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 Reference: Kinetic Landscaper

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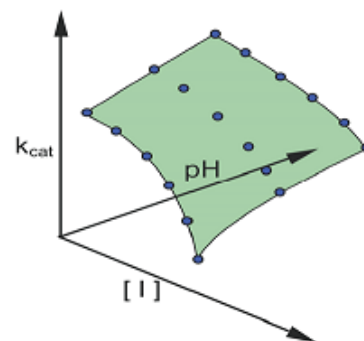
Automated Reaction Kinetic Landscaper

Overview

This microfluidics platform powerfully enhances the potential scope of analysis of biological enzyme catalysis reactions. The conventional manual experimental setup for enzyme analysis is a lengthy, laborious and limited process. This invention automates and greatly speeds up this process by using up to 48 processors to simultaneously conduct and observe multiple reactions. These enhancements create the ability to automatically generate expansive 3-D plots to illustrate reaction parameters over a range of chosen variables. The platform has applications in laboratory-based biological and medical testing and the evaluation and development of new drugs and reagents.

Advantages

- **Cost Efficient:** Consumption of high value protein solutions is on the order of pico/nano liters as opposed to milliliters consumed by conventional experiments
- **Time Efficient:** Traditional manual systems are slow; this technology completely automates the process and allows for several simultaneous experiments
- **Enables detailed analysis:** Low volume and high reaction throughput allow for levels of detailed analysis unachievable with current methods
- **Simultaneous process control:** The Auburn invention controls multiple parallel processes at once allowing for multiple analyses to be carried out simultaneously
- **Multiple Solution Analysis:** can mix and analyze 4 or more solutions at once
- **Automated Plotting Ability:** Automated three-dimensional landscape plots (see figure) illustrate reactions of sample solutions under various conditions; processing capabilities include metering, mixing of multiple ratios, analyzing, and reporting



Example of one possible enzyme kinetic landscape, showing the catalytic rate constant vs. pH and inhibitor concentration $[I]$

Description

This microfluidics platform is designed to prepare 3-D landscapes of an enzyme's general kinetic parameters. It allows for rapid measurement of an enzyme's catalytic performance under different environmental conditions using a multi-layer chip design, 48 processors, a pneumatic control system, temperature control capability, and optical CMOS-based detection. The Auburn invention completely automates the previously tedious processes of reagent metering, ratio mixing, analysis, reporting, and plotting, and will enable more comprehensive analyses than are currently feasible. This can be critical in such areas as complex enzyme mechanisms involving multiple substrates or detailed studies of enzyme inhibition or inactivation for drug development. Similar devices could provide comparable analytical capabilities for protein folding/unfolding, protein:protein association, and protein:nucleic acid association.

Status

- A patent application has been filed
- A prototype is currently under development
- Related Auburn Technology: [Protein Kinetics Chip With Automated Parallel Processing](#)

Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Joint development opportunities include funded research, collaboration or joint venture