Multiplexed Nanophotonic Microarray Biosensor

The Dionne group has developed a new optical platform for rapid, label-free, high throughput, and multiplexed biomarker analysis. This platform detects multiple distinct DNA sequences, RNA sequences, and different proteins without any fluorescent or optical tagging on a single chip. The sensor consists of a nanostructured optical metasurface and camera sensor. The metasurface is bioprinted with receptor molecules corresponding to the desired biomarkers. Upon binding, the amount of light scattering is altered, which is then capture by the camera sensor. With a surface density exceeding 1 M elements/cm² and easily distinguished pixels, this biosensor captures a range of information from a single test. Applicable to multiple biomarkers for a single sample, or a single biomarker for multiple samples, this system has higher throughput and faster results without the added cost of sample preparation reagents.

Stage of Research

• Prototype

Applications

- Diagnosing and monitoring human, animal, and ecosystem health
- Analyze multiple classes of biomarkers on a single chip
- Screen multiple samples for similar biomarkers on a single chip
- Rapid adjustment or optimization of patient treatment plans using longitudinal data of biomarker or metabolite levels

Advantages

- No need for optical tagging or amplification processes for minimal sample processing
- Multiplexing capabilities with sensing elements patterned at densities exceeding 1 M features/cm²
- Higher throughput than PCR, ELISA, mass spec and other methods

Innovators

- Jack Hu
- Jennifer Dionne
- Fareeha Safir
- Butrus Khuri-Yakub

Licensing Contact

David Mallin

Licensing Manager, Physical Sciences

<u>Email</u>