

GENETIC ASSOCIATION ANALYSIS OF VITAMIN D RECEPTOR GENE POLYMORPHISMS AND OBESITY PHENOTYPES

María Correa-Rodríguez¹, Jose Antonio Carrillo-Ávila, Jacqueline Schmidt-Rio Valle¹, Emilio González-Jiménez¹, Blanca M. Rueda-Medina¹

¹ Departamento de Enfermería. Universidad de Granada.

INTRODUCTION

Obesity is a common metabolic disorder that is increasing at an alarming rate. The aetiology of obesity is complex involving genetics and environmental factors. Among the risk factors related to obesity, it has been established that vitamin D has been established as a key factor in the development of obesity through vitamin D receptor (VDR). The aim of this study was to investigate the contribution of the VDR gene in obesity-related phenotypes in a population of Caucasian young adults.

METHODS

The study population consisted of 701 unrelated healthy individuals of Caucasian ancestry (505 (72%) females and 196 (28%) males, mean age 20.41±2.48) recruited from various academic centres in Granada (Spain). Body composition measures including weight, body mass index (BMI), fat mass (FM), percentage of fat mass (PFM) and fat free mass (FFM) were analyzed. Body weight (kg), FM (g), PFM (%) and FFM (g) were measured twice, without shoes and in light clothes, to the nearest 0.11 kg using a body composition analyzer (TANITA BC-418MA®). A Harpenden stadiometer (Holtain 602VR®) was used to measure height. Saliva samples for DNA extraction were collected from study participants using the OG-500 Collection Kit (DNA Genotek Inc, Ontario, Canada). Three single-nucleotide polymorphisms (SNPs) of VDR (*TaqI*, *BsmI* and *FokI*) were selected as genetic. Differences in obesity traits across the genotypes were determined using analysis of covariance (ANCOVA).

RESULTS

The mean BMI of the study population was 22.64±3.71 kg/m². Based on BMI classification, the majority of the subjects in this study (71.1%) were of normal weight. None of the VDR polymorphisms showed a significant association with obesity phenotypes after applying the Bonferroni correction for multiple testing. Our findings suggest that VDR genetic variants are unlikely to have a main role in obesity-related phenotypes in a population of Caucasian young adults.

Table 1. Association of the three SNPs of VDR with body composition measures

| Genotype | N | Height (m) | Weight (Kg) | BMI(kg/m ²) | FM (kg) | PFM (%) | FFM (kg) |
|-------------|-----|------------|-------------|-------------------------|------------|------------|-------------|
| | | Mean SD | Mean SD | Mean SD | Mean SD | Mean SD | Mean SD |
| TaqI | 679 | | | | | | |
| AA | 284 | 1.66 0.08 | 63.13 12.07 | 22.68 3.69 | 13.98 7.67 | 21.49 8.51 | 49.14 8.74 |
| AG | 296 | 1.67 0.08 | 63.32 13.32 | 22.51 3.66 | 14.63 8.55 | 21.77 8.23 | 48.92 9.38 |
| GG | 99 | 1.67 0.08 | 64.60 14.07 | 22.93 3.98 | 14.76 7.27 | 22.07 7.77 | 49.80 9.91 |
| p value | | 0.363 | 0.860 | 0.895 | 0.826 | 0.881 | 0.907 |
| BsmI | 679 | | | | | | |
| CC | 280 | 1.66 0.08 | 63.15 11.95 | 22.68 3.69 | 14.01 7.63 | 21.56 8.47 | 49.12 8.67 |
| CT | 289 | 1.67 0.08 | 63.39 13.42 | 22.49 3.65 | 14.60 8.64 | 21.66 8.26 | 49.02 9.41 |
| TT | 110 | 1.66 0.08 | 64.24 14.00 | 22.94 4.00 | 14.71 7.22 | 22.14 7.84 | 49.49 9.92 |
| P value | | 0.323 | 0.892 | 0.866 | 0.863 | 0.895 | 0.922 |
| FokI | 683 | | | | | | |
| GG | 272 | 1.67 0.08 | 64.24 12.93 | 22.85 3.76 | 14.70 7.71 | 21.19 8.46 | 49.44 9.22 |
| GA | 317 | 1.66 0.08 | 64.74 12.74 | 22.58 3.74 | 14.37 7.97 | 21.85 8.37 | 48.49 8.73 |
| AA | 94 | 1.68 0.09 | 62.51 12.86 | 22.00 3.42 | 13.30 8.87 | 19.72 7.22 | 50.05 10.06 |
| p value | | 0.763 | 0.198 | 0.07 | 0.335 | 0.022 | 0.897 |

P values were determined by ANCOVA test with adjustment for sex and age.

CONCLUSIONS

Our results suggest that polymorphism of the *ESR1* gene does not contribute significantly to the genetic risk for obesity phenotypes in a population of young Caucasian.

Organizan

DESQBRE FUNDACIÓN

CSIC



Financian

