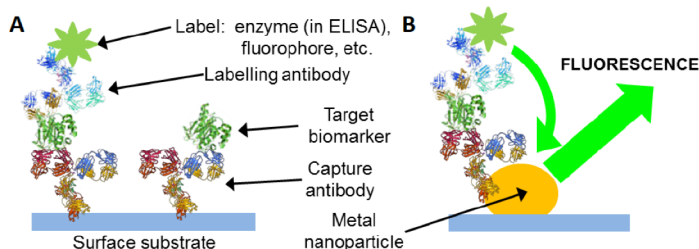


Site-specific bioconjugate chemistry for antibody-nanoparticle conjugates

“The project has demonstrated to us the range of avenues for incorporation of metal-enhanced fluorescence in enhancement of biomarker measuring platform sensitivity.” Stephen Kilfeather, Aeirtec Ltd.



Lu Shin Wong, University of Manchester; Stephen Kilfeather, Aeirtec Ltd.



a) Schematic diagram of immunosorbent assay and b) assay employing a metal nanoparticle that results in metal-enhanced fluorescence.

RESULTS: We developed a collaborative relationship related to the production of protein–metallic nanoparticle conjugate materials for use in diagnostics platforms and that could potentially be incorporated into Aeirtec’s existing platform. The project part-funded a postdoctoral researcher working on the analysis of gold nanoparticle aggregation and a PhD student involved in the chemical synthesis of linker molecules that will enable the attachment of protein molecules to the nanoparticles. The partner company benefited from discussing chemistry in relation to our capacity to generate a metallic–protein microparticle surface. The interaction has now set a direction for incorporation of metals alongside proteins, and forms the basis of the continued research by the PhD student.

INITIAL AIMS: Fluorescence-based immunosorbent assays have become a key technology for the detection and quantification of biomolecules in a range of fields such as the testing of microbial contamination (in water, chemical and during food and drug production), to measure biomarkers (in medical diagnostics and drug discovery) and in biomedical imaging. The use of metal-enhanced fluorescence is an active area of research that is being studied to improve the fluorescence output of these assays. This project will develop production methods for metal nanoparticle–antibody conjugates that are robust and scalable, which would be needed for commercial implementation. These hybrid metal-biomolecule materials offer advantageous spectroscopic properties that could greatly increase detection sensitivity of the assays.

- Aeirtec will contribute to a BBSRC iCASE PhD application
- Together with the University of Manchester, Aeirtec is exploring routes toward a larger collaboration to take forward the diagnostics applications of the project