What is claimed is:

1. A device for causing the transdermal flux of a permeant into a subject via at least one formed pathway through a skin layer of the subject, comprising:
a delivery reservoir comprising:
i) a non-biodegradable matrix having a bottom surface and defining a plurality of conduits therein the matrix, at least a portion of the plurality of conduits being in communication with the bottom surface; and
ii) an undissolved hydrophilic permeant disposed therein at least a portion of the plurality of conduits of the matrix,
wherein the hydrophilic permeant can come in contact with subcutaneous fluid from the subject when the bottom surface of the matrix is positioned in fluid communication with the at least one formed pathway.

2. The device of Claim 1, wherein the permeant comprises at least one bioactive agent.

3. The device of Claim 1, wherein the permeant is a bioactive agent.

4. The device of Claim 2, wherein the permeant comprises a plurality of bioactive agents.

5. The device of Claim 2, wherein the permeant comprises at least one water-soluble filler.

6. The device of Claim 2, wherein the permeant comprises at least one osmotic agent.

7. The device of Claim 5, wherein the filler comprises at least one hygroscopic agent.

8. The device of Claim 2, wherein the permeant comprises mannitol.

9. The device of Claim 2, wherein the permeant comprises at least one anti-healing agent.

10. The device of Claim 2, wherein the permeant comprises at least one anti-clotting agent.

11. The device of Claim 2, wherein the permeant comprises at least one anti-inflamatory agent.

12. The device of Claim 2, wherein the permeant comprises at least one reepitheliating inhibitory agent.

13. The device of Claim 2, wherein the permeant comprises at least one nitrous oxide inhibitory agent.

14. The device of Claim 2, wherein the permeant comprises at least one melanogenesis inhibitory agent.

15. The device of Claim 5, wherein the filler is present in an amount, relative to a predetermined amount of bioactive agent, that can provide a predetermined transdermal dosage of bioactive agent.

16. The device of Claim 1, wherein the permeant is present in an amount and composition, relative to a predetermined amount of the solid matrix, that can provide a predetermined rate of transdermal permeant diffusion.

17. The device of Claim 1, wherein the non-biodegradable matrix comprises a water-insoluble polymer.

18. The device of Claim 17, wherein the water-insoluble polymer comprises an ethylene vinyl acetate co-polymer.

19. The device of Claim 1, wherein the delivery reservoir comprises from approximately 20 weight % to approximately 80 weight % matrix.

20. The device of Claim 1, wherein the reservoir comprises from approximately 20 weight % to approximately 50 weight % matrix.

21. The device of Claim 1, wherein the permeant comprises a salt.

22. The device of Claim 2, wherein the bioactive agent comprises hydromorphone.

23. The device of Claim 2, wherein the bioactive agent comprises a protein.

24. The device of Claim 2, wherein the bioactive agent comprises a peptide.

25. The device of Claim 2, wherein the bioactive agent comprises insulin.

26. The device of Claim 1, wherein the delivery reservoir comprises a plurality of delivery reservoirs in a stacked arrangement.

27. The device of Claim 26, wherein at least two of the plurality of delivery reservoirs comprise a different permeant.

28. The device of Claim 26, wherein each of the plurality of delivery reservoirs comprise a different permeant.

29. The device of Claim 26, wherein the plurality of delivery reservoirs can transdermally deliver at least one permeant at a predetermined rate of delivery over a predetermined administration period.

30. The device of Claim 29, wherein the predetermined rate of delivery remains substantially constant over the predetermined administration period.

31. The device of Claim 30, wherein the administration period is from approximately 0.1 hours to 400 hours.

32. The device of Claim 30, wherein the administration period is from approximately 6 hours to 12 hours.

33. The device of Claim 30, wherein the administration period is from approximately 12 hours to 30 hours.

34. The device of Claim 30, wherein the administration period is from approximately 30 hours to 50 hours.

35. The device of Claim 30, wherein the administration period is from approximately 50 hours to 80 hours.

36. The device of Claim 29, wherein the predetermined rate of delivery is variable over the administration period.

37. The device of Claim 1, wherein the delivery reservoir has a substantially planar and smooth bottom surface.

38. The device of Claim 1, wherein the delivery reservoir has a textured bottom surface.

39. The device of Claim 1, wherein the delivery reservoir has a bottom surface and wherein at least a portion of the bottom surface is non-planar.

