Liquid biopsy in lung cancer screening: The contribution of metabolomics

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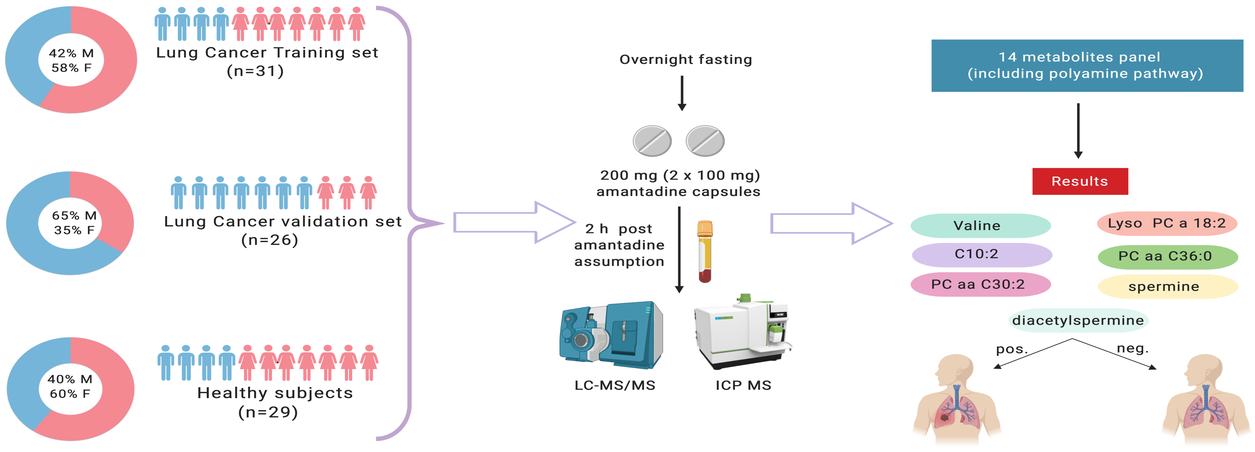
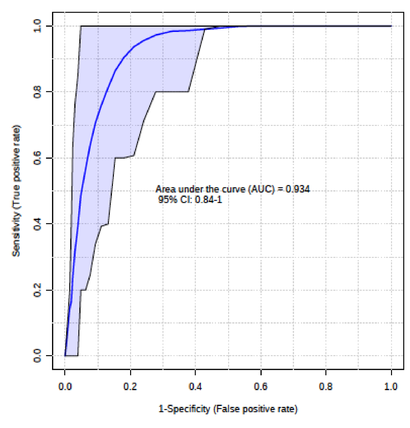
ABSTRACT

Background: Lung cancer is the most common cause of cancer-related deaths worldwide. Early diagnosis is crucial to increase the curability chance of the patients. Low dose CT screening can reduce lung cancer mortality, but it is associated with several limitations. Metabolomics is a promising technique for cancer diagnosis due to its ability to provide chemical phenotyping data. The intent of our study was to explore metabolomic effects and profiles of lung cancer patients to determine if metabolic perturbations in the SSAT-1/polyamine pathway can distinguish between healthy participants and lung cancer patients as a diagnostic and treatment monitoring tool. **Patients and Methods:** Plasma samples were collected as part of the SSAT1 Amantadine Cancer Study. Liquid chromatography-tandem mass spectrometry (LC-MS/MS) was used to identify and quantify metabolite concentrations in lung cancer patient and control samples. Standard statistical analyses were performed to determine whether metabolite concentrations could differentiate between healthy subjects and lung cancer patients, as well as risk prediction modeling applied to determine whether metabolic profiles could provide an indication of cancer progression in later stage patients. **Results:** A panel consisting of 14 metabolites, which included 6 metabolites in the polyamine pathway, was identified that correctly discriminated lung cancer patients from controls with an area under the curve of 0.97 (95% CI: 0.875-1.0).
Conclusion: When used in conjunction with the SSAT-1/polyamine pathway, these metabolites may provide the specificity required for diagnosing lung cancer from other cancer types and could be used as a diagnostic and treatment monitoring tool.

