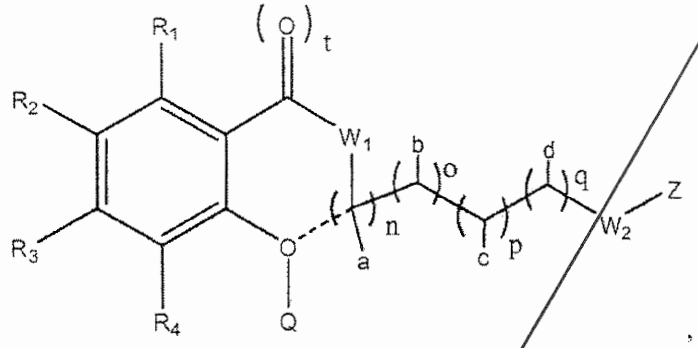
CLAIMS

1. A compound of Formula I,



Formula I

and a pharmaceutically acceptable salt, hydrate, solvate, prodrug, enantiomer, or stereoisomer thereof,

wherein:

R_1, R_2, R_3, and R_4 are each independently selected from the group consisting of H, Cl, F, CN, NH_2, -NH(C_1-C_3 alkyl), -N(C_1-C_3 alkyl)$_2$, -NH(C(O)C_1-C_3 alkyl), -N(C(O)C_1-C_3 alkyl)$_2$,-C(O)H, -C(O)C_1-C_3 alkyl, -C(O)OC_1-C_3 alkyl, -C(O)NH_2, -C(O)NH(C_1-C_3 alkyl), -C(O)N(C_1-C_3 alkyl)$_2$, -C_1-C_3 alkyl, -O-C_1-C_3 alkyl, -S(O)C_1-C_3 alkyl, and -S(O)$_2$$C_1$-$C_3$ alkyl;

W_1 and W_2 are each independently null, O, or NH, or when W_1 and W_2 are both NH, then both W_1 and W_2 can be taken together to form a piperidine moiety;

- - - - - represents an optional bond that when present requires that Q is null;

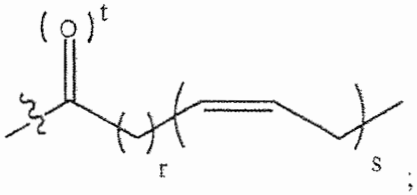
a and c are each independently H, CH_3, -OCH_3, -OCH_2CH_3, or C(O)OH;

b is H, CH_3, C(O)OH, or O-Z;

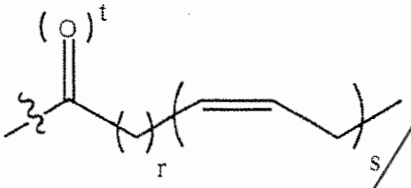
d is H or C(O)OH;

each n, o, p, and q is independently 0 or 1;

each Z is H or



with the proviso that there is at least one



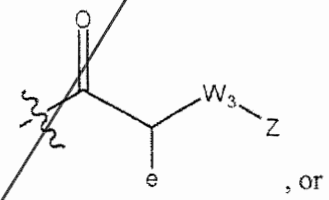
in the compound;

each r is independently 2 or 3;

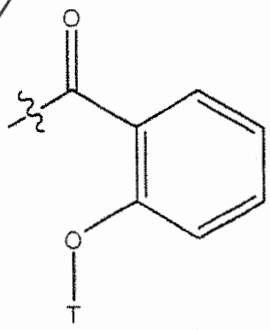
each s is independently 5 or 6;

each t is independently 0 or 1;

Q is null, $C(O)CH_3$, Z,



, or



;

e is H or any one of the side chains of the naturally occurring amino acids;

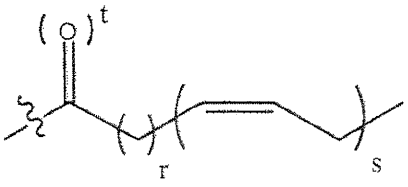
W_3 is null, -O-, or –N(R)-;

R is H or C_1-C_3 alkyl; and

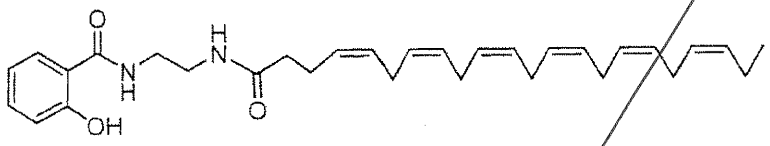
T is H, $C(O)CH_3$, or Z.

2. The compound of claim 1, wherein W_1 or W_2 is NH.

3. The compound of claim 2, wherein r is 2, s is 6, t is 1, and Z is

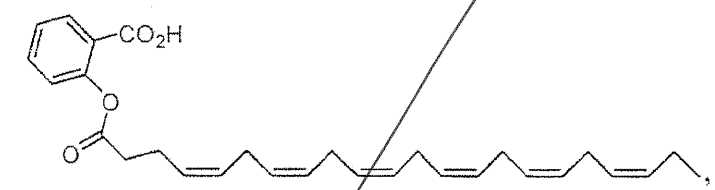


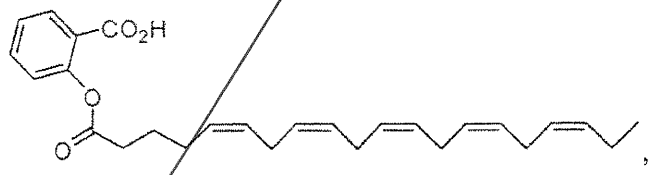
4. The compound of claim 3, wherein the compound is

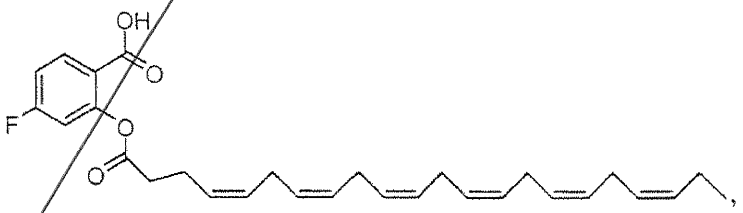


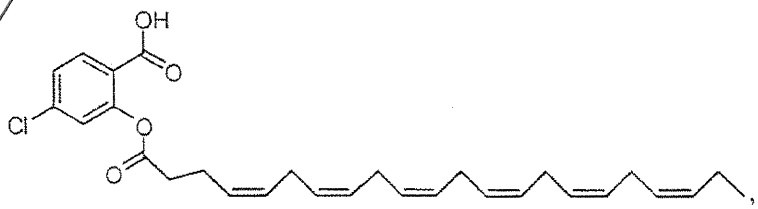
5. The compound of claim 1, wherein Q is Z.

