Claims

1. A vascular access ~~device~~system comprising:

   a vascular access device comprising:

   a needle having a tip portion; and

   a shield arranged around and at least substantially along a longitudinal axis of the needle; and

   a guiding portion configured to be placed at least at a subcutaneous tissue layer above a blood vessel and configured to receive and guide the needle to reach the blood vessel, the guiding portion comprising a channel portion comprising an inlet and an outlet;

   wherein the shield is ~~substantially rigid~~more rigid than the needle so as to provide strength to the tip portion to penetrate at least one of the subcutaneous tissue layer and a ~~tissue~~skin layer over the subcutaneous tissue layer as the tip portion extends out from the shield; ~~and~~

   wherein the needle ~~gradually~~ conforms to the ~~surrounding tissue beneath the tissue layer~~channel portion as the distance between the tip portion and the shield increases; and

   wherein the outlet comprises a constriction which is configured to cause the needle to regain push force to penetrate the blood vessel.

2. The vascular access ~~device~~system of claim 1, further comprising :
   an actuating portion coupled to a portion of the needle.

3. The vascular access ~~device~~system of claim 2, wherein the shield is configured to be slidable relative to the tip portion.

4. The vascular access ~~device~~system of any one of claims 1 to 3, wherein the shield comprises a sealing portion arranged adjacent to the tip portion so as to seal the needle within the shield.

5. The vascular access ~~device~~system of any one of claims 1 to 4, wherein the needle further comprises a flexible portion, the flexible portion coupled to the tip portion.

6. The vascular access ~~device~~system of claim 5, wherein the flexible portion comprises a same or different material from the tip portion.

7. The vascular access ~~device~~system of any one of claims 1 to 6, wherein the needle comprises a single material or a combination of materials with varying flexibility.

8. The vascular access ~~device~~system of claim 7, wherein the material is selected from a group consisting of metal, polymer and shape-memory alloys.

9. The vascular access ~~device~~system of any one of claims 2 to 8, wherein the needle extends out from the shield as the shield retracts into the actuating portion.

~~10. A guiding portion configured to be placed above a blood vessel and configured to receive and guide a needle to reach the same location of the blood vessel repeatedly and consistently, the guiding portion comprises:~~

~~a channel portion comprising an inlet and an outlet;~~

~~wherein the channel portion is configured to be resorbed over time.~~

~~11. The guiding portion of claim 10, wherein the guiding portion forms a resultant scarring track between the blood vessel and a skin layer positioned over the blood vessel.~~

~~12. The guiding portion of claim 11, wherein the channel portion is biodegradable.~~

~~13. The guiding portion of claim 11 or 12, wherein the inlet includes a larger diameter compared to the outlet.~~

~~14. The guiding portion of any one of claims 11 to 13, wherein the channel portion comprises a porous sidewall with a plurality of holes.~~

~~15. The guiding portion of any one of claims 11 to 13, wherein the channel portion comprises at least one helical screw.~~

16. The guiding portion of any one of claims 11 to 13, wherein the channel portion comprises a frusto-conical portion.

17. The guiding portion of claim 16, wherein the channel portion further comprises a tubular portion connected to the frusto-conical portion.

18. The guiding portion of any one of claims 11 to 13, wherein the guiding portion further comprises an unidirectional valve positioned adjacent to the outlet of the channel portion.

19. The guiding portion of any one of claims 11 to 13, wherein the guiding portion further comprises an anchor portion positioned adjacent to the outlet of the channel portion and configured to substantially anchor the channel portion onto the blood vessel.

20. The guiding portion of claim 19, wherein the anchor portion comprises a dog-bone shaped portion.

21. The guiding portion of any one of claims 11 to 13, wherein the channel portion is configured to be filled with an anti bacteria or anti microbial gel.

22. The guiding portion of any one of claims 11 to 13, wherein the channel portion is positioned at an angle relative to a plane of the skin layer.

23. The guiding portion of claim 22, wherein the angle varies between 10 and 80 degrees.

24. A vascular access system comprising:

a vascular access device according to any one of claims 1 to 9; and

a guiding portion according to any one of claims 10 to 23.

25. A method to obtain access to a blood vessel underneath a skin layer, the method comprising:

placing a guiding portion between the blood vessel and the skin layer; and

configuring the guiding portion to receive and guide a needle to reach the same location of the blood vessel repeatedly and consistently.

26. The method of claim 25, wherein the guiding portion is resorbed over time.

27. A method to create vascular access track underneath a skin layer, the method comprising:

placing a guiding portion between the blood vessel and the skin layer;

configuring the guiding portion to receive and guide a needle; and

forming a resultant scarred track between the blood vessel and the skin layer as the guiding portion is resorbed over time.

28. The method of claim 27, wherein placing the guiding portion between the blood vessel and the skin layer comprises :

inserting a delivery device pre-loaded with the guiding portion into the skin layer;

releasing the guiding portion between the blood vessel and the skin layer; and

retracting the delivery device.

