

Automated Droplet Screen System for Rapid Single-Cell Immune Response Assessment (自動化滴液系統用於高通量單細胞免疫反應篩選)

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Project Introduction

In response to the urgent need for rapid vaccine development against infectious diseases such as SARS, H7N9, SFTS, and COVID-19, our project proposes an automated immune screening system capable of processing 100 B-cells per second for large-scale single B-cell analysis. This system will revolutionize immune response diagnostics by: compartmentalizing viruses and cells, automating B-cell screening, sorting functional B-cells, and enabling large-scale vaccine evaluation. It's designed to quickly identify B-cells producing potent neutralizing antibodies, allowing for fast assessment of individual immune responses and hastening vaccine development. This innovation promises to cut down the time and costs related to hospital stays and secondary infections, significantly reducing the economic impact of pandemics. The system's rapid (<4 hours), cost-effective (~\$20 per test), and high-throughput capabilities could decrease vaccine development costs by about \$5 billion HKD, making it a game-changer in the pharmaceutical industry.