MICROFLUORIDE CELL PRINTING TO PRODUCE A HIGH-THROUGHPUT CELL-BASED MICROARRAY

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Cell-based assays are often performed in arrays in order to increase throughput. Improved cell-based assay microarray systems used in drug discovery are needed to increase the efficacy of current drug development programs. These upgraded systems should have improved throughput and parallelization capabilities compared to current systems. Increasing physiological relevance of performed assays is also a goal. The microfluidic flow cell array (MFCA) is a new technique to produce high density cellular arrays for these cell-based assays. The advantages of adapting the MFCA technology to reliably print cells as a step in developing a system for cell-based assay include high-throughput, low reagent use, and physiological relevance. However, the current printing protocol suffers from sporadic and inconsistent adhesion of the cells to the assay surface. In order to exploit the MFCA's potential for cell-based applications the printing process needs to be standardized to produce consistent coverage of the assay surface in each flow cell of the printhead. The printing process for cells was refined by manipulating the variables of cell concentration, flow rate, and pause times. An "optimal" value for each of these variables was incorporated into a standardized printing protocol for the MFCA. Results were verified through the printing of both adherent (RAW) and suspension (Jurkat) cells. Improving the printing of cells in the MFCA is an important step in developing a high-throughput system for assay that addresses many of the limitations of current cell-based systems.