

# DropArray™ Platform for Hassle-free Miniaturization and Multiplexing of High Content Assays

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We have developed DropArray™ technology, a simple and cost effective method that enables the convenient miniaturization of biological assays. Assay miniaturization reduces sample and reagent consumption, accelerates assay kinetics and lowers assay cost. Despite these advantages, there are many challenges in miniaturizing 'wash-based' assays performed on a multi-well plate due to differential carry-over and non-uniformity of rinsing across different wells. DropArray™ technology, which is easily amenable to automation, has overcome such challenges and successfully miniaturized conventional bioassays down to the nanoliter scale.

We have demonstrated the application of this method in a range of high content assays. In general, DropArray™ reduces the number of cells needed per data point by at least 10 times and the amount of reagents required by at least 94% as a typical assay occurs at less than 3 µL scale and requires less than 500 cells for each data point. DropArray™ also produces significant savings in assay time as a result of the shorter diffusion distances and greater encounter frequencies between binding partners in a smaller assay volume. For example, a one hour antibody incubation step can be reduced to just 10 minutes.

The miniaturization characteristics of DropArray™ are particularly attractive for those assays with limited amount of samples available. We have applied the technology to cancer side population cells that typically constitute less than 2 % of a cancer cell population. The cells have been demonstrated in previous studies to possess stem-cell like characteristics and greater resistance to radiotherapy and various chemotherapeutic agents. With DropArray™, we have observed a number of interesting phenomena that have not been observed using conventional multi-well plates. The DropArray™ technology is expected to enable high content assays with rare and expensive cells that have previously not been practical to perform and significantly lower the cost of drug discovery.