40. The device of Claim 1, wherein the permeant is not transdermally active until activated by fluid.

41. The device of Claim 1, wherein the device can transdermally deliver at least about 10 percent of the permeant disposed in the reservoir matrix.

42. The device of Claim 1, wherein the device can transdermally deliver at least about 20 percent of the permeant disposed in the reservoir matrix.

43. The device of Claim 1, wherein the device can transdermally deliver at least about 40 percent of the permeant disposed in the reservoir matrix.

44. The device of Claim 1, wherein the device can transdermally deliver at least about 60 percent of the permeant disposed in the reservoir matrix.

45. The device of Claim 1, wherein the device can transdermally deliver at least about 80 percent of the permeant disposed in the reservoir matrix.

46. The device of Claim 2, wherein the device can transdermally deliver at least about 10 percent of the bio-active agent disposed in the reservoir matrix.

47. The device of Claim 2, wherein the device can transdermally deliver at least about 20 percent of the bio-active agent disposed in the reservoir matrix.

48. The device of Claim 2, wherein the device can transdermally deliver at least about 40 percent of the bio-active agent disposed in the reservoir matrix.

49. The device of Claim 2, wherein the device can transdermally deliver at least about 60 percent of the bio-active agent disposed in the reservoir matrix.

50. The device of Claim 2, wherein the device can transdermally deliver at least about 80 percent of the bio-active agent disposed in the reservoir matrix.

51. The device of Claim 1, wherein the device can transdermally deliver at least about 90 percent of the permeant disposed in the reservoir matrix.

52. The device of Claim 1, further comprising a backing support layer having an inwardly facing surface, wherein the delivery reservoir has a top surface and an opposed bottom surface and wherein at least a portion of the inwardly facing surface of the backing support layer is connected to at least a portion of a top surface of the delivery reservoir.

53. The device of Claim 52, further comprising a protective release layer connected to at least a portion of the bottom surface of the composite reservoir.

54. The device of Claim 52, wherein a portion of the backing support layer peripherally extends beyond the reservoir and wherein at least a portion of peripherally extending support layer has an adhesive layer deposited on the inward facing surface thereof.

55. The device of Claim 53, wherein the protective release layer is removably secured to at least a portion of the peripherally extending backing support layer.

56. The device of Claim 53, wherein when the protective release layer is removed, the bottom surface of the composite reservoir can be positioned in fluid communication with at least one pathway in the skin of a subject.

57. The device of Claim 1, wherein the delivery reservoir comprises a top surface and an opposed bottom surface and wherein a first electrode is positioned in electrical communication with the top surface and a second electrode is positioned in electrical communication with the bottom surface.

58. The device of Claim 57, further comprising a third electrode remotely positioned from the delivery reservoir and adapted to be positioned in electrical communication with the skin of a subject.

59. The device of Claim 57, wherein the first and second electrodes are in selective electrical communication with a controllable voltage or current source.

60. The device of Claim 58, wherein the first, second and third electrodes are in selective electrical communication with a controllable voltage or current source.

61. The device of Claim 1, wherein the subject is a mammal.

62. The device of Claim 61, wherein the subject is a human.

63. The device of Claim 1, wherein the delivery reservoir has a thickness in the range of from 0.01mm to 10.0 mm.

64. The device of Claim 63, wherein the thickness is in the range of from 0.5 mm to 1.0 mm.

65. A system for causing the transdermal flux of a permeant into a subject via at least one formed pathway through a skin layer of the subject, comprising:

a) a means for intentionally forming the at least one formed pathway in the skin layer; and

b) a delivery reservoir comprising:

i) a non-biodegradable matrix having a bottom surface and defining a plurality of conduits therein the matrix, at least a portion of the plurality of conduits being in communication with the bottom surface; and

ii) an undissolved water-soluble permeant disposed therein at least a portion of the plurality of conduits of the matrix, wherein the water-soluble permeant can come in contact with subcutaneous fluid when the bottom surface of the matrix is positioned in fluid communication with the at least one formed pathway.

