IT IS CLAIMED:

1. A transdermal delivery system for systemic delivery of memantine, comprising:

(a) a skin contact adhesive layer to attach the transdermal delivery system to the skin of a user;

(b) an intermediate layer directly on the contact adhesive layer;

(c) a drug reservoir layer on the intermediate layer, the drug reservoir layer comprised of (i) an acrylate copolymer, (ii) a permeation enhancer that is a higher alcohol, (iii) a hydrophilic solvent carrier, and (iv) memantine base generated *in situ* by reaction of a salt of memantine with an alkaline salt.

2. The transdermal delivery system of claim 1, wherein the acrylate copolymer comprises a copolymer of acrylic acid/vinyl acetate.

3. The transdermal delivery system of claim 2, wherein the higher alcohol is selected from the group consisting of lauryl alcohol, isostearyl alcohol, octyldodecanol, and oleyl alcohol.

4. The transdermal delivery system of any one of claims 1-3, wherein the carrier is selected from the group consisting of glycerol, propylene glycol, and liquid polyethylene glycol.

5. The transdermal delivery system of any one of claims 1-4, wherein the skin contact adhesive layer further comprises a permeation enhancer.

6. The transdermal delivery system of any one of claims 1-5, wherein the drug reservoir comprises a disintegrant selected from polyvinylpyrrolidone (PVP) or polyvinyl alcohol (PVA), or cross-linked derivative thereof.

7. The transdermal delivery system of claim 6, wherein the disintegrant is polyvinylpyrrolidone cross-linked material (PVP-CLM).

8. The transdermal delivery system of any of the preceding claims, wherein the intermediate layer is a rate controlling membrane microporous membrane.

9. The transdermal delivery system of claim 8, wherein microporous membrane is comprised of a microporous polypropylene with a plurality of pores that contain the permeation enhancer.

10. The transdermal delivery system of claim 8, wherein the intermediate layer is a non-woven polyester.

11. The transdermal delivery system of any of the preceding claims, wherein the salt of memantine is a halide salt of memantine.

12. The transdermal delivery system of claim 11, wherein the halide salt of memantine is memantine hydrochloride.

13. The transdermal delivery system of any of the preceding claims, wherein the alkaline salt in the drug reservoir layer is selected from the group consisting of sodium acetate, sodium borate, sodium metaborate, sodium carbonate, sodium bicarbonate, potassium carbonate, potassium bicarbonate, potassium citrate, potassium acetate, sodium phosphate, potassium phosphate, disodium hydrogen phosphate, sodium oxylate, sodium succinate, sodium citrate, and sodium salicylate.

14. The transdermal delivery system of claim 13, wherein the alkaline salt in the drug reservoir layer is sodium bicarbonate or potassium bicarbonate.

15. The transdermal delivery system of any of the preceding claims, wherein the skin contact adhesive layer comprises a higher alcohol, a biocompatible polymer or copolymer, and at least one of a matrix modifier and dispersive silica.

16. The transdermal delivery system of claim 15, wherein the higher alcohol is selected from the group consisting of lauryl alcohol, isostearyl alcohol, octyldodecanol, and oleyl alcohol.

17. The transdermal delivery system of claim 15, wherein the biocompatible polymer is selected from the group consisting of polyisobutylene (PIB), a silicone polymer, acrylate copolymers, butyl rubber, polybutylene, styrene-iosprene-styrene block copolymers, styrene-butadiene-styrene block copolymers, ethylene-vinyl acetate (EVA), a mixture thereof or a copolymer thereof.

18. The transdermal delivery system of claim 15, wherein the matrix modifier is selected from the group consisting of cross-linked polyvinylpyrrolidone (PVP), soluble PVP, cellulose derivatives, polyacrylamide, polyacrylic acid and clay.

19. A composition, comprising:

a drug reservoir comprising (i) memantine base generated *in situ* by reaction of a salt of memantine with an alkaline salt; (ii) a hydrophilic solvent carrier, and (iii) an acrylate copolymer.

