INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

DNA Synthesis, RNA Synthesis, and Cell Engineering On-A-Chip

TECHNOLOGY NUMBER: 2024-247

OVERVIEW

On-chip platform for parallel DNA/RNA synthesis and cell engineering

- Enables high-throughput genetic engineering with integrated functional readouts
- Genomic research, drug discovery, and synthetic biology

BACKGROUND

The integration of genomic, proteomic, and cellular analysis has faced limitations due to the complexity and scale of biological data. Traditional methods are often labor-intensive and lack the capacity for real-time observation of genetic modifications. Issues with managing these limitations stem from the difficulties in scalable synthesis and controlled experimental environments. Existing technologies primarily focus on one aspect of genetic analysis, whether it be DNA sequencing or gene expression, without providing holistic solutions. The need to integrate these facets into a seamless and efficient process has become critical as demands on precision medicine and personalized therapies increase. Current systems fail to provide adequate datasets for machine learning applications essential for predictive modeling in biological sciences, necessitating the development of advanced solutions that can synthesize information across multiple biological layers.

INNOVATION

Researchers at the University of Michigan have developed, a novel chip-based technology capable of performing high-density DNA and RNA synthesis, as well as precise cellular manipulations. These capabilities are accompanied by sophisticated sensory readouts that include light, temperature, and chemical signals to decipher cellular function. By combining these functionalities, the chip creates a dataset robust enough to inform machine learning models that map genetic sequences directly to cellular responses. This presents a remarkable advancement over traditional methodologies, providing both scale and accuracy. Real-world applications include streamlining synthetic biology processes, improving efficiencies in drug discovery pipelines, and advancing genomic research through comprehensive predictive modeling. The marriage of data acquisition with cell engineering on a single platform drastically enhances the scope and accuracy of biological experimentation.

ADDITIONAL INFORMATION

INTELLECTUAL PROPERTY

Technology ID
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Category
Hardware
Engineering & Physical Sciences
Semiconductor, MEMS, and Electronics

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