Circulating Tumour Cell Analysis to Evaluate Docetaxel Treatment Response and Resistance Markers in Prostate Cancer

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Introduction
- Docetaxel (DOC) treatment has been shown to significantly improve overall survival (OS) in metastatic castration-resistant prostate cancer (mCRPC), and recently is used as chemo-hormonal therapy in metastatic hormone-sensitive prostate cancer (mHSPC) (Here we focus on data from mHSPC patients only).
- However, a proportion of patients treated with DOC have inherent/acquired resistance.
- This project investigates circulating tumour cells (CTCs) in blood liquid biopsies as a novel tool for predicting and/or monitoring DOC response.
- CTCs were captured using the Parsortix, an epitope independent, size-based CTC isolation system and downstream CTC enumeration, characterisation and mRNA analysis was performed.

Methods

1. mHSPC patient sample collection

2. Detection of CTCs by immunoflorescence

3. Pre-TX CTC enumeration as predictive biomarker of treatment response in mHSPC patients

4. Longitudinal CTC sampling to predict/monitor treatment response

5. M-CTC number and M-CTC progression can identify a subgroup of patients who have shorter FF and/or OS even after a PR to DOC

Conclusions
- Pre-TX total CTC and E-CTC numbers were elevated in patient who were non-responsive to DOC, and the detection of ≥ 2 CTCs pre-TX was significantly predictive of poor FF and OS in these patients.
- CTC dynamics during treatment such as the detection of ≥ 6 CTCs during early or late treatment, CTC progression and changing CTC score status can be used to monitor treatment response and used as early predictors of the development of resistance.
- KLK2 expression is a promising biomarker of resistance to DOC and may have clinical utility if used as an alternative to or in conjunction with serum PSA.

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