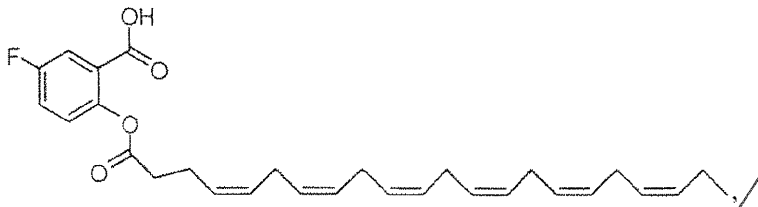
6. The compound of claim 5, wherein the compound is



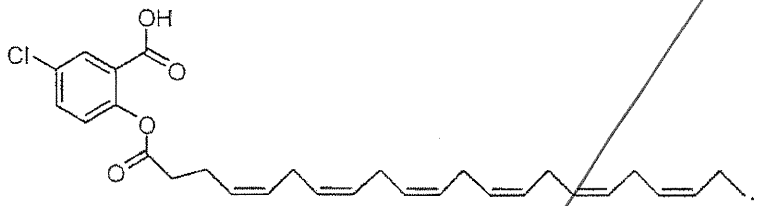




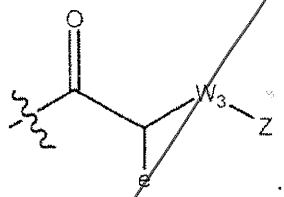




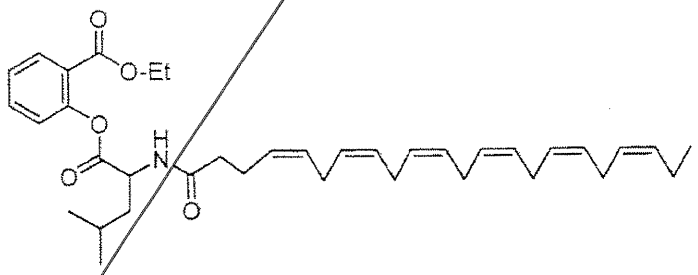
or



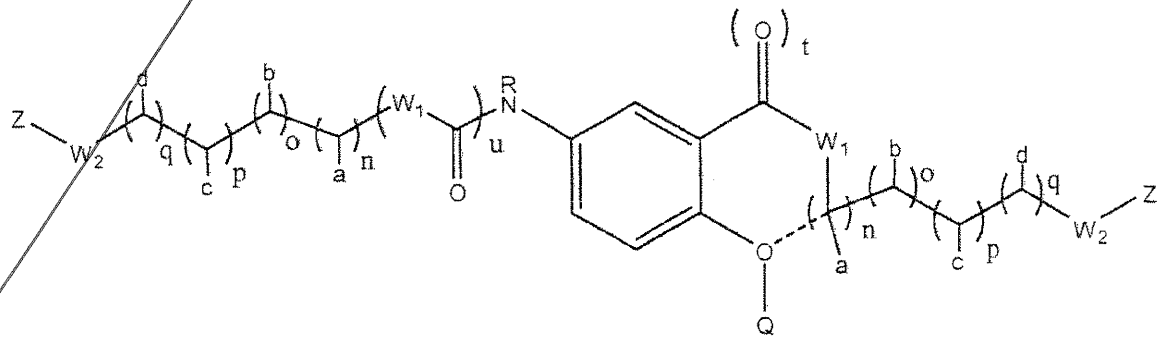
7. The compound of claim 1, wherein Q is



8. The compound of claim 5, wherein the compound is



9. A compound of Formula III,



Formula III,

and a pharmaceutically acceptable salt, hydrate, solvate, prodrug, enantiomer, or stereoisomer thereof,

wherein

each W_1 and W_2 are independently null, O, or NH, or when W_1 and W_2 are both NH, then both W_1 and W_2 can be taken together to form a piperidine moiety;

- - - - - represents an optional bond that when present requires that Q is null;

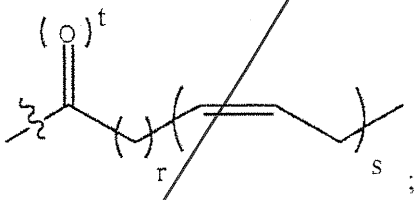
each a and c are independently H, CH_3, $-OCH_3$, $-OCH_2CH_3$, or C(O)OH;

each b is H, CH_3, C(O)OH, or O-Z;

each d is H or C(O)OH;

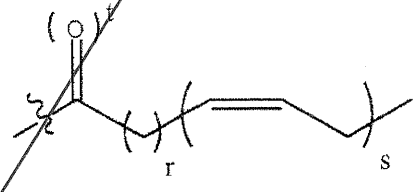
each n, o, p, and q is independently 0 or 1;

each Z is H or



;

with the proviso that there is at least one



in the compound;

each r is independently 2, 3, or 7;

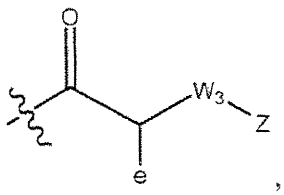
each s is independently 3, 5, or 6;

each t is independently 0 or 1;

u is 0 or 1;

with the proviso that when r is 7, s is 3;

Q is null, $C(O)CH_3$, Z,



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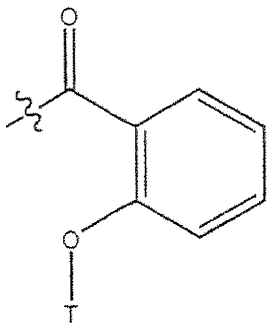

;

e is H or any one of the side chains of the naturally occurring amino acids;

W_3 is null, -O-, or –N(R)-;

R is H or C_1-C_3 alkyl; and

T is H, $C(O)CH_3$, or Z.

10. The compound of claim 9, wherein at least one t is 1 and at least one W_1 is O.

11. The compound of claim 10, wherein Q is H.

12. The compound of claim 11, wherein the compound is



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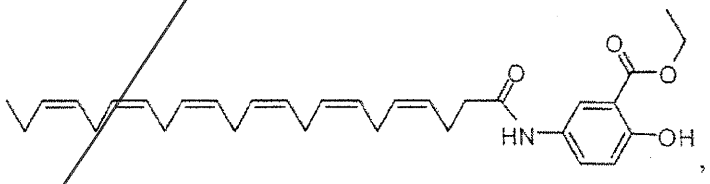

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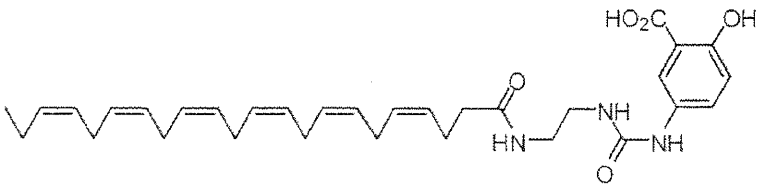

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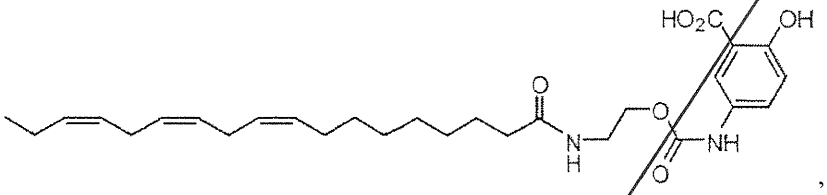

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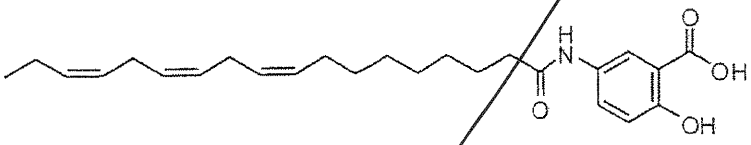

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13. The compound of claim 14, wherein the compound is



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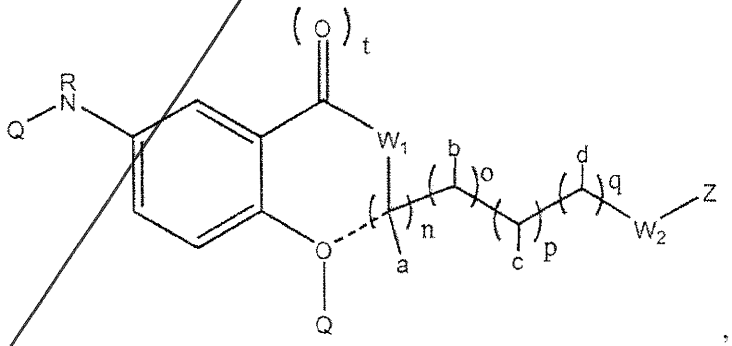
14. A compound of Formula IIIa,



