## CLAIMS

1. An electroporation system configured to test for optimal parameters for the electroporation of a sample, the electroporation system comprising:

a compartment configured to removably receive one electroporation chamber, the electroporation chamber comprising a portion of the sample, the sample comprising one or more particular cell types; and

a controller communicatively coupled to the electroporation chamber, wherein the controller is configured to run one or more optimization routines, each optimization routine including a set of parameters for the electroporation of the sample to determine the optimal parameters for electroporation of the sample;

wherein one optimization routine is run on the portion of the sample in the electroporation chamber.

2. The electroporation system of claim 1, wherein the set of parameters includes voltage, pulse width, pulse number, buffer type, pulse type, and pulse interval.

3. The electroporation system of claim 2 wherein pulse type refers to positive or negative polarity pulse.

4. The electroporation system of claim 1, wherein the controller is further configured to allow selection of a number of replicates for a selected optimization routine.

5. The electroporation system of claim 1, wherein the controller is further configured to create a queue of selected optimization routines.

6. The electroporation system of claim 1, wherein the controller is further configured to repeat individual optimization routines in the queue of selected optimization routines.

7. The electroporation system of claim 1, wherein the controller is further configured to skip individual optimization routines in the queue of selected optimization routine.

8. The electroporation system of claim 1, wherein the controller is further configured to re-order the selected optimization routines.

9. The electroporation system of claim 1, wherein the controller is configured to display a step-by-step guide to a user.

10. The electroporation system of claim 1, wherein the controller is configured to display a "quick start" option to a user, wherein the "quick start" option avoids a step-by-step guide.

11. The electroporation system of claim 1, wherein the controller is configured to receive a command from a user to skip an optimization protocol.

12. The electroporation system of claim 2, wherein the controller is configured to receive a command from a user to add the skipped optimization back to a queue.

13. The electroporation system of claim 1 wherein a second optimization routine is run on a second portion of the sample in a successively received electroporation chamber.

14. The electroporation system of claim 1 wherein the compartment removably receives one or more additional portions of the sample in the same or different electroporation chambers and wherein one or more optimization routines is run on each of the portions of samples, respectively.

15. A method of optimizing electroporation of samples comprising cells, the method comprising:

providing to a user, by an electroporation system, a list of a plurality of optimization protocols to run against one or more samples, wherein each of the plurality of optimization

protocols comprises a unique combination of a plurality of parameters, wherein the electroporation system is configured to apply the plurality of parameters to the one or more samples;

receiving, from the user, a selection of one or more of the plurality of optimization protocols; and

applying, by the electroporation system in a series of operations, the one or more optimization protocols against a corresponding sample of the one or more samples such that each corresponding sample is subject to one of the one or more of the plurality of optimization protocols.

16. The method of claim 15 wherein the plurality of parameters includes voltage, pulse width, pulse number, buffer type, pulse type, and pulse interval.

17. The method of claim 15 further comprising receiving, by the electroporation system, a number of replicates to run and applying, for each optimization protocol, the number of replicates against one of the one or more samples.

18. The method of claim 15 further comprising displaying, to a user, instructions on opening the system, inserting an electroporation cartridge into the system, closing the system and running the optimization protocols.

19. The method of claim 15 further comprising creating a queue of selected optimization routines.

20. The method of claim 19 further comprising receiving a request, from a user, to repeat a selected optimization routine in the queue.

21. The method of claim 19 further comprising receiving a request, from a user, to skip a selected optimization routine in the queue.

22. The method of claim 19 further comprising receiving a request, from a user, to re-order the selected optimization routines in the queue.

23. The method of claim 19 further comprising displaying, to a user, a status of each selected optimization routine in the queue.

24. The method of claim 23 wherein status can be at least one of; completed, skipped, and in progress.

25. The method of claim 15 wherein the one or more samples comprise one or more portions of a sample.

26. A method for optimizing electroporation of a sample comprising cells, the method comprising:

receiving, by an electroporation system, a choice of one or more optimization protocols to run against one or more samples, wherein each of the one or more optimization protocols comprises at least a voltage, a pulse width, and a number of pulses;

receiving, by the electroporation system, a number of replicates to run, wherein the number of replicates multiplied by the one or more optimization protocols equals a number of trials;

receiving, by the electroporation system in a series of electroporation operations corresponding to a number of selected optimization protocols and the number of replicates, an electroporation chamber containing one of the one or more samples for each of the number of trials; and

applying to each respective sample, by the electroporation system, the respective optimization protocol.

27. The method of claim 26 wherein each of the one or more samples is received in an electroporation cartridge.

28. The method of claim 26 further comprising sending, by the electroporation system, results of each of the one or more samples to a remote machine for analysis.

29. The method of claim 26 wherein each of the one or more samples is contained in an electroporation chamber of an electroporation cartridge.

30. The method of claim 26 wherein each of the one or more samples comprises a cell population having a particular cell type.

31. The method of claim 26 wherein each of the one or more samples comprises a cell population having a plurality of cell types.

32. The method of claim 26 further comprising:

assessing, after each trial, a level of electroporation in cells of the respective one or more samples; and

assessing, after all trials have completed, which optimization protocol achieved the best electroporation.

33. The method of claim 26 further comprising assessing, after each trial, one or more of electroporation efficiency, cell viability, and expression of electroporated cells.

34. The method of claim 26 wherein the electroporation system is configured to assess risk of arcing for each optimization protocol.

35. The method of claim 26 further comprising recording, by the electroporation system, information from an authentication tag associated with each of the one or more samples.

36. The method of claim 26 wherein the one or more samples comprise one or more portions of a sample.