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Backscattering interferometry marries aptamer based assays to enable quantitation of nerve agent metabolites and human cytomegalovirus in urine at clinical relevant levels

Backscattering Interferometry (BSI) is a method for the detection of molecular interactions with unique capabilities and numerous advantages important to the near patient setting. These include high sensitivity, low sample volume and "label free" and either free solution or tethered probe operation. Based on an optical train consisting of the same components of a CD player; a laser, an object and a detector BSI's simple optical train can be easily ruggedized and miniaturized. BSI provides quantitative binding data at femtomolar (fM) sensitivity with <15% coefficient of variation on clinical sample matrices such as serum, saliva and urine. In our presentation we will describe the principals of operation for BSI and then show two examples of aptamer enabled BSI detection relevant to near patient diagnosis. The first example will be the quantification of methylphoshonate metabolites of two nerve warfare agents and the second, detection of two major structural proteins of human cytomegalovirus which could serve as biomarkers of disease. We will show that our aptamer BSI assay for "VX acid" and "GB acid" yielded low nanomolar LOQ's with high selectivity and minimal cross reactivity. In the case of cytomegalovirus, picomolar LOQ's urine of were achieved using an aptamer to glycoprotein B, "gB" or the viral protein "pp65". The probe volume LOQ of BSI is several thousand target aptamer species, opening the avenue to early detection of CMV. An approach to constrain environmental noise in BSI will also be presented that is anticipated to lead to a bench top BSI that can be used widely by the unskilled operator.

Biography

Darryl J Bornhop is Professor of Chemistry at Vanderbilt University and is an international expert on the development of lanthanide chelates for contrast detection of cancers.

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