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Extracellular Flux Rates of Single Cells in a Chip Format by Concentration Gradient Observation

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Inventors

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Invention Description

Single cell analysis devices are finding increasing use (for studying cellular metabolism, respiration rates, protein expression, etc.) because they overcome the difficulties in ensuring cell homogeneity in larger cell populations. However, current devices determine extracellular flux by measuring temporal changes in concentration, and thus require a sealed microenvironment. This method slows the response rate and lowers the throughput considerably.

Researchers at the Biodesign Institute of Arizona State University have developed a novel device and method to measure the extracellular flux rates of individual cells. Measurement of spatial changes in concentration dispenses with the need to hermitically seal the chamber. Moreover, such measurements can now be done in a chip format and at greatly increased throughput.

By requiring neither bulk cell populations nor a sealed environment, this device achieves single cell measurements at high throughput, and has the potential to increase the pace of drug discovery, in addition to applications in diagnostics and therapeutics.

Potential Applications

- Basic research of cellular metabolism, respiration, protein expression, etc.
- Observing perturbation-induced responses of single cells:
  - drug discovery
  - diagnostics research
  - therapeutics research

Benefits and Advantages

- Simpler disposable components: hermetically-sealed chambers not required
- Potential to increase throughput up to 10^6
- Compatible with commercial microarray readers, imaging cytometers, and fluorescent microscopes

Intellectual Property Status:
Patent Pending

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