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Platform Integration for High-Throughput Functional Screening Applications

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Abstract : Screening throughput is a common bottleneck in many research areas, including functional genomics, drug discovery, and directed evolution. High-throughput screening techniques can be classified into two main categories: (i) affinity-based screening and (ii) functional screening. The first one relies on binding assays that provide information about the affinity of a test molecule for a target binding site. Binding assays are relatively easy to establish; however, they reveal no functional activity. In contrast, functional assays show an effect triggered by the interaction of a ligand at a target binding site. Functional assays might be based on a broad range of readouts, such as cell proliferation, reporter gene expression, downstream signaling, and other effects that are a consequence of ligand binding. Screening of large cell or gene libraries based on direct activity rather than binding affinity is now a preferred strategy in many areas of research as functional assays more closely resemble the context where entities of interest are anticipated to act. Droplet sorting is the basis of high-throughput functional biological screening, yet its applicability is limited due to the technical complexity of integrating high-performance droplet analysis and manipulation systems. As a solution, the Droplet Genomics Styx platform enables custom droplet sorting workflows, which are necessary for the development of early-stage or complex biological therapeutics or industrially important biocatalysts. The poster will focus on the technical design considerations of Styx in the context of its application spectra.

Keywords : functional screening, droplet microfluidics, droplet sorting, dielectrophoresis
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