

INVITRO-Q: A HIGH-THROUGHPUT BIOSENSOR USED TO EVALUATE THE MECHANISM OF PHAGOCYTOSIS OF MACROPHAGES USING DIFFERENT PARTICLES

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The method of phagocytosis of a particle can provide information on how macrophages respond to a detected particle. The response elicited varies based on the nature of the particle and in turn changes which receptor-mediated phagocytosis is initiated. We have developed a multi-well cell-based sensor that can monitor real-time biological changes in living cells, such as mass redistribution, and viscoelasticity. This system provides unique kinetic information regarding the phenotypic change in the cells post treatment. As a proof of principle study, we evaluate macrophage phagocytosis using three different particles: latex beads, Zymosan A, and Staphylococcus aureus. These studies show the InVitro-Q's ability to distinguish and differentiate the unique physiological method of macrophage phagocytosis of an indigestible particle (latex beads), and digestible particles of different origins (Zymosan A (yeast cell wall) and S. aureus (wood bacteria). The real-time data generated illustrates the unique phenotypic signatures of macrophages in response to particle specific phagocytosis. The traces then dictate time points at which visualization will occur, and guides the elucidation of the mechanism of action.

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