,

Formula IIIa

and pharmaceutically acceptable salts, hydrates, solvates, prodrugs, enantiomers, and stereoisomers thereof,

wherein

each W_1 and W_2 are independently null, O, or NH, or when W_1 and W_2 are both NH, then both W_1 and W_2 can be taken together to form a piperidine moiety;

- - - - - represents an optional bond that when present requires that Q is null;

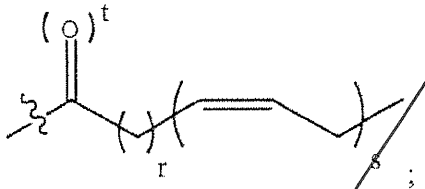
each a and c are independently H, CH_3, $-OCH_3$, $-OCH_2CH_3$, or C(O)OH;

each b is H, CH_3, C(O)OH, or O-Z;

each d is H or C(O)OH;

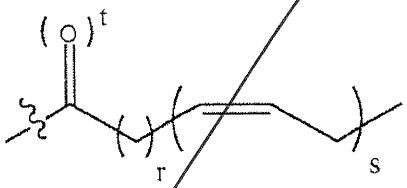
each n, o, p, and q is independently 0 or 1;

each Z is H or



;

with the proviso that there is at least one



in the compound;

each r is independently 2, 3, or 7;

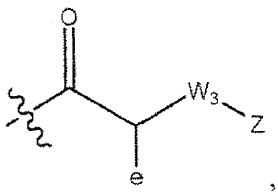
each s is independently 3, 5, or 6;

each t is independently 0 or 1;

u is 0 or 1;

with the proviso that when r is 7, s is 3;

each Q is null, H, $C(O)CH_3$, Z,



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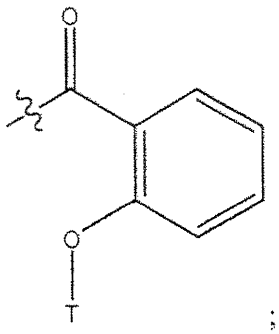


;

each e is H or any one of the side chains of the naturally occurring amino acids;

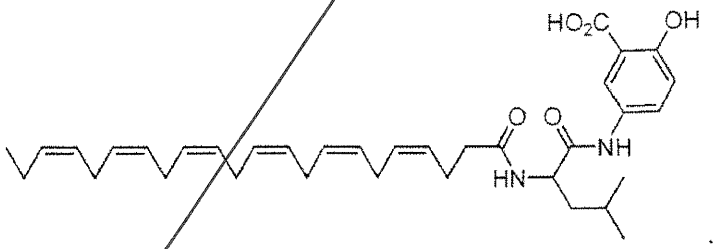
W_3 is null, -O-, or –N(R)-;

R is H or C_1-C_3 alkyl; and

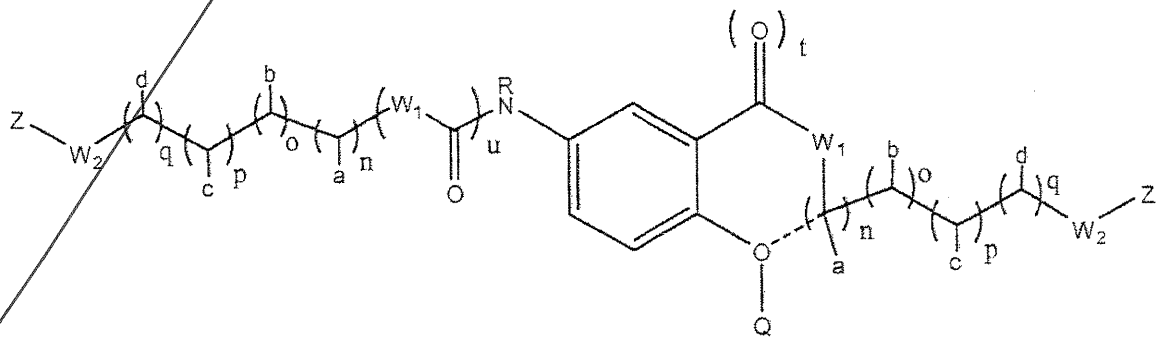
T is H, $C(O)CH_3$, or Z.

15. The compound of claim 13, wherein at least one t is 1, at least one W_1 is O, and at least one Q is H.

16. The compound of claim 15, wherein the compound is



17. A method of treating inflammation, comprising administering to a patient in need thereof an effective amount of a compound of Formula III,



Formula III,

or pharmaceutically acceptable salt, hydrate, solvate, prodrug, enantiomer, or stereoisomer thereof,

wherein

each W_1 and W_2 are independently null, O, or NH, or when W_1 and W_2 are both NH, then both W_1 and W_2 can be taken together to form a piperidine moiety;

- - - - - represents an optional bond that when present requires that Q is null;

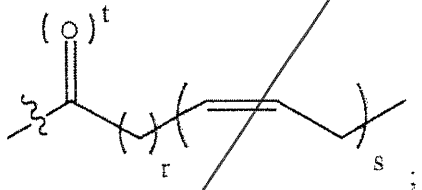
each a and c are independently H, CH_3, $-OCH_3$, $-OCH_2CH_3$, or C(O)OH;

each b is H, CH_3, C(O)OH, or O-Z;

each d is H or C(O)OH;

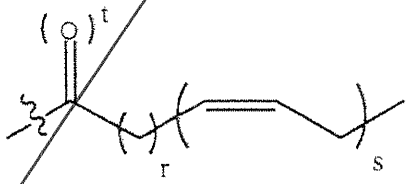
each n, o, p, and q is independently 0 or 1;

each Z is H or



;

with the proviso that there is at least one



in the compound;

each r is independently 2, 3, or 7;

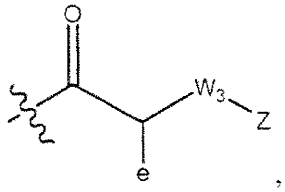
each s is independently 3, 5, or 6;

each t is independently 0 or 1;

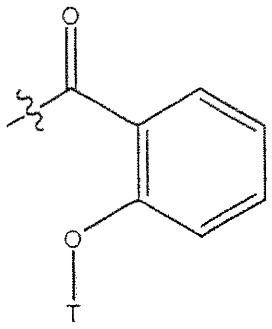
u is 0 or 1;

with the proviso that when r is 7, s is 3;

Q is null, $C(O)CH_3$, Z,



, or



;

e is H or any one of the side chains of the naturally occurring amino acids;

W_3 is null, -O-, or –N(R)-;

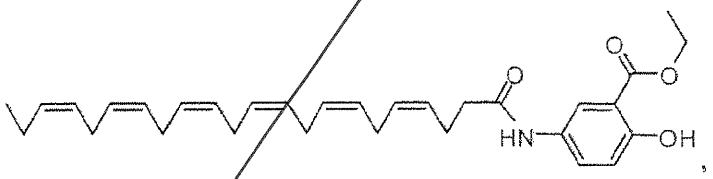
R is H or C_1-C_3 alkyl; and

T is H, $C(O)CH_3$, or Z.

