

Differentially expressed proteins in ER+ MCF7 and ER- MDA- MB-231 human breast cancer cells by RhoGDI- α silencing and overexpression

ABSTRACT

Background: The consequence of Rho GDP dissociation inhibitor alpha (RhoGDI α) activity on migration and invasion of estrogen receptor positive (ER+) and negative (ER-) breast cancer cells has not been studied using the proteomic approach. Changes in expression of RhoGDI α and other proteins interacting directly or indirectly with RhoGDI α in MCF7 and MDA-MB-231, with different metastatic potentials is of particular interest. Materials and Methods: ER+ MCF7 and ER- MDA-MB-231 cell lines were subjected to two-dimensional electrophoresis (2-DE) and spots of interest were identified by matrix-assisted laser desorption/ionization time of- flight/timeof- flight (MALDI-TOF/TOF) mass spectrometry (MS) analysis after downregulation of RhoGDI α using short interfering RNA (siRNA) and upregulated using GFP-tagged ORF clone of RhoGDI α . Results: The results showed a total of 35 proteins that were either up- or down-regulated in these cells. Here we identified 9 and 15 proteins differentially expressed with silencing of RhoGDI α in MCF-7 and the MDA-MB-231 cells, respectively. In addition, 10 proteins were differentially expressed in the upregulation of RhoGDI α in MCF7, while only one protein was identified in the upregulation of RhoGDI α in MDA-MB-231. Based on the biological functions of these proteins, the results revealed that proteins involved in cell migration are more strongly altered with RhoGDI- α activity. Although several of these proteins have been previously indicated in tumorigenesis and invasiveness of breast cancer cells, some ohave not been previously reported to be involved in breast cancer migration. Hence, these proteins may serve as useful candidate biomarkers for tumorigenesis and invasiveness of breast cancer cells. Conclusions: Future studies are needed to determine the mechanisms by which these proteins regulate cell migration. The combination of RhoGDI α with other potential biomarkers may be a more promising approach in the inhibition of breast cancer cell migration.

Keyword: Proteomics; biomarkers; RhoGDI α ; ER+ MCF7; ER-MDA-MB-231; Breast cancer cells