

An Electronic Microfluidic Platform for On-Chip Apoptosis Quantification using Annexin V-Based PS Externalization Detection-GT NEXT

Apoptosis detection can be limited by costs and complexities

The problem with current apoptosis detection methods is their reliance on complex, expensive, and space-consuming equipment, and the need for prelabeling samples, which is not always feasible. These limitations hinder rapid, cost-effective, and accessible apoptotic analysis, particularly in smaller clinics and point-of-care settings.

This innovative electronic microchip integrates an electrical sensor network with a microfluidic capture chamber to detect phosphatidylserine (PS) externalization, a hallmark of apoptosis. It offers a compact, user-friendly, and cost-effective solution, providing high sensitivity and specificity without the need for prelabeling. This adaptable platform enables autonomous, label-free, real-time apoptotic analysis, suitable for diverse applications including clinical diagnostics.

A novel microchip allows for a compact and cost-effective way to detect apoptosis

This electronic microchip integrates an electrical sensor network with a microfluidic capture chamber to detect phosphatidylserine (PS) externalization, a hallmark of apoptosis. It surpasses traditional methods by providing a compact, user-friendly, and cost-effective solution for the analysis of apoptotic events, with applications extending to cell differentiation, signaling, and clinical diagnostics.

Summary Bullets

- This electronic microchip integrates an electrical sensor network with a microfluidic capture chamber to detect phosphatidylserine (PS) externalization, offering a compact, user-friendly, and cost-effective solution for apoptotic analysis.
- The prototype provides high sensitivity and specificity without the need for prelabeling, making it suitable for diverse applications in clinical diagnostics and biomedical research.

- It supports drug discovery, toxicity evaluation, and bioprocessing optimizations, enhancing disease mechanism studies and therapeutic target identification.

Solution Advantages

- High sensitivity and specificity for PS detection
- Eliminates the need for prelabeling cells, reducing assay time and complexity.
- Integration with microfluidics ensures efficient sample processing and reduced volume requirements.
- Low-cost
- Adaptable platform suitable for field-deployed analysis tools
- Compact and user-friendly design

Potential Commercial Applications

- Biomedical research for studying disease mechanisms, drug responses, and therapeutic target identification.
- Pharmaceutical industry for drug discovery, candidate screening, and toxicity evaluation.
- Bioprocessing and cell manufacturing for optimizing production processes and ensuring product quality

Inventors

- Dr. A. Fatih Sarioglu
Assistant Professor – Georgia Tech School of Electrical and Computer Engineering
- A K M Arifuzzman
PhD Student - Georgia Tech School of Electrical and Computer Engineering

IP Status

<p>The patent application has been filed</p>:

Publications

, -

Images

Visit the Technology here:

[An Electronic Microfluidic Platform for On-Chip Apoptosis Quantification using Annexin V-Based PS Externalization Detection-GT NEXT](#)

<https://s3.sandbox.research.gatech.edu//index.php/print/pdf/node/4342>