18. The method of claim 17, wherein at least one t is 1 and at least one W_1 is O.

19. The method of claim 18, wherein Q is H.

20. The method of claim 19, wherein the compound is



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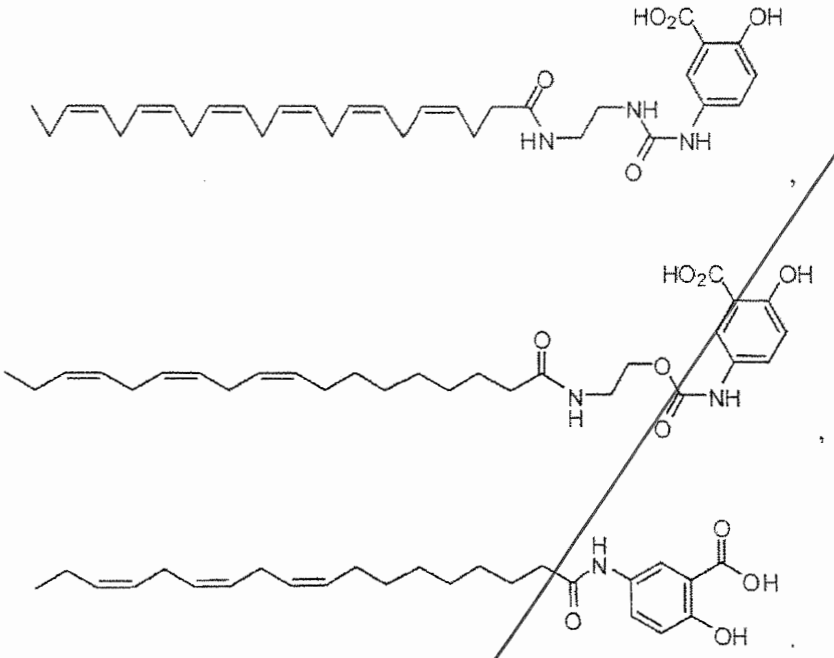


21. The method of claim 17, wherein the inflammation is associated with a metabolic disorder.

22. The method of claim 18, wherein the metabolic disorder is Type II diabetes, insulin resistance cardiovascular disease, arrhythmia, atherosclerosis, coronary artery disease, hypertriglyceridemia, dyslipidemia, retinopathy, nephropathy, neuropathy, or macular edema.

23. The method of claim 17, wherein the inflammation is associated with an inflammatory bowel disease.

24. The method of claim 23, wherein the inflammatory bowel diseas is ileitis, ulcerative colitis, Barrett's syndrome, or Crohn's disease.

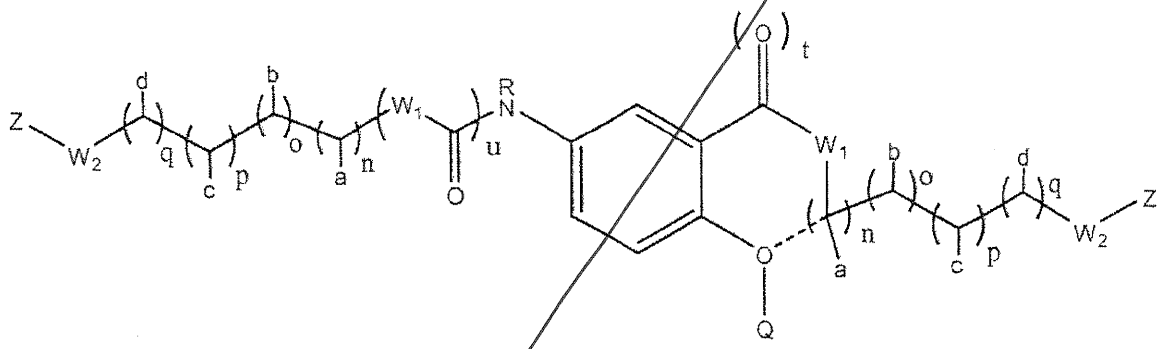
25. The method of claim 17, wherein the inflammation is associated with a neurodegenerative disorder.

26. The method of claim 25, wherein the neurodegenerative disorder is neurodegeneration, Alzheimer's disease, multiple sclerosis, Huntington's disease, infectious meningitis, encephalomyelitis, Parkinson's disease, amyotrophic lateral sclerosis, or encephalitis.

27. The method of claim 17, wherein the inflammation is associated with a muscle wasting disorder.

28. The method of claim 27, wherein the muscle wasting disorder is Duchenne's muscular dystrophy, dermatomositis, inclusion body myositis, polymyositis, or cachexia.

29. A pharmaceutical composition comprising a compound of Formula III,



Formula III,

or pharmaceutically acceptable salt, hydrate, solvate, prodrug, enantiomer, or stereoisomer thereof,

wherein

each W_1 and W_2 are independently null, O, or NH, or when W_1 and W_2 are both NH, then both W_1 and W_2 can be taken together to form a piperidine moiety;

- - - - - represents an optional bond that when present requires that Q is null;

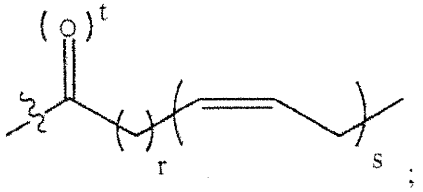
each a and c are independently H, CH_3, $-OCH_3$, $-OCH_2CH_3$, or C(O)OH;

each b is H, CH_3, C(O)OH, or O-Z;

each d is H or C(O)OH;

each n, o, p, and q is independently 0 or 1;

each Z is H or



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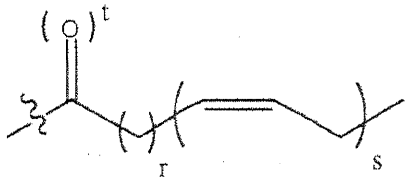
with the proviso that there is at least one



in the compound;

each r is independently 2, 3, or 7;

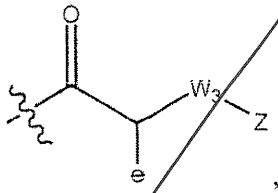
each s is independently 3, 5, or 6;

each t is independently 0 or 1;

u is 0 or 1;

with the proviso that when r is 7, s is 3;

Q is null, $C(O)CH_3$, Z,



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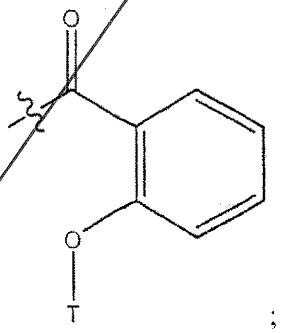


;

e is H or any one of the side chains of the naturally occurring amino acids;

W_3 is null, -O-, or –N(R)-;

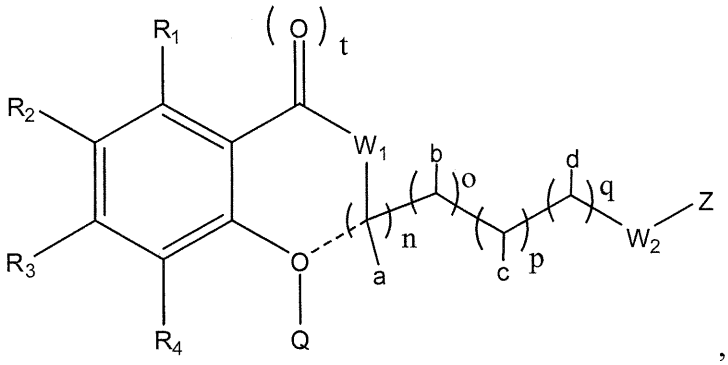
R is H or C_1-C_3 alkyl; and

T is H, $C(O)CH_3$, or Z;

and a pharmaceutically acceptable carrier.

