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Circulating miR-150 and miR-342 in plasma are novel potential biomarkers for acute myeloid leukemia

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Abstract

Background: MicroRNAs (miRNAs) are small (19-22-nt) single-stranded noncoding RNA molecules whose deregulation of expression can contribute to human disease including the multistep processes of carcinogenesis in human. Circulating miRNAs are emerging biomarkers in many diseases and cancers such as type 2 diabetes, pulmonary disease, colorectal cancer, and gastric cancer among others; however, defining a plasma miRNA signature in acute myeloblastic leukemia (AML) that could serve as a biomarker for diagnosis or in the follow-up has not been done yet.

Methods: TaqMan miRNA microarray was performed to identify deregulated miRNAs in the plasma of AML patients. Quantitative real-time RT-PCR was used to validate the results. Receiver-operator characteristic (ROC) curve analysis was conducted to evaluate the diagnostic accuracy of the highly and significantly identified deregulated miRNA(s) as potential candidate biomarker(s).

Results: The plasma expression level of let-7d, miR-150, miR-339, and miR-342 was down-regulated whilst that of let-7b, and miR-523 was up-regulated in the AML group at diagnosis compared to healthy controls. ROC curve analyses revealed an AUC (the areas under the ROC curve) of 0.835 (95% CI: 0.7119– 0.9581; P<0.0001) and 0.8125 (95% CI: 0.6796–0.9454; P=0.0005) for miR-150, and miR-342 respectively. Combined ROC analyses using these 2 miRNAs revealed an elevated AUC of 0.86 (95% CI: 0.7819–0.94; P<0.0001) indicating the additive effect in the diagnostic value of these 2 miRNAs. QRT-PCR results showed that the expression level of these two miRs in complete remission AML patients resembled that of healthy controls.

Conclusions: Our findings indicated that plasma miR-150 and miR-342 are novel important promising biomarkers in the diagnosis of AML. These novel and promising markers warrant validation in larger prospective studies.

Biography

Hussein Fayyad-Kazan got his bachelor degree in Biochemistry from the Lebanese University-Faculty of Sciences-I in 2005, and then continued his studies in the Free University of Brussels (ULB) where he got Masters Degree in Molecular Biology and Biotechnology in 2007. He made his PhD thesis in the Laboratory of Experimental Hematology at Jules Bordet Institute (ULB) on microRNAs and Regulatory T cells and got his PhD Degree in December 2010. He is a postdoctoral researcher (Chargé de Recherches) for the present time and his research project focuses on the investigation of the molecular mechanisms regulating the function of circulating regulatory CD4-positive T cells in healthy individuals and acute leukemia patients.