CLAIMS:

1. A composition comprising a ganglioside having the structure:

(A)x-[(P)y-(L)z]-(M)b;

wherein A is a ganglioside, or any portion thereof; x is an integer from 1 to 32; P is a heteroaryl; y is 1; L is a linker; z is an integer from 0 to 8; M is a core; and b is 0 or 1;

wherein P is optionally substituted with 1, 2, 3, 4, or 5 substituents independently selected from (1) hydrogen; (2) C_{1-7} acyl; (3) C_{1-20} alkyl; (4) amino; (5) C_{3-10} aryl; (6) hydroxy; (7) nitro; (8) C_{1-20} alkyl-amino; and (9) $-(CH_2)_qCONR^B$, where q is an integer from 0 to 4 and where R^B is selected from the group consisting of (a) hydrogen, (b) C_{1-6} alkyl, (c) C_{3-10} aryl, and (d) C_{1-6} alk-C_{6-10} aryl.

2. The composition of claim 1, wherein the heteroaryl is triazine or triazole.

3. The composition of claim 2, wherein

a) the triazine is 1, 3, 5 triazine; or

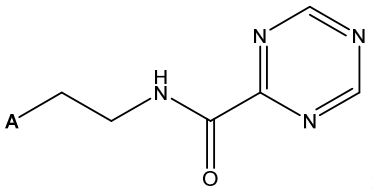
b) the triazole is 1, 2, 3 triazole or 1, 2, 4 triazole.

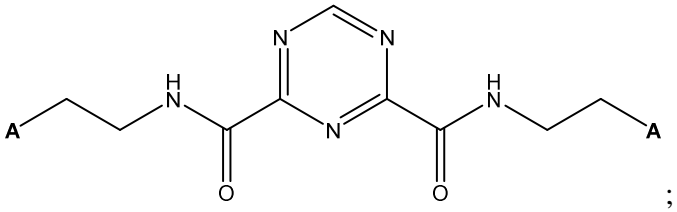
4. The composition of any one of claims 1-3, wherein the P is substituted with 1, 2, 3, 4, or 5 substituents independently selected from (1) hydrogen; (2) C_{1-20} alkyl-amino; and (3) $-(CH_2)_qCONR^B$, where q is an integer from 0 to 4 and where R^B is selected from the group consisting of (a) hydrogen, (b) C_{1-6} alkyl, (c) C_{3-10} aryl, and (d) C_{1-6} alk-C_{6-10} aryl.

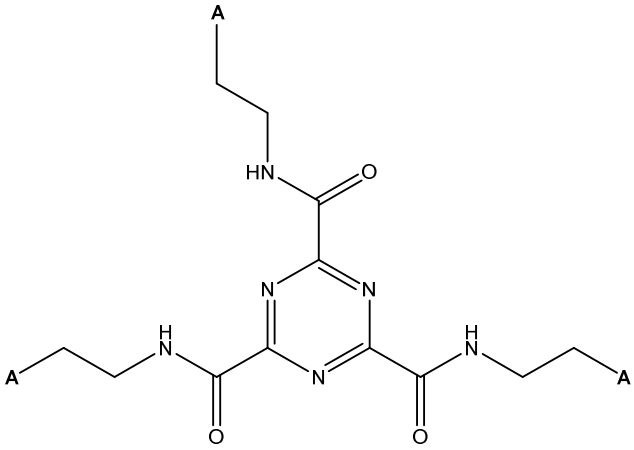
5. The composition of any one of claims 1-4, wherein the M is (1) amine or (2) polyamidoamine (PAMAM).

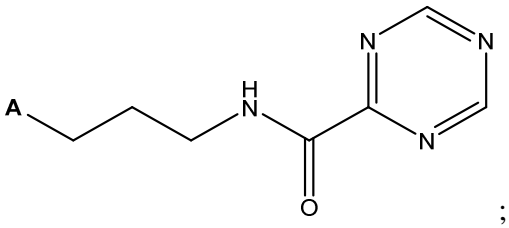
6. The composition of any one of claims 1-5, wherein x is 1, 2, 3, 4, 6, or 8.

