Association of the C677T polymorphism in the methylenetetrahydrofolate reductase gene with breast cancer in a Mexican population

A. Ramos-Silva1,2, L.E. Figuera3, O.M. Soto-Quintana1,2, A.M. Puebla-Pérez4, R. Ramírez-Patiño1,5, I. Gutiérrez-Hurtado1,5, D.I. Carrillo-Moreno1,2, G.M. Zúñiga-González6, I.P. Dávalos-Rodríguez3 and M.P. Gallegos-Arreola1

1Genetics Molecular Laboratory, Molecular Medicine Division, Western Biomedical Research Center, Western National Medical Center, Mexican Institute of Social Security, Guadalajara, Jalisco, Mexico
2Doctorate Programm in Pharmacology, Health Sciences University Center, University of Guadalajara, Guadalajara, Jalisco, Mexico
3Genetics Division, Western Biomedical Research Center, Western National Medical Center, Guadalajara, Jalisco, Mexico
4Immunopharmacology Laboratory, Exact and Engineering Sciences University Center, University of Guadalajara, Guadalajara, Jalisco, México
5Doctorate Program in Human Genetics, Health Sciences University Center, University of Guadalajara, Guadalajara, Jalisco, México
6Mutagenesis Laboratory, Molecular Medicine Division, Western Biomedical Research Center, Western National Medical Center, Mexican Institute of Social Security, Guadalajara, Jalisco, Mexico

Corresponding author: M.P. Gallegos-Arreola
E-mail: marthapatriciagallegos08@gmail.com

Received June 18, 2014
Accepted October 9, 2014
Published April 27, 2015
DOI http://dx.doi.org/10.4238/2015.April.27.16

ABSTRACT. The methylenetetrahydrofolate reductase (MTHFR) gene plays an important role in the steps involved in the processing of amino acids. The analysis of polymorphisms in the MTHFR gene has revealed associations with cancer; in particular the C677T
polymorphism, which has been suggested to affect folate metabolism, DNA methylation, synthesis, and repair, and to contribute to tumor promotion in the mammary gland. We examined the role of the C677T polymorphism in the MTHFR gene by comparing the C677T genotypes of 339 healthy Mexican women with those of 497 Mexican women with breast cancer (BC). The genotype frequencies observed in the controls and patients with BC were 10 and 21% for 677TT; 41 and 36% for 677CT; and 49 and 43% for 677CC, respectively. The odds ratio (OR) for the 677TT genotype was 2.5, with a 95% confidence interval (95%CI) of 1.6-3.8; P = 0.0001. The positive association was also evident when the distributions of the 677TT genotype in control and patients affected within the following two categories were compared to alcohol consumption (OR = 0.41; 95%CI = 0.19-0.86; P = 0.018); and high level glutamate-oxaloacetate transaminase (SGOT) (OR = 0.36; 95%CI = 0.15-0.83, P = 0.017). These results suggest that the 677TT genotype of the C677T polymorphism in the MTHFR gene is associated with BC susceptibility in the Mexican population.

Key words: MTHFR; C677T polymorphism; Breast cancer; Mexican population