CLAIMS

1. A compound of Formula I,



Formula I

or a pharmaceutically acceptable salt, hydrate, solvate, enantiomer, or stereoisomer thereof, wherein:

R_1, R_2, R_3, and R_4 are each independently selected from the group consisting of H, Cl, F, CN, -NH(C_1-C_3 alkyl), -N(C_1-C_3 alkyl)$_2$, -NH(C(O)C_1-C_3 alkyl), -N(C(O)C_1-C_3 alkyl)$_2$,-C(O)H, -C(O)C_1-C_3 alkyl, -C(O)OC_1-C_3 alkyl, -C(O)NH_2, -C(O)NH(C_1-C_3 alkyl), -C(O)N(C_1-C_3 alkyl)$_2$, -O-C_1-C_3 alkyl, -S(O)C_1-C_3 alkyl, and -S(O)$_2$$C_1$-$C_3$ alkyl;

W_1 and W_2 are each independently null, O, or NH, or when W_1 and W_2 are both NH, then both W_1 and W_2 can be taken together to form a piperazine moiety;

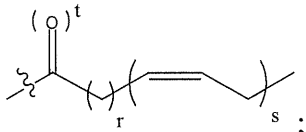
- - - - - represents an optional bond that when present requires that Q is null;

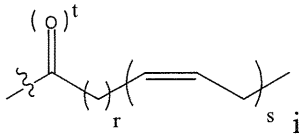
a and c are each independently H, CH_3, -OCH_3, -OCH_2CH_3, or C(O)OH;

b is H, CH_3, C(O)OH, or O-Z;

d is H or C(O)OH;

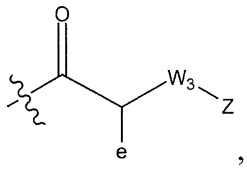
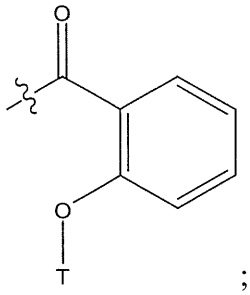
each n, o, p, and q is independently 0 or 1;

each Z is H or  ;

with the proviso that there is at least one  in the compound;

each r is independently 2 or 3, and each s is independently 5 or 6; or each r is independently 7 and each s is independently 3;

each t is independently 0 or 1;

Q is null, $C(O)CH_3$, Z, , or ;

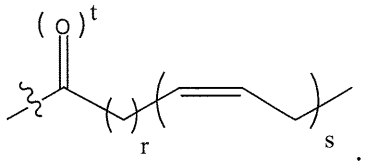
e is H or any one of the side chains of the naturally occurring amino acids;

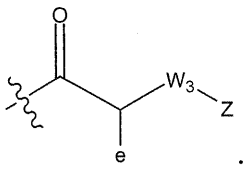
W_3 is null, -O-, or –N(R)-;

R is H or C_1-C_3 alkyl; and

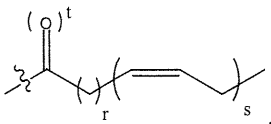
T is H, $C(O)CH_3$, or Z.

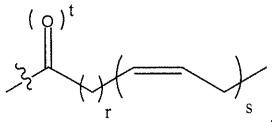
2. The compound of claim 1, wherein W_1 or W_2 is NH.

3. The compound of claim 1 or 2, wherein r is 2, s is 6, t is 1, and Z is .

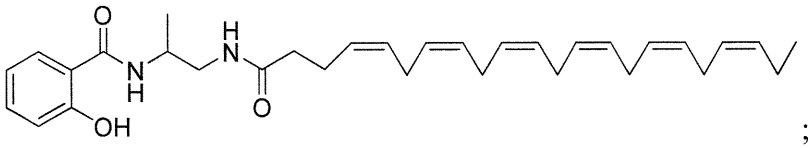
4. The compound of claim 1, wherein Q is Z or .

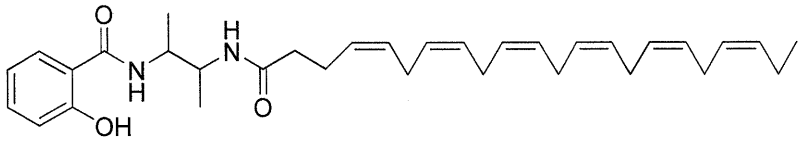
5. The compound of claim 1, wherein Z is a fatty acid selected from the group consisting of all-cis-5,8,11,14,17-eicosapentaenoic acid (EPA), all-cis-4,7,10,13,16,19-docosahexaenoic acid (DHA) and all-cis-9,12,15-octadecatrienoic acid (ALA).

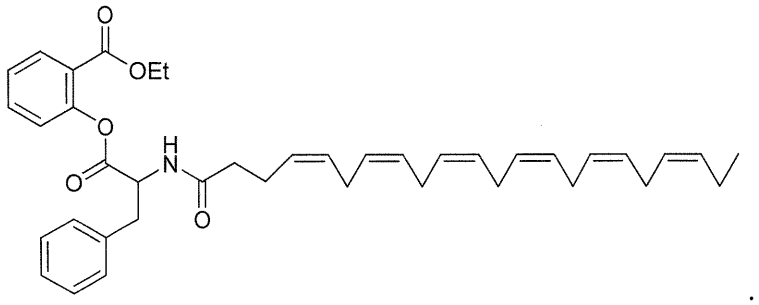
6. The compound of claim 1, wherein Z is , r is 2, and s is 6.

7. The compound of claim 1, wherein Z is , r is 3, and s is 5.

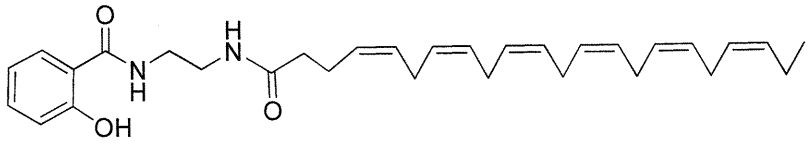
8. The compound of claim 1, wherein the compound is

;

; or

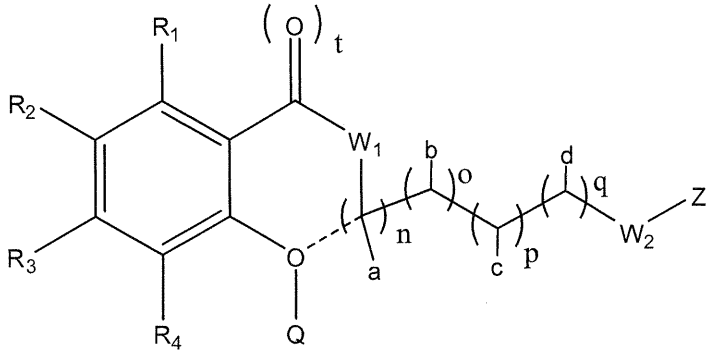
.

9. The compound of claim 1, wherein the compound is

.

10. A pharmaceutical composition comprising a compound according to any one of claims 1-9 and a pharmaceutically acceptable carrier.

