Exploring circulating biomarkers in patients with hepatocellular cancer

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Introduction

Mortality secondary to Hepatocellular cancer (HCC) is increasing significantly in England[1]. This is partly due to the lack of effective screening tools available for early detection of the cancers, which consequently limits the chance of offering curative treatments[1].

As a possible resolution, a non-invasive screening tool has been proposed, which aims to detect circulating tumour cells (CTCs) in the patient blood samples, based on their distinctive biomarkers[2]. Various HCC biomarkers are thus currently under investigation for their suitability[2].

Aims

Two candidate biomarkers (SULF2 and β-catenin) were explored for their applicability in the aforementioned non-invasive screening tool.

Methods

-HCC cell lines (Hep3B, Huh-7, SNU182 and SNU475) and white blood cells (WBCs, from patient blood samples) were methanol-fixed, stained with SULF2 (1:100) and β-catenin (1:250).

-The expression patterns were analysed, in terms of the levels of expression (mean pixel intensity) and the percentage of the population with positive expression, using ImageStream and IDEAS analysis software (Amnis, Seattle) (Fig.1).

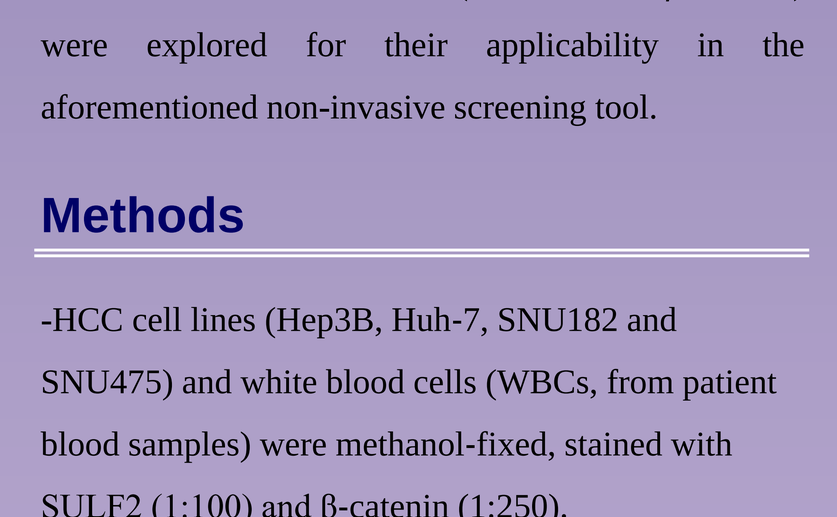

Fig 1. IDEAS analysis software

Results

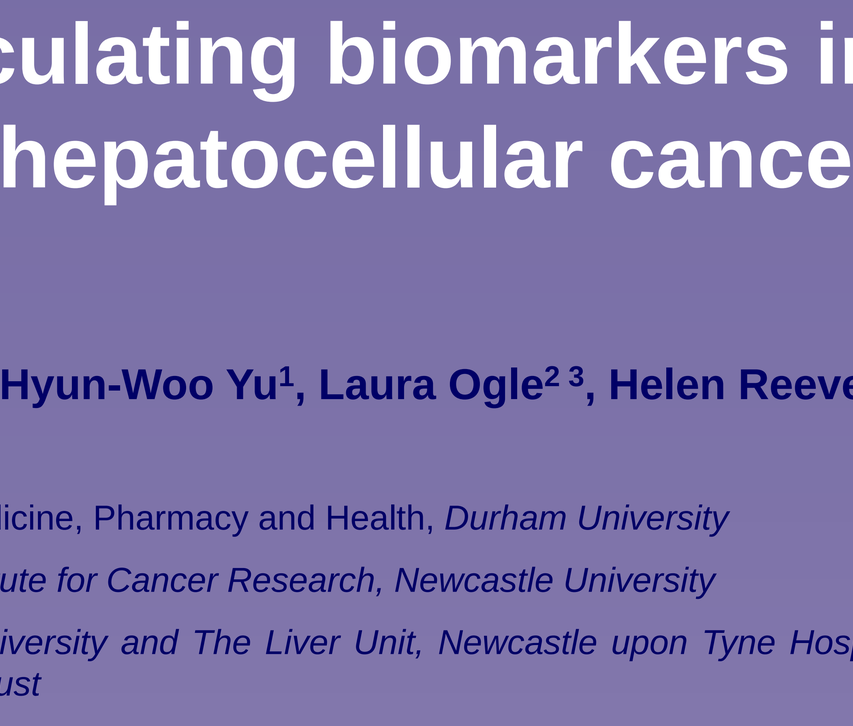

Figure 2.
β-catenin expressions in (a) Huh-7, (b)SNU182, and (c) SNU475

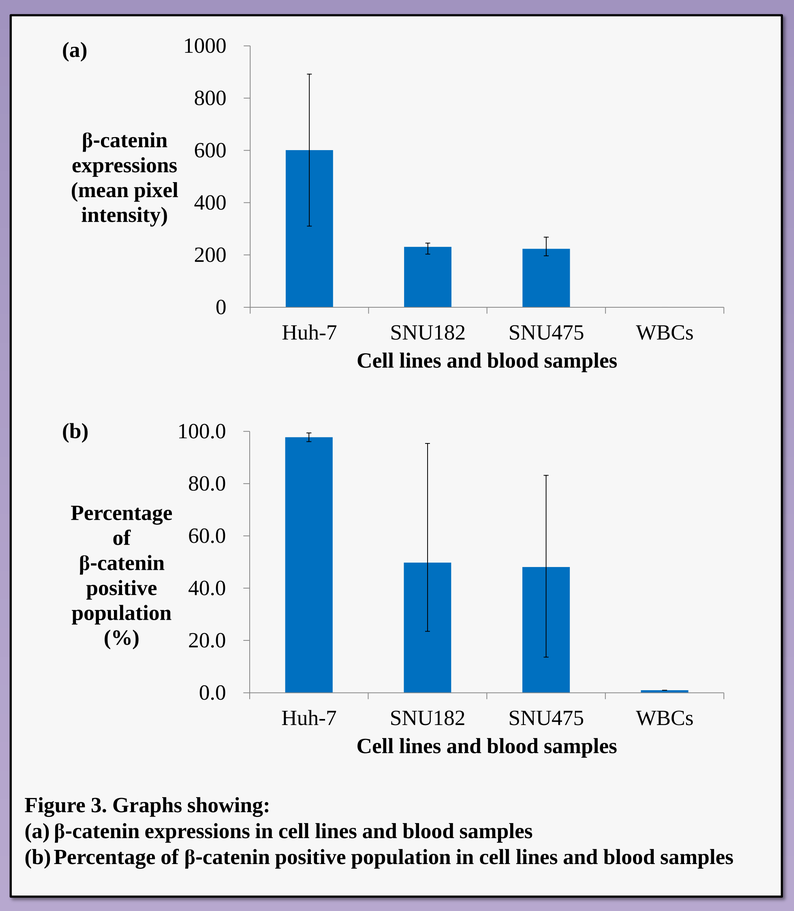

Figure 3. Graphs showing:
(a) β-catenin expressions in cell lines and blood samples
(b) Percentage of β-catenin positive population in cell lines and blood samples

