Docket #: S19-157

A method for rapid diagnostics of bacterial infection using optical spectroscopy and bio-compatible inkjet printing

Stanford researchers have developed an integrated printer/scanner platform to screen biofluids for bacterial pathogens and other cells of interest at the single cell level. The platform uses bio-compatible inkjet printing to split the sample into optically-activated cellular microdroplets with high throughput. As the sample is being printed, the printout is spectrally imaged and analyzed to detect the targeted cells. Through proper analysis of these optical signatures, the cell or the pathogen is identified and its antibiotic susceptibility is determined. Splitting the sample volume into a cellular printout enables the rapid screening of the sample at the cellular level without being overwhelmed by any large background signals.

Applications

- Rapid diagnostics of bacterial infection in biofluids and other complex samples such as food and water.
- Screen for entities of clinical and biological interests including yeast, circulating tumor cells, exosomes and extracellular vesicles and viruses.

Advantages

- Removes the need for culturing of patient samples to improve feedback time and avoid unnecessary treatments.
- Allows identification of unique signatures in complex media.

Publications

- Ho, Chi-Sing, et al. "Rapid identification of pathogenic bacteria using Raman spectroscopy and deep learning." *Nature communications* 10.1 (2019): 1-8.

Patents

- Published Application: WO2021080845
- Published Application: 20220390351
- Issued: 12,761,133 (USA)

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