EXOSOMAL DNA AS A LIQUID BIOPSY ANALYTE FOR THE DETECTION AND MONITORING OF BREAST CANCER

T.P. Ntereke, R.C. Allsopp, K. Page, M.K. Wadsley, E. Acheampong, J.A. Shaw, Leicester Cancer Research Centre, University of Leicester

W h y  b r e a s t  c a n c e r ?
The most common cancer affecting women in the UK
5-year overall survival rate = 85%
Survival rate can be improved through earlier detection
There is an unmet need in development of sensitive tests for earlier detection of cancer & relapse in comparison to current methods

15% Total cancer incidence
7% Total cancer-related mortality

W h a t  i s  t h e  l i q u i d  b i o p s y ?
Cancer is currently detected by looking at tissue samples from biopsies
Only provides a snapshot & limited scope of the extent of the disease
Liquid biopsy involves analysis of fluids to detect cancerous biomarkers including cell-free DNA (cfDNA)

W h a t  a r e  e x o s o m e s ?
Exosomes are small extracellular vesicles (EV) released by most cells
Cancer cells release more exosomes than healthy cells
Copy number analysis using exosomal DNA is an understudied area and we wanted to investigate if it was comparable to the 'gold standard' liquid biopsy analyte cell free DNA (cfDNA).

M e t h o d s

Figure 1: Flowchart to illustrate work done from exosome isolation from blood through to copy number analysis of exoDNA

R e s u l t s

1. exoDNA shows more copy number changes than cfDNA in 33% of samples

Figure 2: Overview of gains (blue) and losses (red) detected after analysis of sequenced plasma samples. More events were detected in the exosome sample (bottom) than plasma cfDNA (top).

2. DNase digestion had minimal effect on the DNA profiles of exoDNA

Figure 3 continued. The general trend of similar copy number events seen in DNase treated exoDNA (d) than untreated exoDNA (c) was retained suggesting analysed DNA is inside vesicles.

3. Exosomes exposed to DNase prior to DNA extraction showed higher tumour related copy number aberrations and tumour DNA fraction than cfDNA

Figure 4: Somatic copy number analysis results from ichorCNA showed that a higher TFx was detected in DNA digested exosome DNA than exoDNA or cfDNA from the same blood sample.

W h a t  d o e s  t h i s  m e a n ?
Results show that exosomes contain tumour DNA, reflective of the releasing cancer cell profile.
There is potential increased sensitivity of exoDNA over cfDNA with higher TFx which needs to be explored further for utility in the liquid biopsy.

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