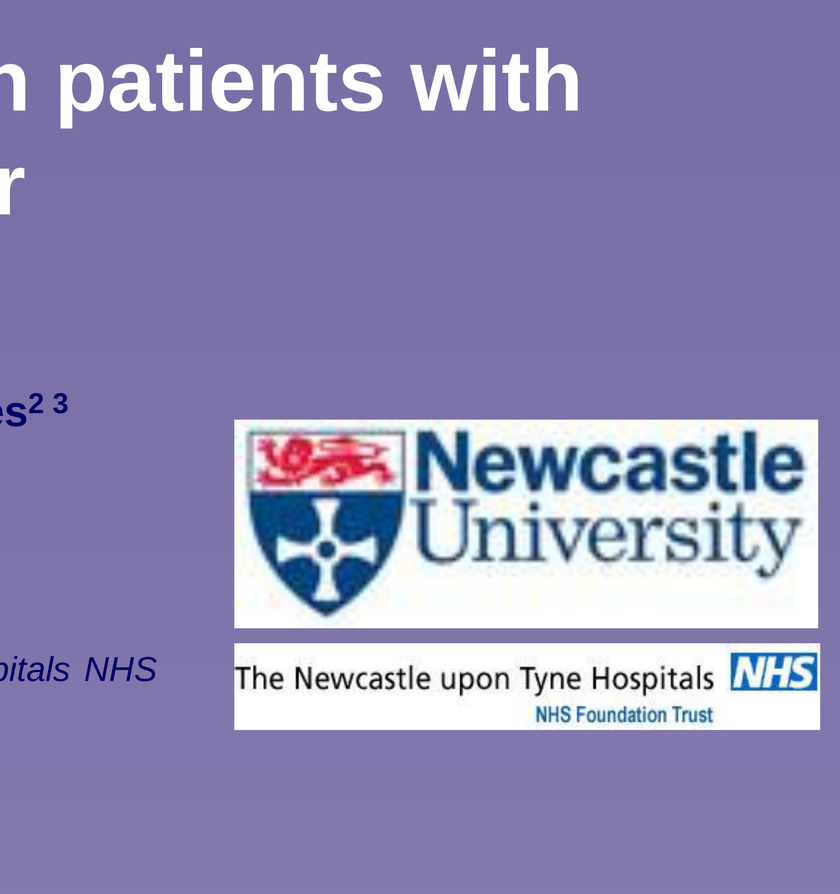

Figure 4. SULF2 expressions in (a)Hep3B, (b) Huh-7, (c) SNU182, (d) SNU475, and (e) WBCs

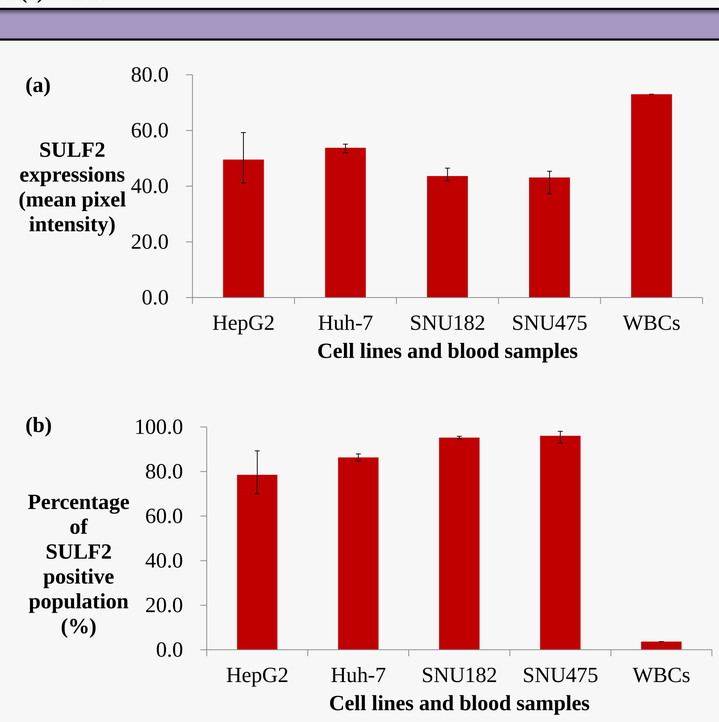

Figure 5. Graphs showing:
(a) SULF2 expressions in cell lines and blood samples
(b) Percentage of SULF2 positive population in cell lines and blood samples

β-catenin:

All WBCs were found to be β-catenin negative (0.95% of WBCs that were shown to be β-catenin positive (Fig.3) were observed to be debris).

SULF2:

Only 3.7% of WBCs were found to be SULF2 positive (Fig.5). However, these WBCs showed a higher level of expressions (mean pixel intensity) than HCC cell lines (Fig.4 and 5).

Conclusions

β-catenin could be a good biomarker, while SULF2 might not be as good a biomarker as β-catenin. However, CTC detection using SULF2 could still be possible if size difference is used as a parameter, since CTCs are larger than WBCs (Fig.2 and 4).

Acknowledgements

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References

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[2] Chiappini, Franck. "Circulating tumor cells measurements in hepatocellular carcinoma." *International journal of hepatology* 2012 (2012): 1-16