Claims

1. A method, wherein:

a patient access subassembly is to be coupled to a patient, the patient access subassembly fluidically coupled to a first fluid reservoir containing a first substance and a second fluid reservoir containing a second substance via an assembly;

cells are to be drawn through the patient access subassembly, through the assembly, and into the first fluid reservoir such that the cells and the first substance form a third substance;

the assembly is manipulated such that the first fluid reservoir is fluidically isolated from the patient access subassembly and such that the first fluid reservoir is in fluidic communication with the second fluid reservoir;

a portion of the third substance is transferred from the first fluid reservoir through the assembly and into the second fluid reservoir such that the portion of the third substance and the second substance form a fourth substance;

the fourth substance is transferred from the second fluid reservoir through the assembly and into the first fluid reservoir such that the remainder of the third substance and the fourth substance form a fifth substance;

the assembly is manipulated such that the first fluid reservoir is in fluid communication with the patient access subassembly;

the fifth substance is to be transferred into the patient, wherein the fifth substance is first transferred from the first fluid reservoir through the assembly and through the patient access subassembly into the patient;

a third fluid reservoir containing a saline solution is fluidically coupled to the assembly;

the assembly is manipulated such that the third fluid reservoir is in fluid communication with the patient access subassembly via the assembly; and

at least a portion of the saline solution is transferred from the assembly to the patient access subassembly.

2. The method of claim 1, wherein the portion of the third substance has a first volume and the fourth substance has a second volume, the second volume being at least about two times the size of the first volume.

3. The method of claim 1, wherein drawing the cells from the patient access subassembly draws the cells into the assembly from the patient access subassembly via a first flow path, and

transferring the fifth substance to the patient access subassembly and into the patient transfers the fifth substance out of the assembly and to the patient access subassembly via a second flow path, the first flow path being different from the second flow path.

4. The method of claim 1, wherein manipulating the assembly includes adjusting the orientations of one or more valves of the assembly.

5. The method of claim 1, wherein the first substance includes an anticoagulant.

6. The method of claim 1, wherein the second substance includes a medicament.

7. The method of claim 6, wherein the medicament includes at least one of 2-Bromo-1-(3,3-dinitroazetidin-1-yl)ethanone, a derivative of 2-Bromo-1-(3,3-dinitroazetidin-1-yl)ethenone, or a dinitroazetidine.

8. The method of claim 6, wherein the medicament includes propofol.

9. The method of claim 6, wherein the medicament includes a nitric oxide donor.

10. The method of claim 6, wherein the medicament includes ozone.

11. The method of claim 1, wherein the cells include at least one of packed red blood cells, white blood cells, or platelets.

12. The method of claim 1, further comprising, prior to transferring the fifth substance from the first fluid reservoir through the assembly, through the patient access subassembly, and into the patient,

allowing the fifth substance to remain in the first fluid reservoir for a duration of time.

13. The method of claim 12, wherein the duration of time is at least two minutes.

14. A kit, comprising:

a first assembly including a first fluid reservoir, a second fluid reservoir, a valve assembly, and a first tube, the first fluid reservoir, the second fluid reservoir, and the first tube fluidically coupled to the valve assembly, the valve assembly configured to selectively allow fluid

communication between the first fluid reservoir and the second fluid reservoir and between the first fluid reservoir and the first tube;

a second assembly including a patient access port fluidically coupled to a second tube, the second tube configured to be fluidically coupled to the valve assembly of the first assembly via a first flow path including a third tube and via a second flow path via the first tube such that the valve assembly can be in fluid communication with the patient access port via the first tube and via the second tube; and

a third fluid reservoir configured to be coupled to the valve assembly such that the valve assembly can selectively allow fluid communication between the third fluid reservoir and the first tube.

15. The kit of claim 14, wherein the valve assembly is coupled to the first tube via a filter, the filter configured to filter a fluid substance transferred between the first fluid reservoir and the patient access port.

