membered heterocyclyl), 4 to 8 ring atoms (4- to 8-membered heterocyclyl), or 5 to 8 ring atoms (5- to 8-membered heterocyclyl). Whenever it appears herein, a numerical range such as "3 to 18" refers to each integer in the given range; *e.g.*, "3 to 18 ring atoms" means that the heterocyclyl group can consist of 3 ring atoms, 4 ring atoms, 5 ring atoms, 6 ring atoms, 7 ring atoms, 8 ring atoms, 9 ring atoms, 10 ring atoms, etc., up to and including 18 ring atoms. Examples of heterocyclyl groups include, but are not limited to, imidazolidinyl, oxazolidinyl, thiazolidinyl, pyrazolidinyl, isoxazolidinyl, isothiazolidinyl, morpholinyl, pyrrolidinyl, tetrahydrofuryl, piperidinyl. Unless otherwise specified, a heterocyclyl group is optionally substituted.

[0029] As used herein, and unless otherwise specified, the term "heterocyclylene" is a divalent heterocyclyl group. Unless otherwise specified, a heterocyclylene group is optionally substituted.

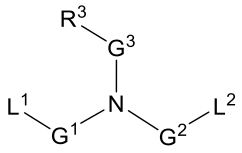
[0030] As used herein, and unless otherwise specified, the term "aryl" refers to a monocyclic aromatic group and/or multicyclic monovalent aromatic group that contain at least one aromatic hydrocarbon ring. In certain embodiments, the aryl has from 6 to 18 ring carbon atoms (C_6-C_{18} aryl), from 6 to 14 ring carbon atoms (C_6-C_{14} aryl), or from 6 to 10 ring carbon atoms (C_6-C_{10} aryl). Examples of aryl groups include, but are not limited to, phenyl, naphthyl, fluorenyl, azulenyl, anthryl, phenanthryl, pyrenyl, biphenyl, and terphenyl. The term "aryl" also refers to bicyclic, tricyclic, or other multicyclic hydrocarbon rings, where at least one of the rings is aromatic and the others of which may be saturated, partially unsaturated, or aromatic, for example, dihydronaphthyl, indenyl, indanyl, or tetrahydronaphthyl (tetralinyl). Unless otherwise specified, an aryl group is optionally substituted.

[0031] As used herein, and unless otherwise specified, the term "arylene" is a divalent aryl group. Unless otherwise specified, an arylene group is optionally substituted.

[0032] As used herein, and unless otherwise specified, the term "heteroaryl" refers to a monocyclic aromatic group and/or multicyclic aromatic group that contains at least one aromatic ring, wherein at least one aromatic ring contains one or more (*e.g.*, one, one or two, one to three, or one to four) heteroatoms independently selected from O, S, and N. The heteroaryl may be attached to the main structure at any heteroatom or carbon atom. In certain embodiments, the

WHAT IS CLAIMED IS:

1. A compound of Formula (I):



(I),

or a pharmaceutically acceptable salt, prodrug or stereoisomer thereof, wherein:

G^1 and G^2 are each independently, C_2-C_{12} alkylene, or C_2-C_{12} alkenylene, wherein one or more -CH_2- in the alkylene or alkenylene is optionally replaced by -O-;

L^1 is –OC(=O)R^1, -C(=O)OR^1, -OC(=O)OR^1, -C(=O)R^1, -OR^1, -S(O)$_x$$R^1$, -S-S$R^1$, -C(=O)S$R^1$, -SC(=O)$R^1$, -N$R^a$C(=O)$R^1$, -C(=O)N$R^b$$R^c$, -N$R^a$C(=O)N$R^b$$R^c$, -OC(=O)N$R^b$$R^c$, -N$R^a$C(=O)O$R^1$, -SC(=S)$R^1$, -C(=S)S$R^1$, -C(=S)$R^1$, -CH(OH)$R^1$, -P(=O)(O$R^b$)(O$R^c$), -($C_6$-$C_{10}$ arylene)-R^1, -(6- to 10-membered heteroarylene)-R^1, or R^1;

L^2 is –OC(=O)R^2, -C(=O)OR^2, -OC(=O)OR^2, -C(=O)R^2, -OR^2, -S(O)$_x$$R^2$, -S-S$R^2$, -C(=O)S$R^2$, -SC(=O)$R^2$, -N$R^d$C(=O)$R^2$, -C(=O)N$R^e$$R^f$, -N$R^d$C(=O)N$R^e$$R^f$, -OC(=O)N$R^e$$R^f$, -N$R^d$C(=O)O$R^2$, -SC(=S)$R^2$, -C(=S)S$R^2$, -C(=S)$R^2$, -CH(OH)$R^2$, -P(=O)(O$R^e$)(O$R^f$), -($C_6$-$C_{10}$ arylene)-R^2, -(6- to 10-membered heteroarylene)-R^2, or R^2;

R^1 and R^2 are each independently C_6-C_{32} alkyl or C_6-C_{32} alkenyl;

R^a, R^b, R^d, and R^e are each independently H, C_1-C_{24} alkyl, or C_2-C_{24} alkenyl;

R^c and R^f are each independently C_1-C_{32} alkyl or C_2-C_{32} alkenyl;

G^3 is C_2-C_{24} alkylene, C_2-C_{24} alkenylene, C_3-C_8 cycloalkylene, or C_3-C_8 cycloalkenylene;

R^3 is -N(R^4)R^5;

R^4 is C_3-C_8 cycloalkyl, C_3-C_8 cycloalkenyl, or 4- to 8-membered non-aromatic heterocyclyl; and R^4 is unsubstituted or substituted with one or more hydroxyl, halogen, C_1-C_6 alkyl, unsubstituted aryl or oxo;

R^5 is C_1-C_{12} alkyl or C_3-C_8 cycloalkyl; and R^5 is unsubstituted, substituted with one or more hydroxyl, or substituted with one or more hydroxyl and one or more oxo;

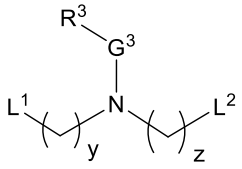
x is 0, 1 or 2; and

wherein, unless otherwise specified, each of alkyl, alkenyl, cycloalkyl, cycloalkenyl, non-aromatic heterocyclyl, aryl, alkylene, alkenylene, cycloalkylene, cycloalkenylene, arylene, and heteroarylene is independently optionally substituted;

wherein the prodrug comprises an acetate, formate or benzoate derivative of an alcohol functional group of said compound of Formula (I), and/or comprises an amide derivative of an amine functional group of said compound of Formula (I).

2. The compound as claimed in claim 1, wherein G^1 and G^2 are each independently C_5 alkylene.

3. The compound as claimed in claim 1, which is a compound of Formula (I-A):



(I-A),

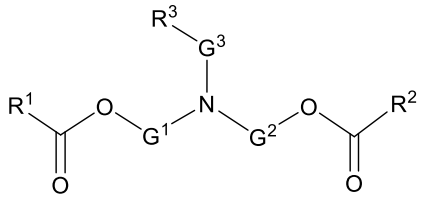
wherein y and z are each independently an integer from 2 to 12,

or a pharmaceutically acceptable salt, prodrug or stereoisomer thereof.

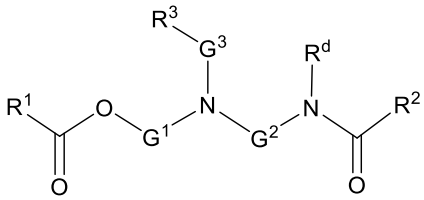
4. The compound as claimed in claim 3, wherein y is 5 and z is 5.

5. The compound as claimed in any one of claims 1 to 4, wherein L^1 is $–OC(=O)R^1$, $-C(=O)OR^1$, or $-C(=O)NR^bR^c$; and L^2 is $–OC(=O)R^2$, $-C(=O)OR^2$, or $-C(=O)NR^eR^f$.

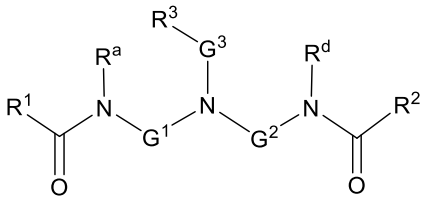
6. The compound as claimed in claim 1, which is a compound of Formula (I-B), (I-B'), (I-B"), (I-C), (I-D), or (I-E):



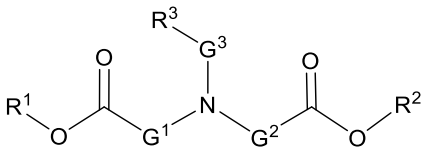
(I-B),



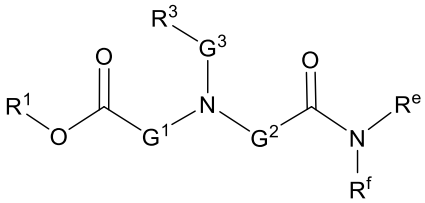
(I-B'),



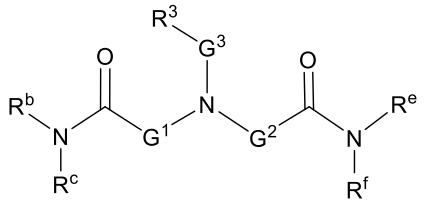
(I-B"),



(I-C),



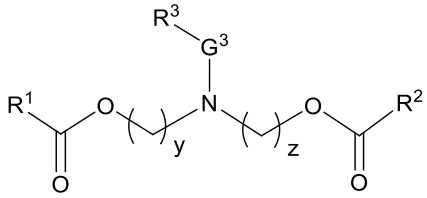
(I-D), or



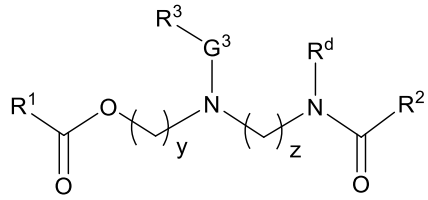
(I-E),

or a pharmaceutically acceptable salt, prodrug or stereoisomer thereof.

