What is claimed:

1. A microfluidic device for culturing one or more biological cells comprising:

a flow region configured to contain a flow of a first fluidic medium; and

at least one growth chamber comprising an isolation region having a single opening to a connection region with a width in the range of 20 to 500 microns, the isolation region being fluidically connected with the connection region and the connection region comprising a proximal opening to the flow region, wherein:

the isolation region is an unswept region of said microfluidic device; and

the at least one growth chamber further comprises at least one surface conditioned to support cell growth, viability, portability allowing the one or more biological cells to be moved after a period of culture, or any combination thereof within the microfluidic device.

2. The microfluidic device of claim 1, wherein the at least one conditioned surface is conditioned with one or more agents that support portability allowing the one or more biological cells to be moved after the period of culture within the microfluidic device.

3. The microfluidic device of claim 1 or 2, wherein the at least one conditioned surface is conditioned with a polymer comprising alkylene ether moieties.

4. The microfluidic device of any one of the preceding claims, wherein the at least one conditioned surface is conditioned with a polymer comprising saccharide moieties.

5. The microfluidic device of any one of the preceding claims, wherein the at least one conditioned surface is conditioned with a polymer comprising amino acid moieties.

6. The microfluidic device of any one of the preceding claims, wherein the at least one conditioned surface of the microfluidic device is conditioned with a polymer comprising carboxylic acid moieties, sulfonic acid moieties, nucleic acid moieties, or phosphonic acid moieties.

7. The microfluidic device of any one of the preceding claims, wherein the at least one conditioned surface comprises a linking group covalently linked to a surface of the microfluidic device, and wherein the linking group is linked to a moiety configured to support cell growth, viability, portability allowing the one or more biological cells to be moved after the period of culture, or any combination thereof within the microfluidic device.

8. The microfluidic device of claim 7, wherein the linking group is a siloxy linking group.

9. The microfluidic device of claim 7 or 8, wherein the at least one conditioned surface comprises alkyl or fluoroalkyl moieties.

10. The microfluidic device of claim 9, wherein the alkyl or fluoroalkyl moieties have a backbone chain length of greater than 10 carbons.

11. The microfluidic device of any one of claims 7 to 10, wherein the linking group is indirectly linked via a linker to the moiety configured to support cell growth, viability, portability allowing the one or more biological cells to be moved after the period of culture, or any combination thereof within the microfluidic device.

12. The microfluidic device of claim 11, wherein the linker comprises a triazolylene moiety.

13. The microfluidic device of any one of the preceding claims, wherein the at least one conditioned surface comprises saccharide moieties.

14. The microfluidic device of any one of the preceding claims, where the at least one conditioned surface comprises alkylene ether moieties.

15. The microfluidic device of any one of the preceding claims, wherein the at least one conditioned surface comprises amino acid moieties.

16. The microfluidic device of any one of claims 7 to 15, wherein the at least one conditioned surface comprises zwitterions.

17. The microfluidic device of any one of the preceding claims, wherein the at least one conditioned surface comprises at least one cell adhesion blocking molecule.

18. The microfluidic device of any one of the preceding claims, wherein the conditioned surface comprises a cleavable moiety.

19. The microfluidic device of any one of the preceding claims, wherein the at least one conditioned surface of the microfluidic device comprises one or more components of mammalian serum.

20. The microfluidic device of any one of the preceding claims, wherein the microfluidic device further comprises a substrate having a dielectrophoresis (DEP) configuration.

21. The microfluidic device of claim 20, wherein the DEP configuration is optically actuated.

22. The microfluidic device of any one of the preceding claims, wherein the at least one growth chamber comprises at least one surface conditioned to support cell growth, viability, portability allowing the one or more biological cells to be moved after the period of culture, or any combination thereof of a mammalian cell within the microfluidic device.

23. The microfluidic device of any one of the preceding claims, wherein the at least one growth chamber comprises at least one surface conditioned to support cell growth, viability, portability allowing the one or more biological cells to be moved after the period of culture, or any combination thereof of an immunological cell within the microfluidic device.

24. The microfluidic device of claim 23, wherein the immunological cell is a lymphocyte or leukocyte.

25. The microfluidic device of claim 23, wherein the immunological cell is a B cell, a T cell, NK cell, a macrophage, or a dendritic cell.

26. The microfluidic device of any one of claims 1 to 22, wherein the at least one growth chamber comprises at least one surface conditioned to support cell growth, viability, portability allowing the one or more biological cells to be moved after the period of culture, or any combination thereof of an adherent cell within the microfluidic device.

27. The microfluidic device of any one of claims 1 to 22, wherein the at least one growth chamber comprises at least one surface conditioned to support cell growth, viability, portability allowing the one or more biological cells to be moved after the period of culture, or any combination thereof of a hybridoma cell within the microfluidic device.

