

What is claimed is:

1. A cell culture system comprising:
 - a cell culture chamber;
 - one or more pumps in fluidic communication with the cell culture chamber; and
 - a processor operably connected to the one or more pumps, the processor configured to operate the one or more pumps on recurring duty cycles, each recurrence of the duty cycle comprising an on-cycle and an off-cycle that is longer than the on-cycle and wherein the processor operates the duty cycle such that each recurrence of the duty cycle has a same average flow rate.
2. The cell culture system of claim 1, wherein the cell culture system is sized and configured to fit inside an incubator.
3. The cell culture system of claim 1, wherein the cell culture chamber comprises an inlet and an outlet.
4. The cell culture system of claim 3, further comprising a fluid reservoir in fluidic communication with the inlet of the cell culture chamber.
5. The cell culture system of claim 3, wherein the pump is configured to deliver cell culture medium to the cell culture chamber via the inlet and remove waste products from the cell culture chamber via the outlet.
6. The cell culture system of claim 1, wherein during the on-cycle, the pump forces a flow of fluid to and from the cell culture chamber.
7. The cell culture system of claim 6, wherein the fluid comprises a cell culture medium.
8. The cell culture system of claim 1, wherein the duty cycle has a duration of about 60 seconds.

9. The cell culture system of claim 1, wherein the on-cycle lasts for under 20% of the duration of the duty cycle.
10. The cell culture system of claim 1, wherein the average flow rate is less than 1000 μL of fluid per minute.
11. A method for culturing cells, the method comprising:
 providing a cell culture chamber in fluidic communication with a pump; and
 operating the pump with a processor configured to run recurring duty cycles, each recurrence of the duty cycle having a same average flow rate and comprising: an on-cycle in which a fluid flows to and from the cell culture chamber; and an off-cycle in which fluid flow is stopped, the off-cycle being longer than the on-cycle.
12. The method of claim 11, wherein the cell culture system is sized and configured to fit inside an incubator.
13. The method of claim 11, wherein the cell culture chamber comprises an inlet and an outlet.
14. The method of claim 13, further comprising a fluid reservoir in fluidic communication with the inlet of the cell culture chamber.
15. The method of claim 13, wherein operating the pump comprises delivering cell culture medium to the cell culture chamber via the inlet and removing waste products from the cell culture chamber via the outlet.
16. The method of claim 11, wherein during the on-cycle, the pump forces a flow of fluid to and from the cell culture chamber.
17. The method of claim 16, wherein the fluid comprises a cell culture medium.
18. The method of claim 11, wherein the duty cycle has a duration of about 60 seconds.

19. The method of claim 11, wherein the on-cycle lasts for under 20% of the duration of the duty cycle.

20. The method of claim 11, wherein the average flow rate is less than 1000 μL of fluid per minute.