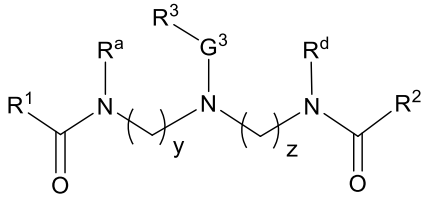
7. The compound as claimed in claim 6, which is a compound of Formula (I-F), (I-F'), (I-F"), (I-G), (I-H), or (I-I):



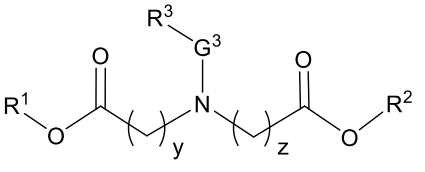
(I-F),



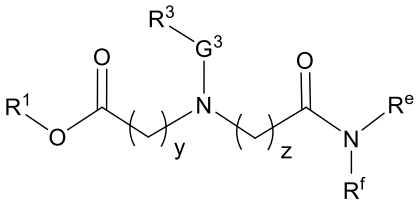
(I-F'),



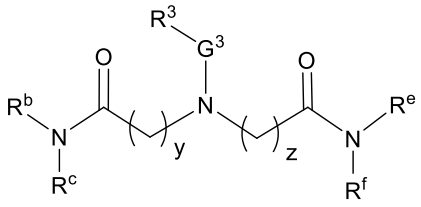
(I-F"),



(I-G),



(I-H), or



(I-I),

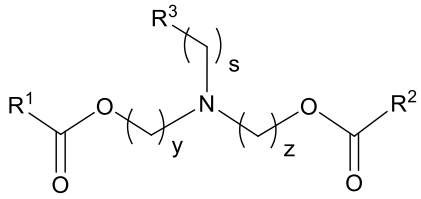
wherein y and z are each independently an integer from 2 to 12,

or a pharmaceutically acceptable salt, prodrug or stereoisomer thereof.

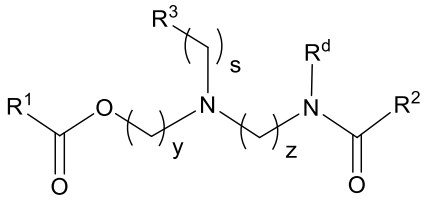
8. The compound as claimed in claim 7, wherein y is 5 and z is 5.

9. The compound as claimed in claim 1, wherein G^3 is C_2-C_4 alkylene.

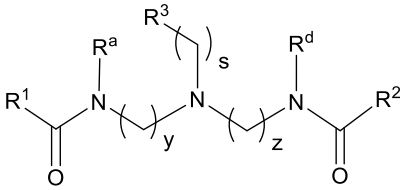
10. The compound as claimed in claim 1, which is a compound of Formula (I-J), (I-J'), (I-J"), (I-K), (I-L), or (I-M):



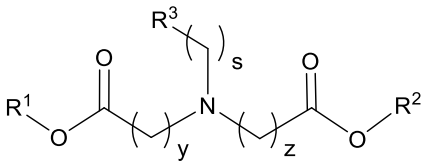
(I-J),



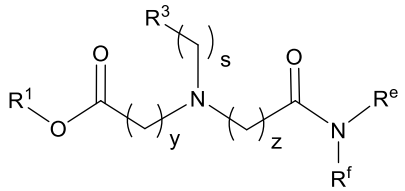
(I-J'),



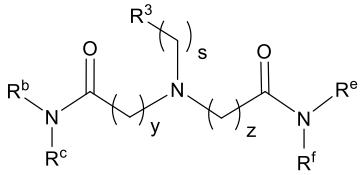
(I-J"),



(I-K),



(I-L), or



(I-M),

wherein y and z are each independently an integer from 2 to 12, and

s is an integer from 2 to 24,

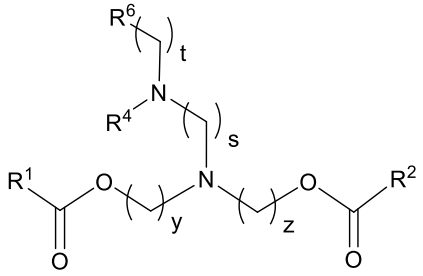
or a pharmaceutically acceptable salt, prodrug or stereoisomer thereof.

11. The compound as claimed in claim 10, wherein y is 5, z is 5, and s is 2.

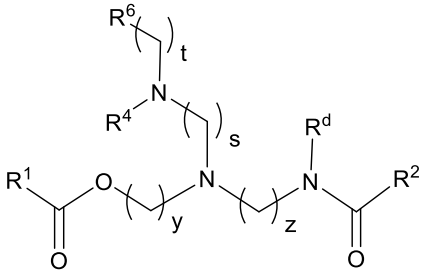
12. The compound as claimed in claim 10, wherein y is 5, z is 5, and s is 4.

13. The compound as claimed in any one of claims 1 to 12, wherein R^5 is substituted with one or more hydroxyl.

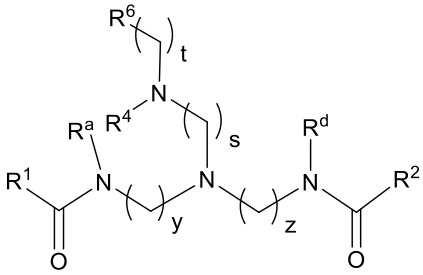
14. The compound as claimed in claim 1, which is a compound of Formula (I -N), (I -N'), (I -N"), (I -O), (I -P), or (I -Q):



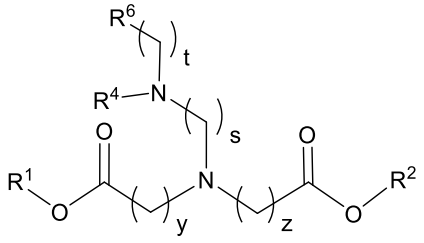
(I-N),



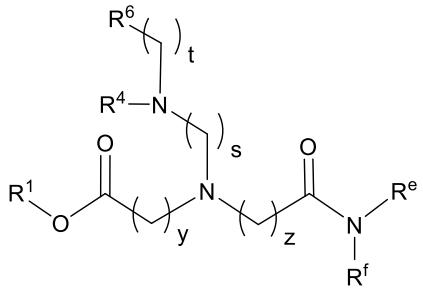
(I-N'),



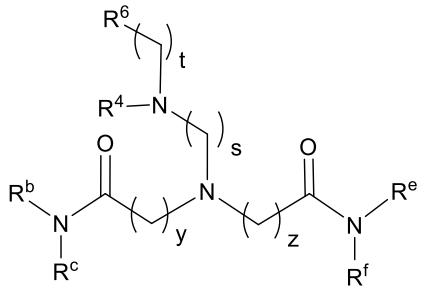
(I-N"),



(I-O),



(I-P), or



(I-Q),

wherein y and z are each independently an integer from 2 to 12,

s is an integer from 2 to 24,

t is an integer from 1 to 12, and

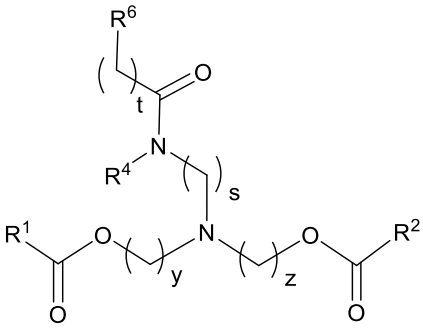
R^6 is hydrogen or hydroxyl,

or a pharmaceutically acceptable salt, prodrug or stereoisomer thereof.

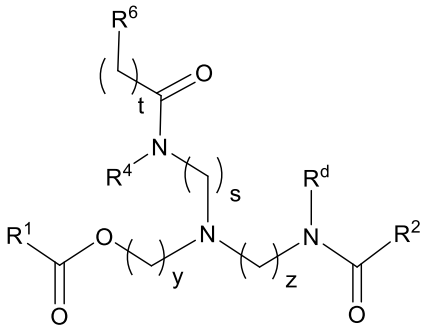
15. The compound as claimed in any one of claims 1 to 14, wherein R^5 is substituted with one or more hydroxyl and one or more oxo.

