

**P0603 Towards microbiome-based liquid biopsy: oral microbiota harbours highly accurate biomarkers of lung cancer**Ayca Gundogdu<sup>1,2</sup>, Omer Onal<sup>3</sup>, Muge G Onal<sup>2</sup>, Ufuk Nalbantoglu<sup>4,2</sup>

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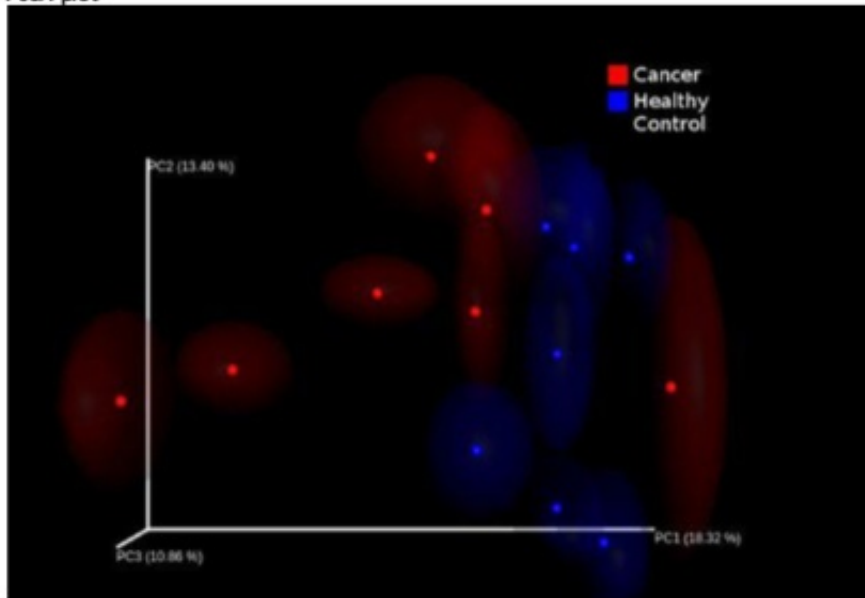
**Background:** Lung cancer is the leading cause of cancer death in the world with significant need for early diagnosis and prevention. Recent studies showed that bacterial communities in the lung are associated with lung cancer. Therefore, being the primary source of lung microbiota, oral microbiome is a potential target of non-invasive biomarkers. This study aims to investigate the tongue coat microbiome differences of lung cancer patients with healthy controls. Discovering potential microbiota biomarkers of lung cancer, and evaluating their discriminatory behavior is also aimed.

**Materials/methods:** Tongue coat microbiota from 7 healthy individuals and 7 lung cancer patients (diagnosed clinically) were swab-sampled. For each sample DNA isolation with commercial kits is followed by PCR amplification of V3-V4 hypervariable regions of 16S rRNA genes. The resulting amplicons were sequenced using MiSeq sequencer and analyzed using QIIME (Quantitative Insights Into Microbial Ecology) software. Taxonomic profiles were subject to biomarker identification by correlation based feature-subset selection. In order to evaluate the diagnostic potential of the identified biomarker candidates, they were used to classify cancer cases by Random Forest classifiers with 10-fold cross-validation.

**Results:** A total of 125 bacterial genera were identified in the tongue-coat microbiota of the selected cohort. *Bifidobacterium*, *Lactobacillus*, *Granulicatella*, *Veillonella* genera, and *Bacteroidales* order found to be significantly differing between cancer and healthy control cases. The area under Receiver Operator Characteristics (ROC) curves were found to be 0.816, 0.867, 0.959, 0.796, and 0.704 respectively. A combinatorial microbial biomarker comprising the selected taxa were found to assess 100% sensitivity and 85.7% specificity.

**Conclusions:** While the discovered biomarkers comply with previous cancer-microbiome studies, their oral abundances measurements have achieved unprecedented accuracy, based on our cross-validation tests. Further investigations with large cohorts and metagenomics methodologies is very promising to achieve non-invasive liquid biopsy for early lung cancer diagnosis.

PcoA plot



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