66. A method of transdermal monitoring, comprising steps of:
forming at least one micropore in a biological membrane, and
monitoring an analyte contained in a subcutaneous fluid extracted via the at least one micropore.

67. A transdermal monitoring system, comprising:
a microporation device adapted to form at least one micropore in a biological membrane; and
a monitoring device adapted to monitor an analyte contained in a subcutaneous fluid extracted via the at least one micropore.

CLAIMS

1. A device for causing the transdermal flux of a permeant into a subject via at least one formed pathway through a skin layer of the subject,
comprising:
a delivery reservoir comprising:
i) a non-biodegradable matrix having a bottom surface and defining a plurality of conduits therein the matrix, at least a portion of the plurality of conduits being in communication with the bottom surface; and
ii) an undissolved hydrophilic permeant disposed therein at least a portion of the plurality of conduits of the matrix,
wherein the hydrophilic permeant can come in contact with subcutaneous fluid from the subject when the bottom surface of the matrix is positioned in fluid communication with the at least one formed pathway.

2. The device of Claim 1, wherein the permeant comprises at least one bioactive agent.

3. The device of Claim 1, wherein the permeant is a bioactive agent.

4. The device of Claim 2, wherein the permeant comprises a plurality of bioactive agents.

5. The device of Claim 2, wherein the permeant comprises at least one water-soluble filler.

6. The device of Claim 2, wherein the permeant comprises at least one osmotic agent.

7. The device of Claim 5, wherein the filler comprises at least one hygroscopic agent.

8. The device of Claim 2, wherein the permeant comprises mannitol.

9. The device of Claim 2, wherein the permeant comprises at least one anti-healing agent.

10. The device of Claim 2, wherein the permeant comprises at least one anti-clotting agent.

11. The device of Claim 2, wherein the permeant comprises at least one anti-inflamatory agent.

12. The device of Claim 2, wherein the permeant comprises at least one reepitheliating inhibitory agent.

13. The device of Claim 2, wherein the permeant comprises at least one nitrous oxide inhibitory agent.

14. The device of Claim 2, wherein the permeant comprises at least one melanogenesis inhibitory agent.

15. The device of Claim 5, wherein the filler is present in an amount, relative to a predetermined amount of bioactive agent, that can provide a predetermined transdermal dosage of bioactive agent.

16. The device of Claim 1, wherein the permeant is present in an amount and composition, relative to a predetermined amount of the solid matrix, that can provide a predetermined rate of transdermal permeant diffusion.

17. The device of Claim 1, wherein the non-biodegradable matrix comprises a water-insoluble polymer.

18. The device of Claim 17, wherein the water-insoluble

polymer comprises an ethylene vinyl acetate co-polymer.

19. The device of Claim 1, wherein the delivery reservoir comprises from approximately 20 weight % to approximately 80 weight % matrix.

20. The device of Claim 1, wherein the reservoir comprises from approximately 20 weight % to approximately 50 weight % matrix.

21. The device of Claim 1, wherein the permeant comprises a salt.

22. The device of Claim 2, wherein the bioactive agent comprises hydromorphone.

23. The device of Claim 2, wherein the bioactive agent comprises a protein.

24. The device of Claim 2, wherein the bioactive agent comprises a peptide.

25. The device of Claim 2, wherein the bioactive agent comprises insulin.

26. The device of Claim 1, wherein the delivery reservoir comprises a plurality of delivery reservoirs in a stacked arrangement.

27. The device of Claim 26, wherein at least two of the plurality of delivery reservoirs comprise a different permeant.

28. The device of Claim 26, wherein each of the plurality of delivery reservoirs comprise a different permeant.

29. The device of Claim 1, wherein the delivery reservoir has a substantially planar and smooth bottom surface.

30. The device of Claim 1, wherein the delivery reservoir has a textured bottom surface.

31. The device of Claim 1, wherein the delivery reservoir has a bottom surface and wherein at least a portion of the bottom surface is non-planar.