16. The compound as claimed in claim 15, wherein R^5 is $–CH_2CH_2OH$.

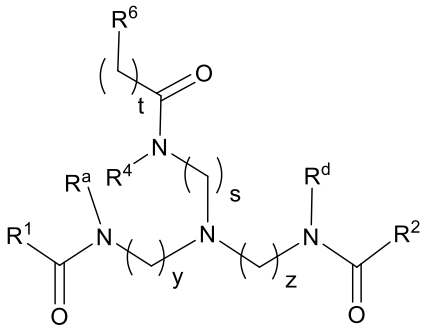
17. The compound as claimed in claim 1, which is a compound of Formula (I-R), (I-R'), (I-R"), (I-S), (I-T), or (I-U):



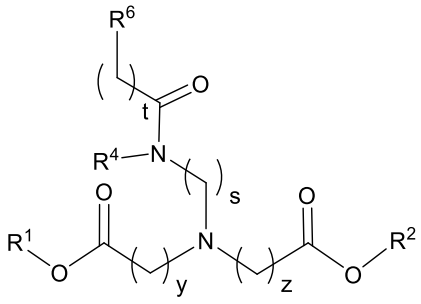
(I-R),



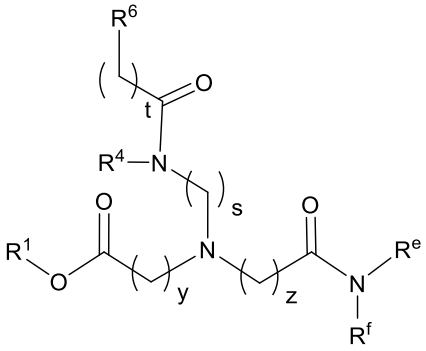
(I-R'),



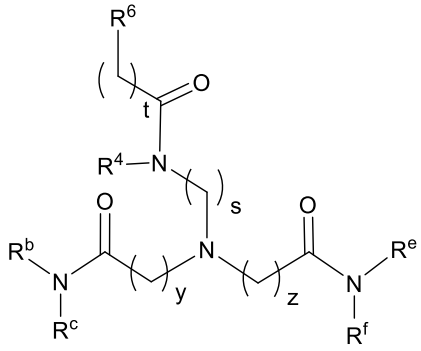
(I-R"),



(I-S),



(I-T), or



(I-U),

wherein y and z are each independently an integer from 2 to 12,

s is an integer from 2 to 24,

t is an integer from 1 to 12, and

R^6 is hydrogen or hydroxyl,

or a pharmaceutically acceptable salt, prodrug or stereoisomer thereof.

18. The compound as claimed in any one of claims 1 to 17, wherein R^4 is C_3-C_8 cycloalkyl.

19. The compound as claimed in any one of claims 1 to 18, wherein R^1 and R^2 are each independently branched C_6-C_{24} alkyl or branched C_6-C_{24} alkenyl.

20. The compound as claimed in claim 19, wherein R^1 and R^2 are each independently -R^7-$CH(R^8)(R^9)$, wherein R^7 is C_1-C_5 alkylene, and R^8 and R^9 are independently C_2-C_{10} alkyl or C_2-C_{10} alkenyl.

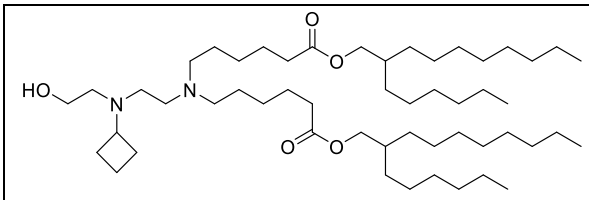
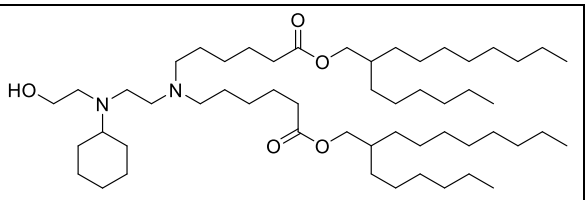
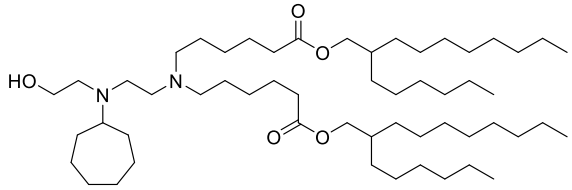
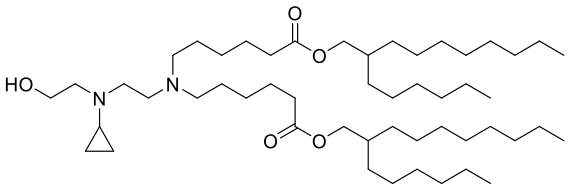
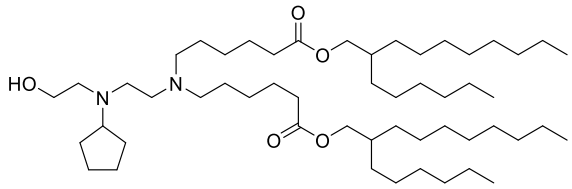
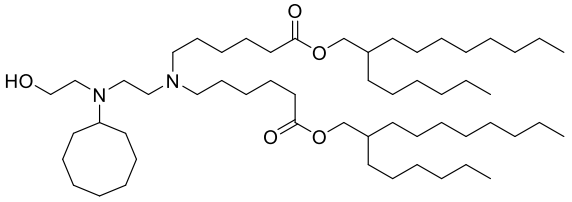
21. The compound as claimed in any one of claims 1 to 20, wherein R^a, R^b, R^d, and R^e are each independently H.

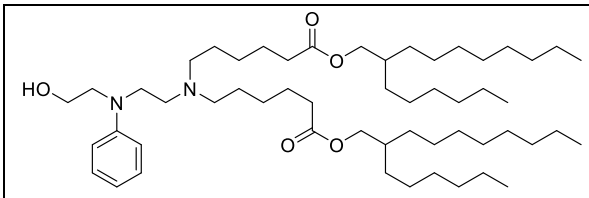
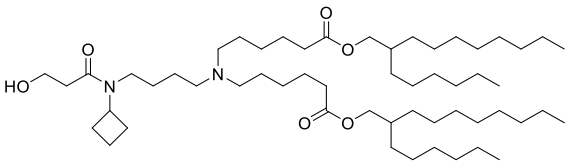
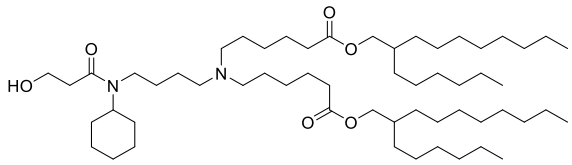
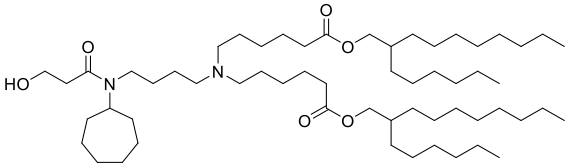
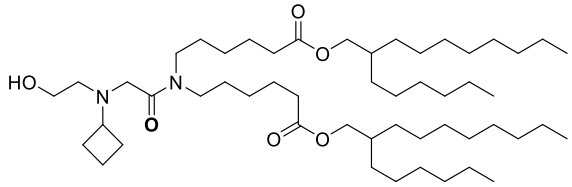
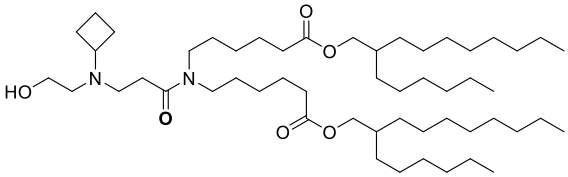
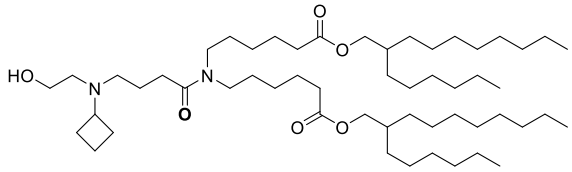
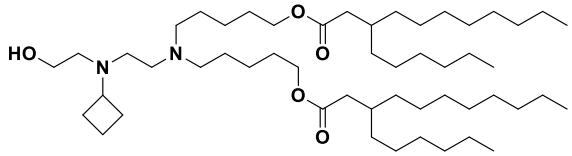
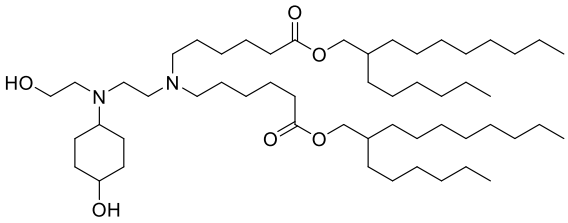
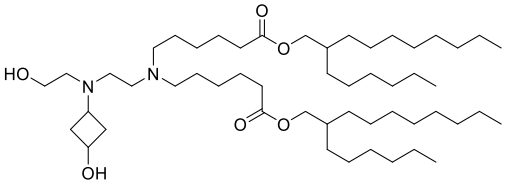
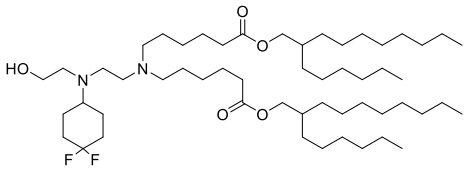
22. The compound as claimed in any one of claims 1 to 21, wherein R^c and R^f are each independently branched C_6-C_{24} alkyl or branched C_6-C_{24} alkenyl.

