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Fast Plating Mode Increases Single-Cell Cloning Throughput

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Introduction

Single-cell genomics, antibody discovery, cell line development, and gene editing can all benefit from single-cell plating as part of their respective workflows. NanoCellect's WOLF® Cell Sorter and N1 Single Cell Dispenser are established tools for each of these workflows. The N1 dispenses single cells into 96- and 384-well plates with complete sterility and high viability. Under standard settings, it completes a 96-well plate in 9 minutes and a 384-well plate in 33 minutes. However, these settings have now been optimized to reduce plating times by three-fold and increase the overall productivity of single-cell dispensing. Here, this new Fast Plating Mode performance was verified.

Method

15 µm Dragon Green Beads (Bangs Labs, #FSDG009) were prepared at 1.0×10^5 beads/mL in PBS. Beads were sorted based on scatter and dispensed with Fast Plating Mode into three 96-well and three 384-well plates. This was repeated for a total of 5 cartridges. Control plates were dispensed with standard settings at the beginning and end of the experiment for each cartridge. Plates were imaged and single-bead wells were counted using the NyOne® (SYNENTEC). Single-bead dispensing efficiency (single-bead wells/total wells) was averaged for each mode and plate type.

Results

Fast Plating Mode reduced dispense time at least three-fold – 384-well plating dropped from 33 to 9 minutes and 96-well plating dropped from 9 to 3 minutes. In an eight-hour day, Fast Plating Mode could dispense 38 more 384-well or 107 more 96-well plates than Standard Mode (Figure 1C). The efficiency is still more than double the theoretical efficiency of manual limiting dilution[1] and, at this higher speed, could yield up to a 216% improvement in daily single-cell cloning throughput.

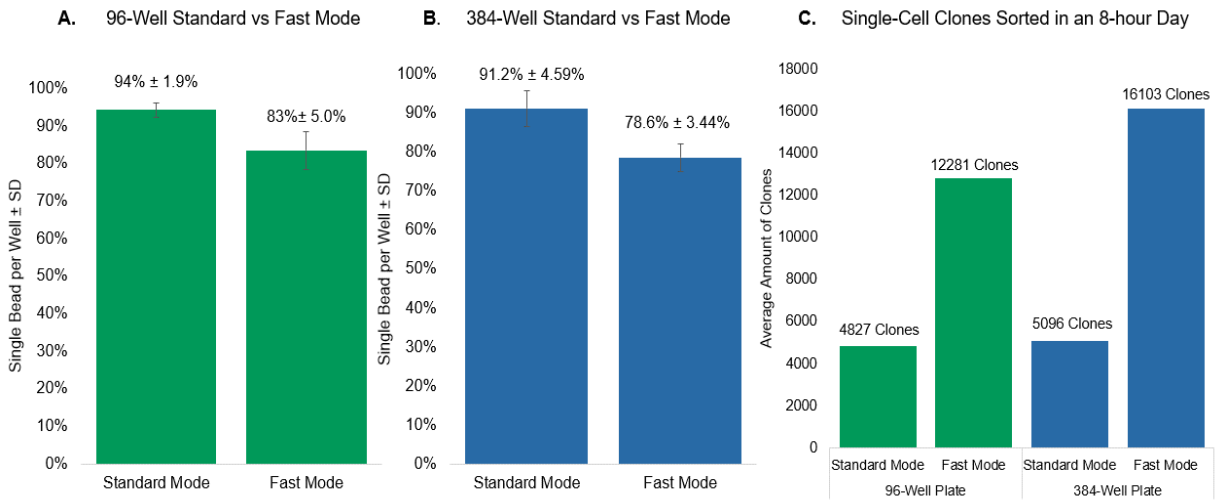

Figure 1. Fast Plating Mode can dispense 154.4-216.0% more clones with only 11-12.6% decrease in plating efficiency. (A) Single-bead plating efficiency decreased 11% for 96-well plates and **(B)** 12.6% for 384-well plates with Fast Plating Mode. **(C)** In a standard workday, at 3 minutes/plate and 83% efficiency, Fast Plating Mode could theoretically dispense 7,545 more single-cell clones to 96-well plates than Standard Mode at 9 minutes/plate, 94% efficiency. Similarly, at 9 minutes/plate instead of 33 minutes/plate, Fast Plating Mode could dispense 11,007 more clones to 384-well plates.

Conclusion

The WOLF Cell Sorter and the N1 Single Cell Dispenser can now dispense single cells even faster with a limited impact on efficiency. With Fast Plating Mode, the user can substantially increase their productivity for a variety of downstream applications.

References

1. Krasny, A. & Morachis, J. M. (2019). WOLF Exceeds Limiting Dilution Cell Cloning Efficiency. Retrieved from https://nanocellect.com/scientific-content/