Quadraplexing Experimentation in Microplate Assays to Support High-Throughput Screening

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Modern High-Throughput Screening (HTS) is a system used in drug discovery labs that can rapidly test hundreds of thousands of chemicals against a target in a disease with the aim of developing novel drugs. Current HTS drug screening methods include separate assays for each level of chemical testing, with individual experiments being required for initial, secondary and dose-response screening. In addition, further assays may be required to test how a chemical interacts with a target in the context of a cell. To speed up this process, a process called quadraplexing was developed, which can greatly speed up the process of understanding how chemicals and compounds interact with targets, especially in the context of cell culture. The process includes modifying the BioRaptr machine, a biological liquid dispenser, and creating a solution with a certain viscosity for precision dispensing of hydrogel / cell culture mixtures. The engineering goal is to successfully modify the BioRaptr and buffers to create four separate cell cultured colonies sharing a common buffer milieu to enable biological studies of drug mediated control of intercellular interactions. The results of this experiment yielded four different cell culture mixtures in a well that was kept separated, potentially allowing for studies of cross-communication between cells in drug testing, as well as simultaneous primary screening and counterscreening when testing chemicals on targets. This system can greatly speed up the process of drug screening when producing antivirals.

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