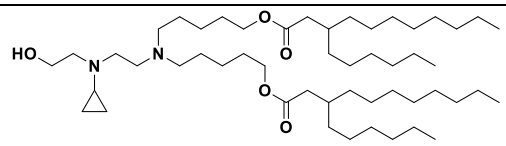
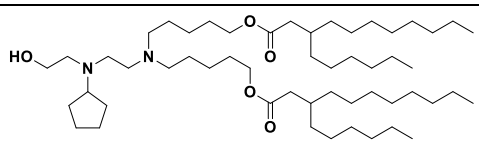
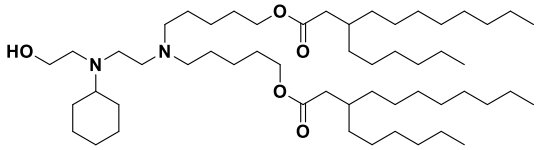
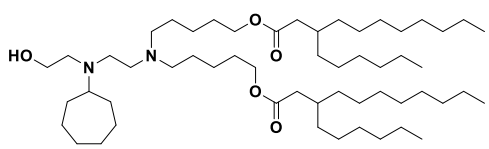
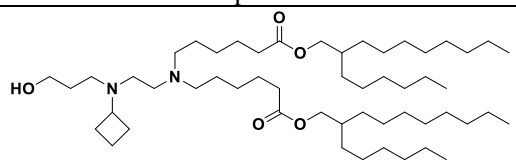
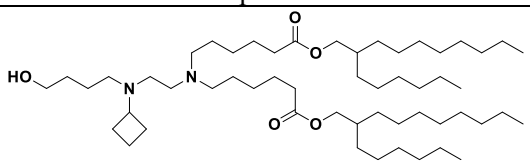
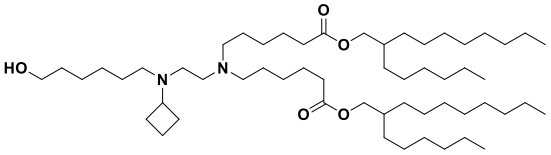
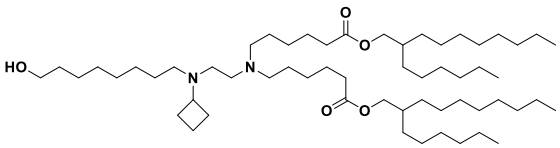
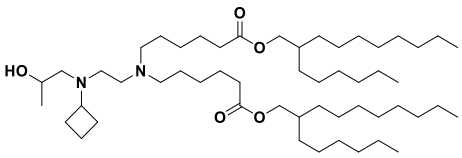
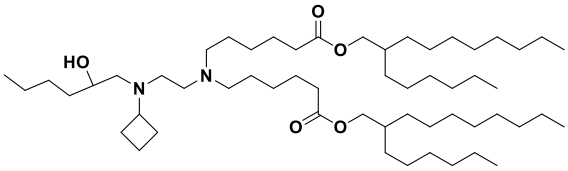
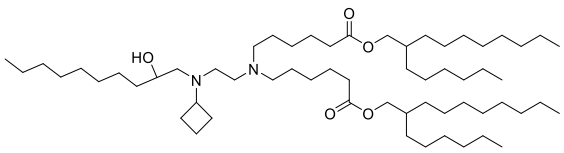
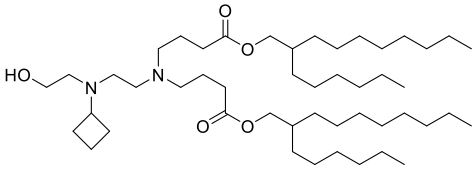
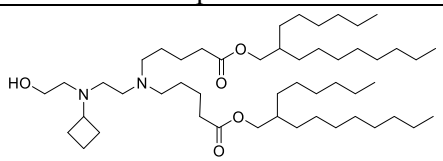
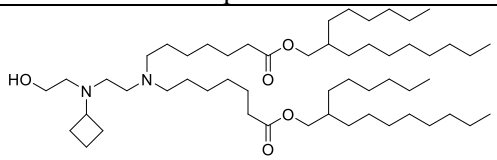
23. The compound as claimed in claim 22, wherein R^c and R^f are each independently -R^7-$CH(R^8)(R^9)$, wherein R^7 is C_1-C_5 alkylene, and R^8 and R^9 are independently C_2-C_{10} alkyl or C_2-C_{10} alkenyl.

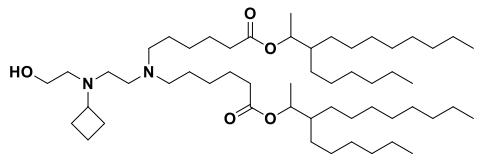
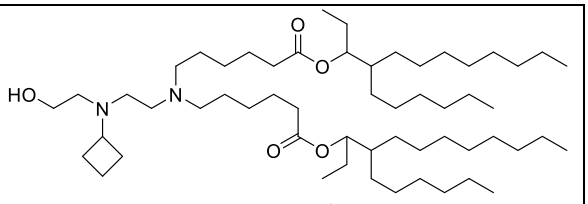
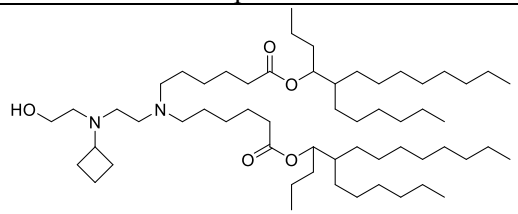
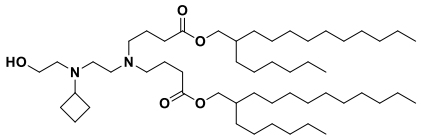
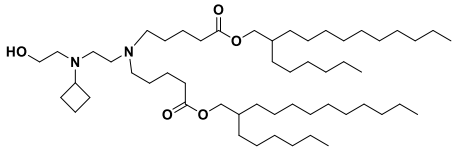
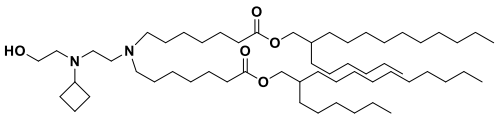
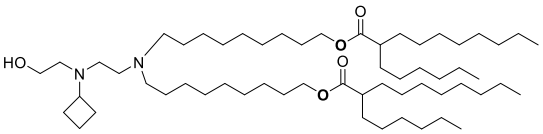
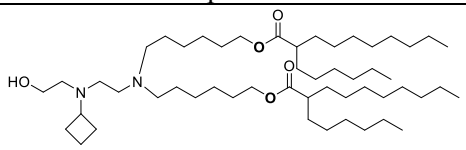
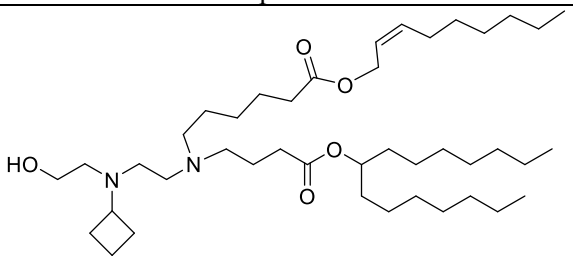
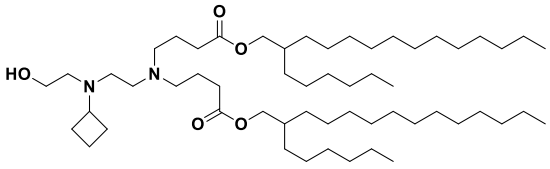
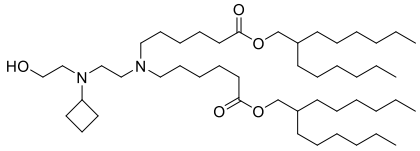
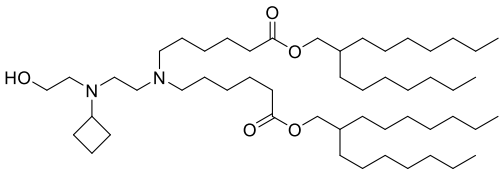
24. The compound as claimed in any one of claims 1 to 23, wherein R^4 is substituted with one hydroxyl.

