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Integrated, Automated System for Single Cell Analysis

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Inventors

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Invention Description

Heterogeneity within cell populations is a major obstacle for gathering accurate data for genomic and proteomic studies. Single cell analysis has emerged as the platform technology for solving the problem of cell heterogeneity in basic cell studies. A more precise understanding of single cell behavior and differences between individual cells would lead to better treatments for a wide range of diseases from cancer to diabetes. However, the field has been hampered by many problems, such as low-throughput analysis, labor intensive single cell manipulation/selection, and lack of user configurability.

Researchers at the Biodesign Institute at Arizona State University have developed a fully automated system for high throughput single-cell analysis. The unique design includes a precise single cell manipulator and an analysis chamber equipped with multiple sensors. The highly modular cell chamber allows the user to perform multi-parameter experiments on a single cell, multiple cells, and/or tissue samples in a controlled microenvironment. The automated device will make single cell selection fast and efficient for biologics production. Furthermore, the device can be used for characterization of single cell behavior for drug screening.

Potential Applications

- Biologics Production:
  - Automated single cell selection
    - Antibody development
    - Stem cell differentiation
- Research:
  - Genomics
  - Proteomics
  - Cell-cell interaction
  - Applicable diseases:
    - Cancer, diabetes, heart disease
- Drug screening

Benefits and Advantages

- **Fully Automated:** Device can process large numbers of single cells in a short amount of time without manual labor
- **High throughput:** Multiple measurements can be performed at once in analysis chamber.
- **Flexible:** Highly modular design allows for user configurability for testing multiple cell formats (single and multiple cells).
- **Data management:** Interface program allows for easy data acquisition and management.
- **Highly compatible:** Additional instruments are easily integrated into the system.

Intellectual Property Status:

Patent Pending

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