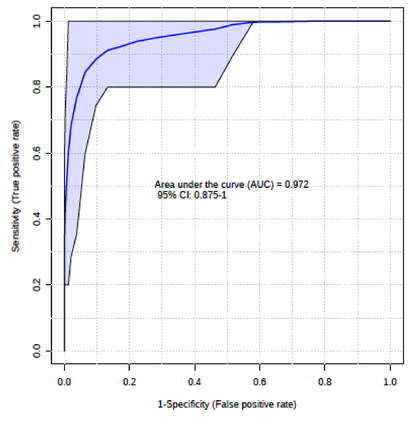
STUDY DESIGN



RESULTS: AUROC

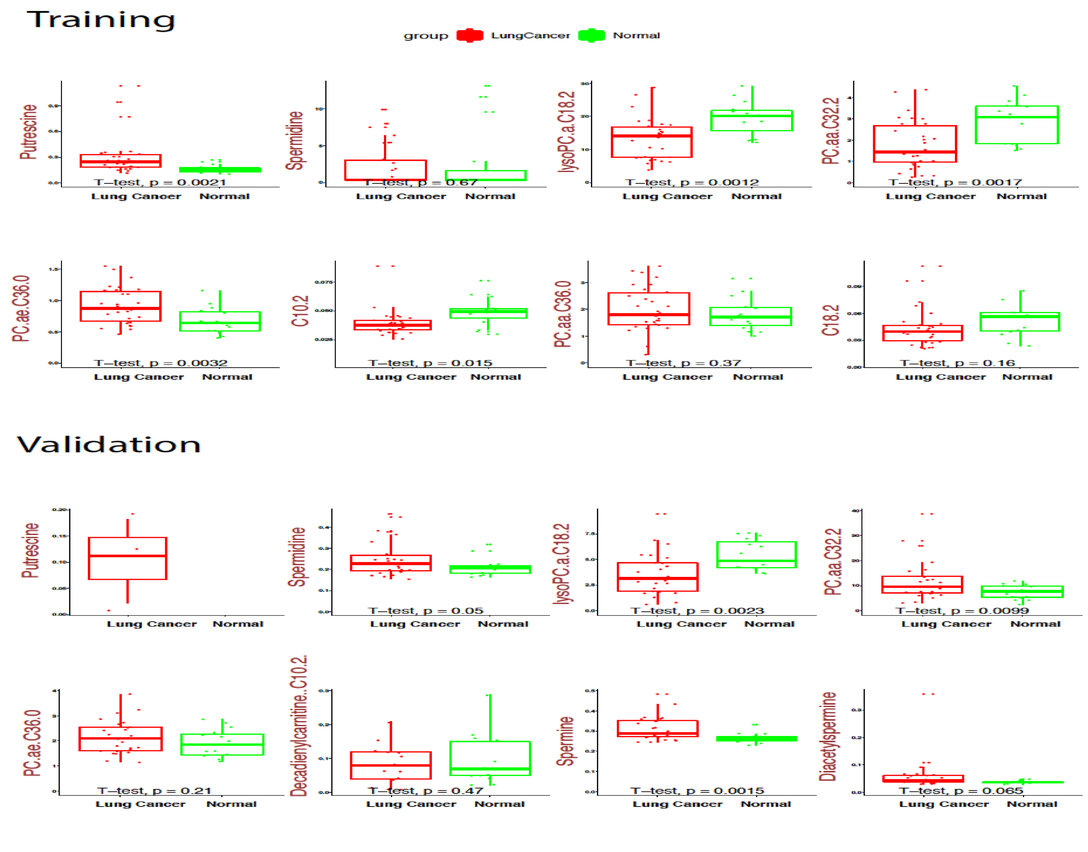


5 metabolites included valine, putrescine, PC.ae.C36.0 PC.aa.C32.2 and C10.2



3 key metabolites Valine, Spermine and Ornithine

RESULTS: METABOLITES



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