Scientists at UCL have invented a new test to identify the earliest genetic changes of prostate cancer in blood: a process which could allow doctors to see if cancers have spread, monitor tumour behaviour and enable better treatment selection.

In this proof of concept study, the researchers set out to investigate a process called DNA methylation—that is, a chemical change in DNA molecules that can affect gene function and has been studied in tissues.

To do this, the methylation and genome profiles of circulating-cell free DNA (degraded DNA fragments released to the blood plasma) from 25 metastatic prostate cancer patients were concurrently profiled using NGS. As a control, four healthy blood plasma samples were also analysed.

The research group interrogated the molecular profiles to identify circulating tumour DNA (ctDNA) methyllations, which can be used to sensitively track tumour content change.

Traditionally, the amount and quality of circulating cell-free DNA extracted from blood can be limited: surprisingly, researchers discovered 1,000s of methylation changes specific to the prostate gland in blood samples from men with prostate cancer.
Using this finding, they developed these changes into a signature (a blood test that can be used in the clinic) for tracking prostate genetic material in blood to monitor cancer activity.

Corresponding author, Professor Gert Attard (UCL Cancer Institute), said:

"We are now testing our new technique in trial patients to see if it can complement or substitute the traditional serum prostate specific antigen (PSA) for diagnosis, risk assignment and monitoring how well a treatment is working.

"We believe the increased sensitivity and additional information we derive, will significantly improve the outcomes of men with advanced prostate cancer."

Professor Mark Emberton, Dean of the Faculty of Medical Sciences at UCL, said "The field of liquid biopsies has shown great potential recently to improve the diagnosis and management of cancer patients.

"This test could be the first to tell us cancer has got into blood before the spread is large enough to see on imaging. This could allow targeting of treatment for men at the highest risk of prostate cancer spread."