WHAT IS CLAIMED IS:

1. A nozzle device for a minimally invasive injection device, comprising:

an outlet to generate a microjet of a liquid; and

an injection part of a micro-scale size connected to the outlet and adapted to be inserted into a skin tissue to a preset depth.

2. The nozzle device for a minimally invasive injection device according to claim 1, wherein the outlet is detachably connected to a first reservoir part containing the liquid to be injected.

3. The nozzle device for a minimally invasive injection device according to claim 2, wherein the outlet and the first reservoir part have locking structures, respectively, to be locking-engaged with each other.

4. The nozzle device for a minimally invasive injection device according to claim 1, wherein a minimum diameter of the outlet is less than or equal to 0.5 mm.

5. The nozzle device for a minimally invasive injection device according to claim 1, wherein an inner diameter of the injection part is from 50 to 450 μm.

6. The nozzle device for a minimally invasive injection device according to claim 1, wherein the injection part is inserted into the skin issue to the depth between 0.1 and 20 mm.

7. A minimally invasive injection device, comprising:

a nozzle part comprising a first reservoir part to contain a liquid to be injected, an outlet to generate a microjet of the liquid, and an injection part of a micro-scale size connected to the outlet and adapted to be inserted into a skin tissue to a preset depth; and

a pressure providing part comprising a first pressure applying part connected to the first reservoir part and configured to apply pressure to the liquid, and a first pressure generator to provide the pressure to the first pressure applying part.

8. The minimally invasive injection device according to claim 7, further comprising:

a liquid providing part of manual or automated type connected to the first reservoir part and configured to provide the liquid of a preset amount.

9. The minimally invasive injection device according to claim 7, wherein the outlet is detachably connected to the first reservoir part containing the liquid to be injected.

10. The minimally invasive injection device according to claim 9, wherein the outlet and the first reservoir part have locking structures, respectively, to be locking-engaged with each other.

11. The minimally invasive injection device according to claim 7, wherein a single dose ejectable from the first reservoir part is from 1 to 1000 $\mu\ell$.

12. The minimally invasive injection device according to claim 8, wherein the liquid providing part of automated type comprises a second reservoir part to store the liquid to be injected, a second pressure applying part to apply pressure to the second reservoir part, and a second pressure generator to provide the pressure to the second pressure applying part.

13. The minimally invasive injection device according to claim 12, further comprising:

a controller connected to the second pressure generator and configured to control a movement distance of the second pressure generator.

14. The minimally invasive injection device according to claim 7, further comprising:

a third pressure applying part connected to the first pressure applying part and configured to apply the pressure to the first reservoir part.

15. The minimally invasive injection device according to claim 7, further comprising:

a controller connected to the first pressure generator and configured to control at least one of a magnitude and a generation time of the pressure generated by the first pressure generator.

16. The minimally invasive injection device according to claim 15, wherein the controller is connected to the first pressure generator and configured to control an extended distance or a retracted distance of the first pressure applying

part.

17. The minimally invasive injection device according to claim 15, wherein the controller is connected to the first pressure generator and configured to control to continuously move the first pressure applying part forward or repeatedly move the first pressure applying part forward and backward.

18. The minimally invasive injection device according to claim 7, wherein a jet force of the microject being jet is adjusted by adjusting a diameter of the outlet.

19. The minimally invasive injection device according to claim 7, wherein a minimum diameter of the outlet is less than or equal to 0.5 mm.

20. The minimally invasive injection device according to claim 7, wherein an inner diameter of the injection part is from 50 to 450 μm.

21. The minimally invasive injection device according to claim 7, wherein the injection part is inserted into the skin issue to the depth between 0.1 and 20 mm.

22. The minimally invasive injection device according to claim 12, wherein the first pressure generator or the second pressure generator includes at least one of the group consisting of a compression spring, compressed gas, an explosive chemical substance, piezoelectricity, an electric driving motor, a linear Lorentz's force driving motor, an electric cylinder, and a linear motion guide.

23. The minimally invasive injection device according to claim 12, wherein the first pressure generator and the second pressure generator are an integral pressure generator connected to the first pressure applying part and the second pressure applying part.

24. The minimally invasive injection device according to claim 7, wherein a plurality of outlets and injection parts connected to the outlets are connected to the first reservoir part, and an area in which the plurality of outlets and injection parts connected to the outlets are placed is adjusted to adjust an ejection area of the microjet.

25. The minimally invasive injection device according to claim 12, wherein the first pressure generator or the second pressure generator is adapted to generate the pressure from 1 to 100 bar.

26. The minimally invasive injection device according to claim 7, wherein the liquid includes at least one selected from the group consisting of hyaluronic acid, collagen, a stem cell, a stem cell culture fluid, a fat cell, fat, silicon, vitamin, a placenta extract, blood plasma, tranexamic acid, a saline solution, polyvinyl alcohol, poly(methyl methacrylate), polyethylene glycol, cross-linked hyaluronic acid, calcium hydroxy apatide, polylactic acid, poly(lactic-co-glycolic acid), pteroylglutamic acid, poly-gamma-glutamic acid, phospholipid, deoxycholic acid, minoxidil, finasteride, dutasteride, a growth factor, botulinum toxin, alginic acid, chitosan, chondroitin sulfate, dermatan sulfate, hyaluronate lyase, an antibody, a pain relief ingredient, and an anesthetic ingredient.

