Skysong Innovations
Advancing the Arizona State University Knowledge Enterprise

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Microreactor Array Instrument/Platform

High throughput parallel assays are needed to effectively identify and study biomolecules and their activity. Typically it takes a large number of repeated assays to get statistically significant data for studying biomolecules. However, fewer assays would be needed to get statistically meaningful results if the data were of higher quality. Because of this, there is a compelling need for miniaturized, highly parallel assay platforms to simultaneously run many independent experiments quickly, efficiently, inexpensively and consistently.

Prof. Peter Wiktor at the Biodesign Institute of Arizona State University has developed a novel high throughput microreactor array that enables multiple simultaneous, parallel, independent, unique chemical reactions involving free floating molecular compounds. This device, with integrated optical detection, prevents evaporation, diffusion or movement during an experiment, thus preventing cross-reactions or contamination with neighboring containers. This instrument will enable thousands of unique reactions to take place simultaneously, in an array of sealed microreactors, under identical chemical and operating conditions.

This novel platform enables simultaneous multiple parallel reactions to take place in physically isolated sealed containers thus mitigating evaporation, diffusion and movement and allowing for higher quality data to be collected.

Potential Applications

- Potentially useful in many biological/chemical/life science applications including:
  - Gene expression profiling
  - Genotyping
  - Polymerase chain reaction (PCR)
  - DNA sequencing
  - Immunoassays
  - High throughput screening
  - High throughput cell analysis

Benefits and Advantages

- Miniaturized and highly parallel: tens of thousands of reactions per microscope slide
- Low sample and reagent volumes
- Integrated optical detection - allows highly sensitive real time detection based on enzyme-linked fluorogenic or chromogenic signal amplification
- Enables rapid and complete filling and sealing of the microwells into independent chemical reaction containers without evaporation, leakage,

diffusion, movement or cross-contamination

- Reactions take place under identical conditions of temperature, reagent/sample concentrations, reagent/sample composition and washing, blocking and drying protocols
- Different configurations in microwell size and shape
- The entire device can be placed inside an oven or immersed in a temperature controlled water bath for thermal cycling

For more information about the inventor(s) and their research, please see Dr. Wiktor's Biodesign directory webpage