Fast and reliable cell counting using the Nucleocounter NC-200™

Introduction

Precise cell counting is critical for reproducibility in cellular assays. At Aptuit (Switzerland) AG, we are cultivating a variety of different cell lines which are used for assay development and high-throughput screening for hit identification in drug discovery projects. In that regard, reproducible cell counts are crucial to obtain comparable data across different batches and days in longer screening campaigns. In addition to cell number, assessment of cell viability is particularly important for functional assays with TR-FRET and FLIPR readouts performed at Aptuit, and we highly rely on the NucleoCounter® NC-200™ (Chemometec) for robust and reliable cell counting at moderate cost with little hands on time.

Materials and Methods

Adherent, target-expressing Chinese Hamster Ovary (CHO), 1321N1 human brain (astrocytoma) and wild-type Prostate Cancer (PC3), as well as suspension THP-1 monocytic cells were grown in predefined media at 37 °C and 5% CO2. For cell counting, adherent cells were trypsinized and re-suspended in full growth medium, suspension cells were counted without any further treatment. Via1-Cassettes™ were loaded with sample by the simple procedure of inserting the Via1-Cassettes™ tip into the cell suspension and pressing down the piston, which requires as little as 100 μl of cell suspension for cell counting.

Using the NucleoCounter® NC-200™ (Chemometec) and the standard protocol “Viability and Cell Count”, cell count and viability were determined. Furthermore, cell diameter and percentage of cell aggregates were also reported in the same determination. All measurements were performed in triplicates from the same cell suspension.

Results

Summary

Counting cells using the NucleoCounter® NC-200™ is a fast and reliable method to determine cell numbers and viability with low running cost and little maintenance effort. Reproducible cell counts with a low CV were obtained for all cell suspensions covering a wide range of cell concentrations and with fast throughput (<1 minute per measurement). No additives other than the Via1-Cassette™ were used for counting. The standard protocol “Viability and Cell Count” was used for the different adherent and suspension cells, even for the slightly clumpy PC3 cells. As cell aggregation never exceeded 20% there was no need to switch to the “Aggregated Cells Assay” protocol. For THP-1 cells, a new protocol was defined by enlarging the counting gate to ensure all cells were counted correctly.