CC-PM Flagship Project Proposal: Metastatic ccRCC 1

Personalising prognosis and therapy of metastatic renal carcinoma

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A deadly complication of human cancers is that the initial tumour often spreads throughout the body to form new tumours at other sites, a process called metastasis. Renal carcinoma is one of the cancers with the highest rate of metastasis, occurring in approximately 60% of cases. Renal cancer patients with metastatic disease have a very poor survival and current therapeutic regimes provide very little clinical benefit. To improve the prediction of which patients are most likely to develop metastasis and to improve therapeutic strategies to treat metastatic renal cancer, it will be vital to better understand which genetic alterations cause renal cancer tumour cells to leave the kidney and spread throughout the body. Current understanding of the molecular events that cause renal cancer metastasis are very limited. This project unites researchers with unique complementary expertise in clinical and diagnostic pathology, the newest genome-wide molecular analysis techniques, bioinformatics, cell biology, mouse tumour models and genetic and small molecule therapeutic screens to form an integrated approach to tackle this important clinical problem. By studying the genetic and cellular heterogeneity of renal cancers that have metastatic potential we aim to elucidate the molecular mechanisms that cause metastasis of cancer cells, to identify biomarkers that will inform patient-specific diagnosis, prognosis and therapy and to identify novel therapies that exploit molecular features of metastatic renal cancer. These approaches work towards the goal of personalising the treatment of renal cancer patients. In addition to this goal, we envisage that this project will establish more general experimental workflows that will be applicable to the study of other types of metastatic human tumours.