Design features for enhancing optical detection on Lab-on-a-disc platforms

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Centrifugal microfluidics has gained increased interest over the past 15 years, evident by the number of comprehensive reviews currently available, with special regard towards Lab-On-A-Disc (LOAD) diagnostic solutions.[1–3] The potential of a LOAD system is dependent on its ability to mimic the specific laboratory analytical tasks to achieve a sample-to-answer performance. This includes sample handling and manipulation (such as mixing and separation), sample modification (including heating and redox reactions), as well as reaction detection (such as optical, electrochemical, or as required by user). Optical detection strategies on LOAD platforms has been largely successful in both the fields of biological and chemical sensing[4].

Herein, will demonstrate the optimisation of optical configurations which were carried out on a biological fluorescence-based and chemical absorbance-based[5] LOAD detection platforms. This includes the identification and optimisation of LED-photodiode selection, the effects of detection orientation and pathway-length as well as fluorophore selection. Optimisation includes a comparison between the microfluidic architecture for incorporating either detection methods as well as their reported limits of detection and quantitation.

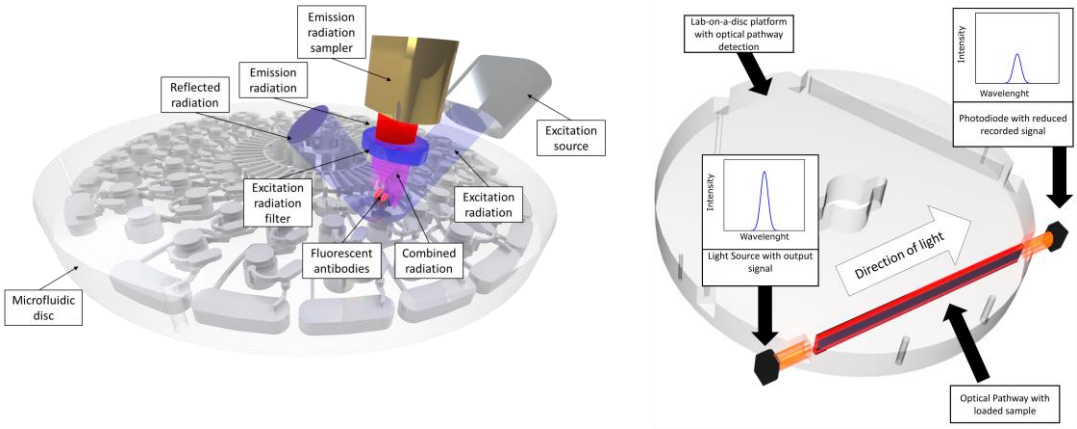

Figure 1. Optical detection solutions for lab-on-a-disc (LOAD) platforms Right) Top-down fluorescent detection of fluorescent antibody technology on a LOAD platform. Left) Absorbance-based colourimetric analysis conducted through an optical pathway detection zone on a LOAD platform.

References:

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