16. The kit of claim 14, wherein the first fluid reservoir contains an antioxidant.

17. The kit of claim 16, wherein the antioxidant includes at least one of vitamin C or N-acetylcysteine.

18. The kit of claim 14, wherein the first fluid reservoir contains an anti-coagulant.

19. The kit of claim 14, wherein the second fluid reservoir contains a medicament.

20. The kit of claim 19, wherein the medicament includes at least one of 2-Bromo-1-(3,3-dinitroazetidin-1-yl)ethanone, a derivative of 2-Bromo-1-(3,3-dinitroazetidin-1-yl)ethenone, or a dinitroazetidine.

21. The kit of claim 19, wherein the medicament includes propofol.

22. The kit of claim 19, wherein the medicament includes at least one of nitric oxide or a nitric oxide donor.

23. The kit of claim 19, wherein the medicament includes ozone.

24. The kit of claim 14, wherein the third fluid reservoir contains a saline solution.

25. The kit of claim 14, wherein the third fluid reservoir contains Ringer's lactate solution.

26. The kit of claim 14, further comprising a fourth fluid reservoir configured to be fluidically coupled to the valve assembly such that the valve assembly can selectively allow fluid communication between the fourth fluid reservoir and the first fluid reservoir.

27. The kit of claim 14, further comprising at least one of a first syringe including the first fluid reservoir, a second syringe including the second fluid reservoir, and a third syringe including the third fluid reservoir.

28. The kit of claim 14, wherein the valve assembly includes a first valve, a second valve, and a third valve, the first fluid reservoir in selective fluid communication with the second fluid reservoir via the first valve and the second valve, the first valve in selective fluid communication with the first tube via the first valve and the second valve.

29. The kit of claim 28, wherein, when the third fluid reservoir is coupled to the valve assembly, the third fluid reservoir is in selective fluid communication with the first tube via the third valve, the first valve, and the second valve.

30. The kit of claim 28, wherein, when the third tube is coupled to the valve assembly, the third tube is in selective fluid communication with the first fluid reservoir via the third valve and the second valve.

31. A method, comprising:

fluidically coupling a first coupling member of a first subassembly to a valve assembly of a second subassembly, the second subassembly including a first fluid reservoir and a second fluid reservoir fluidically coupled to the valve subassembly, the first fluid reservoir selectively fluidically coupled to the second fluid reservoir via the valve assembly, the first subassembly including a patient access port, a first coupling member, and a second coupling member, the first coupling member and the second coupling member to be in fluid communication with the patient access port, the first coupling member coupled to the valve assembly such that the first fluid reservoir of the second subassembly is to be in selective fluid communication with the patient access port via a first flow path;

fluidically coupling the second coupling member of the first subassembly to the valve assembly such that the first fluid reservoir is to be in selective fluid communication with the patient access port via a second flow path different from the first flow path;

coupling a third fluid reservoir to the valve assembly such that the third fluid reservoir is to be in selective fluid communication with the patient access port via the second flow path.

32. The method of claim 31, wherein the first fluid reservoir contains an anti-coagulant.

33. The method of claim 31, wherein the second fluid reservoir contains a medicament.

34. The method of claim 33, wherein the medicament includes at least one of 2-Bromo-1-(3,3-dinitroazetidin-1-yl)ethanone, a derivative of 2-Bromo-1-(3,3-dinitroazetidin-1-yl)ethenone, or a dinitroazetidine.

35. The method of claim 33, wherein the medicament includes propofol.

36. The method of claim 33, wherein the medicament includes nitric oxide.

37. The method of claim 33, wherein the medicament includes ozone.

38. The method of claim 31, wherein the third fluid reservoir contains a saline solution.

39. The method of claim 31, wherein the third fluid reservoir contains Ringer's lactate solution.

40. An apparatus, comprising:

a patient access subassembly;

a first fluid reservoir configured to contain a first fluid substance;

a second fluid reservoir configured to contain a second fluid substance; and

an assembly having a first configuration in which the patient access subassembly is in fluid communication with the first fluid reservoir via a first tube, a second configuration in which the first fluid reservoir is in fluid communication with the second fluid reservoir, and a third configuration in which the first fluid reservoir is in fluid communication with the patient access subassembly via a second tube, the first fluid reservoir fluidically isolated from the first tube in the third configuration.