11. A compound for use in the treatment of an inflammation that is associated with a metabolic disorder, an inflammatory bowel disease, a neurodegenerative disorder, or a muscular wasting disorder, wherein the compound is a compound of formula I:



Formula I

or a pharmaceutically acceptable salt, hydrate, solvate, enantiomer, or stereoisomer thereof, wherein:

R_1, R_2, R_3, and R_4 are each independently selected from the group consisting of H, Cl, F, CN, -NH(C_1-C_3 alkyl), -N(C_1-C_3 alkyl)$_2$, -NH(C(O)C_1-C_3 alkyl), -N(C(O)C_1-C_3 alkyl)$_2$,-C(O)H, -C(O)C_1-C_3 alkyl, -C(O)OC_1-C_3 alkyl, -C(O)NH_2, -C(O)NH(C_1-C_3 alkyl), -C(O)N(C_1-C_3 alkyl)$_2$, -O-C_1-C_3 alkyl, -S(O)C_1-C_3 alkyl, and -S(O)$_2C_1$-C_3 alkyl;

W_1 and W_2 are each independently null, O, or NH, or when W_1 and W_2 are both NH, then both W_1 and W_2 can be taken together to form a piperazine moiety;

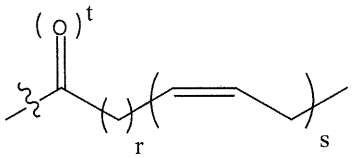
----- represents an optional bond that when present requires that Q is null;

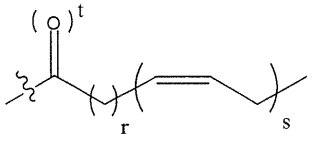
a and c are each independently H, CH_3, -OCH_3, -OCH_2CH_3, or C(O)OH;

b is H, CH_3, C(O)OH, or O-Z;

d is H or C(O)OH;

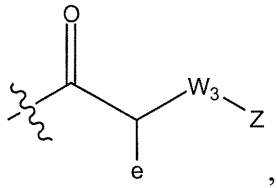
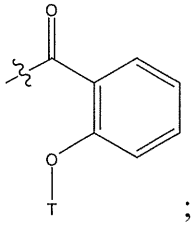
each n, o, p, and q is independently 0 or 1;

each Z is H or  ;

with the proviso that there is at least one  in the compound;

each r is independently 2 or 3, and each s is independently 5 or 6; or each r is independently 7 and each s is independently 3;

each t is independently 0 or 1;

Q is null, $C(O)CH_3$, Z,  , or  ;

e is H or any one of the side chains of the naturally occurring amino acids;

W_3 is null, -O-, or -N(R)-;

R is H or C_1-C_3 alkyl; and

T is H, $C(O)CH_3$, or Z.

12. The compound for the use according to claim 11, wherein the inflammation is associated with a disorder or disease selected from Type II diabetes, insulin resistance cardiovascular disease, arrhythmia, atherosclerosis, coronary artery disease, hypertriglyceridemia, dyslipidemia, retinopathy, nephropathy, neuropathy, macular edema, ileitis, ulcerative colitis, Barrett's syndrome, Crohn's disease, neurodegeneration, Alzheimer's disease, multiple sclerosis, Huntington's disease, infectious meningitis, encephalomyelitis, Parkinson's disease, amyotrophic lateral sclerosis, encephalitis, muscular dystrophy, dermatomositis, inclusion body myositis, polymyositis, or cachexia.

13. The compound for use according to claim 12, wherein the inflammation is associated with muscular dystrophy.

14. The compound for use according to claim 12, wherein the inflammation is associated with Type II diabetes.

15. The compound for use according to claim 12, wherein the inflammation is associated with inflammatory bowel disease.

16. The compound for use according to claim 12, wherein the inflammation is associated with ulcerative colitis.

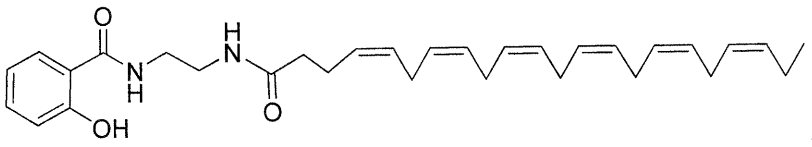
17. The compound for use according to claim 12, wherein the inflammation is associated with Crohn's disease.

18. The compound for use according to claim 12, wherein the inflammation is associated with cachexia.

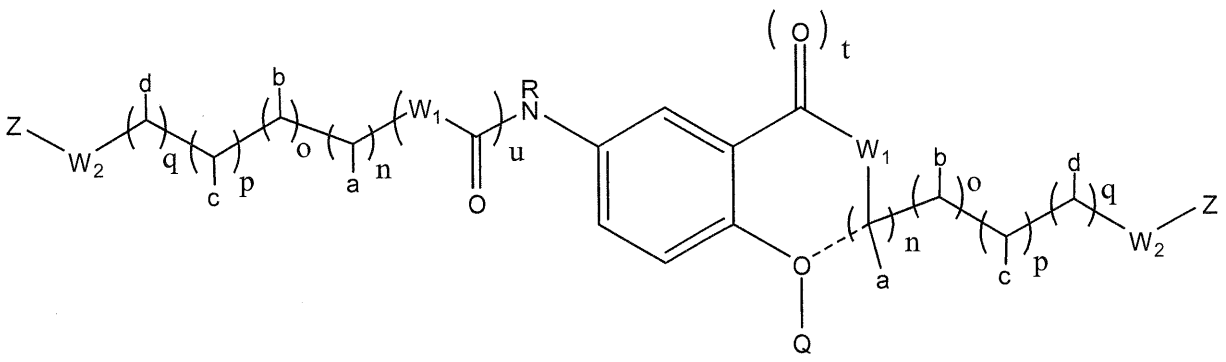
19. The compound for use according to any one of claims 11-18, wherein the compound is as defined in any one of claims 1-9.

20. The compound for use according to claim 11, wherein the muscle wasting disorder is Duchenne's Muscular Dystrophy.

21. The compound for use according to claim 11, wherein the compound is



22. A compound of Formula III,



Formula III,

or a pharmaceutically acceptable salt, hydrate, solvate, enantiomer, or stereoisomer thereof, wherein:

each W_1 and W_2 are independently null, O, or NH, or when W_1 and W_2 are both NH, then both W_1 and W_2 can be taken together to form a piperazine moiety;

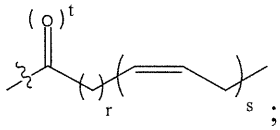
- - - - - represents an optional bond that when present requires that Q is null;

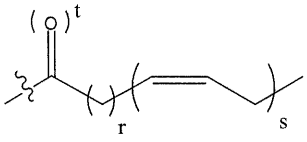
each a and c are independently H, CH_3, $-OCH_3$, $-OCH_2CH_3$, or C(O)OH;

each b is H, CH_3, C(O)OH, or O-Z;

each d is H or C(O)OH;

each n, o, p, and q is independently 0 or 1;

each Z is H or ;

with the proviso that there is at least one  in the compound;

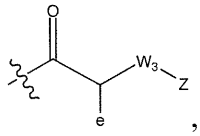
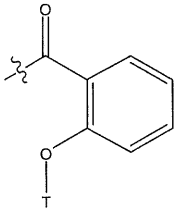
each r is independently 2, 3, or 7;

each s is independently 3, 5, or 6;

each t is 1;

u is 0 or 1;

with the proviso that when r is 7, s is 3;

Q is null, $C(O)CH_3$, Z, , or ;

e is H or any one of the side chains of the naturally occurring amino acids;

W_3 is null, -O-, or –N(R)-;

R is H or C_1-C_3 alkyl; and

T is H, $C(O)CH_3$, or Z.

23. The compound of claim 22, wherein W_1 is O and Q is H.

24. The compound of claim 22, wherein the compound is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,


,


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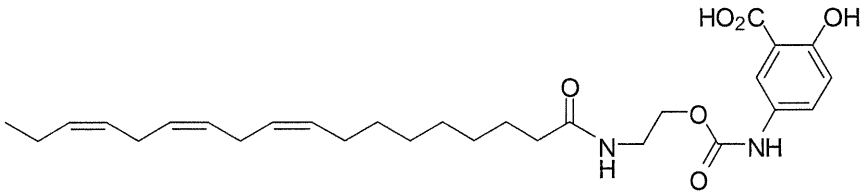
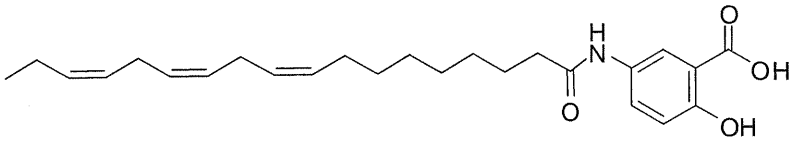

, or


.