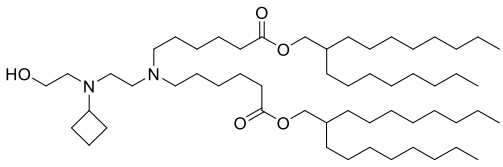
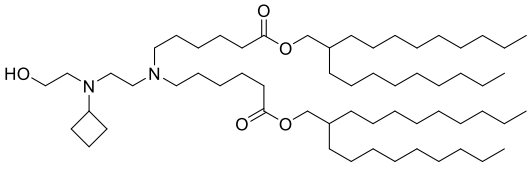
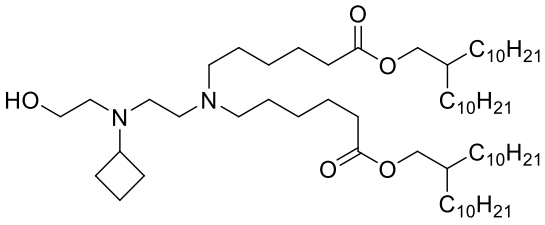
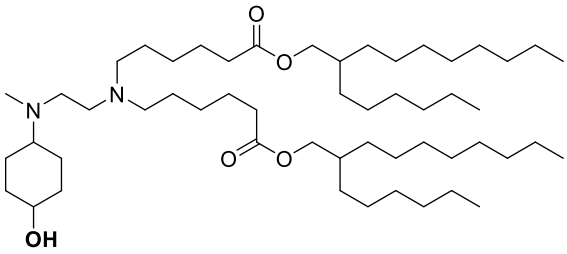
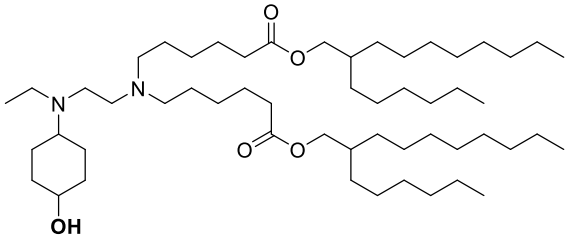
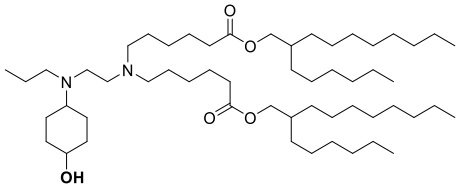
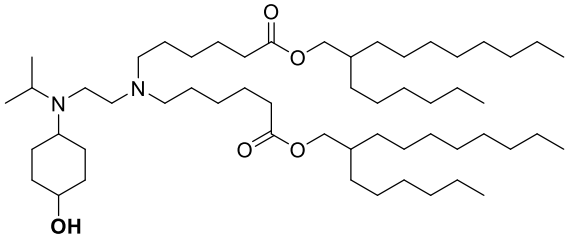
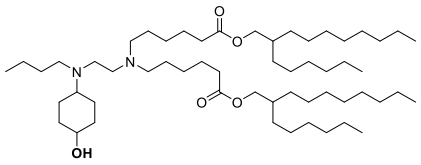
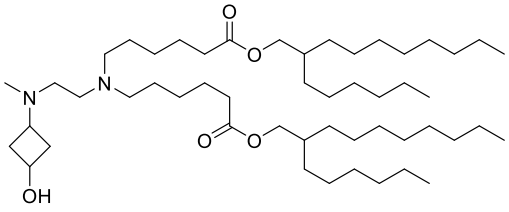
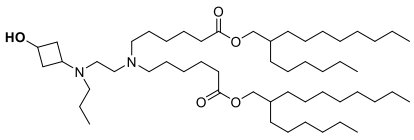
25. A compound, or a pharmaceutically acceptable salt, prodrug or stereoisomer thereof, wherein the compound is selected from the group consisting of:

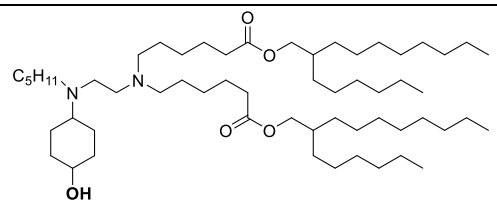
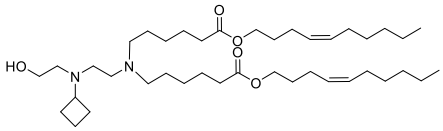
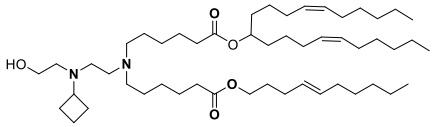
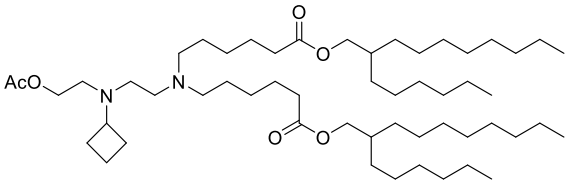
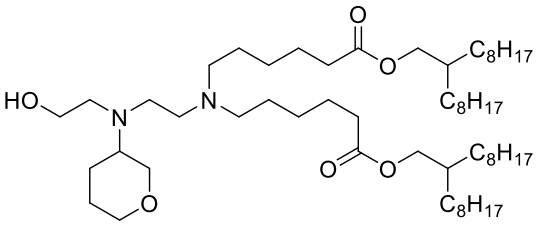
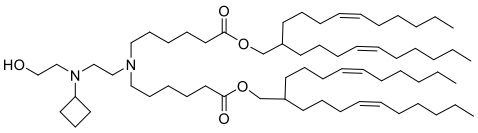
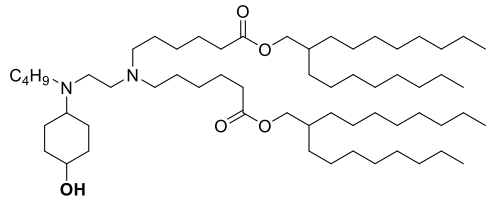
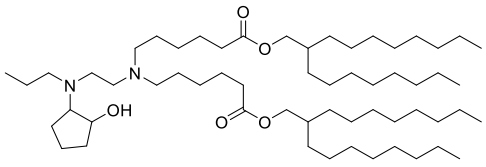
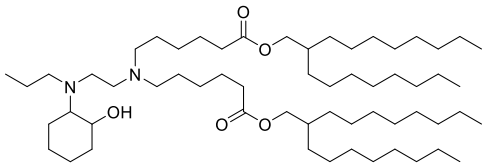
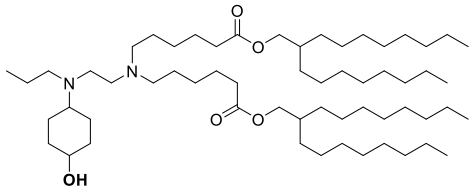
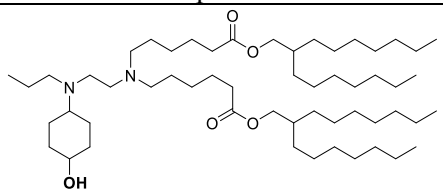
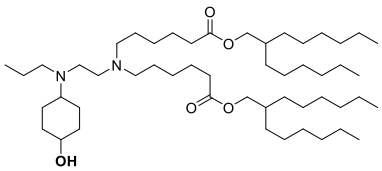
<table>
<tr><td>
Compound 1</td><td>
Compound 2</td></tr>
<tr><td>
Compound 3</td><td>
Compound 4</td></tr>
<tr><td>
Compound 5</td><td>
Compound 6</td></tr>
</table>

