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Biomarkers identified by urinary metabonomics for noninvasive diagnosis of nutritional rickets

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Nutritional rickets is a worldwide public health problem; however, the current diagnostic methods retain shortcomings for accurate diagnosis of nutritional rickets. To identify urinary biomarkers associated with nutritional rickets and establish a noninvasive diagnosis method, urinary metabonomics analysis by ultra-performance liquid chromatography / quadrupole time-of-flight tandem mass spectrometry and multivariate statistical analysis were employed to investigate the metabolic alterations associated with nutritional rickets in 200 children with or without nutritional rickets. The pathophysiological changes and pathogenesis of nutritional rickets were illustrated by the identified biomarkers. By urinary metabolic profiling, 31 biomarkers of nutritional rickets were identified and five candidate biomarkers for clinical diagnosis were screened and identified by quantitative analysis and receiver operating curve analysis. Urinary levels of five candidate biomarkers were measured using mass spectrometry or commercial kits. In the validation step, the combination of phosphate and sebacic acid was able to give a noninvasive and accurate diagnostic with high sensitivity (94.0%) and specificity (71.2%). Furthermore, on the basis of the pathway analysis of biomarkers, our urinary metabonomics analysis gives new insight into the pathogenesis and pathophysiology of nutritional rickets.

Biography

Yang Xue has completed her PhD from Harbin Medical University School of Public Health on 2015. She participated in several projects supported by National natural science foundation of China. And now she works as a lecturer in the National Key Disciplines of Nutrition and Food Hygiene, in Harbin Medical University.

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