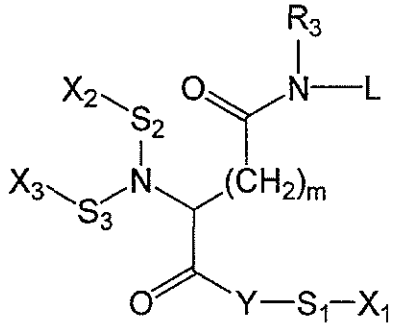
Patent Claims

1. A carrier system comprising a compound of formula I



I

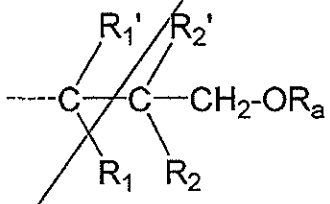
wherein

Y represents O, N, S or a covalent bond,

S_1, S_2, S_3 represent independently of each other a covalent bond or a spacer group,

X_1, X_2, X_3 represent independently of each other H or a ligand group

L is a group of formula (a)



(a)

wherein the dashed line represents the linkage to N,

R_1 represents H or a group of formula $-(CH_2)_2-OR_{b1}$,

R_1' represents H or a group of formula $-(CH_2)_2-OR_{b2}$,

R_2 represents H or a group of formula $-CH_2-OR_c$,

R_2' represents H or a group of formula $-OR_d$ or $-CH_2-OR_d$,

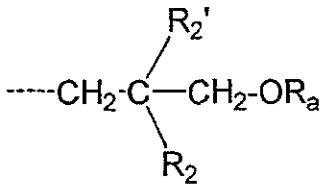
R_3 represents H or a group of formula $-(CH_2)_2-OR_e$ or $-(CH_2)_3-OR_e$,

R_a, R_{b1}, R_{b2}, R_c, R_d, R_e represent independently of each other a saturated or unsaturated, straight or branched hydrocarbon chain,

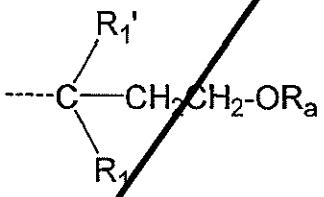
m is 1, 2 or 3,

with the proviso that at least one of R_1, $R_{1'}$, R_2, $R_{2'}$, R_3 is not H and at least one of X_1, X_2, X_3 is a ligand group.

2. A carrier system according to claim 1 wherein R_3 is H, and L is a group of formulas (b) or (c)



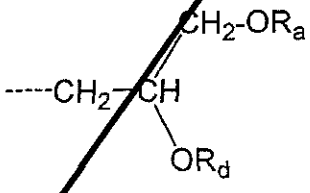
(b)



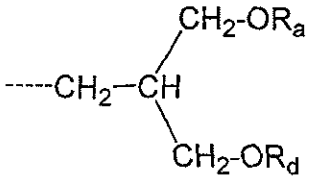
(c)

wherein the dashed line represents the linkage to N, and
S_1, S_2, S_3, X_1, X_2, X_3, Y, R_a, and m are defined as in claim 1,
with the proviso that in formula (b) one of R_2 and $R_{2'}$ is not H, and in formula (c) one of R_1 and $R_{1'}$ is not H, and at least one of X_1, X_2, X_3 is a ligand group.

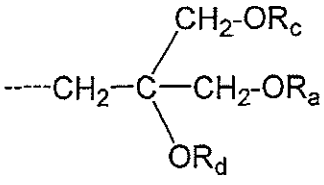
3. A carrier system according to claim 2, wherein L is a group of formula (b1), (b2), (b3) or (b4):



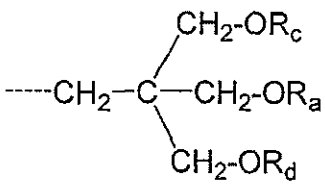
(b1)



(b2)



(b3)

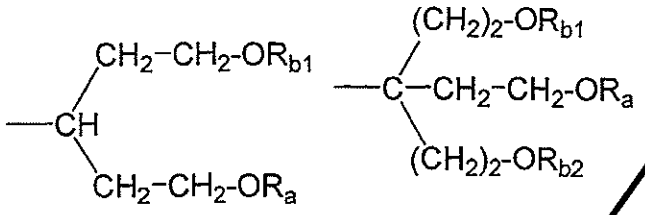


(b4)

wherein the dashed line represents the linkage to N, and

wherein R_a, R_c and R_d are independently of each other a saturated or unsaturated, straight or branched hydrocarbon chain.

