

Relationship Between Folate and Vitamin B12 Levels and the Status of Estrogen Receptor Alpha (ERα) Hypermethylation in Patients with Breast Cancer in Iranian Women

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Abstract

Introduction: The genetic expression of Retinoic acid and Estrogen Receptor alpha (Era) for breast tumor cells has a therapeutic importance. Hypermethylation has been shown to play a key role in silencing the expression of these genes. The present review article aimed to determine the relationship between folate and vitamin B12 levels of plasma and the status of ERα hypermethylation in patients with breast cancer.

Materials and Methods: This review was gathered from original and review studies published in Google scholar, Medline, PubMed and Science direct with key words of Estrogen- Receptor alpha gene, hypermethylation, breast cancer, folate, vitamin B12 between the years of 2000 to 2017.

Results: Folate and vitamin B12 are as cofactors in metabolism and supply of single carbon units for the synthesis of SAM (S-adenosylmethionine) and methylation of many biological compounds, in regulation of genes expression, purine and pyrimidine synthesis, in the formation of chromosome stability and other reactions biochemicals. Therefore, their deficiency promotes the development of cancer by disrupting gene expression regulation. The findings of this study showed the reverse effect of folate and vitamin B12 plasma on the status of hypermethylation of ERα gene in patients with breast cancer. Significant correlation was found between these values and the risk of progression of gene hypermethylation. Despite the evidence that there is an inverse relationship between folate and vitamin B12 and the risk of breast cancer, the results of a number of studies contradicted these findings.

Conclusions: It can therefore be concluded that the decrease in plasma folate and vitamin B12 levels and inadequate intake of them may play a role in the prognosis of hypermethylation of genes in breast cancer patients.