

## **Formulation, characterisation and functional assessment of tyrosine kinase inhibitors delivered to the lung.**

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Lung cancer is one of the leading causes of cancer-related deaths worldwide. The main types of lung cancer are divided into small cell lung carcinoma (SCLC) and non-small cell lung carcinoma (NSCLC). The epidermal growth factor receptor (EGFR) is a major target of lung anticancer therapy and can be modulated using monoclonal antibodies, or using small molecules that inhibit its phosphorylation/activation at the tyrosine kinase domain. Recently, small molecule inhibitors of tyrosine kinase (TKIs) have been introduced and licensed for NSCLC. These include gefitinib and erlotinib, which are both orally administered.

Aerosol treatment either in the form of nebulisation, dry powder or propellant-driven inhalers, offer some advantages over systemic delivery in lung cancer treatment. These include direct delivery to the lung, lower doses and fewer systemic side effects. Currently very little has been reported on aerosol delivery of TKI's, although there are some reports of similar anticancer molecules being delivered in this way.

The aim of this project is to produce an aerosol formulation(s) of TKI's, characterise the lung deposition profile and functionally characterise TKI uptake and activity in NSCLC cell lines. The project will rely on a number of techniques and expertise within Kingston University. In particular, formulation expertise will be provided by Professor Alany, Dr. Patel and Dr. Murnane, functional assessment and cell culture expertise by Professor Modjtahedi and image analysis by Dr. Wertheim.