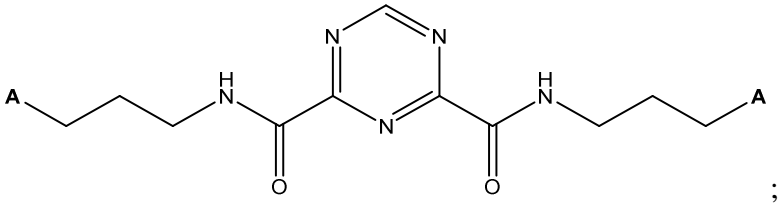
7. The composition of any one of claims 1-6, wherein the structure is selected from:

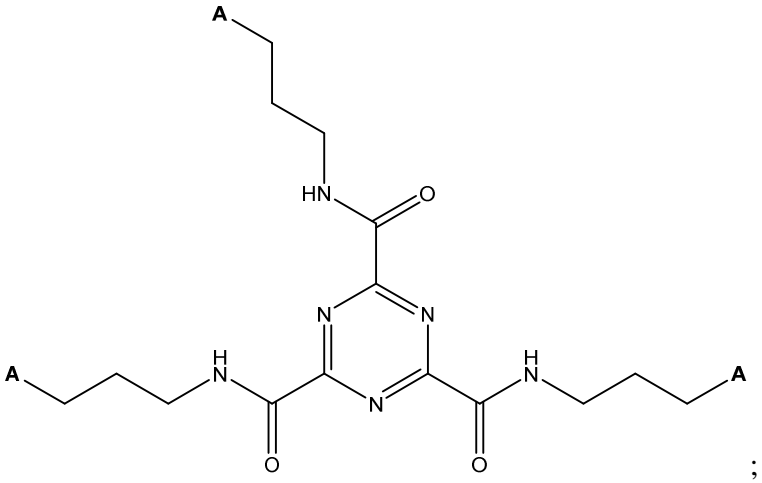

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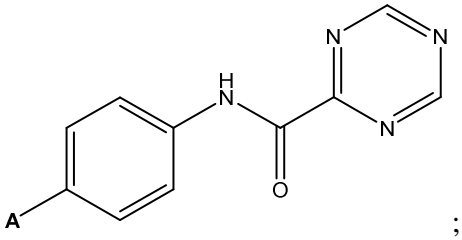

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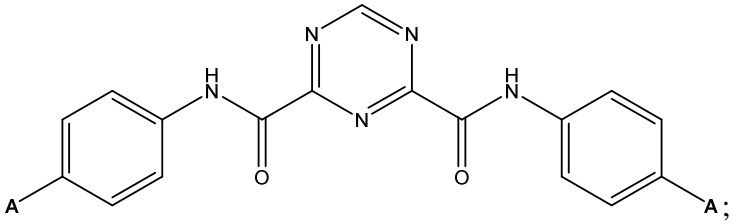

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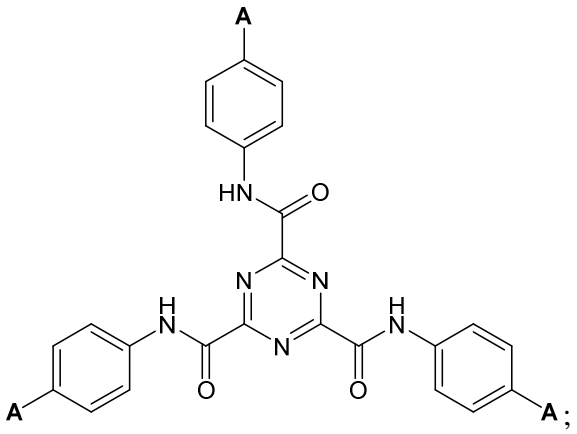

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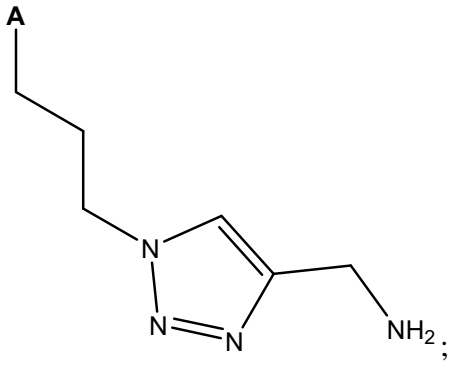

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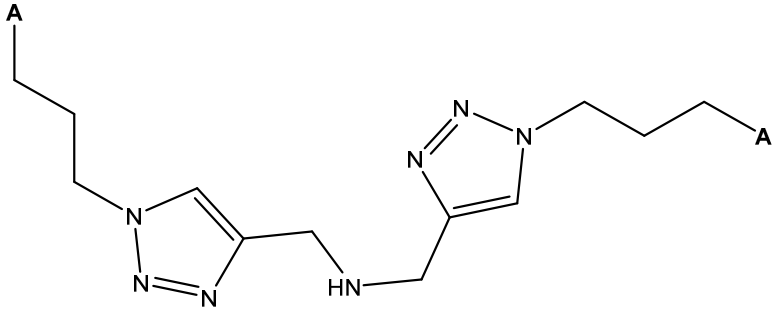

