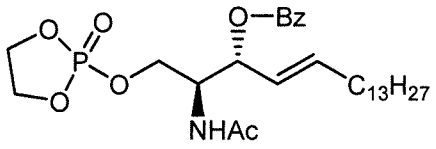
CLAIMS

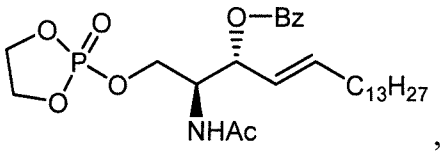
1. A method for synthesizing an *N*-acyl-3-O-benzoyl-*D-erythro*-sphingomyelin, wherein acyl is a fatty acid residue having 3 to 36 carbons and zero to six carbon-carbon double bonds, comprising:

allowing an *N*-acyl-3-O-benzoyl-*D-erythro*-ceramide, wherein acyl is a fatty acid residue having 3 to 36 carbons and zero to six carbon-carbon double bonds, to react with 2-chloro-2-oxo-1,3,2-dioxaphospholane in the presence of tetramethylethylenediamine to yield the compound having the formula:



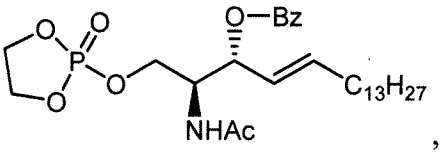
, wherein the acyl is Ac; and

allowing the compound having the formula:



, wherein the acyl is Ac, to react with trimethylamine under conditions effective to yield the *N*-acyl-3-O-benzoyl-*D-erythro*-sphingomyelin;

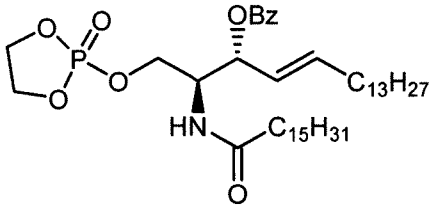
wherein the compound having the formula:



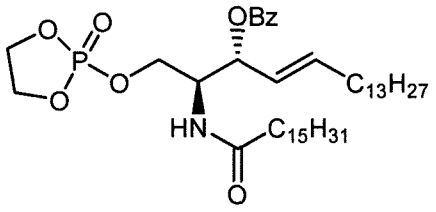
, wherein the acyl is Ac, is not purified or isolated.

2. A method for synthesizing an *N*-acyl-*D-erythro*-sphingomyelin, wherein acyl is a fatty acid residue having 3 to 36 carbons and zero to six carbon-carbon double bonds, comprising performing the method of claim 1 and allowing the *N*-acyl-3-O-benzoyl-*D-erythro*-sphingomyelin to react with a debenzoylating reagent under conditions that are effective to yield the *N*-acyl-*D-erythro*-sphingomyelin.

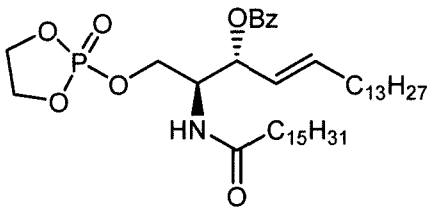
3. A method for synthesizing *N*-palmitoyl-3-O-benzoyl-*D-erythro*-sphingomyelin, comprising allowing *N*-palmitoyl-3-O-benzoyl-*D-erythro*-ceramide to react with 2-chloro-2-oxo-1,3,2-dioxaphospholane in the presence of tetramethylethylenediamine to yield the compound



having the structure ;



allowing the compound having the structure to react with trimethylamine under conditions effective to yield *N*-palmitoyl-3-O-benzoyl-*D-erythro*-sphingomyelin;



wherein the compound having the structure is not purified or isolated.

4. A method for synthesizing *N*-palmitoyl-*D-erythro*-sphingomyelin, comprising performing the method of claim 5 and allowing *N*-palmitoyl-3-O-benzoyl-*D-erythro*-sphingomyelin to react with a debenzoylating reagent under conditions that are effective to yield *N*-palmitoyl-*D-erythro*-sphingomyelin.