41. The apparatus of claim 40, further comprising a third tube and a filter, the filter fluidically coupled to the assembly via the second tube and fluidically coupled to the patient access component via the third tube.

42. The apparatus of claim 40, wherein the first fluid substance includes an anti-coagulant.

43. The apparatus of claim 42, wherein the first fluid substance includes an antioxidant.

44. The apparatus of claim 40, wherein the second fluid substance is a medicament.

45. The method of claim 44, wherein the medicament includes at least one of 2-Bromo-1-(3,3-dinitroazetidin-1-yl)ethanone, a derivative of 2-Bromo-1-(3,3-dinitroazetidin-1-yl)ethenone, or a dinitroazetidine.

46. The method of claim 44, wherein the medicament includes propofol.

47. The method of claim 44, wherein the medicament includes nitric oxide.

48. The method of claim 44, wherein the medicament includes ozone.

49. An apparatus, comprising:

a patient access subassembly configured to provide access to a blood vessel of a patient;

a first fluid reservoir configured to contain a first fluid substance;

a second fluid reservoir configured to contain a second fluid substance; and

an assembly including a first valve, a second valve, and a third valve, the first fluid reservoir in selective fluid communication with the second fluid reservoir via the first valve and the second valve, the patient access subassembly in selective fluid communication with the first fluid reservoir via the first valve, the third valve configured to couple to a third fluid reservoir such that the third fluid reservoir is in selective fluid communication with the patient access subassembly via the first valve and the second valve.

50. The apparatus of claim 49, wherein the first valve has a first position, a second position, and a third position, the second valve has a first position and a second position, and the third valve has a first position and second position,

the first fluid reservoir being in fluid communication with the patient access subassembly via a first fluid path when the first valve is in the first position and the third valve is in the first position,

the first fluid reservoir being in fluid communication with the second fluid reservoir when the first valve is in the second position and the second valve is in the first position, and

the first fluid reservoir being in fluid communication with the patient access subassembly via a second fluid path when the first valve is in the second position and the third valve is in the second position.

51. The apparatus of claim 50, wherein the third fluid reservoir is in fluid communication with the patient access subassembly via the second fluid path when the third fluid reservoir is coupled to the third valve, the third valve is in the second position, the first valve is in the third position, and the second valve is in the second position.

52. The apparatus of claim 49, further comprising the third fluid reservoir.

53. The apparatus of claim 49, further comprising at least one of a first syringe including the first fluid reservoir, a second syringe including the second fluid reservoir, and a third syringe including the third fluid reservoir.

54. The apparatus of claim 49, wherein the first fluid substance includes an anticoagulant and the second fluid substance includes at least one of 2-Bromo-1-(3,3-dinitroazetidin-1-yl)ethanone, a derivative of 2-Bromo-1-(3,3-dinitroazetidin-1-yl)ethenone, or a dinitroazetidine, and further comprising the at least one of 2-Bromo-1-(3,3-dinitroazetidin-1-yl)ethanone, the derivative of 2-Bromo-1-(3,3-dinitroazetidin-1-yl)ethenone, or the dinitroazetidine.

55. The apparatus of claim 49, wherein the first fluid substance includes an anticoagulant and the second fluid substance includes propofol, and further comprising the anticoagulant and the propofol.

56. The apparatus of claim 49, wherein the first fluid substance includes an anticoagulant and the second fluid substance includes a nitric oxide donor, and further comprising the anticoagulant and the nitric oxide donor.

57. The apparatus of claim 49, wherein the first fluid substance includes an anticoagulant and the second fluid substance includes ozone, and further comprising the anticoagulant and the ozone.