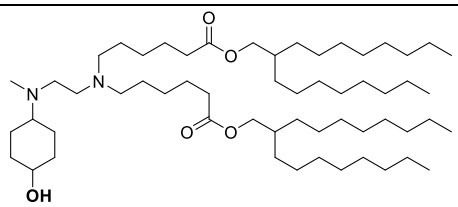
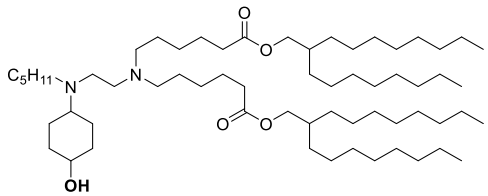
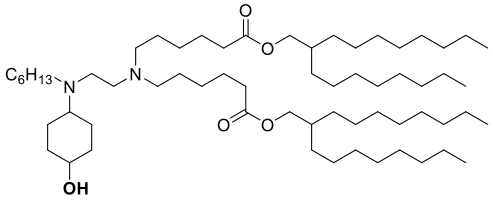
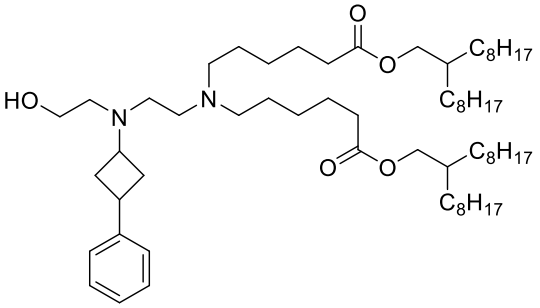
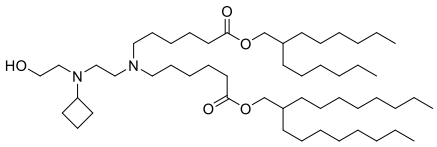
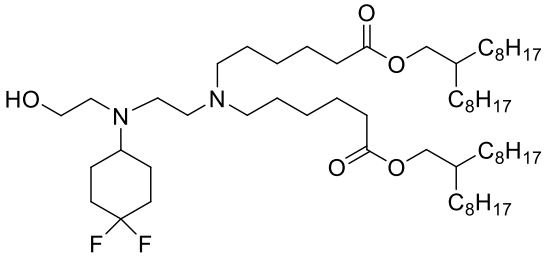
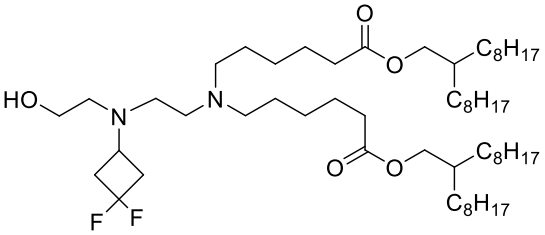
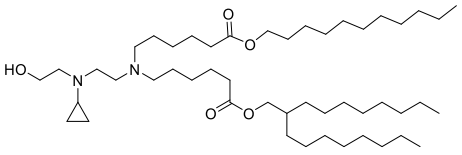
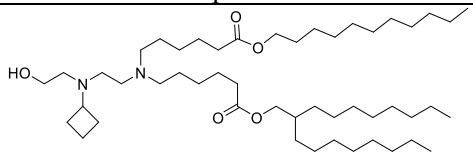
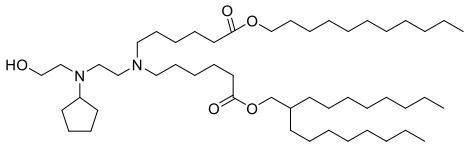
 Compound 7	 Compound 8
 Compound 9	 Compound 10
 Compound 11	 Compound 12
 Compound 13	
 Compound 20	 Compound 21
 Compound 22	 Compound 23

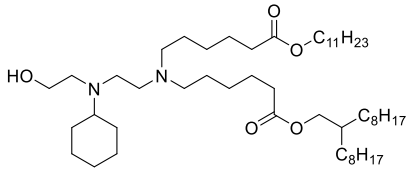
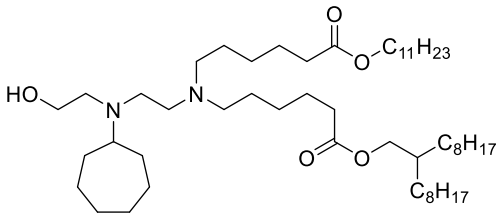
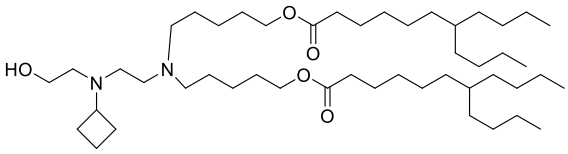
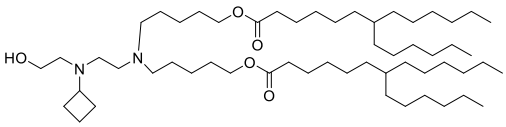
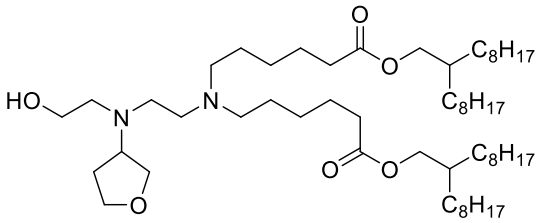
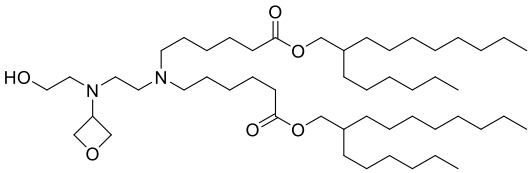
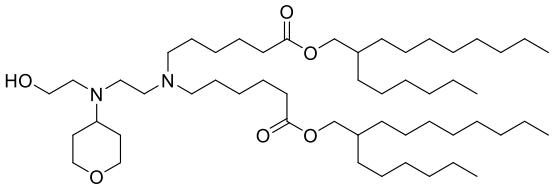
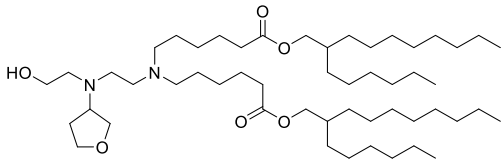
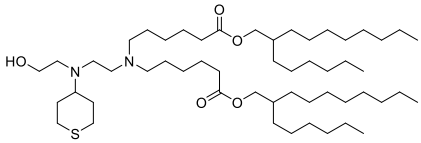
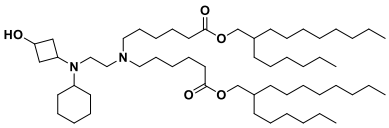
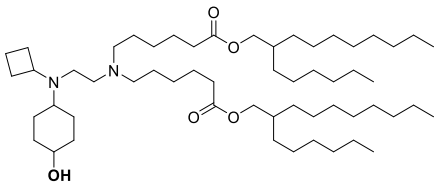
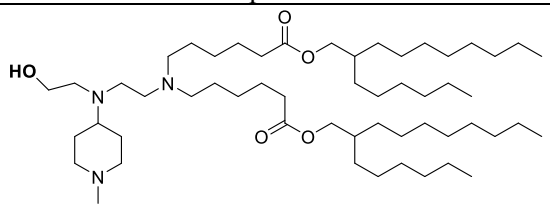
 Compound 24	 Compound 25
 Compound 26	 Compound 27
 Compound 28	 Compound 29
 Compound 30	 Compound 31
 Compound 32	 Compound 33
 Compound 34	 Compound 35
 Compound 36	 Compound 37

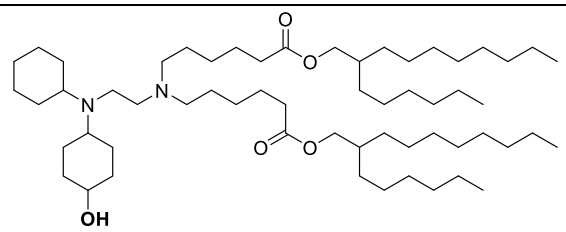
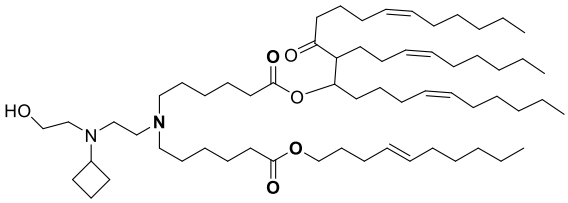
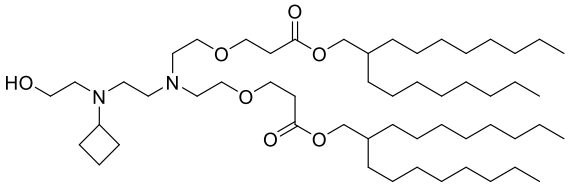
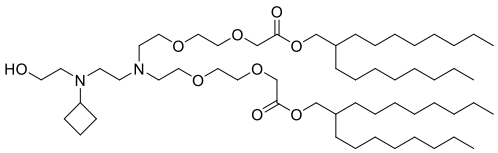
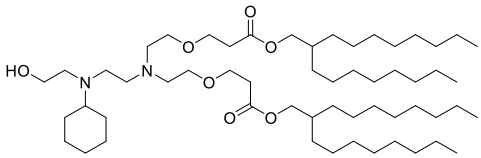
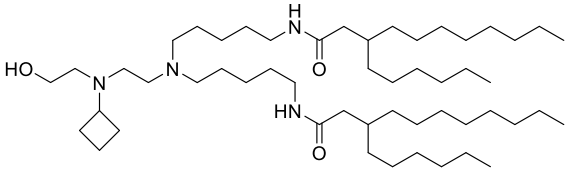
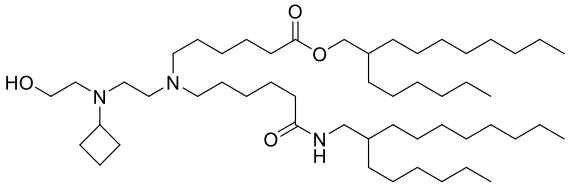
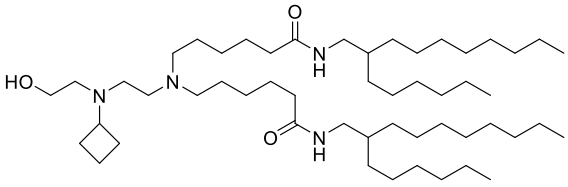
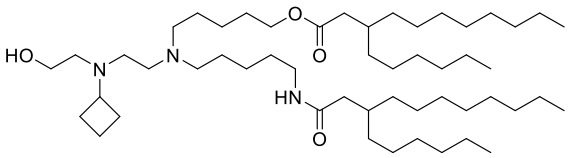
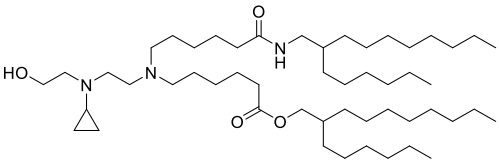
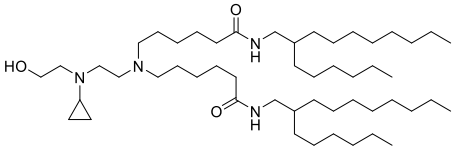
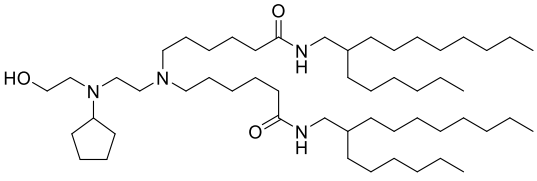
 Compound 38	 Compound 39
 Compound 40	 Compound 41
 Compound 42	 Compound 43
 Compound 44	 Compound 45
 Compound 46	 Compound 47
 Compound 48	 Compound 49

