CLAIMS

1. A culture system comprising:

a culture device including a housing with an internal space in which a multilayer culture vessel including a plurality of trays therein is placed, and a manipulator manipulating the multilayer culture vessel while the multilayer culture vessel is kept in a state placed within the internal space; and

a pump introducing a fluid material into the multilayer culture vessel or discharging the fluid material from the multilayer culture vessel,

wherein the manipulator includes a rotation unit rotating or swinging the multilayer culture vessel inside the housing,

the multilayer culture vessel is communicated with a liquid supply tube such that the fluid material can be introduced into the multilayer culture vessel from an outside of the housing via the liquid supply tube, or that a fluid can be discharged from the multilayer culture vessel to the outside of the housing via the liquid supply tube, ~~and~~

the liquid supply tube in communication with the multilayer culture vessel is disposed to extend to the outside of the housing after passing through a single insertion portion formed ~~in~~ on the housing, and

the manipulator is located within the housing and rotates or swings the multilayer culture vessel in connection with the liquid supply tube without rotating the housing.

2. The culture system according to claim 1, wherein a single liquid supply tube is inserted into the single insertion portion.

3. The culture system according to claim 1 or 2, wherein the manipulator rotates the multilayer culture device around two rotational axes on a horizontal plane.

~~2~~4. The culture system according to any one of claims 1 to 3, wherein the manipulator includes an opening/closing unit opening and closing a communication path between the liquid supply tube and the multilayer culture vessel.

~~3~~5. The culture system according to any one of claims 1 ~~or 2~~ to 4, further comprising an air filter between an inside and an outside of the multilayer culture vessel,

wherein the manipulator includes an opening/closing unit opening and closing a communication path between the air filter and the multilayer culture vessel.

~~4~~6. The culture system according to any one of claims 1 to ~~3~~5, wherein the housing includes an insertion portion at which the liquid supply tube penetrates through the housing, and via both the insertion portion and the liquid supply tube, the fluid material is introduced into the multilayer culture vessel from the outside of the housing, or the fluid is discharged from the multilayer culture vessel to the outside of the housing.

~~5~~7. The culture system according to any one of claims 1 to ~~4~~ 6, wherein the liquid supply tube may be communicated with a plurality of containers or devices present outside the housing in a switchable

manner.

~~6~~8. The culture system according to claim ~~5~~7, wherein a plurality of separate liquid supply tubes in communication with the plurality of containers in a one-to-one relation are communicated with a common liquid supply tube that is communicated with the multilayer culture vessel, valves are disposed on the separate liquid supply tubes or at junctions between the separate liquid supply tubes and the common liquid supply tube, and communication states between the separate liquid supply tubes and the common liquid supply tube are controllable with control of the valves.

~~7~~9. The culture system according to any one of claims 1 to ~~6~~8, further comprising an observation device disposed under the multilayer culture vessel and taking an image of an inside of the tray in the multilayer culture vessel.

~~8~~10. A culture device comprising:

a housing with an internal space in which a multilayer culture vessel including a plurality of trays therein is placed; and

a manipulator manipulating the multilayer culture vessel while the multilayer culture vessel is kept in a state placed within the internal space,

wherein the manipulator includes a rotation unit rotating or swinging the multilayer culture vessel inside the housing,

the multilayer culture vessel is communicated with a liquid supply tube such that a fluid material can be introduced into the multilayer

culture vessel from an outside of the housing via the liquid supply tube, or that a fluid can be discharged from the multilayer culture vessel to the outside of the housing via the liquid supply tube, ~~and~~

the liquid supply tube in communication with the multilayer culture vessel is disposed to extend to the outside of the housing after passing through a single insertion portion formed ~~in~~ on the housing, and

the manipulator is located within the housing and rotates or swings the multilayer culture vessel in connection with the liquid supply tube without rotating the housing.

~~9~~11. The culture device according to claim ~~8~~10, wherein the manipulator includes an opening/closing unit opening and closing a communication path between the liquid supply tube and the multilayer culture vessel.

12. The culture device according to claim 10 or 11, wherein a single liquid supply tube is inserted into the single insertion portion.

13. The culture system according to any one of claims 10 to 12, wherein the manipulator rotates the multilayer culture device around two rotational axes on a horizontal plane.

~~10~~14. A multilayer culture vessel manipulation device placed within a housing and including a manipulator that manipulates a multilayer culture vessel including a plurality of trays therein,

wherein the multilayer culture vessel is communicated with the liquid supply tube inside the housing,

the manipulator is able to manipulate the multilayer culture vessel while the multilayer culture vessel is kept in a state placed within the housing,

the manipulator includes a rotation unit rotating or swinging the multilayer culture vessel inside the housing,

with the manipulator manipulating the multilayer culture vessel, a fluid material can be introduced into the multilayer culture vessel from an outside of the housing via the liquid supply tube, or a fluid can be discharged from the multilayer culture vessel to the outside of the housing via the liquid supply tube, ~~and~~

the liquid supply tube in communication with the multilayer culture vessel is disposed to extend to the outside of the housing after passing through a single insertion portion formed ~~in~~ on the housing, and

the manipulator is located within the housing and rotates or swings the multilayer culture vessel in connection with the liquid supply tube without rotating the housing.

~~11~~15. The multilayer culture vessel manipulation device according to claim ~~10~~14, wherein the rotation unit has a first rotation axis and a second rotation axis each serving as a rotation axis about which the multilayer culture vessel is rotated or swung, and

the rotation unit is constituted such that the first rotation axis and the second rotation axis are each a rotation axis passing the multilayer culture vessel.

~~12~~16. The multilayer culture vessel manipulation device according to claim ~~10~~14 or ~~11~~15, wherein the manipulator includes an opening/closing

unit opening and closing a communication path between the liquid supply tube and the multilayer culture vessel.

17. The multilayer culture vessel manipulation device according to any one of claims 14 to 16, wherein a single liquid supply tube is inserted into the single insertion portion.

~~13~~18. The multilayer culture vessel manipulation device according to any one of claims ~~10~~14 to ~~12~~17, further comprising a liquid level sensor detecting a liquid level of the fluid material in the multilayer culture vessel when the fluid material is introduced into the multilayer culture vessel from the outside of the housing via the liquid supply tube.

~~14~~19. The multilayer culture vessel manipulation device according to claim ~~13~~18, wherein the liquid level sensor includes a first liquid level sensor detecting whether the fluid material has reached a first water level indicating that a predetermined amount of the fluid material has been introduced into the multilayer culture vessel, or a second liquid level sensor detecting whether the fluid material has reached a second water level being lower than the first water level and indicating that the fluid material has been introduced in an amount close to the predetermined amount.