5. The method of claim 3, wherein the trimethylamine is added as a liquid.

6. The method of claim 3, wherein the trimethylamine is added in a gaseous form.

7. The method of claim 4, wherein the debenzoylating reagent is sodium methoxide.

8. A method for synthesizing *N*-palmitoyl-D-*erythro*-sphingomyelin, comprising:

allowing *N*-palmitoyl-3-O-benzoyl-*D-erythro*-ceramide to react with 2-chloro-2-oxo-1,3,2-dioxaphospholane in the presence of tetramethylethylenediamine to yield *N*-palmitoyl-3-O-benzoyl-1-O-(2-oxo-1,3,2-dioxaphospholan)-*D-erythro*-ceramide;

allowing *N*-palmitoyl-3-O-benzoyl-1-O-(2-oxo-1,3,2-dioxaphospholan)-*D-erythro*-ceramide to react with trimethylamine under conditions effective to yield *N*-palmitoyl-3-O-benzoyl-*D-erythro*-sphingomyelin; and

allowing *N*-palmitoyl-3-O-benzoyl-*D-erythro*-sphingomyelin to react with sodium methoxide under conditions effective to yield *N*-palmitoyl-D-*erythro*-sphingomyelin;

wherein *N*-palmitoyl-3-O-benzoyl-1-O-(2-oxo-1,3,2-dioxaphospholan)-*D-erythro*-ceramide is not purified or isolated.

9. The method of claim 8, wherein the trimethylamine is added as a liquid.

10. The method of claim 8, wherein the trimethylamine is added in a gaseous form.

11. The method of claim 3, wherein the method is performed on a kilogram scale.

12. The method of claim 4, wherein the method is performed on a kilogram scale.

13. The method of claim 7, wherein the method is performed on a kilogram scale.

14. The method of claim 8, wherein the method is performed on a kilogram scale.

15. The method of claim 2, wherein reacting *N*-acyl-3-O-benzoyl-*D-erythro*-sphingomyelin the debenzoylating reagent is sodium methoxide.

16. A method for synthesizing *N*-acyl-D-*erythro*-sphingomyelin, wherein acyl is a fatty acid residue having 3 to 36 carbons and zero to six carbon-carbon double bonds, comprising:

allowing *N*-acyl-3-O-benzoyl-*D-erythro*-ceramide, wherein acyl is a fatty acid residue having 3 to 36 carbons and zero to six carbon-carbon double bonds, to react with 2-chloro-2-oxo-1,3,2-dioxaphospholane in the presence of tetramethylethylenediamine to yield *N*-acyl-3-O-

benzoyl-1-O-(2-oxo-1,3,2-dioxaphospholan)-*D-erythro*-ceramide, wherein the acyl is a fatty acid residue having 3 to 36 carbons and zero to six carbon-carbon double bonds;

allowing *N*-acyl-3-O-benzoyl-1-O-(2-oxo-1,3,2-dioxaphospholan)-*D-erythro*-ceramide to react with trimethylamine under conditions effective to yield *N*-acyl-3-O-benzoyl-*D-erythro*-sphingomyelin, wherein acyl is a fatty acid residue having 3 to 36 carbons and zero to six carbon-carbon double bonds; and

allowing *N*-acyl-3-O-benzoyl-*D-erythro*-sphingomyelin to react with sodium methoxide under conditions effective to yield *N*-acyl-D-*erythro*-sphingomyelin;

wherein *N*-acyl-3-O-benzoyl-1-O-(2-oxo-1,3,2-dioxaphospholan)-*D-erythro*-ceramide is not purified or isolated.

17. The method of claim 1, wherein the method is performed on a kilogram scale.

18. The method of claim 16, wherein the method is performed on a kilogram scale.