Orflo's Moxi Z Cell Analyzer, The New Standard for Cell Counting and Sizing Analysis

The Moxi Z Delivers Gold Standard Precision and Accuracy

Cell counts are routinely performed in life science, clinical, and industrial laboratories to monitor cell growth rates, to measure seeding densities, to establish counts for data normalization, and to determine initial counts for experimental protocols. Traditionally, these counts are performed manually using hemocytometers. However, in addition to being laborious, this approach suffers from large errors and variability.

Alternatives to hemocytometer-counting include flow cytometers, Coulter counters, and imaging-based systems. The former systems are prohibitively expensive in both initial costs and maintenance, while imaging systems suffer from poor count precision and accuracy. The Moxi Z cell analyzer bridges the gap in performance versus cost and usability. The Moxi Z was benched marked against the gold standard for cell counting, Coulter's Z2 system. As shown in Fig. 1, the Moxi Z achieved comparable count accuracy ($r^2 > 0.994$) across a broad dynamic range (3e3 – 2.5e6 cells/ml).

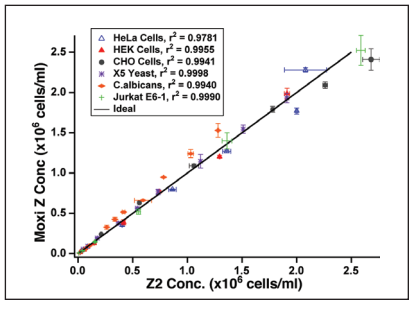

Figure 1. - Moxi Z's Precise and Accurate Cell Counts – Plots of the Moxi Z measured concentrations (n=3, Type S cassettes) vs. analogous Coulter Z2 system measurements (100 μm aperture).

Moxi Z Provides Single Cell Resolution and 3D Cell Sizing and Health Assessment

The Moxi Z delivers a high-resolution histogram that provides exact sizing information, with 30nm size resolution, for each particle in the sample, as well as a valuable perspective of the culture omposition. The accuracy (r^2>0.999) and precision of the Moxi Z particle sizing was illustrated through comparison (Fig 2a) of Moxi Z measured diameters of precision calibrated beads with manufacturer reported values (3.0μm, 4.17μm, 5.6μm, 7.5μm, 10.1μm, 15.6μm, and 25.0μm diameters). Furthermore the high-resolution histogram (e.g. Fig 2a inset – five bead mixture) demonstrates the size discrimination capabilities of the instrument. Researchers are utilizing this enabling feature to study yeast cycle and algae growth rates.

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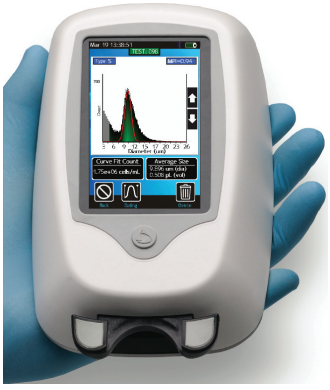

The histogram sizing and shape also provides a means of monitoring culture health. One example of this is shown in Fig. 2b, highlighting differences in histogram shapes for a healthy Jurkat population (Fig 2b., blue) versus a mix of healthy and heat-killed (60˚C for 30 min, followed by overnight incubation at 37˚C) Jurkat cells (Fig 2b, red). Increases in counts in the 4–8 μm range of the histogram reflect increased dead cell and debris counts. The histogram change is quantified as an MPI value, that is a ratio of the core cell population to the total particle population. Changes in the MPI values and histogram shape can additionally uncover potential microbial contamination in cultures through their contributions to smaller particle counts as they colonize/aggregate.

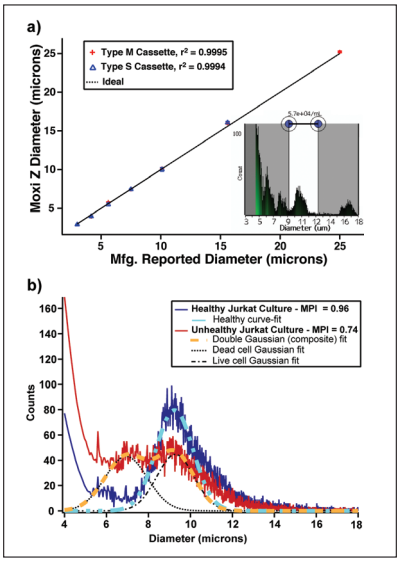

Fig 2. – Moxi Z Cell Sizing and Health – a.) Moxi Z size histogram for a multi-bead sample **b)** Comparison of healthy (blue, MPI=0.96) and necrotic-spiked (red, MPI=0.74) populations of Jurkat cells

In this regard, the MPI and monitoring of changes in histogram shapes can provide a level of quality control for the cultures by potentially signaling size changes associated with cellular mutations, cell cycle, variations in media composition, or other environmentally induced health changes.