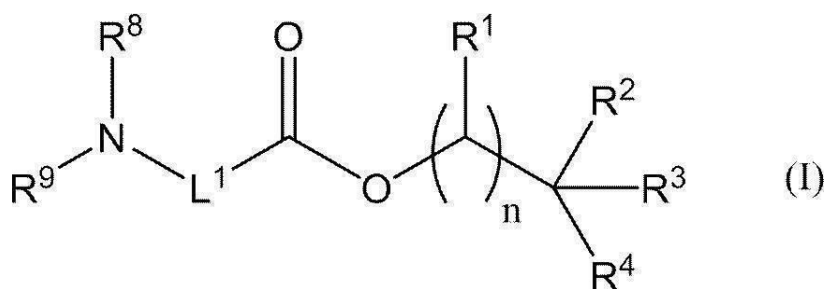


CLAIMS

1. A lipid nanoparticle comprising the following (a) to (c):
 (a) a nucleic acid encoding a chimeric antigen receptor or an
 5 exogenous T cell receptor;
 (b) a cationic lipid; and
 (c) a non-cationic lipid,

wherein the aforementioned lipid nanoparticle has a ligand that
 can be targeted to T cells on the surface.

2. The lipid nanoparticle according to claim 1, wherein the
 aforementioned cationic lipid is a compound represented by the
 formula (I):



wherein

L¹ is a C₁₋₂₂ alkylene group, a C₂₋₂₂ alkenylene group or a C₃₋₂₂
 alkadienylene group,

n is an integer of 0 or 1,

R¹ is

- (1) a hydrogen atom,
- (2) a linear C₁₋₂₂ alkyl group optionally substituted by one or
 two substituents selected from a linear C₁₋₂₂ alkyl group and a
 linear C₂₋₂₂ alkenyl group,
- 25 (3) a linear C₂₋₂₂ alkenyl group optionally substituted by one
 or two substituents selected from a linear C₁₋₂₂ alkyl group and
 a linear C₂₋₂₂ alkenyl group, or
- (4) a linear C₃₋₂₂ alkadienyl group optionally substituted by
 one or two substituents selected from a linear C₁₋₂₂ alkyl group
 30 and a linear C₂₋₂₂ alkenyl group,

R² is -CH₂-O-CO-R⁵, -CH₂-CO-O-R⁵ or -R⁵,

R³ is -CH₂-O-CO-R⁶, -CH₂-CO-O-R⁶ or -R⁶,

R⁴ is a hydrogen atom, -CH₂-O-CO-R⁷, -CH₂-CO-O-R⁷ or -R⁷,

R⁵, R⁶ and R⁷ are each independently

5 (1) a linear C₁₋₂₂ alkyl group optionally substituted by one or two substituents selected from a linear C₁₋₂₂ alkyl group and a linear C₂₋₂₂ alkenyl group,

(2) a linear C₂₋₂₂ alkenyl group optionally substituted by one or two substituents selected from a linear C₁₋₂₂ alkyl group and
10 a linear C₂₋₂₂ alkenyl group, or

(3) a linear C₃₋₂₂ alkadienyl group optionally substituted by one or two substituents selected from a linear C₁₋₂₂ alkyl group and a linear C₂₋₂₂ alkenyl group,

R₈ and R₉ are each independently, a C₁₋₆ alkyl group,
15 or a salt thereof.

3. The lipid nanoparticle according to claim 1, wherein the aforementioned nucleic acid is mRNA or DNA.

20 4. The lipid nanoparticle according to claim 1, wherein the aforementioned non-cationic lipid is phospholipid, cholesterol and/or PEG lipid.

~~5. The lipid nanoparticle according to claim 1, wherein the
25 aforementioned lipid nanoparticle has a ligand that can be targeted to T cells on the surface.~~

~~6~~5. The lipid nanoparticle according to claim ~~5~~1, wherein the aforementioned ligand is a ligand comprising an antigen binding
30 domain of one or more antibodies selected from the group consisting of an antibody against CD3, an antibody against CD4, an antibody against CD8 and an antibody against CD28.

~~7~~6. The lipid nanoparticle according to claim ~~5~~1, wherein the
35 aforementioned ligand is a ligand comprising an antigen binding

domain of an antibody against CD3 and/or an antibody against CD28.

5 ~~8~~7. The lipid nanoparticle according to claim ~~5~~1, wherein the
aforementioned ligand is a ligand comprising an antigen binding
domain of an antibody against CD3 and an antibody against CD28.

~~9~~8. A medicament comprising the lipid nanoparticle according to
claim 1.

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~~10~~9. The medicament according to claim ~~9~~8, wherein the
medicament is a prophylactic or therapeutic drug for cancer.

15 ~~11~~10. The medicament according to claim ~~9~~8, wherein the
medicament introduces a chimeric antigen receptor or an
exogenous T cell receptor gene into an in vivo immunocyte to
induce an expression thereof.

