Bimetallic Plasmonic Nanoparticles based Ultrasensitive Fiber-optic Immunosensor for *Chlamydia trachomatis* Detection

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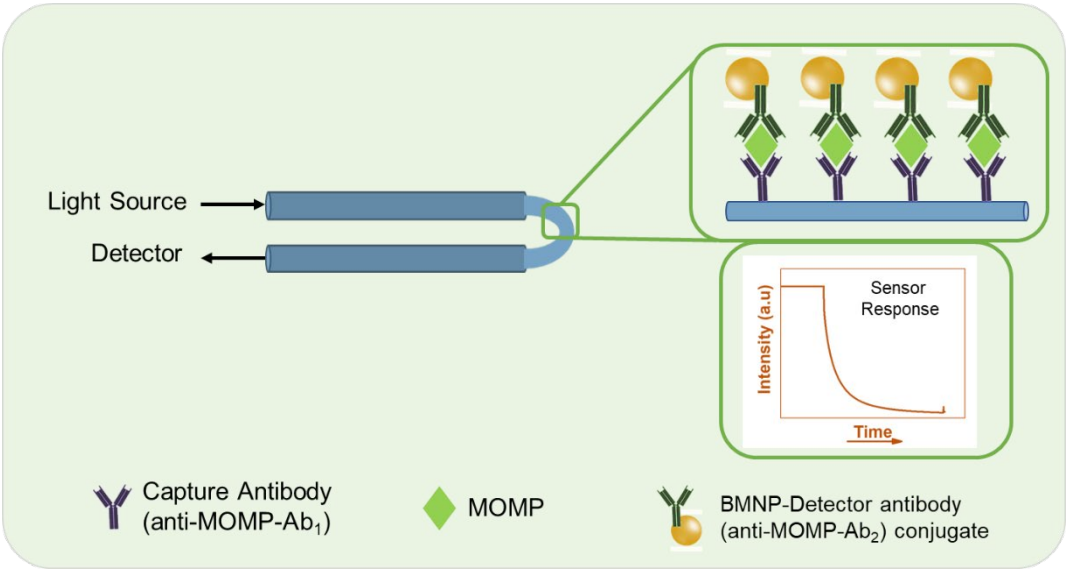
2

Graphical Abstract/ Layout



Project Description

Chlamydia trachomatis (CT) is one of the most prevalent bacterial sexually transmitted infections (STIs) globally but has been inadequately detected for intervention. Currently, direct cytological examination of culture samples, bacterial antigen detection, nucleic acid hybridization (NAH), and serological assays have been developed or are being used in clinical settings. However, these assays suffer from one or several issues such as labor-intensive procedures, expensive nature, longer analysis time (up to 72 hours), and limited specificity and sensitivity. In addition, these require sophisticated analytical instruments which restrict their field applications for mass screening.

To address these issues, we are developing an innovative solution through this project that can diagnose the Chlamydia infection by quantifying the ultralow level of Major Outer Membrane Protein (MOMP) of Chlamydia trachomatis. MOMP is selected as a diagnostic marker mainly because it is one of the most immunodominant surface antigens of *Chlamydia trachomatis*. We have developed a localized surface plasmon resonance-based unique and innovative immunosensing strategy by employing the conjugate of nanoparticle and detector antibody as nanobioprobe. This has been integrated with fiber-optic probes to devise an ultrasensitive sensitive, ergonomic and field-deployable sensor technology.