PESTICIDE EXPOSURE, FOLIC ACID INTAKE, POLYMORPHISM Q192R PON1 AND RISK FOR HAVING OFFSPRING AFFECTED WITH CLEFT LIP AND PALATE

M. Moreno-Godinez¹, Y. Godinez¹, S. Loaiza-Loeza¹, V. Antonio-Véjar¹, L. Acosta-Saavedra², A. E. Rojas-García³ and E. S. Calderón-Aranda²

¹Laboratorio de Toxicología y Salud Ambiental. Universidad Autonoma de Guerrero, Mexico. ²Departamento de Toxicología- CINVESTAV, ³Universidad Autónoma de Nayarit

Abstract: Cleft lip and palate (LPH) is a common congenital malformation in Southern Mexico. Exposure of mother to pesticides, deficiency in folic acid intake during the first trimester of pregnancy and the presence of polymorphisms in genes that encode enzymes that detoxify pesticides have been associated with LPH. The PON1 gene coding for the enzyme paraoxonase 1 which function is the detoxification of organophosphates pesticides (OP). Polymorphism Q192R of PON1 affects the enzyme's catalytic efficiency and characterization of this polymorphism represents a predictor of susceptibility to OP toxicity. The aims of the present study were to evaluate pesticide exposure and deficiency in folic acid intake of the mother during pregnancy, and Q192R polymorphism in mothers of children with LPH. We performed a case-control study to evaluate the risk for having offspring affected by LPH in 93 case and 118 control mothers. Polymorphism was determined by real-time PCR. Odds ratios and confidence interval 95% were determined. Exposure to pesticides and consumption of folic acid in the mothers were assessed through a survey. Mothers who did not consume folic acid and were exposed to pesticides during of pregnancy were 3.9 and 2.5 times higher risk of having a child with LPH in comparison to control mothers, respectively. The QR192 genotype (cases: controls 43% and 44%) and the R192 allele predominated in both study groups (cases: 0.61 and controls: 0.64). The Q192R polymorphism in the PON1 gene did not contribute to the development of LPH.

Keywords: Cleft lip and palate, paraoxonase 1, polymorphisms Q192R, folic acid, pesticides.

Acknowledgements: This work was supported by the Mexican Council for Science and Technology (CONACYT) Fomix-GUE-C02-2008-108764 and SEP-PROMEP.