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Laser-Induced Confocal Microscope for Dielectrophoretic Fluorescence-Activated Droplet Sorting

Tech ID: 30230 / UC Case 2019-663-0

BRIEF DESCRIPTION

A system that enhances and accelerates enzyme evolution process for synthetic biology applications using microfluidic technology and fluorescent sensors.

FULL DESCRIPTION

This system leverages microfluidic technology and associated laser-induced confocal microscopy for ultrahigh throughput fluorescence-activated droplet sorting (FADS) to evolve enzymes with enhanced or novel activities. This system can sort droplets containing enzyme-expressing cells at high speeds based on enzymatic activity to rapidly screen large enzyme libraries, surpassing traditional directed evolution methods in speed and volume.

SUGGESTED USES

- » Synthetic Biology: Development of novel enzymes, including the synthesis and modification of artificial genetic polymers.
- » Pharmaceutical R&D: High-throughput screening of enzyme inhibitors or activators for therapeutic and diagnostic applications.
- » Agricultural Biotech: Enzyme evolution for crop protection, nutrient synthesis, or biomass conversion.
- » Academic Research: Dedicated platform for protein engineering and single-cell enzymology studies.

ADVANTAGES

- » Task Efficiency: Enables high-throughput screening of enzyme variants, up to 108 droplets per hour.
- » Droplet Integrity: Generates highly monodisperse droplets for efficient and accurate selection.
- » Screening Accuracy: Employs fluorescent sensors to accurately detect enzymatic activity within droplets.
- » Resource Efficiency: Requires minimal sample volumes and preparation steps, reducing resource consumption

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Published Application	WO 2020/223675	11/05/2020	2019-663

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OTHER INFORMATION

CATEGORIZED AS

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Additional Patent Pending

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