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Lyse-It® - A Rapid 30 Second Transformation Lysis and DNA Fragmentation Technology

There is a long-standing need for rapid and sensitive detection platforms, including point-of-care tests, for a variety of viruses and bacteria. While many technologies such as PCR and others, have the potential to provide results in under 30 minutes, pathogen identification on these platforms actually takes many hours to complete, mostly due to the upfront sample preparation, or specifically, sample cell lysis. Lysis, the process by which a bacteria or virus is "opened-up" to release its genetic material, is crucial for its detection / identification, and is typically undertaken by adding a chemical cocktail to the sample (lysis buffer) accompanied by heating. This process takes several hours to complete and often involves expensive lysis buffers. Even in non-diagnostic settings such as in research laboratories, lysis is still cumbersome performed by a great number of researchers using the age-old lysing buffer technology. Consequently, Professor Geddes at the Institute of Fluorescence has developed a rapid solution to this age-old problem, Lyse-It®, which has the potential to impact significantly both diagnostic and research settings. Focused microwaves in small disposable sample chambers readily allow the user to lyse cellular samples with near-100% efficiency, within 20 seconds on a single platform at a cost less than other technologies available today. Importantly, this lysing approach is generic to a wide range of cells and viruses, i.e., is a single platform (one size fits all), unlike traditional lysing buffer approaches that all use multiple kits for different media. In addition, within this 30 second step, DNA / RNA can be fragmented into tunable bp-fragment sizes, ideal for amplification and detection.

Biography

Dr Chris D. Geddes, Ph.D., FRSC, Professor, has extensive experience in fluorescence spectroscopy, particularly in fluorescence sensing and metal-fluorophore interactions, publishing over 275 peer-reviewed papers (h-index: 45), and 30 books. Dr Geddes is internationally known in fluorescence and plasmonics and his laboratory is widely attributed to the development of the Metal-Enhanced Fluorescence (MEF) and related plasmon-fluorescence technologies, securing in excess of \$25 million in recent years to pursue his research aspirations. He is the editor-in-chief of the Journal of Fluorescence and founding editor-in-chief of the Who's Who in Fluorescence, Annual Reviews in Fluorescence and the Annual Reviews in Plasmonics volumes. In addition, due to the labs' pioneering efforts in the fields of metallic nanoparticle-fluorophore interactions, Dr Geddes launched a Springer Journal "Plasmonics" in 2005, which is a leading journal in the field today. Dr Geddes is Director of the Institute of Fluorescence, a department within UMBC (University of Maryland Baltimore County), which focuses on the nano-bio-technological applications of fluorescence. Dr Geddes has been a permanent member of the NIH's EBIT R01 study section (2007-2012) and chaired the NIH's Analytical and BioAnalytical SBIR study section from ~ 2004-2009. Dr Geddes is a fellow of both the Royal Society of Chemistry (FRSC) and the Institute of Physics. Dr Geddes holds > 100 patents in the fields of fluorescence and plasmonics and his roles and interactions with industry have created enterprise value in excess of \$100 Million dollars.

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