Ultra-rapid microbial detection in cell & gene therapy products: the closest you can be to real-time release

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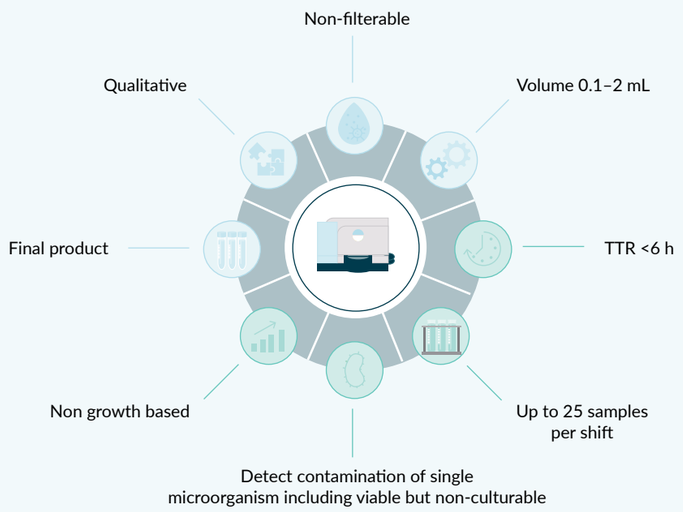
When innovators are focused on shortening manufacturing process to meet patient demand for life saving therapies, there is a need for new quality control analytical method solutions that are fast enough to keep pace with faster manufacturing approaches. This poster explores a new ultra-fast sterility solution for cell and gene therapeutic products.

METHOD

The SCANRDI® is an ultra-rapid alternative technology for detecting microbial contaminants in drug products **(Figure 1)**. Designed to meet compendial testing standards, studies on limit of detection (LoD) and equivalency have been performed with a focus on species listed by the Pharmacopeias microorganisms. The most probable number (MPN) was used to demonstrate that the LoD of the SCANRDI® CELL-BURST is not significantly different from the LoD of a traditional plate counting method on ten compendial strains. To show the equivalency, we compared the proportion of positive results between both methods for all strains and all dilutions with a non-inferiority test of Farrington-Manning, with a 20% margin.

Figure 1. SCANRDI® CELL-BURST solution technological capabilities: a filtration based solid-phase cytometry.



CELL TYPES USED

Jurkat cells (cellular model used in R&D) – at a concentration of 10^7, 2×10^7, and 3×10^7 cells/mL

T cell lymphocytes – T cells at a concentration of 2×10^7 cells/mL

Final samples – CAR-T cells at a concentration of 5×10^6 cells/m

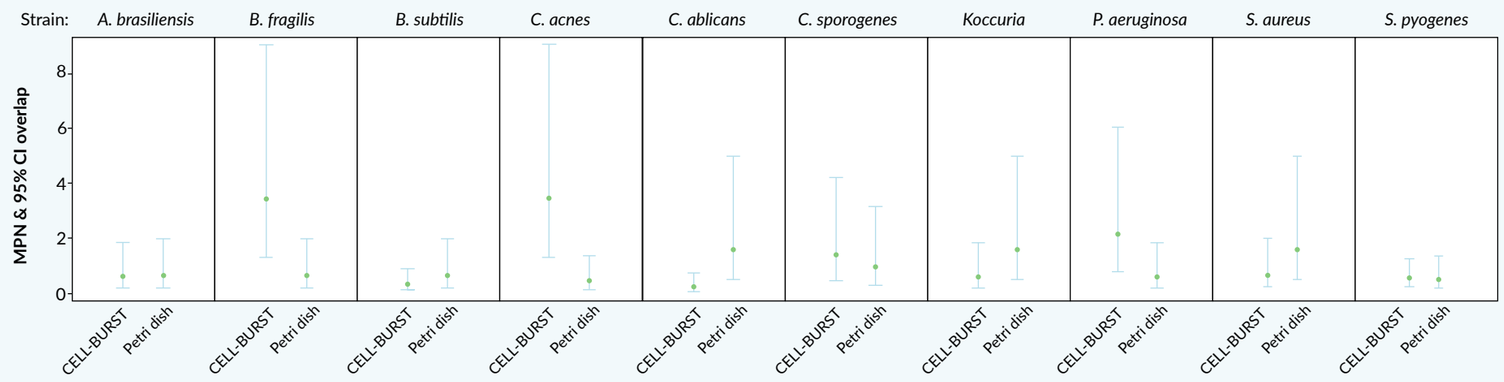
RESULTS

The MPN results **(Figure 2)** show that the confidence interval for both methods overlapped for each strain. Results demonstrated that there is no significant difference in LoD between the two methods. With a p-value inferior to 0.05 for the non-inferiority test of proportions, CELL-BURST is not significantly less sensitive than the petri dish method. The lower limit of the 95% confidence interval of the difference between detection proportions was -0.0689 (=-6.89%), which is greater than -20%.

CONCLUSION

The SCANRDI® CELL-BURST solution has a LoD that is not significantly different from a traditional counting method. Furthermore, the CELL-BURST was shown to be not significantly less sensitive than the petri dish method, considering a margin of 20%. These initial results allow us to proceed to full method validation and determine the equivalence with a traditional sterility method for cell-based products. This solution will facilitate sterility screening at various stages of the CGT manufacturing process in T cell-based products, with less than 6 h for time to result in a low-volume sample.

Figure 2. MPN & non-inferiority testing between the SCANRDI® CELL-BURST & petri dish methods for ten different microorganism strains.



CELL & GENE THERAPY INSIGHTS

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