Carnitine shuttle

Alterations in the carnitine shuttle system may be an indication of the presence of cancer. As such, in-depth analyses of this pathway in different malignant tumors could be important for the detection and treatment of this disease. A study aimed to assess the profiles of carnitine and acylcarnitines in gliomas with respect to their grade, the presence of isocitrate dehydrogenase mutations, and 1p 19q co-deletion. Brain tumors obtained from 19 patients were sampled on-site using solid-phase microextraction (SPME) immediately following excision. Analytes were desorbed and then analyzed via liquid chromatography-high-resolution mass spectrometry. The results showed that SPME enabled the extraction of carnitine and 22 acylcarnitines. An analysis of the correlation factor revealed the presence of two separate clusters: short-chain and long-chain carnitine esters. Slightly higher carnitine and acylcarnitine concentrations were observed in the higher-malignancy tumor samples (high vs. low grade) and in those samples with worse projected clinical outcomes (without vs. with IDH mutation; without vs. with 1p/19q co-deletion). Thus, the proposed chemical biopsy approach offers a simple solution for on-site sampling that enables sample preservation, thus supporting comprehensive multi-method analyses [1)]

1)
Bogusiewicz J, Burlikowska K, Jaroch K, Gorynska PZ, Gorynski K, Birski M, Furtak J, Paczkowski D, Harat M, Bojko B. Profiling of Carnitine Shuttle System Intermediates in Gliomas Using Solid-Phase Microextraction (SPME). Molecules. 2021 Oct 10;26(20):6112. doi: 10.3390/molecules26206112. PMID: 34684691; PMCID: PMC8540799.