27. The minimally invasive injection device according to claim 7, wherein the liquid is provided as at least one of a solution, a suspension, and a dispersion in which particles including active ingredients are dispersed.

WHAT IS CLAIMED IS:

1. A minimally invasive injection device, comprising:

a nozzle part comprising a first reservoir part to contain a liquid to be injected, an outlet to generate a microjet of the liquid, and an injection part of a micro-scale size connected to the outlet and adapted to be penetrated and inserted into stratum corneum or epidermis so that the liquid is injected into and below the dermis by the microjet ; and

a pressure providing part comprising a first pressure applying part connected to the first reservoir part and configured to apply pressure to the liquid, a third pressure applying part connected to the first pressure applying part and configured to apply the pressure to the first reservoir part, and a first pressure generator to provide the pressure to the first pressure applying part,

wherein a plurality of outlets and injection parts connected thereto connected to the first reservoir part, and a plurality of protrusions corresponding to the outlets are formed in the third pressure applying part, and

wherein a ring or a locking step is formed in the third pressure applying part and a groove engaged with the ring or a groove part engaged with the locking step is formed in the first reservoir part to limit the extended distance of the first pressure applying part or the third pressure applying part.

2. The minimally invasive injection device according to claim 1, further comprising:

a liquid providing part of manual or automated type connected to the first reservoir part and configured to provide the liquid of a preset amount.

3. The minimally invasive injection device according to claim 1, wherein the outlet is detachably connected to the first reservoir part containing the liquid to be injected.

4. The minimally invasive injection device according to claim 3, wherein the outlet and the first reservoir part have locking structures, respectively, to be locking-engaged with each other.

5. The minimally invasive injection device according to claim 1, wherein a single dose ejectable from the first reservoir part is from 1 to 1000 $\mu\ell$.

6. The minimally invasive injection device according to claim 2, wherein the liquid providing part of automated type comprises a second reservoir part to store the liquid to be injected, a second pressure applying part to apply pressure to the second reservoir part, and a second pressure generator to provide the pressure to the second pressure applying part.

7. The minimally invasive injection device according to claim 6, further comprising:

a controller connected to the second pressure generator and configured to control a movement distance of the second pressure generator.

8. The minimally invasive injection device according to claim 1, further comprising:

a controller connected to the first pressure generator and configured to control at least one of a magnitude and a generation time of the pressure generated by the first pressure generator.

9. The minimally invasive injection device according to claim 8, wherein the controller is connected to the first pressure generator and configured to control an extended distance or a retracted distance of the first pressure applying part.

10. The minimally invasive injection device according to claim 8, wherein the controller is connected to the first pressure generator and configured to control to continuously move the first pressure applying part forward or repeatedly move the first pressure applying part forward and backward.

11. The minimally invasive injection device according to claim 1, wherein a jet force of the microjet being jet is adjusted by adjusting a diameter of the outlet.

12. The minimally invasive injection device according to claim 1, wherein a minimum diameter of the outlet is less than or equal to 0.5 mm.

13. The minimally invasive injection device according to claim 1, wherein an inner diameter of the injection part is from 50 to 450 μm.

14. The minimally invasive injection device according to claim 1, wherein the injection part is inserted into the skin issue to the depth between 0.1 and 20 mm.

15. The minimally invasive injection device according to claim 6, wherein the first pressure generator or the second pressure generator includes at least one of the group consisting of a compression spring, compressed gas, an explosive chemical substance, piezoelectricity, an electric driving motor, a linear Lorentz's force driving motor, an electric cylinder, and a linear motion guide.

16. The minimally invasive injection device according to claim 6, wherein the first pressure generator and the second pressure generator are an integral pressure generator connected to the first pressure applying part and the second pressure applying part.

17. The minimally invasive injection device according to claim 1, wherein an area in which the plurality of outlets and injection parts connected to the outlets are placed is adjusted to adjust an ejection area of the microjet.

18. The minimally invasive injection device according to claim 6, wherein the first pressure generator or the second pressure generator is adapted to generate the pressure from 1 to 100 bar.

19. The minimally invasive injection device according to claim 1, wherein the liquid includes at least one selected from the group consisting of hyaluronic acid, collagen, a stem cell, a stem cell culture fluid, a fat cell, fat, silicon, vitamin, a placenta extract, blood plasma, tranexamic acid, a saline solution, polyvinyl alcohol, poly(methyl methacrylate), polyethylene glycol, cross-linked hyaluronic acid, calcium hydroxy apatide, polylactic acid, poly(lactic-co-glycolic acid), pteroylglutamic acid, poly-gamma-glutamic acid, phospholipid, deoxycholic acid, minoxidil, finasteride, dutasteride, a growth factor, botulinum toxin, alginic acid, chitosan, chondroitin sulfate, dermatan sulfate, hyaluronate lyase, an antibody, a pain relief ingredient, and an anesthetic ingredient.

20. The minimally invasive injection device according to claim 1, wherein the liquid is provided as at least one of a solution, a suspension, and a dispersion in which particles including active ingredients are dispersed.