29. A method to obtain access to a blood vessel underneath a skin layer, the method comprising:

inserting a tissue scarring device through the skin layer to reach the blood vessel; and

~~forming a resultant scarred track between the blood vessel and the skin layer as the tissue scarring device is retracted.~~

~~30. The method of claim 29, wherein the tissue scarring device comprises an ablation coil or a combination of a vascular access device and an ablation coil.~~

10. The vascular access system of any of claims 1 to 9, wherein the channel portion is biodegradable.

11. The vascular access system of any of claims 1 to 10, wherein the channel portion comprises a porous sidewall with a plurality of holes.

12. The vascular access system of any one of claims 1 to 11, wherein the channel portion comprises at least one helical screw.

13. The vascular access system of any one of claims 1 to 12, wherein the channel portion comprises at least a frusto-conical portion.

14. The vascular access system of any one of claims 1 to 12, wherein the channel portion further comprises at least a tubular portion.

15. The vascular access system of any one of claims 1 to 14, wherein the guiding portion further comprises an unidirectional valve positioned adjacent to the outlet of the channel portion.

16. The vascular access system of any one of claims 1 to 15, wherein the guiding portion further comprises an anchor portion positioned adjacent to the outlet of the channel portion and configured to substantially anchor the channel portion onto the blood vessel.

17. The vascular access system of claim 16, wherein the anchor portion comprises a dog-bone shaped portion.

18. The vascular access system of any one of claims 1 to 17, wherein the channel portion is configured to be filled with an anti-bacteria or anti-microbial gel.

19. The vascular access system of any one of claims 1 to 18, wherein the channel portion is positioned at an angle relative to a plane of the skin layer.

20. The vascular access system of claim 19, wherein the angle varies between 0 and 90 degrees.

21. The vascular access system of any one of claims 1 to 20, wherein the guiding portion is configured to be resorbed over time, thereby forming a scarred tissue track configured to serve as a guide for subsequent access of the vascular access device.

22. The vascular access system of any one of claims 1 to 21, wherein the needle is configured to conform to an orientation of the blood vessel after penetration of the blood vessel.

Claims

1. A vascular access system comprising:

   a vascular access device comprising:

   a needle having a tip portion; and

   a shield arranged around and at least substantially along a longitudinal axis of the needle; and

   a guiding portion configured to be placed at least at a subcutaneous tissue layer above a blood vessel and configured to receive and guide the needle to reach the blood vessel, the guiding portion comprising a channel portion comprising an inlet and an outlet;

   wherein the shield is more rigid than the needle so as to provide strength to the tip portion to penetrate at least one of the subcutaneous tissue layer and a skin layer over the subcutaneous tissue layer as the tip portion extends out from the shield;

   wherein the needle conforms to the channel portion as the distance between the tip portion and the shield increases; and

   wherein the outlet comprises a constriction which is configured to cause the needle to regain push force to penetrate the blood vessel.

2. The vascular access system of claim 1, further comprising :

   an actuating portion coupled to a portion of the needle.

3. The vascular access system of claim 2, wherein the shield is configured to be slidable relative to the tip portion.

4. The vascular access system of any one of claims 1 to 3, wherein the shield comprises a sealing portion arranged adjacent to the tip portion so as to seal the needle within the shield.

5. The vascular access system of any one of claims 1 to 4, wherein the needle further comprises a flexible portion, the flexible portion coupled to the tip portion.

6. The vascular access system of claim 5, wherein the flexible portion comprises a same or different material from the tip portion.

7. The vascular access system of any one of claims 1 to 6, wherein the needle comprises a single material or a combination of materials with varying flexibility.

8. The vascular access system of claim 7, wherein the material is selected from a group consisting of metal, polymer and shape-memory alloys.

9. The vascular access system of any one of claims 2 to 8, wherein the needle extends out from the shield as the shield retracts into the actuating portion.

10. The vascular access system of any of claims 1 to 9, wherein the channel portion is biodegradable.

11. The vascular access system of any of claims 1 to 10, wherein the channel portion comprises a porous sidewall with a plurality of holes.

12. The vascular access system of any one of claims 1 to 11, wherein the channel portion comprises at least one helical screw.

13. The vascular access system of any one of claims 1 to 12, wherein the channel portion comprises at least a frusto-conical portion.

14. The vascular access system of any one of claims 1 to 12, wherein the channel portion further comprises at least a tubular portion.

15. The vascular access system of any one of claims 1 to 14, wherein the guiding portion further comprises an unidirectional valve positioned adjacent to the outlet of the channel portion.

16. The vascular access system of any one of claims 1 to 15, wherein the guiding portion further comprises an anchor portion positioned adjacent to the outlet of the channel portion and configured to substantially anchor the channel portion onto the blood vessel.

17. The vascular access system of claim 16, wherein the anchor portion comprises a dog-bone shaped portion.

18. The vascular access system of any one of claims 1 to 17, wherein the channel portion is configured to be filled with an anti-bacteria or anti-microbial gel.

19. The vascular access system of any one of claims 1 to 18, wherein the channel portion is positioned at an angle relative to a plane of the skin layer.

20. The vascular access system of claim 19, wherein the angle varies between 0 and 90 degrees.

21. The vascular access system of any one of claims 1 to 20, wherein the guiding portion is configured to be resorbed over time, thereby forming a scarred tissue track configured to serve as a guide for subsequent access of the vascular access device.

22. The vascular access system of any one of claims 1 to 21, wherein the needle is configured to conform to an orientation of the blood vessel after penetration of the blood vessel.