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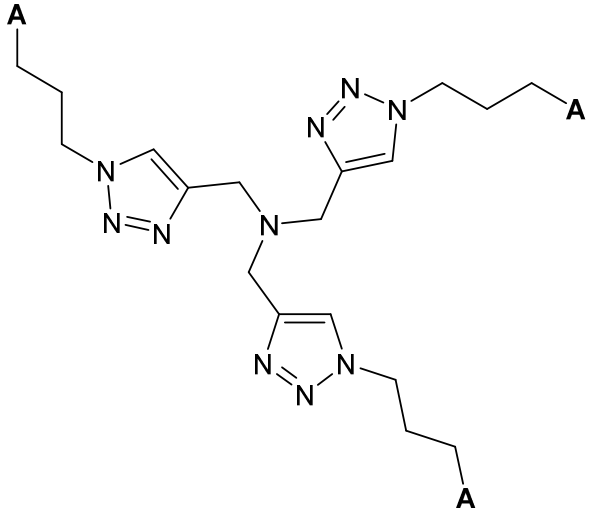

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wherein A is a ganglioside.

8. The composition of any one of claims 1-7, wherein the ganglioside is selected from GD2, GD3, GD1b, GT1b, fucosyl-GM1, GloboH, polysialic acid (PSA), GM2, GM3, sialyl-Lewis^X,

sialyl-Lewis^{Y}, sialyl-Lewis^{A}, sialyl-Lewis^{B}, and Lewis^{Y}, optionally wherein the ganglioside is GD2, GD3, GT1b, and GM2.

9. The composition of any one of claims 1-8, wherein the ganglioside is detectably labeled, optionally wherein the ganglioside is labeled with an enzyme, prosthetic group (e.g., streptavidin/biotin), fluorophore, luminescent tag, bioluminescent tag, and/or a radioisotope.

10. The composition of any one of claims 1-9, wherein the composition is a pharmaceutical composition.

11. Use of the composition of any one of claims 1-10, in the manufacture of a medicament for inducing an immune response against a ganglioside in a subject.

12. Use of the composition of any one of claims 1-10, in the manufacture of a medicament for treating cancer in a subject.

13. Use of the composition of any one of claims 1-10, in the manufacture of a medicament for treating an infection (e.g., viral or bacterial infection) in a subject.

14. A method of producing an antibody, comprising:

(a) immunizing a mammal with the composition of any one of claims 1-10, optionally further comprising an adjuvant; and

(b) isolating an antibody that binds to the ganglioside from the mammal, a cell from the mammal, or a hybridoma made using a cell from the mammal.

15. The method of claim 14, wherein the mammal is selected from a rabbit, a mouse, a goat, a camel, a dog, a sheep, or a rat.

16. A monoclonal antibody, or antigen-binding fragment thereof, wherein the monoclonal antibody specifically binds to the carbohydrate portion of a ganglioside, wherein the ganglioside is (a) GD2, (b) GD3, or (c) GD2 and GD3.

17. The monoclonal antibody or antigen-binding fragment thereof of claim 16, wherein the monoclonal antibody or antigen-binding fragment thereof, comprises:

a) a combination of a heavy chain CDR1, CDR2, and CDR3 as set forth in Table 1, or a variant sequence thereof which differs by only one or two amino acids, or which has at least or about 85% sequence identity; and/or

b) a combination of a light chain CDR1, CDR2, and CDR3 as set forth in Table 1, or a variant sequence thereof which differs by only one or two amino acids, or which has at least or about 85% sequence identity.

18. An isolated nucleic acid molecule that encodes:

a) a polypeptide comprising an amino acid sequence listed in Table 1 and/or Table 2;

b) a polypeptide comprising an amino acid sequence with at least or about 85% identity to an amino acid sequence listed in Table 1 and/or Table 2; and/or

c) the monoclonal antibody or antigen-binding fragment thereof, of claim 16 or 17.

19. A method of purifying a ganglioside from a sample, the method comprising:

(a) obtaining the sample;

(b) adding to the sample about 2 to 5-fold volume of an organic solvent comprising $CHCl_3$:methanol:water at a ratio selected from (i) about 1:2:1, (ii) about 4:8:3, or (iii) about 2:4:1;

(c) shaking the combined mixture of (b); and

(d) separating the sample from the organic solvent, thereby extracting lipids from the sample.

20. Use of a monoclonal antibody according to claim 16 or 17, or antigen-binding fragment thereof, in diagnosing a cancer in a subject, the use comprising:

a) determining the level of at least one ganglioside in a subject sample using the monoclonal antibody, or antigen-binding fragment thereof; and

b) comparing said level of the at least one ganglioside to that in a control sample,

wherein a significantly higher level of the at least one ganglioside in the subject sample as compared to the level in the control sample indicates that the subject has a cancer.

21. The composition of any one of claims 1-10, for use in therapy.