Lukasz Boguszewicz, J Bioengineer & Biomedical Sci 2016, 6:5 (Suppl)
http://dx.doi.org/10.4172/2155-9538.C1.014

1H NMR based metabolomic approach to monitoring of the head and neck cancer treatment toxicity

Lukasz Boguszewicz
Maria Sklodowska-Curie-Memorial Cancer Center and Institute of Oncology, Poland

Sequential and concurrent radiotherapy and chemotherapy, a standard organ preservation treatment for head and neck squamous cell carcinomas (HNSCC), results in temporary or permanent toxicity considered as changes in normal tissues and/or involved regions. We aimed to investigate molecular processes reflecting acute radiation sequelae (ARS) in HNSCC patients using 1H NMR-based metabolomics of blood serum. 45 HNSCC patients were treated with radiotherapy/chemoradiotherapy (RT/CHRT). Severity of ARS was monitored throughout and after the treatment until the resolution of all the ARS symptoms. The patients were divided into two classes (of high and low ARS) on the basis of the highest individual ARS value observed during the treatment. Blood samples were collected within a week after RT/CHRT completion. 1H NMR spectra of serum samples were acquired on a 400.13 MHz spectrometer at 310 K and analyzed using principal component analysis (PCA) and orthogonal partial least squares discriminant analysis (OPLS-DA). The metabolic features characteristic for high ARS are the increased signals of N-acetyl-glycoprotein (NAG) and acetate, as well as decrease of choline and the metabolites involved in energy metabolism, such as branched-chain amino acids (BCAAs), alanine, creatinine, carnitine and glucose. NAG was found to be positively correlated with C-reactive protein (CRP), while alanine and BCAAs showed negative correlation with CRP. We also observed a positive correlation between acetate and a percentage-weight-loss during the treatment. The results indicate at least three concomitant processes related to high ARS, inflammation, altered energy metabolism and disturbed membrane metabolism.

Biography

Lukasz Boguszewicz has completed his PhD in Physics at University of Silesia in Katowice, Poland in 2014. He has 10 years of experience in working as a Researcher in a leading cancer research and treatment institute in Poland. He also specializes in "Multivariate statistical methods, nuclear magnetic resonance spectroscopy and imaging".

lukasz.boguszewicz@io.gliwice.pl

Notes: