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S6. A NOVEL METHOD FOR BETTER DIAGNOSSIS OF ASBESTOS-INDUCED LUNG CANCER (MESOTHELIOMA) FROM HUMAN BODY FLUIDS

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Malignant pleural mesothelioma (MPM) is an aggressive and rare form of cancer which arises from environmental fibrous minerals (tremolite asbestos or erionite) exposures. It is difficult to differentiate it from other lung cancers. Aim of this study is to develop a new method with high specificity and sensitivity for MPM diagnosis from body fluids (pleural fluids and serum) using Attenuated Total Reflectance Fourier Transform Infrared (ATR-FTIR) spectroscopy and chemometric analysis.

FTIR spectra of the samples collected from patients diagnosed with malignant pleural mesothelioma (MPM), lung cancer (MLC), benign (for pleural fluids) , and healthy (for serum) controls (C) were recorded in the 4000-650 cm^{-1} spectral region. Spectral analysis indicated significant changes in the lipid, protein, carbohydrates, and nucleic acid contents in MLC and MPM with respect to the control samples. The significant variations in the saturated lipids, triglyceride/cholesterol ester content and lipid to protein ratio can be used as biosensors to diagnose MPM patients from pleural fluids. However, variation in the protein content and amide I to amide II area ratio were found to be used as biomarkers to diagnose MPM from serum samples. Hierarchical Cluster analyses (HCA) and Principal Component Analysis (PCA) were performed to differentiate the studied groups based on the spectral differences which revealed successful differentiation of the groups.

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