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Seeing, counting and phenotyping exosomes as biomarkers using nanoparticle tracking analysis

Exosomes are 30-100nm nanovesicular bodies released from endosomes which originate in a wide variety of cells and can be found in most body fluids including blood, urine, saliva, breast milk etc.,. They are currently the subject of intense study, being increasingly recognized as playing multiple roles in intracellular communication and immune regulation. As well as displaying membrane proteins reflecting from their cellular origin, exosomes have now been shown to carry micro- and mRNA. It is increasingly accepted that exosomes are implicated in a multitude of pathological conditions and show much promise as diagnostics for many different diseases such as cancer, heart disease, diabetes, Alzheimer's, pre-eclampsia, etc. However, because of their small size, they are below the current detection limit of flow cytometry and the lack of methods for their detection and analysis is inhibiting progress in this field.

Nanoparticle Tracking Analysis is a relatively new method by which deeply submicron structures can be individually visualized and, through analysis of their Brownian motion, sized and counted in real time and with a rapid and robust microscopical methodology. Furthermore, fluorescently labeled exosomes can be successfully tracked and analysed allowing phenotyping of subpopulations in complex sample types which could form the basis of a new form of diagnostic test.

We will show results gained recently from the use of NTA in the development of a diagnostic test for pre-eclampsia and we will review other studies in which NTA has been most lately used to speciate and enumerate exosomes.

Biography

From a degree in Chemical Engineering from the University of Birmingham, UK, Warren worked for Unilever in chemical production where he qualified as a chartered engineer. He then set up a successful chemicals manufacturing business in Belgium, before completing an MBA at INSEAD in France. After a period in strategy consultancy with Booz.Allen, Warren began a series of CEO roles in SMEs centered on developing technology businesses. Warren joined NanoSight in 2005 as CEO and was directly involved in development of the company's multiparameter characterization technology. During the last two years emphasis has been on biological nanoparticles, with particular interest in the use of NanoSight as a platform for their detection and diagnostic application.