WHAT IS CLAIMED IS:

1. A method for delivering a substance across a blood brain barrier of a subject's brain, the method comprising:

applying an alternating electric field to the subject's brain for a first period of time, wherein application of the alternating electric field to the subject's brain for the first period of time increases permeability of the blood brain barrier in the subject's brain;

administering a first substance to the subject after the first period of time has elapsed, wherein the increased permeability of the blood brain barrier allows the first substance to cross the blood brain barrier;

discontinuing the application of the alternating electric field for enough time to allow the blood brain barrier to recover;

after the blood brain barrier has recovered, applying an alternating electric field to the subject's brain for a second period of time, wherein application of the alternating electric field to the subject's brain for the second period of time increases permeability of the blood brain barrier in the subject's brain; and

administering a second substance to the subject after the second period of time has elapsed, wherein the increased permeability of the blood brain barrier allows the second substance to cross the blood brain barrier.

2. The method of claim 1, wherein the alternating electric field is applied at a frequency between 75 kHz and 125 kHz.

3. The method of claim 1, wherein the alternating electric field is applied at a frequency of at least 50 kHz.

4. The method of claim 1, wherein the second period of time is at least 24 hours.

5. The method of claim 1, wherein the second period of time is at least 48 hours.

6. The method of claim 1, wherein the alternating electric field has a field strength of at least 1 V/cm in at least a portion of the subject's brain.

7. The method of claim 1, wherein the alternating electric field is applied at a frequency

between 75 kHz and 125 kHz, the second period of time is at least 24 hours, and the alternating electric field has a field strength of at least 1 V/cm in at least a portion of the subject's brain.

8. The method of claim 1, wherein the administering of the second substance is performed intravenously.

9. The method of claim 1, wherein the administering of the second substance is performed orally.

10. The method of claim 1, wherein the first substance and the second substance are identical.

11. The method of claim 1, wherein at least one of the first substance and the second substance comprises paclitaxel.

12. A method for delivering a substance across a blood brain barrier of the subject's brain, the method comprising:

applying a first alternating electric field at a first frequency to the subject's brain for a first period of time, wherein application of the first alternating electric field at the first frequency to the subject's brain for the first period of time increases permeability of the blood brain barrier in the subject's brain;

subsequent to the first period of time, applying a second alternating electric field at a second frequency to the subject's brain for a second period of time, wherein the second frequency is different from the first frequency, and wherein the second alternating electric field at the second frequency operates to maintain permeability of the blood brain barrier; and

administering the substance to the subject at least 24 hours after the first period of time has elapsed, wherein the maintained permeability of the blood brain barrier allows the substance to cross the blood brain barrier.

13. The method of claim 12, wherein the first frequency is between 75 kHz and 125 kHz.

14. The method of claim 12, wherein the first frequency is between 50 kHz and 190 kHz.

15. The method of claim 14, wherein the second frequency is at least 190 kHz.

16. The method of claim 12, wherein the first frequency is at least 50 kHz and the second frequency is higher than the first frequency.

17. The method of claim 12, wherein the first period of time is at least 24 hours.

18. The method of claim 12, wherein the second period of time comprises a single uninterrupted interval of time that is at least one week long.

19. The method of claim 12, wherein the second period of time comprises a plurality of non-contiguous intervals of time during which the second alternating electric field at the second frequency is applied to the subject's brain, wherein the plurality of non-contiguous intervals of time collectively add up to at least one week.

20. A method for delivering a substance across a blood brain barrier of a subject's brain, the method comprising:

applying an alternating electric field to the subject's brain for a period of time, wherein application of the alternating electric field to the subject's brain for the period of time increases permeability of the blood brain barrier in the subject's brain; and

administering paclitaxel to the subject after the period of time has elapsed, wherein the increased permeability of the blood brain barrier allows the paclitaxel or at least one metabolite thereof to cross the blood brain barrier.

21. The method of claim 20, wherein the alternating electric field is applied at a frequency between 75 kHz and 125 kHz.

22. The method of claim 20, wherein the period of time is at least 24 hours.

23. The method of claim 20, wherein the period of time is at least 48 hours.

24. The method of claim 20, wherein the alternating electric field has a field strength of at least 1 V/cm in at least a portion of the subject's brain.

25. The method of claim 20, wherein the alternating electric field is applied at a frequency between 75 kHz and 125 kHz, the period of time is at least 24 hours, and the alternating electric field has a field strength of at least 1 V/cm in at least a portion of the subject's brain.

26. A method as in any of claims 1-25, wherein the substance has a molecular weight of at least 4 kDa.

27. A method as in any of claims 1-25, wherein the substance has a molecular weight of at least 69 kDa.

28. A method as in any of claims 1-25, wherein the substance has at least one characteristic that ordinarily impedes the substance from crossing a non-leaky BBB.