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Eloiza H Tajara

University of São Paulo, Brazil

Plasma metabolomics for identifying diagnostic and prognostic biomarkers of oral cancer

Metabolomics has proved be an important tool in cancer research, it allows the identification of molecular pathways behind the tumor phenotype and clinically useful markers. In fact, the data have shown the potential of metabolites to classify different types of cancer, both in diagnostic and prognostic levels. In head and neck cancer, several metabolomic data have been published in biofluids and tumor tissues. In the present study, plasma analysis was performed to identify metabolic profiles in oral squamous cell carcinoma (OSCC) patients and controls as well as in patients at different stages of disease. 1H NMR (Proton Nuclear Magnetic Resonance) analysis was performed on plasma samples from 47 OSCC cases and 49 controls to investigate association of metabolite concentrations with clinical, pathological and lifestyle variables. The results showed that clinical and lifestyle variables affect the plasma concentration of metabolites, especially those involved in metabolic pathways related to energy homeostasis. Mass spectrometry analysis of plasma samples was also performed to compare metabolite concentrations of 61 OSCC patients with 61 controls and of different cancer stages to obtain an insight on the dynamics of metabolite changes during oral neoplastic progression. Identification of the metabolites with significantly different concentrations was carried out using the PLS-DA (Partial least squares Discriminant Analysis) method. The 15 top features with higher VIP scores included acylcarnitine, serotonin and phosphatidylcholines more expressed in plasmas from patients. In addition, the data showed a deregulation in carnitine concentrations and an increased biosynthesis of unsaturated lipids during neoplastic transformation, but more evident in the stage with larger tumor volume. In summary, the OSCC patients exhibited a distinct plasma metabolic profile suggestive of abnormal lipogenesis and energy metabolism, which is apparent in advanced stages of the disease and may contribute to proliferation and inflammation. Such signature, if used in monitoring tests, may contribute to prognosis and treatment of OSCC.

Biography

Eloiza H Tajara obtained her Bachelor's Degree in Biological Sciences (1969) and PhD Degree in Genetics (1980) at the University of São Paulo, Brazil. She did her Postdoctoral studies at the Southwest Biomedical Research Institute (Arizona, USA) and was a Fellow of the Union for International Cancer Control in the Eleanor Roosevelt Institute for Cancer Research (Colorado, USA) in 1994 and in the University of Chicago (USA) in 1997. She is currently an Associate Professor at the Faculty of Medicine of São José do Rio Preto, Sao Paulo, Brazil. She is the Coordinator of GENCAPO (Head and Neck Genome Project), a consortium of research groups from universities and hospitals in the State of São Paulo, in collaboration with researchers from the Federal University of Espírito Santo and the International Agency for Research on Cancer, Lyon, France whose goal is to develop clinical, epidemiological and molecular analysis of head and neck cancer. She has experience in Genetics and Molecular Biology, with emphasis on Cancer. Her scientific papers were cited 3435 times and the H index is 28.

tajara@famerp.br

Notes:

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