180°C, and micropore chips each having one million micropores (well or recessed sections) with a diameter of 5 μm were produced using a photolithography technique. A glass base material with a feeding port was provided on the top of a micropore chip such that the gap between the micropore chips and the glass base became 100 μm. Accordingly, a flow path which is provided between two base materials was produced. The flow path can send a liquid to the micropores. An invader reaction reagent (1 μM allele probe, 0.4 μM invader oligo, 1 μM FAM label arm, 20 μM MOPS pH7.5, 15 mM NaCl, 6.25 mM $MgCl_2$, and 50 U/μL cleavase) was sent to the recessed sections through the sample ports, and the minute recessed sections were filled with the reaction reagent through deaeration. 40 μL of hexadecane in which a mixed lipid of DOPE and DOPG is dissolved to be 4 mg/ml, was sent to the recessed sections. 40 μL of a buffer (20 μM MOPS pH 7.5, 15 mM NaCl, 6.25 mM $MgCl_2$) was sent to the recessed sections.

[0062]

(2) Reaction of Oligonucleotide Sealed in Liposome

An oligonucleotide as a substrate was sealed in a liposome reagent (Thermo Fisher Scientific Inc., Lipofectamine) to obtain a sample solution as a model of an exosome. Thereafter, the sample solution was sent to the top of the wells filled with the above-described invader reaction reagent. The sample solution was made into droplets by further sending oil to the wells. Thereafter, the wells were incubated in an oven at 62°C for 15 minutes. The fluorescent amount of each well after the reaction was measured using a fluorescence microscope. The measurement results are shown in FIG. ~~23~~24.

[0063]

In the above, the embodiments and the examples of the present invention have

CLAIMS:

1. A membrane vesicle recovery device, comprising:

a liquid filler; and

a fused membrane including a lipid bilayer membrane which covers at least a part of an outer periphery of the liquid filler, wherein

a content of a membrane vesicle is mixed into the liquid filler through fusing of the membrane vesicle and the fused membrane.

2. The membrane vesicle recovery device according to Claim 1, further comprising:

a reaction base having a surface on which a plurality of holding sections which is configured to hold the liquid filler are formed, wherein

the liquid filler is covered with the fused membrane in each of the holding sections.

3. The membrane vesicle recovery device according to Claim 2, wherein

the holding sections are recessed sections formed in the reaction base,

in the recessed sections, the fused membrane comes into contact with an opening end forming a boundary between the surface and each of the recessed sections and is provided in the reaction base so as to block the recessed sections, and

the recessed sections are filled with the liquid filler.

4. The membrane vesicle recovery device according to Claim 3, wherein

a plurality of the fused membranes are provided in the reaction base so as to ~~be coupled to~~come into contact with a part along the opening end in the inner wall surface of the recessed sections and to individually block each of the plurality of recessed sections.

5. The membrane vesicle recovery device according to Claim 4, wherein

in the reaction base, at least the inner wall surface is hydrophobic and a hydrophobic section of the fused membrane ~~is coupled to~~comes into contact with the inner wall surface.

6. The membrane vesicle recovery device according to Claim 3, wherein

the fused membrane is formed in a planar shape along the surface and is formed in a series of membrane shape which blocks recessed sections.

7. The membrane vesicle recovery device according to Claim 3, wherein

the fused membrane contains a membrane charge adjustment substance promoting membrane fusion between the fused membrane and the membrane vesicle which is derived from a living body or an artificial vesicle and which is covered by the lipid bilayer membrane.

8. The membrane vesicle recovery device according to Claim 7, wherein

the membrane charge adjustment substance contains at least one of a membrane-destroying peptide, a membrane fusogenic polymer, a pH-sensitive polymer, and virus-derived membrane fusion protein.

9. The membrane vesicle recovery device according to any one of Claims 1 to 8, wherein

the liquid filler contains a solvent and a reaction reagent for biochemical analysis contained in the solvent.

10. The membrane vesicle recovery device according to Claim 9, wherein

the reaction reagent for biochemical analysis contains a pH indicator.

11. The membrane vesicle recovery device according to any one of Claims 1 to 10, wherein

the liquid filler is a gel or sol.

12. The membrane vesicle recovery device according to Claim 1, further comprising:

a reaction base which has a surface on which a plurality of hydrophilic sections and hydrophobic sections surrounding the hydrophilic sections are formed, wherein

the liquid filler is provided in the hydrophilic sections, and the fused membrane ~~is coupled to~~comes into contact with the hydrophobic sections in a boundary between each of the hydrophilic sections and each of the hydrophobic sections and wraps the liquid filler.

13. A membrane vesicle recovery method for recovering a membrane vesicle which is derived from a living body or an artificial vesicle and which is covered by a lipid bilayer

membrane in the membrane vesicle recovery device according to any one of Claims 1 to 12, the method comprising:

subjecting the fused membrane and the membrane vesicle to membrane fusion by bringing a sample containing the membrane vesicle into contact with the fusion membrane.

14. The membrane vesicle recovery method according to Claim 13, comprising:

adding a pH regulator which makes the sample acidic to the sample, and then, bringing the acidic sample into contact with the fused membrane.

15. A membrane vesicle analysis method for analyzing the content, membrane protein, or a membrane lipid of a membrane vesicle which is derived from a living body or an artificial vesicle and which is covered by a lipid bilayer membrane, the method comprising:

fusing the membrane vesicle into the fused membrane of the membrane vesicle recovery device according to any one of Claims 1 to 12; and

holding the membrane protein or the membrane lipid on the membrane vesicle at the fused membrane.

16. A membrane vesicle analysis method for analyzing the content, membrane protein, or a membrane lipid of a membrane vesicle which is derived from a living body or an artificial vesicle and which is covered by a lipid bilayer membrane, the method comprising:

fusing the membrane vesicle into the fused membrane of the membrane vesicle recovery device according to Claim 9 or 10; and

reacting the reaction reagent for biochemical analysis with the content, membrane protein, or a membrane lipid of the membrane vesicle within the liquid filler.

17. The membrane vesicle analysis method using the membrane vesicle recovery device according to Claim 9 or 10 or the membrane vesicle analysis method according to Claim 16, wherein

the reaction reagent for biochemical analysis contains at least one of a nucleic acid analysis reagent, an invader reaction reagent, a protein analysis reagent, a lipid analysis reagent, an immunoassay reagent, and a homogeneous antigen-antibody reaction reagent.