25. The compound of any one of claims 17 to 20, wherein X is a therapeutic agent selected from Abciximab, Adalimumab, Agalsidase alfa, Agalsidase beta, Aldeslukin, Alglucosidase alfa, Factor VIII, Factor IX, Infliximab, L-asparaginase, Laronidase, Natalizumab, Octreotide, Phenylalanine ammonia-lyase (PAL), or Rasburicase (uricase), a portion of any of said antigens, and a mimetic of any of said antigens

26. The compound of any one of claims 17 to 20, wherein X is selected from the group consisting of insulin, proinsulin, and preproinsulin and wherein the unwanted immune response is associated with type 1 diabetes mellitus.