

Hannah Schäfer: Assessment of the choline metabolism in human breast cancer by High Resolution Magic Angle Spinning ^1H Magnetic Resonance Spectroscopy and quantitative Polymerase Chain Reaction

The study analysed invasive ductal carcinoma grade II and III with the use of two different analytical techniques: ^1H MRS at 14T and real-time PCR. The results were matched and monitored for specific patterns.

Simultaneous analysis of the datasets led to rejection of the null-hypothesis: there was a statistically significant correlation between histological grade, the concentration of certain enzymes of the Kennedy pathway and metabolites measured by ^1H MRS in malignant breast cancer tissue. The following significant differences in enzyme concentration within the two histological groups were found: a negative correlation between ChoK β and higher pathological grade; a positive correlation between ChoK α and total choline concentration in both grades. In both grades, there was a negative correlation between ChoK α/β and the (PC+GPC)/choline ratio, as well as between ChoK α and the GPC level in grade 2. Apart from ChoK, there was one statistically significant finding for another enzyme involved in the Kennedy cycle: PCYT1A concentration and GPC/choline ratio were negatively correlated in grade 3.

These results underline the notion that there is a specific spectral pattern that allows differentiation between different breast tissue lesions. The study discusses several possible explanations for the results and puts them into perspective with work done so far in the field.

Provided a sufficiently large dataset, the integration of MRS with MRI data could lead to higher quality and reliability of diagnostic procedures. A comprehensive histopathologic, clinical and biochemical classification of breast lesions could allow for less repetitive surgical interventions and ultimately higher survival rates of breast cancer patients.