11.05 Investigation of the Utility of Exhaled Breath Condensate (EBC) as a Liquid Biopsy in the Detection of Spatial Genomic Heterogeneity in Patients with Early-Stage Non-Small Cell Lung Cancer (ESLC)

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Spatial genomic heterogeneity is implicated in treatment resistance and recurrence and may lead to sampling bias in diagnostic biopsies. Liquid biopsy has the potential to overcome the challenges of tumour heterogeneity. This study investigated the potential of using EBC as a liquid biopsy to detect spatial heterogeneity in ESLC.Four quadrants of the resected tumour, a lymph node and normal lung tissue from 8 patients were analysed by whole exome sequencing. Patient specific panels of 5 mutations were designed based on the sequencing results. Cell free DNA (cfDNA) extracted from EBC and plasma, collected before surgery and at 6 and 12 weeks post-operatively, was analysed using digital droplet PCR.The median level of spatial genomic heterogeneity was 30.2% (IQR 11.4-57.8) raising the possibility of sampling bias in biopsy samples. 39/40 mutations (97.5%) were detected in pre-operative EBC samples compared to 40/40 (100%) mutations in plasma. A trend towards reductions in mutation copy numbers was observed in post-operative EBC and plasma. In 3/8 biopsy samples not all mutations were detected by ddPCR. Using this ultra-sensitive technology, almost all selected mutations were detected in EBC. Both liquid biopsies were superior to the original biopsy in the detection of spatial genomic heterogeneity (p=0.0001).

Conflict of Interest: None to declare