32. The device of Claim 1, wherein the permeant is not transdermally active until activated by fluid.

33. The device of Claim 1, further comprising a backing support layer having an inwardly facing surface, wherein the delivery reservoir has a top surface and an opposed bottom surface and wherein at least a portion of the inwardly facing surface of the backing support layer is connected to at least a portion of a top surface of the delivery reservoir.

34. The device of Claim 33, further comprising a protective release layer connected to at least a portion of the bottom surface of the composite reservoir.

35. The device of Claim 33, wherein a portion of the backing support layer peripherally extends beyond the reservoir and wherein at least a portion of peripherally extending support layer has an adhesive layer deposited on the inward facing surface thereof.

36. The device of Claim 34, wherein the protective release layer is removably secured to at least a portion of the peripherally extending backing support layer.

37. The device of Claim 34, wherein when the protective

release layer is removed, the bottom surface of the composite reservoir can be positioned in fluid communication with at least one pathway in the skin of a subject.

38. The device of Claim 1, wherein the delivery reservoir comprises a top surface and an opposed bottom surface and wherein a first electrode is positioned in electrical communication with the top surface and a second electrode is positioned in electrical communication with the bottom surface.

39. The device of Claim 38, further comprising a third electrode remotely positioned from the delivery reservoir and adapted to be positioned in electrical communication with the skin of a subject.

40. The device of Claim 38, wherein the first and second electrodes are in selective electrical communication with a controllable voltage or current source.

41. The device of Claim 39, wherein the first, second and third electrodes are in selective electrical communication with a controllable voltage or current source.

42. The device of Claim 1, wherein the subject is a mammal.

43. The device of Claim 42, wherein the subject is a human.

44. The device of Claim 1, wherein the delivery reservoir has a thickness in the range of from 0.01mm to 10.0 mm.

45. The device of Claim 44, wherein the thickness is in the range of from 0.5 mm to 1.0 mm.

46. A system for causing the transdermal flux of a permeant

into a subject via at least one formed pathway through a skin layer of the subject,
comprising:
a) a means for intentionally forming the at least one formed pathway in the skin layer; and
b) a delivery reservoir comprising:
i) a non-biodegradable matrix having a bottom surface and defining a plurality of conduits therein the matrix, at least a portion of the plurality of conduits being in communication with the bottom surface; and
ii) an undissolved water-soluble permeant disposed therein at least a portion of the plurality of conduits of the matrix, wherein the water-soluble permeant can come in contact with subcutaneous fluid when the bottom surface of the matrix is positioned in fluid communication with the at least one formed pathway.

47. A device for causing the transdermal flux of a permeant into a subject and an analyte from the subject via at least one formed pathway through a skin layer of the subject, comprising:
a delivery reservoir comprising:
i) a non-biodegradable matrix having a bottom surface and defining a plurality of conduits therein the matrix, at least a portion of the plurality of conduits being in communication with the bottom surface; and
ii) an undissolved hydrophilic permeant disposed therein at least a portion of the plurality of conduits of the matrix,
wherein the hydrophilic permeant can come in contact with subcutaneous fluid containing the analyte from the subject when the bottom surface of the matrix is positioned in fluid communication with the at least one formed pathway.

48. A system for causing the transdermal flux of a permeant into a subject and an analyte from the subject via

at least one formed pathway through a skin layer of the subject, comprising:

a) a means for intentionally forming the at least one formed pathway in the skin layer; and

b) a delivery reservoir comprising:

i) a non-biodegradable matrix having a bottom surface and defining a plurality of conduits therein the matrix, at least a portion of the plurality of conduits being in communication with the bottom surface; and

ii) an undissolved water-soluble permeant disposed therein at least a portion of the plurality of conduits of the matrix, wherein the water-soluble permeant can come in contact with subcutaneous fluid containing the analyte when the bottom surface of the matrix is positioned in fluid communication with the at least one formed pathway.