25. The compound of claim 22, wherein the compound is

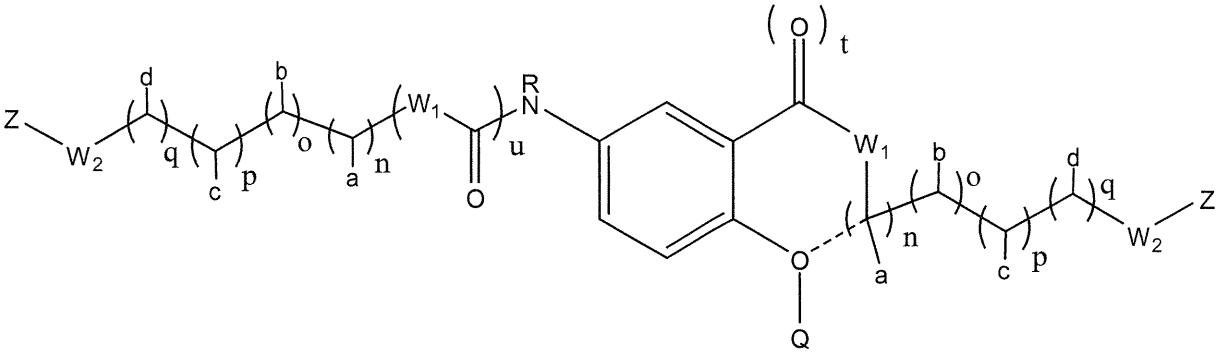

.

26. The compound of claim 22, wherein at least one W_1 is NH, and Q is H.

27. The compound of claim 26, wherein Q is H.

28. A pharmaceutical composition comprising a compound according to any one of claims 22-27 and a pharmaceutically acceptable carrier.

29. A compound for use in the treatment of an inflammation that is associated with a metabolic disorder, an inflammatory bowel disease, a neurodegenerative disorder, or a muscle wasting disorder, wherein the compound is a compound of Formula III:



Formula III

or pharmaceutically acceptable salt, hydrate, solvate, enantiomer, or stereoisomer thereof, wherein:

each W_1 and W_2 are independently null, O, or NH, or when W_1 and W_2 are both NH, then both W_1 and W_2 can be taken together to form a piperazine moiety;

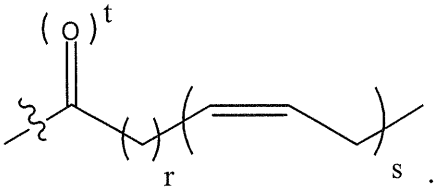
- - - - - represents an optional bond that when present requires that Q is null;

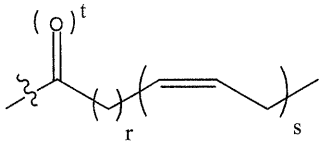
each a and c are independently H, CH_3, $-OCH_3$, $-OCH_2CH_3$, or C(O)OH;

each b is H, CH_3, C(O)OH, or O-Z;

each d is H or C(O)OH;

each n, o, p, and q is independently 0 or 1;

each Z is H or  ;

with the proviso that there is at least one  in the compound;

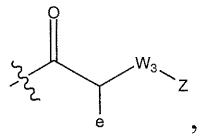
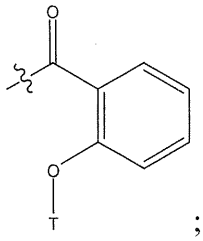
each r is independently 2, 3, or 7;

each s is independently 3, 5, or 6;

each t is independently 1;

u is 0 or 1;

with the proviso that when r is 7, s is 3;

Q is null, $C(O)CH_3$, Z, , or ;

e is H or any one of the side chains of the naturally occurring amino acids;

W_3 is null, -O-, or –N(R)-;

R is H or C_1-C_3 alkyl; and

T is H, $C(O)CH_3$, or Z.

30. The compound for use according to claim 29, wherein the inflammation is associated with a metabolic disorder.

31. The compound for use according to claim 30, wherein the metabolic disorder is Type II diabetes, insulin resistance cardiovascular disease, arrhythmia, atherosclerosis, coronary artery disease, hypertriglyceridemia, dyslipidemia, retinopathy, nephropathy, neuropathy, or macular edema.

32. The compound for use of claim 30, wherein the metabolic disorder is Type II diabetes.

33. The compound for use according to claim 29, wherein the inflammation is associated with an inflammatory bowel disease.

34. The compound for use according to claim 33, wherein the inflammatory bowel diseas is ileitis, ulcerative colitis, Barrett's syndrome, or Crohn's disease.

35. The compound for use according to claim 33, wherein the inflammatory disease is ulcerative colitis.

36. The compound for use according to claim 33, wherein the inflammatory disease is Crohn's disease.

37. The compound for use according to claim 29, wherein the inflammation is associated with a neurodegenerative disorder.

38. The compound for use according to claim 37, wherein the neurodegenerative disorder is neurodegeneration, Alzheimer's disease, multiple sclerosis, Huntington's disease, infectious meningitis, encephalomyelitis, Parkinson's disease, amyotrophic lateral sclerosis, or encephalitis.

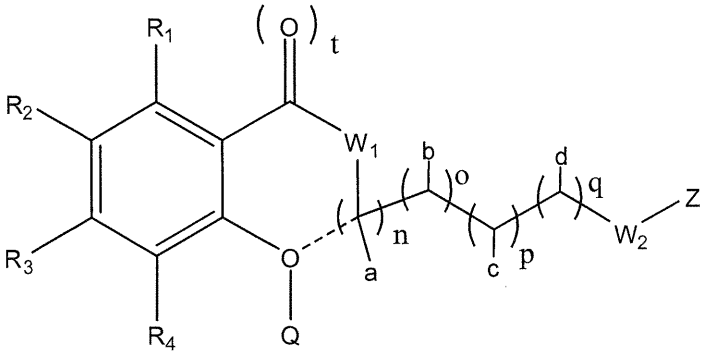
39. The compound for use according to claim 29, wherein the inflammation is associated with a muscle wasting disorder.

40. The compound for use according to claim 39, wherein the muscle wasting disorder is Duchenne's muscular dystrophy, dermatomositis, inclusion body myositis, polymyositis, or cachexia.

41. The compound for use according to claim 39, wherein the muscle wasting disorder is Duchenne's muscular dystrophy.

42. The compound for use according to any one of claims 29-41, wherein the compound is as defined in any one of claims 22-28.