4. A carrier system according to claim 2, wherein L is a group of formula (c1) or (c2):



(c1) (c2)

wherein the dashed line represents the linkage to N, and wherein R_a, R_{b1}, R_{b2} are independently of each other a saturated or unsaturated, straight or branched hydrocarbon chain.

5. A carrier system according to claim 1 wherein R_1, $R_{1'}$, R_2, $R_{2'}$ are H, R_3 is a group of formula $-(CH_2)_2-OR_e$ or $-(CH_2)_3-OR_e$, and S_1, S_2, S_3, X_1, X_2, X_3, Y, R_a, and m are defined as in claim 1.

6. A carrier system according to any preceding claim, wherein R_a, R_{b1}, R_{b2}, R_c, R_d, R_e are independently of each other straight or branched C(10-22)alkyl, C(10-22)alkenyl or C(10-22)alkynyl.

7. A carrier system according to any preceding claim, wherein C(10-22)alkenyl and C(10-22)alkynyl have 1, 2, 3 or 4 unsaturated bonds, preferably 1 or 2.

8. A carrier system according to any preceding claim wherein the carrier system is a microparticulate or a nanoparticulate material.

9. A carrier system according to claim 8, wherein the microparticulate or a nanoparticulate material is a lipid vesicle, such as a liposome or a micelle, or a nanoparticle, a nanosphere and/or a nanorod, comprising at least one compound of formula I and optionally one or more other co-lipids.

10. A carrier system according to any preceding claim wherein at least one of X_1, X_2, X_3 is a targeting ligand or an antigenic ligand or a therapeutic or diagnostic ligand or a combination thereof.

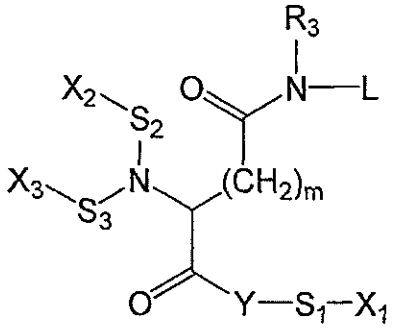
11. A carrier system according to any preceding claim wherein the spacer group is polyethylene glycol or an end-capped polyethylene glycol.

12. A carrier system according to claim 9, wherein the lipid vesicle further contains at least one bioactive agent enclosed or embedded within its internal void or adsorbed onto or attached to its surface.

13. Pharmaceutical composition comprising a carrier system according to any of claims 1 to 12.

14. Use of a carrier system according to any of claims 1 to 12 as a drug delivery system, diagnostic system or as an antigen display system.

15. Compound of formula I



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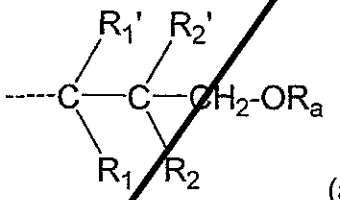
wherein

Y represents O, N, S or a covalent bond,

S_1, S_2, S_3 represent independently of each other a covalent bond or a spacer group,

X_1, X_2, X_3 represent independently of each other H or a ligand group

L is a group of formula (a)



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$R_{1'}$ represents H or a group of formula $-(CH_2)_2-OR_{b2}$,

R_2 represents H or a group of formula $-CH_2-OR_c$,

$R_{2'}$ represents H or a group of formula $-OR_d$ or $-CH_2-OR_d$,

R_3 represents H or a group of formula $-(CH_2)_2-OR_e$ or $-(CH_2)_3-OR_e$,

R_a, R_{b1}, R_{b2}, R_c, R_d, R_e represent independently of each other a saturated or unsaturated, straight or branched hydrocarbon chain,

m is 1, 2 or 3,

with the proviso that at least one of R_1, $R_{1'}$, R_2, $R_{2'}$, R_3 is not H and at least one of X_1, X_2, X_3 is a ligand group for use in a carrier system according to claims 1 to 14.

16. A carrier system according to any of claims 1 to 12 for use in the treatment of a disease which responds to a therapeutic agent, , wherein at least one of X_1, X_2, X_3 is said therapeutic agent.

17. A carrier system according to any of claims 1 to 12 for use in the diagnosis of a disease using a disease specific diagnostic agent, , wherein at least one of X_1, X_2, X_3 is said diagnostic agent.

18. A carrier system according to any of claims 1 to 12 for use in modulating an immune response , wherein at least one of X_1, X_2, X_3 is an antigenic agent.

What is claimed is:

1. An invention not claimed in any divisional application.