28. The microfluidic device of any one of the preceding claims, wherein the at least one growth chamber comprises at least one surface conditioned to support cell growth, viability, portability allowing the one or more biological cells to be moved after the period of culture, or any combination thereof a single cell and a corresponding clonal colony of biological cells within the microfluidic device.

29. A system for culturing one or more biological cells on a microfluidic device, the system comprising:

a microfluidic device comprising:

a flow region configured to contain a flow of a first fluidic medium; and

at least one growth chamber comprising an isolation region having a single opening to a connection region with a width in the range of 20 to 500 microns, the isolation region being fluidically connected with the connection region and the connection region comprising a proximal opening to the flow region, wherein:

the isolation region is an unswept region of said microfluidic device; and

the at least one growth chamber has at least one surface conditioned to support cell growth, viability, portability allowing the one or more biological cells to be moved after a period of culture, or any combination thereof within the microfluidic device.

30. The system of claim 29, wherein the microfluidic device is any one of the microfluidic devices of claims 1 to 28.

31. The system of claim 29 or 30, further comprising a flow controller configured to perfuse at least the first fluidic medium.

32. The system of claim 31, wherein the controller is configured to perfuse the at least first fluidic medium non-continuously.

33. The system of any one of claims 29 to 32, wherein the microfluidic device further comprises a substrate having a dielectrophoresis (DEP) configuration configured to introduce one or more biological cells into or move the one or more biological cells out of the growth chamber.

34. The system of claim 33, wherein the DEP configuration is optically actuated.

35. The system of any one of claims 29 to 34 further comprising a reservoir configured to contain the first fluidic medium, wherein the reservoir is fluidically connected to the microfluidic device.

36. The system of claim 35, wherein the reservoir is configured to be contacted by a gaseous environment capable of saturating the first fluidic medium with dissolved gaseous molecules.

37. The system of any one of claims 29 to 36, further comprising a sensor connected to at least one inlet port of the microfluidic device, wherein the sensor is configured to detect a pH of the first fluidic medium.

38. The system of any one of claims 29 to 37, further comprising a sensor connected to at least one outlet, wherein the sensor is configured to detect a pH of the first fluidic medium as the first fluidic medium leaves the microfluidic device

39. The system of claim 37 or 38, wherein the sensor is an optical sensor.

40. The system of any one of claims 29 to 39 further comprising a detector configured to capture an image of the at least one growth chamber and any biological cells contained therein.

41. A kit for culturing a biological cell, comprising:

a microfluidic device comprising:

a flow region configured to contain a flow of a first fluidic medium; and

at least one growth chamber comprising an isolation region having a single opening to a connection region with a width in the range of 20 to 500 microns, the isolation region being fluidically connected with the connection region and the connection region comprising a proximal opening to the flow region, wherein:

the isolation region is an unswept region of said microfluidic device; and

the at least one growth chamber further comprises at least one surface conditioned to support cell growth, viability, portability allowing the biological cell to be moved after a period of culture, or any combination thereof within the microfluidic device.

42 The kit of claim 41, wherein the microfluidic device is the microfluidic device of any one of claims 1-28.

43. The kit of claim 41 or 42 wherein the at least one conditioned surface of the microfluidic device comprises alkyl moieties, fluoroalkyl moieties, mono- or polysaccharide moieties, alcohol moieties, polyalcohol moieties, alkylene ether moieties; polyelectrolyte moieties, amino moieties,

carboxylic acid moieties, phosphonic acid moieties, sulfonate moieties, carboxybetaine moieties, sulfobetaine moieties, sulfamic acid moieties, or amino acid moieties.

44. The kit of any one of claims 41 to 43, wherein the at least one conditioned surface of the microfluidic device comprises at least one of saccharide moieties, alkylene ether moieties, alkyl moieties, fluoroalkyl moieties, or amino acid moieties.

45. The kit of claim 44, wherein the alkyl or fluoroalkyl moieties have a backbone chain length of greater than 10 carbons.

46. The kit of any one of claims 41 to 45, wherein the at least one conditioned surface comprises a linking group covalently linked to a surface of the microfluidic device, and further wherein the linking group is linked to a moiety configured to support growth, viability, portability allowing the biological cell to be moved after the period of culture, or any combination thereof of the biological cell within the microfluidic device.

47. The kit of claim 46, wherein the linking group is a siloxy linking group.

48. The kit of claim 46 or 47, wherein the linking group is indirectly linked to the moiety configured to support cell growth, viability, portability allowing the biological cell to be moved after the period of culture, or any combination thereof within the microfluidic device.

49. The kit of claim 48, wherein the linking group is indirectly linked to the moiety configured to support cell growth, viability, portability allowing the biological cell to be moved after the period of culture, or any combination thereof within the microfluidic device, via a linker.

