Molecular Studies of Spermidine / Spermine N1-acetyltransferase 1 (SSAT-1) enzyme and its Expression on Suspected Cases of Breast Cancer

Rubina Ghani

Department of Biochemistry, Jinnah Medical and Dental College, Sohail University, Karachi Pakistan

Sehrish Zia

Department of Biochemistry, Jinnah Medical and Dental College, Sohail University, Karachi Pakistan

Afifa Fatima Rafique

Department of Biochemistry, Jinnah Medical and Dental College, Sohail University, Karachi Pakistan

Shaista Emad

Department of Biochemistry, Jinnah Medical and Dental College, Sohail University, Karachi Pakistan

Abstract:

Background: Cancer is a leading cause of death worldwide, with breast cancer being the most common cancer in women. Pakistan has the highest rate of breast cancer cases among Asian countries. The estimated proportion of breast cancer is one out of nine women being diagnosed with breast cancer, due to poor facilities or late diagnosis leading to an increase in the mortality rate of breast cancer in Pakistan. Spermidine / spermine N1-acetyltransferase-1(SSAT-1) enzyme involved in the homeostasis of polycationic, aliphatic amines spermine/ spermidine.

Objective: The aim of this study to measure the increase in SSAT-1 activity and correlated with polyamine. This will assist in accurate diagnosis and contribute to the treatment outcome and quality of life in breast cancer-affected patients.

Methodology: It is a case-control study with a sample size of 150. All the patients were divided into 3 groups: 100 suspected cancer cases, 25 controls, and 25 confirmed breast cancer cases. To analyse SSAT-1 mRNA expression in whole blood with Zymo Research Quick-RNA Miniprep and Innu SCRIPT- One Step RT-PCR Syber Green kits were used.

The polyamine was performed By ELISA Kit ( ) on Increased level of SSAT-1 enzyme..

Result: The total mRNA was isolated, and the expression of SSAT-1 was measured using RT-qPCR. The threshold cycle (Ct) values were used to determine the amount of each mRNA. ▲Ct values were then calculated by taking the difference between the CtSSAT-1 and Ct GAPDH, and further ▲▲Ct values were calculated with the median absolute deviation for all the samples within the same experimental group. Samples that did not correlate with the results were excluded from the analysis. The relative fold change is shown as 2^-▲▲Ct values. Suspected cases showed a maximum fold change of 32.24, with a control fold change of 1.31. The polyamine also correlated with increased level of SSAT-! enzyme.

Conclusion: The study reveals an overexpression of SSAT-1 in breast cancer. Furthermore, we can use SSAT-1 as a diagnostic, prognostic, and therapeutic marker for early diagnosis of cancer and its correlation with polyamine.

Keywords:

Breast cancer, Spermidine / Spermine, Gene expression. Polyamine activity.