MULTIFUNCTIONAL HYBRID-NANOPARTICLES TO IMPROVE PANCREATIC CANCER THERAPY

Lauren Evans [1], Clare Hoskins [1]

[1] Department of Pure and Applied Chemistry, University of Strathclyde, Glasgow, G1 1RD

Background: Pancreatic cancer is the most aggressive common cancer. A major challenge facing current treatments and contributing to the diseases' dismal prognosis is chemotherapy resistance. Silver iron-oxide hybrid nanoparticles are attractive drug delivery systems due to their physiochemical properties and feasibility for controlled delivery and triggered release. Whilst the interior magnetic core can be exploited for imaging, silver possesses unique characteristics which we expect can be exploited to enhance drug efficacy. The objective of this study is to develop novel nanohybrids to tackle drug resistance and enhance chemotherapy drug efficacy in pancreatic cancer.

Methods: Silver iron-oxide hybrid-nanoparticles were synthesised and characterised using UV-Vis spectrophotometry, zeta potential measurement, dynamic light scattering, transmission electron microscopy and superconducting quantum interference device (SQUID) magnetometry. The effect of tailoring the particle's structural composition has been investigated. Optimal drug loading levels have been assessed alone and with polymer coating and drug release profiles under various physiological conditions were evaluated. The heating ability of the particles are currently being assessed.

Results: Silver iron-oxide hybrid-nanoparticles (approximately 50 nm) have been successfully synthesised. Anti-cancer drugs have been immobilised onto the HNP surface with high loading efficiency as determined by high performance liquid chromatography. The particle's ability to act as a thermally triggered delivery system is currently under evaluation.

Conclusions: The optimal composition of the silver iron-oxide hybrid-nanoparticle was selected to progress to drug loading studies. High drug loading efficiencies and drug release profiles show promising results for these systems to be used as drug-carriers. Overall, the proposed systems can progress into *in vitro* studies and can be considered as a potential theranostic agent.