50. The kit of any one of claims 41 to 49, wherein the microfluidic device further comprises a surface conditioning reagent.

51. The kit of claim 50, wherein the surface conditioning reagent comprises a polymer comprising at least one of alkylene ether moieties, carboxylic acid moieties, sulfonic acid moieties, phosphonic acid moieties, amino acid moieties, nucleic acid moieties or saccharide moieties.

52. The kit of claim 50 wherein the surface conditioning reagent comprises at least one cell adhesion blocking molecule.

53. The kit of claim 50, wherein the surface conditioning reagent comprises one or more components of mammalian serum.

54. The kit of any one of claims 41 to 53, further comprising a culture medium additive comprising a reagent configured to replenish the conditioning of the at least one surface of growth chamber.

55. The kit of any one of claims 41 to 54 wherein the conditioned surface comprises a cleavable moiety.

56. The kit of claim 55, wherein the kit further comprises a reagent configured to cleave the cleavable moiety of the conditioned surface.

57. A method of culturing at least one biological cell in a microfluidic device having a flow region configured to contain a flow of a first fluidic medium; and at least one growth chamber comprising an isolation region having a single opening to a connection region with a width in the range of 20 to 500 microns, the isolation region being fluidically connected with the connection region and the connection region comprising a proximal opening to the flow region, wherein the isolation region is an unswept region of said microfluidic device, comprising the steps:

introducing the at least one biological cell into the at least one growth chamber, wherein the at least one growth chamber is configured to have at least one surface conditioned to support cell growth, viability, portability allowing the at least one biological cell to be moved after a period of culture within the microfluidic device, or any combination thereof; and,

incubating the at least one biological cell for a period of time at least long enough to expand the at least one biological cell to produce a colony of biological cells.

58. The method of claim 57, wherein the microfluidic device is the microfluidic device of any one of claims 1-28.

59. The method of any one of claims 57 to 58, wherein the at least one conditioned surface comprises a linking group covalently linked to the surface, and further wherein the linking group is linked to a moiety configured to support cell growth, viability, portability allowing the at least one biological cell to be moved after the period of culture, or any combination thereof of the at least one biological cell within the microfluidic device.

60. The method of any one of claims 57 to 59, wherein the at least one conditioned surface comprises alkyl or perfluoroalkyl moieties.

61. The method of any one of claims 57 to 59, wherein the at least one conditioned surface comprises alkylene ether moieties or dextran moieties.

62. The method of any one of claims 57 to 61, further comprising conditioning at least a surface of the at least one growth chamber.

63. The method of claim 62, wherein conditioning comprises treating the at least a surface of the at least one growth chamber with a conditioning reagent comprising a polymer.

64. The method of any one of claims 62 to 63, wherein conditioning comprises treating at least a surface of the at least one growth chamber with one or more components of mammalian serum.

65. The method of any one of claims 62 to 64, wherein conditioning comprises treating at least one surface of the at least one growth chamber with at least one cell adhesion blocking molecule.

66. The method of any one of claims 57 to 65, wherein introducing the at least one biological cell into the at least one growth chamber comprises using a dielectrophoresis (DEP) force having sufficient strength to move the at least one biological cell.

67. The method of claim 66, wherein the DEP force is optically actuated.

68. The method of any one of claims 57 to 67, further comprising perfusing the first fluidic medium during the incubating step, wherein the first fluidic medium is introduced via at least one inlet port of the microfluidic device and exported via at least one outlet of the microfluidic device, wherein, upon export, the first fluidic medium optionally comprises components from a second fluidic medium.

69. The method of any one of claims 57 to 68, further comprising the step of cleaving one or more cleavable moieties of the conditioned surface after the incubating step, thereby facilitating export of the at least one biological cell out of the growth chamber or isolation region thereof and into the flow region.

70. The method of any one of claims 57 to 69, further comprising the step of exporting the at least one biological cell out of the growth chamber or the isolation region thereof into the flow region.

71. The method of any one of claims 57 to 70, wherein the at least one biological cell is a mammalian cell.

72. The method of any one of claims 57 to 71, wherein the at least one biological cell is an immunological cell.

73. The method of claim 72, wherein the immunological cell is a lymphocyte or leukocyte.

74. The method of claim 72, wherein the immunological cell is a B cell, a T cell, NK cell, a macrophage, or a dendritic cell.

75. The method of any one of claims 57 to 72, wherein the at least one biological cell is an adherent cell.

76. The method of any one of claims 57 to 72, wherein the at least one biological cell is a hybridoma cell.

77. The method of any one of claims 57 to 76, wherein introducing the at least one biological cell into the at least one growth chamber comprises introducing a single cell into the growth chamber, and wherein the colony of biological cells produced by the incubating step is a clonal colony.