

POSTER PRESENTATION

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NMR metabonomic study of lung cancer: metabolic profiling of tissues

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This work aims to evaluate the potential of ¹H Nuclear Magnetic Resonance (NMR) spectroscopy combined with multivariate statistics (metabonomics) for finding malignancy biomarkers in lung tissue and discriminating between different tumour histological types. Paired tissue samples from 32 patients with primary lung cancer were directly analysed by ¹H High Resolution Magic Angle Spinning (HRMAS) NMR (500 MHz) and the spectral profiles subjected to Principal Component Analysis (PCA) and Partial Least Squares Regression Discriminant Analysis (PLS-DA). Tumor and control tissues were clearly discriminated in the PLS-DA model with 95% sensitivity and 100% specificity. In agreement with previous work [1], the metabolites giving rise to this separation were mainly lactate, glycerophosphocholine, phosphocholine, taurine, glutathione and uridine di/tri-phosphate (elevated in tumours), and glucose, phosphoethanolamine, acetate, lysine, methionine, glycine, *myo*- and *scyllo*-inositol (reduced in tumours compared to control tissues). Regarding differentiation of histological types, carcinoid tumors showed a distinct profile characterized by very low lipid levels, the presence of broad signals possibly arising from oligopeptides, decreased PC/GPC ratio and increased taurine and ascorbate levels. Epidermoid tumors could also be differentiated from adenocarcinomas due to increased lipids, lactate, creatine and GSH and decreased taurine, choline and PC. The biochemical information retrieved, not available by conventional histopathology, may provide additional criteria for improving clinical decisions and potentially aid in the differential diagnosis of lung tumors.

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