20 ~~12~~11. The medicament according to claim ~~9~~8, wherein the
medicament introduces a chimeric antigen receptor or an
exogenous T cell receptor gene into an in vivo T cell to induce
an expression thereof.

25 ~~13~~12. The lipid nanoparticle according to claim 1 for use in
expressing a chimeric antigen receptor or an exogenous T cell
receptor by introducing the receptor into an in vivo immunocyte
of a mammal, wherein the lipid nanoparticle according to claim
1 is to be administered to the mammal.

30 ~~14~~13. The lipid nanoparticle according to claim 1 for use in
expressing a chimeric antigen receptor or an exogenous T cell
receptor by introducing the receptor into an in vivo T cell of
a mammal, wherein the lipid nanoparticle according to claim 1
is to be administered to the mammal.

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~~15~~14. The lipid nanoparticle according to claim 1 for use in the prophylaxis or treatment of cancer.

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~~16~~15. Use of the lipid nanoparticle according to claim 1 in the manufacture of a medicament for the prophylaxis or treatment of cancer.

10 ~~17~~16. A composition for inducing expression of a chimeric antigen receptor or an exogenous T cell receptor, comprising the lipid nanoparticle according to claim 1.

~~18~~17. An ex vivo immunocyte that expresses a chimeric antigen
15 receptor or an exogenous T cell receptor and is obtained by adding the lipid nanoparticle according to claim 1 to a culture comprising an ex vivo immunocyte.

~~19~~18. An ex vivo T cell that expresses a chimeric antigen
20 receptor or an exogenous T cell receptor and is obtained by adding the lipid nanoparticle according to claim 1 to a culture comprising an ex vivo T cell.

~~20~~19. A medicament comprising an ex vivo immunocyte that
25 expresses a chimeric antigen receptor or an exogenous T cell receptor and is obtained by adding the lipid nanoparticle according to claim 1 to a culture comprising an ex vivo immunocyte.

30 ~~21~~20. A medicament comprising an ex vivo T cell that expresses a chimeric antigen receptor or an exogenous T cell receptor and is obtained by adding the lipid nanoparticle according to claim 1 to a culture comprising an ex vivo T cell.

35 ~~22~~21. The medicament according to claim ~~20~~19, wherein the

medicament is a prophylactic or therapeutic drug for cancer.

2322. The medicament according to claim 2019, wherein the medicament is a drug for inducing apoptosis.

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2423. A method for expressing a chimeric antigen receptor or an exogenous T cell receptor by introducing the receptor into an ex vivo immunocyte, comprising adding the lipid nanoparticle according to claim 1 to a culture comprising an ex vivo

10 immunocyte.

2524. A method for expressing a chimeric antigen receptor or an exogenous T cell receptor in an ex vivo T cell, comprising adding the lipid nanoparticle according to claim 1 to a culture

15 comprising an ex vivo T cell.

2625. An ex vivo immunocyte for use in the prophylaxis or treatment of cancer, wherein the ex vivo immunocyte expresses a chimeric antigen receptor or an exogenous T cell receptor and

20 is obtained by adding the lipid nanoparticle according to claim 1 to a culture comprising an ex vivo immunocyte.

2726. An ex vivo T cell for use in the prophylaxis or treatment of cancer, wherein the ex vivo T cell expresses a chimeric

25 antigen receptor or an exogenous T cell receptor and is obtained by adding the lipid nanoparticle according to claim 1 to a culture comprising an ex vivo T cell.

2827. Use of an ex vivo immunocyte in the manufacture of a medicament for the prophylaxis or treatment of cancer, wherein the ex vivo immunocyte expresses a chimeric antigen receptor or an exogenous T cell receptor and is obtained by adding the lipid nanoparticle according to claim 1 to a culture comprising an ex vivo immunocyte.

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~~29~~28. Use of an ex vivo T cell in the manufacture of a medicament for the prophylaxis or treatment of cancer, wherein
5 the ex vivo T cell expresses a chimeric antigen receptor or an exogenous T cell receptor and is obtained by adding the lipid nanoparticle according to claim 1 to a culture comprising an ex vivo T cell.

10 ~~30~~29. A method for producing a medicament comprising an ex vivo immunocyte that expresses a chimeric antigen receptor or an exogenous T cell receptor, comprising a step of adding the lipid nanoparticle according to claim 1 to a culture comprising an ex vivo immunocyte.

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| ~~31~~30. A method for producing a medicament comprising an ex vivo T cell that expresses a chimeric antigen receptor or an exogenous T cell receptor, comprising a step of adding the lipid nanoparticle according to claim 1 to a culture comprising
20 an ex vivo T cell.

| ~~32~~31. A lipid nanoparticle according to claim 1 for use in medicine.

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