Bionanotechnology-enabled monitoring of treatment response during cancer

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Not all patients Respond to Cancer Treatment Equally

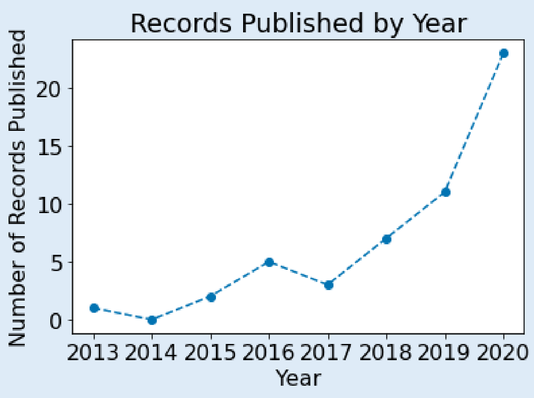
To monitor progress routine invasive tissue biopsies are used

We can collect the same information from a blood test

Circulating tumour DNA provides insight into treatment efficacy

The Application of Nanotechnology for Quantification of Circulating Tumour DNA in Liquid Biopsies: A Systematic Review

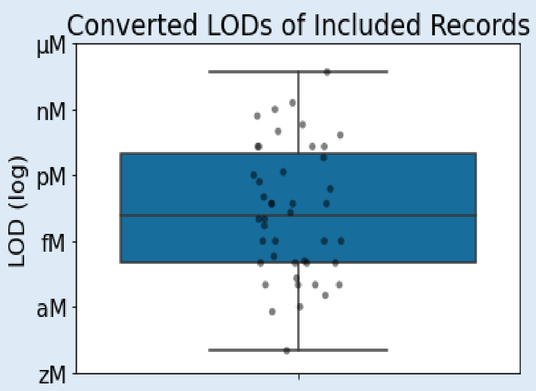
'Nanotechnology may enable simpler, cheaper, faster ctDNA diagnostics.' Wu *et al. (2022)*



Interest in nanotech-based approaches for ctDNA analysis is increasing.

Limit of Detection (LOD) ranged from 10 zM to 50 nM.

50% of studies had a LOD of less than 10 fM.



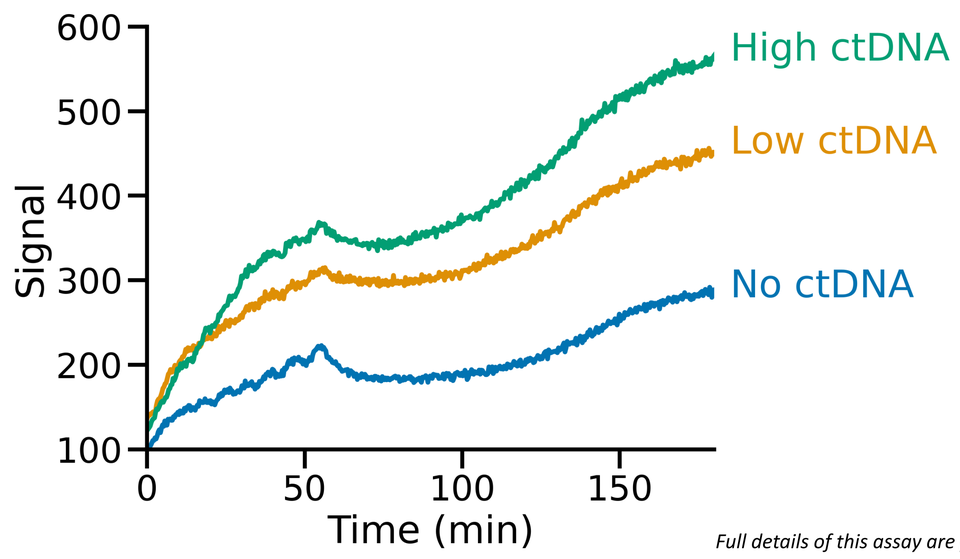
Wu et al. 2022. The application of nanotechnology for quantification of circulating tumour DNA in liquid biopsies: a systematic review. *IEEE Reviews in Biomedical Engineering.* **10.1109/RBME.2022.3159389**

Patient Sample → Amplify → Detect → Quantify

DNA nanotechnology-based assay

DNA nanotechnology takes advantage of the unique properties of DNA at the nanoscale. Artificial DNA strands can potentially create new technologies, such as **next-generation diagnostics.**

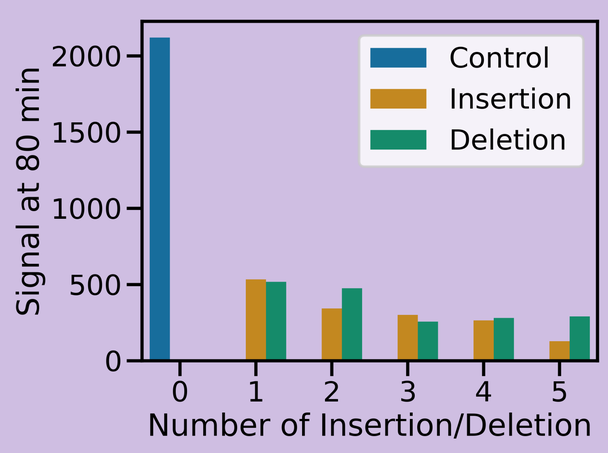
We have developed a novel assay that exploits DNA nanotechnology to detect a clinically relevant concentration of 'mock' ctDNA.



Full details of this assay are proprietary.

In this assay, we used a known concentration of double-stranded DNA with a sequence relevant to cancer. Using the pathway above, we found that the measured signal was larger for higher 'mock' ctDNA concentrations.

In another assay, we have found that we can distinguish between wild-type DNA sequences and those with bases added or removed. Insertions and deletions are common mutations that may be found in circulating tumour DNA.



I would like to thank my co-supervisors Bin-Zhi Qian, Ines Gonzalez Garcia, and Remco Loos. We would like to thank Katalin Kis and Eve Duncan (University of Edinburgh) for their advice and support.

Scottish Funding Council
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