TCS/16/07 - The preclinical optimisation of targeted nanoparticles loaded with beta-emitting nuclides for molecular radiotherapy

Colorectal cancer patients often present with disseminated disease. Whilst radiotherapy is the most effective anticancer treatment for cancers that cannot be surgically removed it cannot be used to control metastatic spread. Currently chemotherapy is the mainstay for treatment of metastases but cancer cells comprising metastases almost always develop resistance to chemotherapy. Molecular radiotherapy involves administering, intravenously, radioactive targeted drugs targeted to cancer cells which seek out primary tumours and metastases and use their radioactive payload to locally irradiate cancer tissue. However the distribution of sufficient cancer cell killing activity throughout a cancer to enable complete destruction of the cancer is problematic due to variation in cancer cell receptor expression and heterogeneity of blood flow. In this project we will produce molecules capable of delivering the necessary high radiation dose to colorectal tumours and their metastases. They will be tested on biological models for efficacy and safety. The results from this study will provide the requisite data for a full clinical study to be submitted to the Medical Research Council.