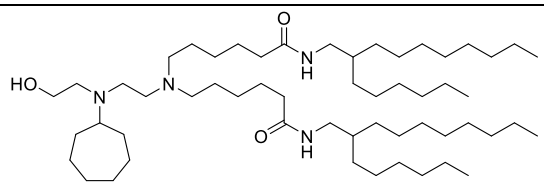
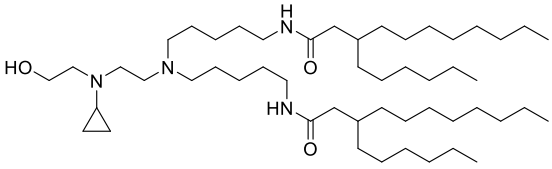
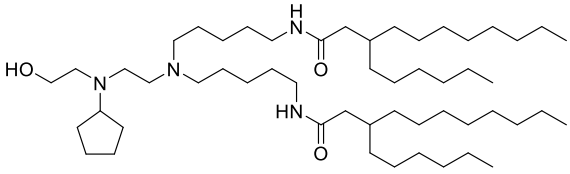
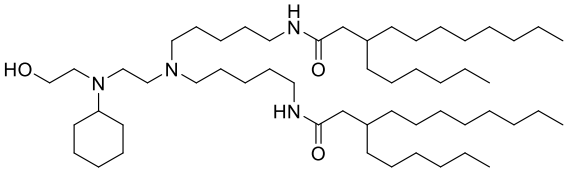
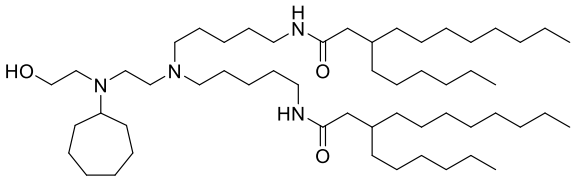
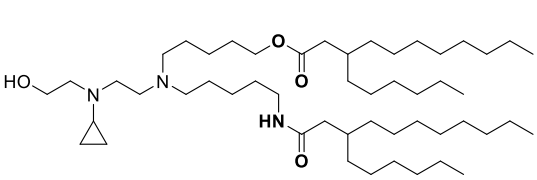
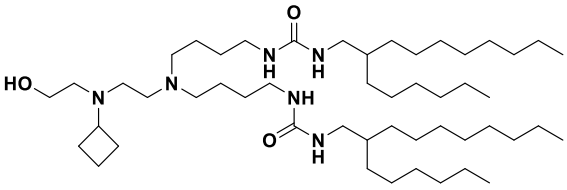
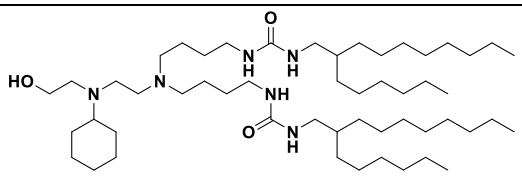
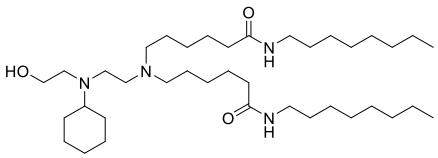
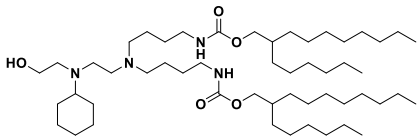
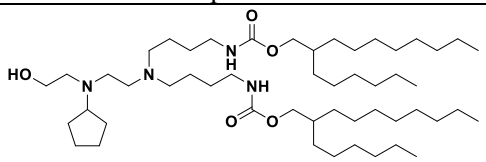
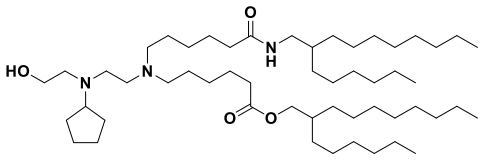
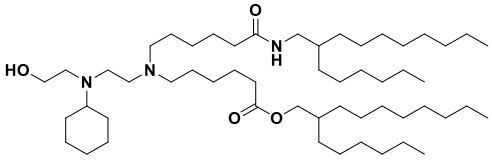
 Compound 50	 Compound 51
 Compound 52	 Compound 54
 Compound 55	 Compound 56
 Compound 57	 Compound 58
 Compound 59	 Compound 60

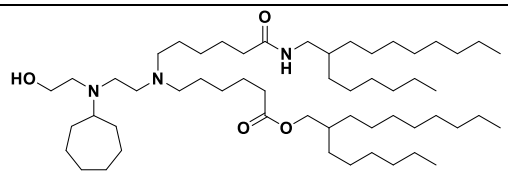
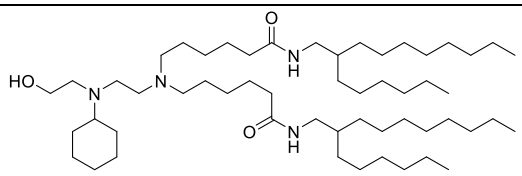
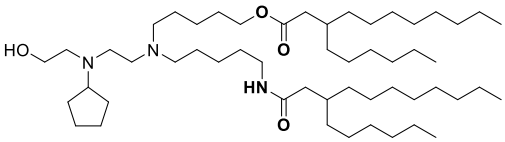
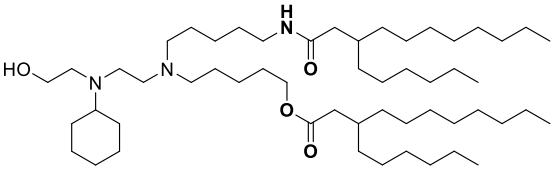
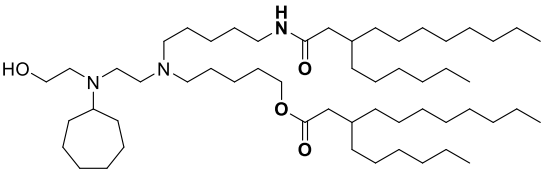
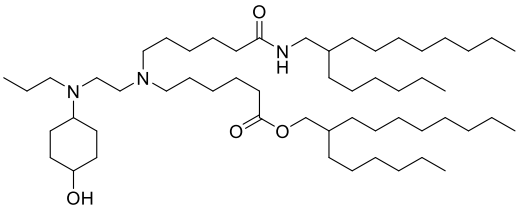
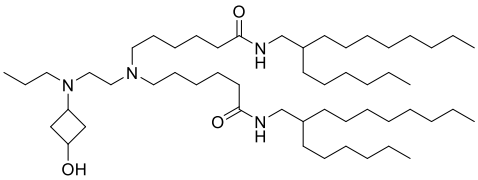
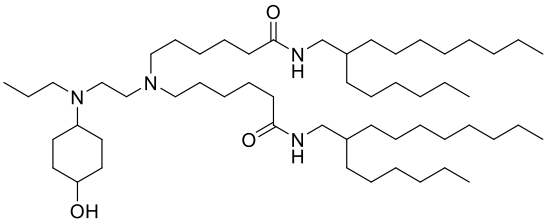
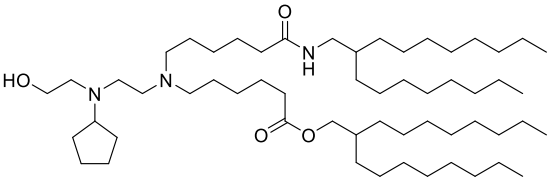
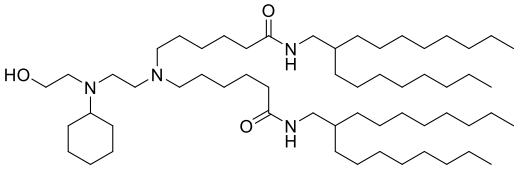
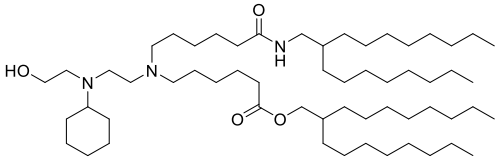
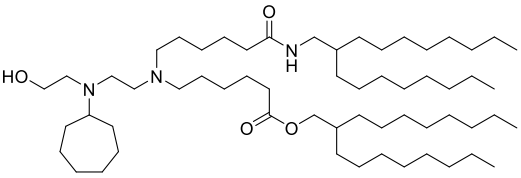
 Compound 61	 Compound 62
 Compound 63	 Compound 64
 Compound 65	 Compound 66
 Compound 67	 Compound 68
 Compound 69	 Compound 70
 Compound 71	 Compound 72

