CLAIMS:

1. A device for implanting cells in a host body, comprising:

a porous scaffold comprising an immunologically compatible polymer mesh forming the walls of at least one chamber; wherein the chamber comprises an opening at either or both of a proximal end and a distal end of the chamber, wherein the proximal end and the distal end are separated by a lumen that is bounded by the walls, and wherein the porous scaffold has pores sized to facilitate growth of vascular and connective tissues around and through the walls of the at least one chamber;

at least one seal configured to enclose either or both the proximal end and the distal end of the chamber; and

wherein at least a part of the porous scaffold is coated with a material comprising a biocompatible, biodegradable material that temporarily fills the pores of the scaffold before vascular and connective tissue infiltrates the device through the pores of the scaffold into the at least one chamber.

2. The device of claim 1, further comprising at least one plug configured to be positioned within the lumen of the at least one chamber.

3. The device of claim 1, wherein the material stimulates tissue incorporation and angiogenesis.

4. The device of claim 1 or 2, wherein the material comprises at least one of collagen, fibronectin, extracellular matrix proteins, and membrane cytoskeletal proteins.

5. The device of any one of claims 1-4, wherein the chamber is filled with cells to be transplanted and optionally mixed with a biodegradable polymer.

6. The device of claim 5, wherein the biodegradable polymer is selected from polyethylene-imine and dextran sulfate, poly(vinylsiloxane)ecopolymerepolyethyleneimine, phosphorylcholine, poly(ethylene glycol), poly(lactic-glycolic acid), poly(lactic acid), polyhydroxyvalerte and copolymers, polyhydroxybutyrate and copolymers, polydiaxanone, polyanhydrides, poly(amino acids), poly(orthoesters), polyesters, collagen, gelatin, cellulose polymers, chitosans, alginates, fibronectin, extracellular matrix proteins, vinculin, agar, agarose,

hyaluronic acid, matrigel and combinations thereof.

7. The device of claim 5 or 6, wherein the cell preparation comprises islet of Langerhans cells and/or Sertoli cells.

8. The device of any one of claims 5-7, wherein the cell preparation comprises stem cells, differentiated stem cells, dopaminergic neurons, neural stem cells, mesenchymal stem cells, embryonic stem cells, cord blood cells, thyroid cells, allogeneic cells, xenogeneic or syngeneic cells, genetically engineered cells or cell lines, or a combination of cell types.

9. The device of any one of claims 1-8, wherein the polymer mesh comprises a polytetrafluoroethylene mesh, a polyurethane mesh, a polyester mesh, and/or a silk mesh.

10. The device of any one of claims 1-9, wherein the porous scaffold comprises multiple chambers that are connected laterally.

11. The device of claim 10, comprising three chambers, four chambers, five chambers, six chambers, seven chambers, eight chambers, nine chambers, ten chambers, eleven chambers, or twelve chambers connected laterally.

12. The device of claim 10 or 11, wherein the multiple chambers are formed by ultrasonic welding.

13. The device of any one of claims 10-12, further comprising a common seal for the multiple chambers.

14. The device of any one of claims 10-12, further comprising a seal for each chamber.

15. The device of any one of claims 1-14, wherein at least a part of the porous scaffold is roughened to stimulate tissue incorporation into the at least one chamber.

16. The device of any one of claims 1-15, further comprising a cell delivery device comprising at least one cell infusion tube configured to be positioned within the chamber.

17. The device of any one of claims 1-16, wherein the at least one seal comprises at least one surgical clip, surgical suture, or reversible lock.

18. The device of any one of claims 1-17, wherein the coating on at least a part of the porous scaffold comprises one or more growth factor, an antifibrotic agent, a polymer, and/or a material that stimulates tissue incorporation and angiogenesis.

19. The device of claim 18, wherein the growth factor comprises a vascular endothelial growth factor (VEGF).

20. The device of claim 18, wherein the polymer is a drug-eluting polymer.

21. A device for implanting cells in a host body comprising:

a porous scaffold comprising an immunologically compatible polypropylene mesh forming the walls of at least one chamber; wherein the chamber comprises an opening at either or both of a proximal end and a distal end of the chamber, wherein the proximal end and the distal end are separated by a lumen that is bounded by the walls, and wherein the porous scaffold has pores sized to facilitate growth of vascular and connective tissues around and through the walls of the at least one chamber;

one removable, non-porous plug configured to be positioned within the lumen of the at least one chamber; and

at least one seal configured to enclose either or both the proximal end and the distal end of the chamber.

22. The device of claim 21, wherein the chamber is filled with cells to be transplanted and optionally mixed with a biodegradable polymer.

23. The device of claim 22, wherein the biodegradable polymer is selected from polyethylene-imine and dextran sulfate, poly(vinylsiloxane)ecopolymerepolyethyleneimine, phosphorylcholine, poly(ethylene glycol), poly(lactic-glycolic acid), poly(lactic acid), polyhydroxyvalerte and copolymers, polyhydroxybutyrate and copolymers, polydiaxanone, polyanhydrides, poly(amino acids), poly(orthoesters), polyesters, collagen, gelatin, cellulose polymers, chitosans, alginates, fibronectin, extracellular matrix proteins, vinculin, agar, agarose, hyaluronic acid, matrigel and combinations thereof.

24. The device of claim 22 or 23, wherein the cell preparation comprises islet of Langerhans cells and/or Sertoli cells.

25. The device of any one of claims 22-24, wherein the cell preparation comprises stem cells, differentiated stem cells, dopaminergic neurons, neural stem cells, mesenchymal stem cells, embryonic stem cells, cord blood cells, thyroid cells, allogeneic cells, xenogeneic or syngeneic cells, genetically engineered cells or cell lines, or a combination of cell types.

26. The device of any one of claims 21-25, wherein the porous scaffold comprises multiple chambers that are connected laterally.

27. The device of claim 26, comprising three chambers, four chambers, five chambers, six chambers, seven chambers, eight chambers, nine chambers, ten chambers, eleven chambers, or twelve chambers connected laterally.

28. The device of claim 26 or 27, wherein the multiple chambers are formed by ultrasonic welding.

29. The device of any one of claims 26-28, further comprising a common seal for the multiple chambers.

30. The device of any one of claims 26-28, further comprising a seal for each chamber.

31. The device of any one of claims 21-30, wherein at least a part of the porous scaffold is roughened to stimulate tissue incorporation into the at least one chamber.

32. The device of any one of claims 21-31, further comprising a cell delivery device comprising at least one cell infusion tube configured to be positioned within the chamber.

33. The device of any one of claims 21-32, wherein the at least one seal comprises at least one surgical clip, surgical suture, or reversible lock.

34. The device of any one of claims 21-33, wherein at least a part of the porous scaffold is coated with one or more growth factor, an antifibrotic agent, a polymer, and/or a material that stimulates tissue incorporation and angiogenesis.

35. The device of claim 34, wherein the growth factor comprises a vascular endothelial growth factor (VEGF).

36. The device of claim 34, wherein the polymer is a drug-eluting polymer.