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The lipid metabolites of blood serum and erythrocytes: The opportunities for diagnosis of colorectal cancer

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The aim of the work was to evaluate lipid metabolites of blood serum (BS) and red blood cells (RBCs) as potential biomarkers for the diagnosis of colorectal cancer (CRC). BS, RBCs from 95 patients (56+8 years old) with colorectal adenocarcinoma (early stages I-II, n=44; late stages III-IV, n=51) and 28 healthy controls were analyzed by FT mass spectrometry, GC/MS system triple quad Agilent 7000B (USA). The list one of the BS lipid metabolites - amines of fatty acids (FA) (palmitic amide, erucamide, oleamide), saturated FA (C14:0, 16:0, 18:0), polyunsaturated FA (C20:3, 20:4), lysophosphatidylcholines (m>2) (C18:2, 20:2, 20:4, 20:6, 22:6) allowed us to obtain the high level of AUC 0.98 (sensitivity 0,97, specificity 0,99) when comparing early stage CRC patients with controls. Panel two including the following lipids of BS - palmitic amide, erucamide, oleamide, myristic, palmitic, stearic acids, lysophosphatidic acids, LPC(16:0)- showed good opportunities for distinguishing the CRC patients from healthy controls (AUC 0,95 (0,8, 0,96). The combination of the lipids - phosphatidylcholine, phosphatidylserine, lysophosphatidylcholines (18:0, 18:1, 18:2, 20:4, 20:6, 22:6), palmitic acid – differentiated the late stages from the early ones (AUC 0,91 (0,80, 0,92). Differentiating FA of RBCs membranes were polyunsaturated (C20:0, C20:2, C20:3, C20:4, C22:4, C22:5, C22:6), the levels of which were significantly higher in CRC patients, and saturated and monounsaturated (C 12-17:0, C16:1, C 18:1, C18:2), prevailing in healthy controls. The observed shifts correlated with the CRC stages. The lipid metabolites of blood serum and erythrocytes should be considered as the promising biomarkers for CRC diagnosis.

Biography

Kruchinina M V has completed her Doctor of Medicine degree at Institute of Internal Medicine SB RAS, Novosibirsk, Russia. From 2009, she is a Leading Researcher at Research Institute of Internal and Preventive Medicine–Branch of Federal State Budget Scientific Institution of the Institute of Cytology and Genetics, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia. She is the author of more than 120 publications, including one monograph, five teaching aids and eight patents. Her areas of scientific interests are metabolomics, microcirculation, rheology, membrane disorders in oncopathology, endocrinological, cerebrovascular, cardiovascular pathology and diagnosis of diffuse liver pathology.

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