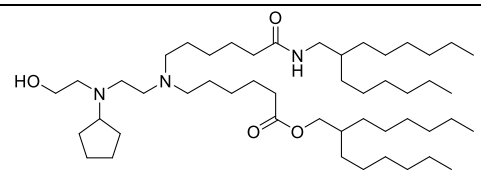
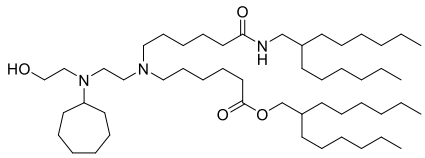
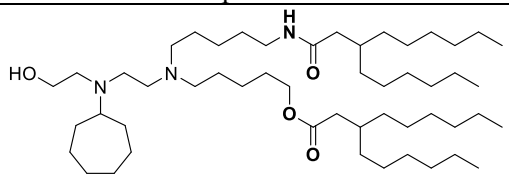
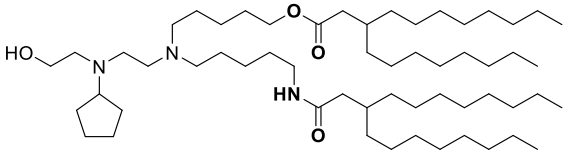
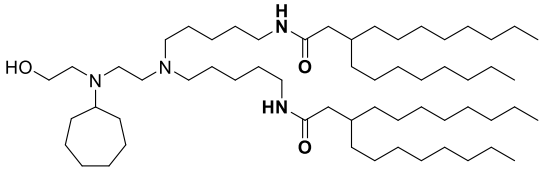
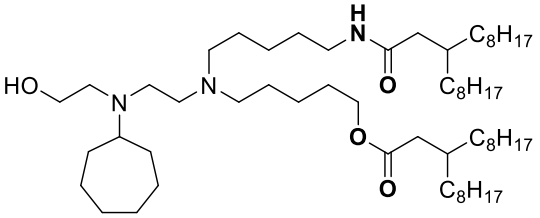
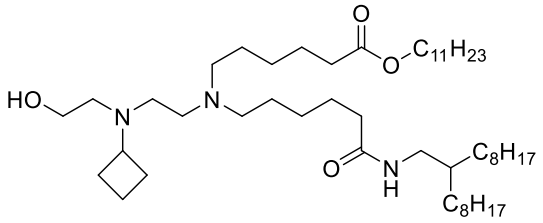
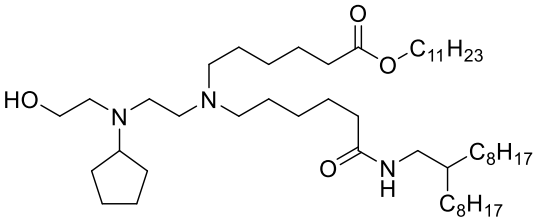
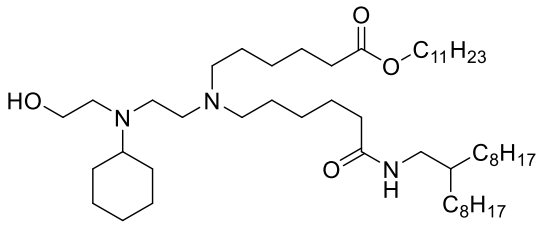
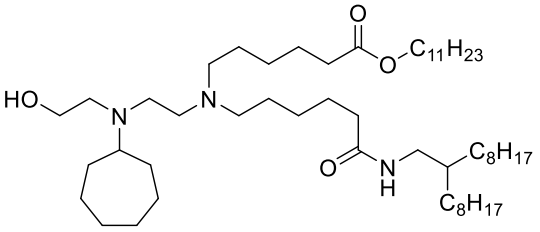
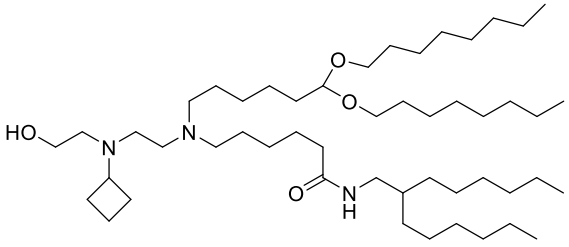
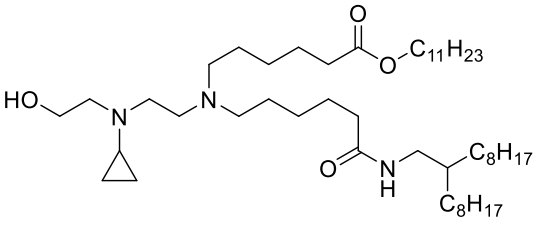
 Compound 73	 Compound 74
 Compound 75	 Compound 76
 Compound 77	 Compound 78
 Compound 79	 Compound 80
 Compound 81	 Compound 82

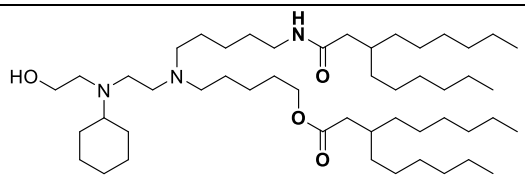
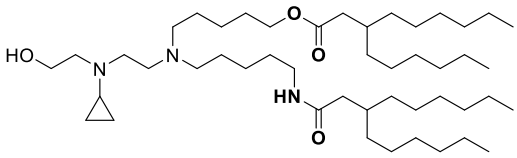
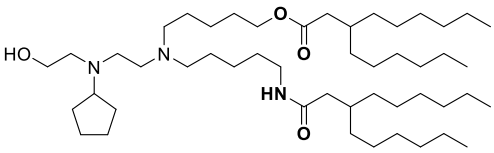
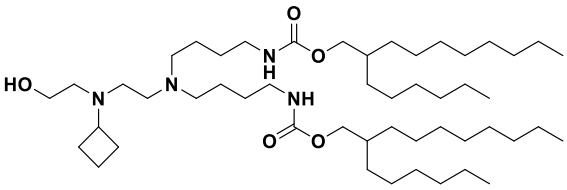
 Compound 83	 Compound 84
 Compound 85	 Compound 86
 Compound 87	 Compound 88
 Compound 89	 Compound 90
 Compound 91	 Compound 92
 Compound 93	 Compound 94

 Compound 99	 Compound 101
 Compound 102	 Compound 103
 Compound 104	 Compound 105
 Compound 106	 Compound 107
 Compound 108	 Compound 109
 Compound 110	 Compound 111

 Compound 112	 Compound 113
 Compound 114	 Compound 115
 Compound 116	 Compound 117
	 Compound 121
 Compound 122	 Compound 123
 Compound 124	 Compound 125
 Compound 126	 Compound 127

 Compound 128	 Compound 129
 Compound 130	 Compound 131
 Compound 132	 Compound 133
 Compound 134	 Compound 135
 Compound 136	 Compound 137
 Compound 138	 Compound 139

 Compound 140	 Compound 141
 Compound 142	 Compound 143
 Compound 144	 Compound 145
 Compound 146	 Compound 147
 Compound 148	 Compound 149
 Compound 150	 Compound 151

 Compound 152	 Compound 153
 and Compound 154	 Compound 155

wherein the prodrug comprises an acetate, formate or benzoate derivative of an alcohol functional group of said compound, and/or comprises an amide derivative of an amine functional group of said compound.

26. A composition comprising the compound as claimed in any one of claims 1 to 25, and a therapeutic or prophylactic agent.

27. A lipid nanoparticle comprising the compound as claimed in any one of claims 1 to 25.

28. A pharmaceutical composition comprising the compound as claimed in any one of claims 1 to 25, and a pharmaceutically acceptable excipient or diluent.