43. Use of a compound in the manufacture of a medicament for treating an inflammation that is associated with a metabolic disorder, an inflammatory bowel disease, a neurodegenerative disorder, or a muscular wasting disorder, wherein the compound is a compound of formula I:



Formula I

or a pharmaceutically acceptable salt, hydrate, solvate, enantiomer, or stereoisomer thereof, wherein:

R_1, R_2, R_3, and R_4 are each independently selected from the group consisting of H, Cl, F, CN, -NH(C_1-C_3 alkyl), -N(C_1-C_3 alkyl)$_2$, -NH(C(O)C_1-C_3 alkyl), -N(C(O)C_1-C_3 alkyl)$_2$,-C(O)H, -C(O)C_1-C_3 alkyl, -C(O)OC_1-C_3 alkyl, -C(O)NH_2, -C(O)NH(C_1-C_3 alkyl), -C(O)N(C_1-C_3 alkyl)$_2$, -O-C_1-C_3 alkyl, -S(O)C_1-C_3 alkyl, and -S(O)$_2$$C_1$-$C_3$ alkyl;

W_1 and W_2 are each independently null, O, or NH, or when W_1 and W_2 are both NH, then both W_1 and W_2 can be taken together to form a piperazine moiety;

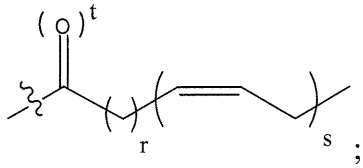
----- represents an optional bond that when present requires that Q is null;

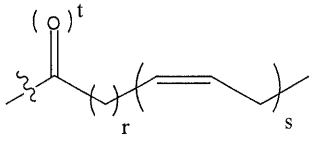
a and c are each independently H, CH_3, -OCH_3, -OCH_2CH_3, or C(O)OH;

b is H, CH_3, C(O)OH, or O-Z;

d is H or C(O)OH;

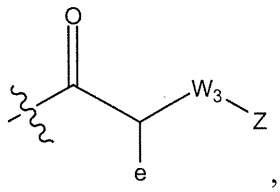
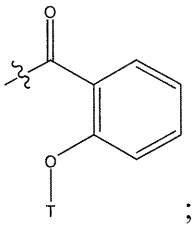
each n, o, p, and q is independently 0 or 1;

each Z is H or  ;

with the proviso that there is at least one  in the compound;

each r is independently 2 or 3, and each s is independently 5 or 6; or each r is independently 7 and each s is independently 3;

each t is independently 0 or 1;

Q is null, $C(O)CH_3$, Z, , or ;

e is H or any one of the side chains of the naturally occurring amino acids;

W_3 is null, -O-, or -N(R)-;

R is H or C_1-C_3 alkyl; and

T is H, $C(O)CH_3$, or Z.

44. The use according to claim 43, wherein the inflammation is associated with a disorder or disease selected from Type II diabetes, insulin resistance cardiovascular disease, arrhythmia, atherosclerosis, coronary artery disease, hypertriglyceridemia, dyslipidemia, retinopathy, nephropathy, neuropathy, macular edema, ileitis, ulcerative colitis, Barrett's syndrome, Crohn's disease, neurodegeneration, Alzheimer's disease, multiple sclerosis, Huntington's disease, infectious meningitis, encephalomyelitis, Parkinson's disease, amyotrophic lateral sclerosis, encephalitis, muscular dystrophy, dermatomositis, inclusion body myositis, polymyositis, or cachexia.

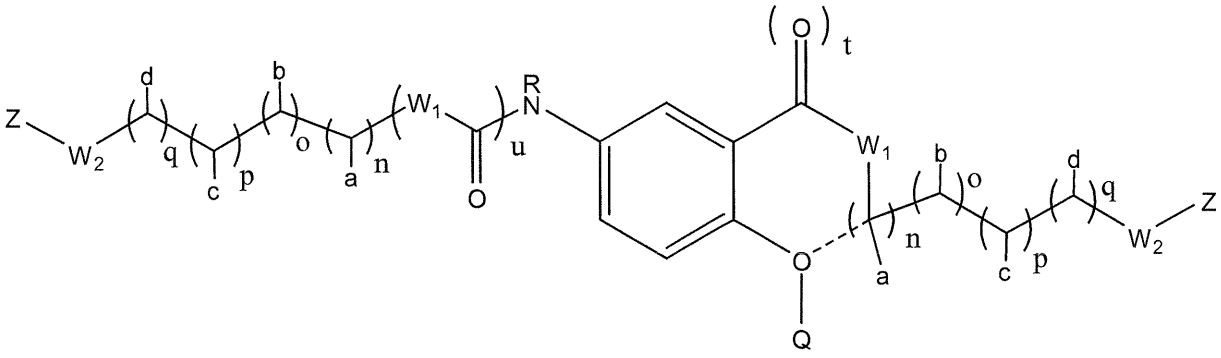
45. The use according to claim 43, wherein the muscle wasting disorder is Duchenne's Muscular Dystrophy.

46. The use according to claim 43, wherein the muscle wasting disorder is cachexia.

47. The use according to any one of claims 43-46, wherein the compound is



48. Use of a compound in the manufacture of a medicament for the treatment of an inflammation that is associated with a metabolic disorder, an inflammatory bowel disease, a neurodegenerative disorder, or a muscle wasting disorder, wherein the compound is a compound of Formula III:



Formula III

or pharmaceutically acceptable salt, hydrate, solvate, enantiomer, or stereoisomer thereof, wherein:

each W_1 and W_2 are independently null, O, or NH, or when W_1 and W_2 are both NH, then both W_1 and W_2 can be taken together to form a piperazine moiety;

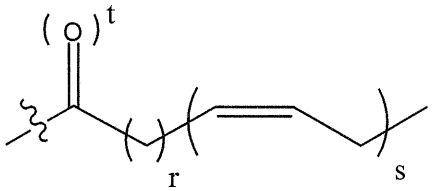
- - - - - represents an optional bond that when present requires that Q is null;

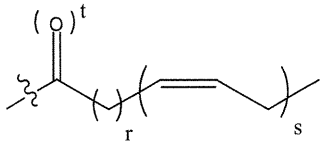
each a and c are independently H, CH_3, $-OCH_3$, $-OCH_2CH_3$, or C(O)OH;

each b is H, CH_3, C(O)OH, or O-Z;

each d is H or C(O)OH;

each n, o, p, and q is independently 0 or 1;

each Z is H or  ;

with the proviso that there is at least one  in the compound;

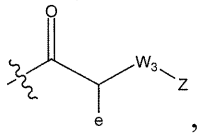
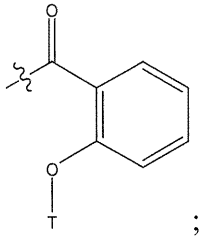
each r is independently 2, 3, or 7;

each s is independently 3, 5, or 6;

each t is independently 1;

u is 0 or 1;

with the proviso that when r is 7, s is 3;

Q is null, $C(O)CH_3$, Z, , or ;

e is H or any one of the side chains of the naturally occurring amino acids;

W_3 is null, -O-, or –N(R)-;

R is H or C_1-C_3 alkyl; and

T is H, $C(O)CH_3$, or Z.

49. The use according to claim 48, wherein the inflammation is associated with a metabolic disorder selected from Type II diabetes, insulin resistance cardiovascular disease, arrhythmia, atherosclerosis, coronary artery disease, hypertriglyceridemia, dyslipidemia, retinopathy, nephropathy, neuropathy, or macular edema.

50. The use according to claim 48, wherein the inflammatory bowel disease is ileitis, ulcerative colitis, Barrett's syndrome, or Crohn's disease.

51. The use according to claim 48, wherein the neurodegenerative disorder is neurodegeneration, Alzheimer's disease, multiple sclerosis, Huntington's disease, infectious meningitis, encephalomyelitis, Parkinson's disease, amyotrophic lateral sclerosis, or encephalitis.

52. The use according to claim 48, wherein the muscle wasting disorder is Duchenne's muscular dystrophy, dermatomositis, inclusion body myositis, polymyositis, or cachexia.

53. The use according to claim 52, wherein the muscle wasting disorder is Duchenne's muscular dystrophy.

54. The use according to any one of claims 48-53, wherein the compound is

