The lung is the barrier organ, which has the utmost contact to the environment. Within several seconds the lung epithelial tissues gets into contact with freshly inhaled air containing bacteria, aerosols, toxic substances and allergens. Relatively little is known about the lung lipidome and how it influences the maintenance of the barrier functions and gas exchange. We studied the lipid composition of clinical samples covering bronchial, alveolar and cancer tissues biopsies using the lipidomics screen approach. With the help of detailed histological and clinical characterization we were able to make associations of obtained lipid profiles with age, gender and pathology. In this regard hierarchical clustering of quantitative lipid profiles enabled the unambiguous separation of cancer and alveolar tissues biopsies independent of age and gender. Moreover our results indicated that the quantity of surfactant lipids and neutral lipids could directly be used for functional associations.