20. The composition of claim 19, wherein the hydrophilic solvent carrier is glycerol.

21. The composition of claim 19 or 20, wherein the drug reservoir further comprises a permeation enhancer.

22. The composition of claim 21, wherein the permeation enhancer is a higher alcohol selected from the group consisting of lauryl alcohol, isostearyl alcohol, octyldodecanol, and oleyl alcohol.

23. The composition of any one of claims 19-22, wherein drug reservoir further comprises a crosslinked polyvinylpyrrolidone.

24. The composition of any one of claims 19-23, wherein the salt of memantine is memantine hydrochloride and the alkaline salt is selected from the group consisting of sodium acetate, sodium borate, sodium metaborate, sodium carbonate, sodium bicarbonate, potassium carbonate, potassium bicarbonate, potassium citrate, potassium acetate, sodium phosphate, potassium phosphate, disodium hydrogen phosphate, sodium oxylate, sodium succinate, sodium citrate, and sodium salicylate.

25. A composition comprising a drug reservoir consisting essentially of:

a memantine base generated *in situ* by reaction of a salt of memantine and an alkaline salt; a permeation enhancer; a hydrophilic solvent carrier; and a polymeric, adhesive matrix comprising crosslinked polyvinylpyrrolidone and an acrylate polymer.

26. A composition, comprising a drug reservoir consisting essentially of:

(a) memantine base generated *in situ* by reaction of between about 10-30 wt% memantine HCl and between about 5-15 wt% sodium bicarbonate;

(b) about 5-15 wt% octyldodecanol;

(c) about 5-15 wt% glycerol;

(d) about 10-30 wt% crosslinked polyvinylpyrrolidone; and

(e) about 20-65 wt% acrylate polymer.

27. A composition, comprising a drug reservoir consisting essentially of:

(a) memantine base generated *in situ* by reaction of between about 22-27 wt% memantine HCl and between about 7-12 wt% sodium bicarbonate;

(b) about 8-12 wt% octyldodecanol;

(c) about 8-12 wt% glycerol;

(d) about 13-17 wt% crosslinked polyvinylpyrrolidone; and

(e) about 25-50 wt% acrylate polymer.

28. A composition, comprising:

(a) a drug reservoir comprised of the composition of any one of claims 19-27;

(b) a rate controlling membrane with a plurality of pores; and

(c) a skin contact adhesive.

29. The composition according to claim 28, wherein the rate controlling membrane is a microporous polypropylene membrane.

30. The composition of claim 29, wherein the plurality of pores contain a permeation enhancer or octyldodecanol.

31. The composition according to any one of claims 28-30, wherein the skin contact adhesive comprises a higher alcohol and a biocompatible polymer or copolymer.

32. The composition of claim 31, wherein the higher alcohol is selected from the group consisting of lauryl alcohol, isostearyl alcohol, octyldodecanol, and oleyl alcohol.

33. The composition of claim 31, wherein the biocompatible polymer comprises polyisobutylene (PIB), silicone polymers, acrylate copolymers, butyl rubber, polybutylene, styrene-iosprene-styrene block copolymers, styrene-butadiene-styrene block copolymers, ethylene-vinyl acetate (EVA), or a

mixture thereof.

34. A method for delivering memantine to a subject in need thereof, comprising contacting a tissue of the subject with the transdermal delivery system of any one of claims 1-33;

whereby said contacting achieves transdermal delivery of memantine to the subject.

35. The method of claim 34, wherein the tissue is skin tissue.

36. The method of claim 34 or claim 35, wherein the subject is suffering from or has been diagnosed with a CNS disorder.

37. The method of claim 36, wherein the CNS disorder is selected from Alzheimer's disease and vascular dementia.

38. The method of any one of claims 34-37, wherein the subject is a human subject.