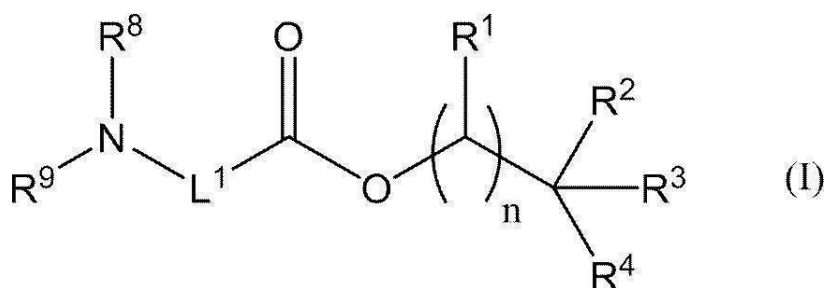


CLAIMS

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.

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



wherein

- 15 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,
 - 20 (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,
 - (3) a linear C₂₋₂₂ alkenyl group optionally substituted by one or two substituents selected from a linear C₁₋₂₂ alkyl group and
 - 25 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 and a linear C₂₋₂₂ alkenyl group,
- R² is -CH₂-O-CO-R⁵, -CH₂-CO-O-R⁵ or -R⁵,
- 30 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

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

5 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 a linear C₂₋₂₂ alkenyl group, or

(3) a linear C₃₋₂₂ alkadienyl group optionally substituted by
10 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, or a salt thereof.

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

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

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

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

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

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

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

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

11. The medicament according to claim 9, 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.

12. The medicament according to claim 9, 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.

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 immunocyte
of a mammal, wherein the lipid nanoparticle according to claim
1 is to be administered to the mammal.

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

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

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

18. An ex vivo immunocyte 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
15 comprising an ex vivo immunocyte.

19. 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
20 comprising an ex vivo T cell.

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

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

22. The medicament according to claim 20, wherein the medicament is a prophylactic or therapeutic drug for cancer.

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23. The medicament according to claim 20, wherein the medicament is a drug for inducing apoptosis.

24. A method for expressing a chimeric antigen receptor or an
5 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
immunocyte.

10 25. 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
comprising an ex vivo T cell.

15 26. 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
is obtained by adding the lipid nanoparticle according to claim
1 to a culture comprising an ex vivo immunocyte.

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27. An ex vivo T cell for use in the prophylaxis or treatment
of cancer, wherein 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
25 to a culture comprising an ex vivo T cell.

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

30. 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
10 lipid nanoparticle according to claim 1 to a culture comprising an ex vivo immunocyte.

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

32. A lipid nanoparticle according to claim 1 for use in
20 medicine.