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Scientists develop simple blood test to track tumour evolution in cancer patients

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[Scientists develop simple blood test to track tumour evolution in cancer patients](#)



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Image

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Research sheds light on how tumours develop drug resistance

By tracking changes in patients' blood, Cambridge scientists have created a new way of looking at how tumours evolve in real-time and develop drug resistance. The research was published in the print edition of *Nature* today, 02 May.

Scientists at the Cancer Research UK Cambridge Institute at the University of Cambridge used traces of tumour DNA, known as circulating tumour DNA (ctDNA), found in cancer patients' blood to follow the progress of the disease as it changed over time and developed resistance to chemotherapy treatments.

For the study, which was co-directed by Dr James Brenton, Professor Carlos Caldas, and Dr Nitzan Rosenfeld from the University's Cancer Research UK Cambridge Institute, they followed six patients with advanced breast, ovarian and lung cancers and took blood samples, over one to two years. They then focused analysis on those samples that contained relatively higher concentrations of tumour ctDNA,

We hope that our discoveries can pave the way to helping us understand how cancers develop drug resistance

Nitzan Rosenfeld

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By looking for changes in the tumour ctDNA before and after each course of treatment, they were able to identify changes in the tumour's DNA that were likely linked to drug resistance following each treatment session.

Using this new method they were able to identify several changes linked to drug-resistance in response to chemotherapy drugs such as paclitaxel (taxol) which is used to treat ovarian, breast and lung cancers, tamoxifen which is used to treat oestrogen-positive breast cancers and trastuzumab (Herceptin) which is used to treat HER2 positive breast cancers.

The researchers hope this new approach could facilitate research on how cancer tumours develop resistance to some of our most effective chemotherapy drugs as well as providing an alternative to current methods of collecting tumour DNA – by taking a sample direct from the tumour – a much more difficult and invasive procedure.

Dr Rosenfeld said: "Tumours are constantly changing and evolving which helps them develop a resistance to many of the drugs we currently give patients to treat their disease. We've shown that a very simple blood test can be used to collect enough tumour DNA to suggest to us what parts of the cancer's genetic code is changing and creating tumour resistance to chemotherapy or biologically-targeted therapies.

"We hope that our discoveries can pave the way to helping us understand how cancers develop drug resistance as well as identifying new potential targets for future cancer drugs."

Dr Brenton added: "Importantly, this advance means that we will be able to screen a much larger number of genes in the blood to test if specific genetic changes in the cancer explain resistance to treatment. The low cost and high acceptability of a blood sample means that this can be done across hundreds or thousands of patients. This is vital to discover reliable clinical biomarkers."

Professor Caldas said: "The tracking of different cancer clones in real time using a liquid biopsy will have enormous value to identify drug resistance in the clinic and adjust therapy accordingly."

The Cancer Research UK Cambridge Institute is a major research centre which aims to take the scientific strengths of Cambridge to practical application for the benefit of cancer patients. The Institute is a unique partnership between the University of Cambridge and Cancer Research UK. It is housed in the Li Ka Shing Centre, a state-of-the-art research facility located on the Cambridge Biomedical Campus which was generously funded by Hutchison Whampoa Ltd, Cambridge University, Cancer Research UK, The Atlantic Philanthropies and a range of other donors. For more information visit www.cruk.cam.ac.uk.

Story adapted from CRUK press release.

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