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Impact of nutrient interactions with polymorphism of DRD2, apoe and OCT1 Genes on glycaemic And lipidic control in type 2 diabetes patients from western Mexico: Implications for genomic Medicine

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Abstract

Statement of the Problem: Genetic and nutritional factors substantially explain the metabolic control sought in patients with type 2 Diabetes (T2D). In this context, DRD2/ANKK1 TaqIA polymorphism has been involved in addictive behaviours toward energy-dense foods. Besides, some studies have found association of APOE alleles with differential metabolic phenotypes depending on the dietary intake, and Met408Val SLC22A1/OCT1 polymorphism has been explored with glycaemic control in T2D patients. These genetic polymorphisms could influence the metabolic control of these patients according to their diet. The purpose of this study was to analyse of clinically relevant interactions between nutritional factors and DRD2/ANKK1 TaqIA, APOE (ε2, ε3, ε4) and SLC22A1/OCT1 Met408Val polymorphisms on glycaemic and lipidic control in T2D patients from western Mexico.

Methodology: A total of 432 T2D patients were enrolled. Diet and biochemical profile were recorded. Genotyping of DRD2/ANKK1 TaqIA was performed by PCR-RFLP method and APOE & SLC22A1/OCT1 genotyping were performed by real-time allelic discrimination assays. Gene-diet interactions were screened by adjusted multiple linear regression analyses.

Findings: No significant differences were found in clinical and nutritional parameters. Significant alleles-by-diet interactions on metabolic profile were found. DRD2/ANKK1 TaqIA, A1 allele carriers were protected from triglycerides increases by maltose intake (P int. =0.023). APOE alleles, higher blood levels of total cholesterol (P int. =0.016) were found in ε2 allele carriers with a low consumption of MUFA, and ε4 allele carriers with a high ω-6: ω-3 PUFA ratio in the diet had higher %HbA1c (P int. =0.035). SLC22A1/OCT1, an interaction was found between calcium intake and carriers of the risk allele A (408Val) with %HbA1c (P int. =0.028).

Conclusion & Significance: This work documents a differential effect of the polymorphic alleles of the DRD2/ANKK1, APOE and SLC22A1/OCT1 genes on the metabolic control of T2D patients according to their dietary intake, with important potential implications in the genomic and personalized medicine.

Biography

Dr.Rafael Torres is Medical Doctor and PhD in Molecular Biology in Medicine. Currently works as a professor in the academic unit of integral health at the Autonomous University of Nayarit, Mexico. He is a researcher in the unit specialized in Genomic Medicine at the Nayarita Center for Innovation and Technology Transfer (CENIT2). He is a member of the National System of Researchers and qualified scientific reviewer of the National Council of Science and Technology (CONACYT), Mexico. He is the author and co-author of multiple original articles published in indexed international journals. Speaker at national and international conferences and co-author of the book chapters.

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