Counting copy numbers characterises prostate cancer

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Non-invasive 'liquid biopsies' can find metastatic or recurrent prostate cancer, in a low cost assay suitable for most healthcare systems, finds research published in BioMed Central's open access journal *Genome Medicine*. Genomic signatures of prostate cancer, isolated from plasma DNA, display abnormal copy numbers of specific areas of chromosomes. It is even possible to separate out patients who develop resistance against hormone deprivation therapy, which is the most common form of treatment in men with metastatic prostate cancer.

Prostate cancer is the most common cancer in men with 2.6 million new cases being diagnosed each year in Europe alone. PSA testing means that many cancers are found and treated at an early stage. However some men still have recurrent or metastatic disease despite treatment which appears to have destroyed the cancer.

Testing for metastasis remains a challenge requiring repeated biopsies. A team of researchers from the Medical University of Graz and the University Medical Center Hamburg Eppendorf investigated the possibility of testing for the presence of disease in a less invasive manner.

Using whole genome analysis of plasma DNA, plus targeted sequencing of genes known to be involved in prostate cancer, the team discovered that there are abnormal copy numbers (some losses, some gains) of specific prostate cancer related sequences. Although this was a small scale study the presence of prostate cancer was flagged by copy number

mistakes in sequences such as NCOA2, PHLPP1 and TMPRSS2-ERG. As expected each person's cancer signature was slightly different, however patients whose cancer did not respond to castration all had increased copy numbers of genes for the androgen receptor (AR).

Discussing the value of this research Dr Jochen Geigl and Prof Michael Speicher, who led this study commented, "The simplicity and low cost of 'liquid biopsies' make these genetic tests an attractive alternative to traditional biopsies. Better genetic information resulting from these tests may also help target treatment, especially of castration-resistant prostate cancer and aid personalised therapy in the clinic."

More information: Tumor associated copy number changes in the circulation of patients with prostate cancer identified through whole-genome sequencing Ellen Heitzer, Peter Ulz, Jelena Belic, Stefan Gutschi, Franz Quehenberger, Katja Fischereder, Theresa Benezeder, Martina Auer, Carina Pischler, Sebastian Mannweiler, Martin Pichler, Florian Eisner, Martin Haeusler, Sabine Riethdorf, Klaus Pantel, Hellmut Samonigg, Gerald Hoefler, Herbert Augustin, Jochen B Geigl and Michael R Speicher *Genome Medicine*

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