







INVESTIGATION OF GENETIC POLYMORPHISMS RELATED TO VITAMIN D METABOLISM AND THEIR ASSOCIATION WITH OBESITY

Costa, EC¹; dos Santos, PI¹; Auer, ED¹; Thomaz, AC¹; Silva, PR²; Rego, FGM²; Pileggi, M³; Bonini, J⁴; Seiva, FRF⁵; Nagano, FEZ⁶; Hundt, JE⁷; Carvalhal, SRS¹; Boldt, ABW¹; Bumiller-Bini Hoch, V¹

1- Programa de Pós-Graduação em Genética, Laboratório de Genética Molecular Humana, UFPR; 2- Programa de Pós-Graduação em Ciências Farmacêuticas, UFPR; 3- Universidade Estadual de Ponta Grossa; 4- Universidade Estadual do Centro-Oeste do Paraná; 5- Universidade Estadual do Norte do Paraná; 6- Complexo Hospital de Clínicas da UFPR/EBSERH 7- Universität zu Lübeck camilacosta3060@gmail.com

INTRODUCTION

Vitamin D regulates more than 900 genes involved in many processes¹.

Its deficiency is associated with obesity and other disorders, but the underlying causes and mechanisms remain unclear².

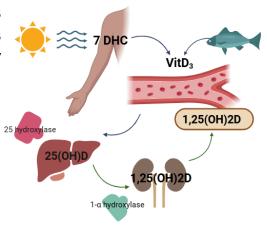


Figure 1: VitD metabolism.

AIMS

In this study, we aimed to investigate the association between obesity and single nucleotide polymorphisms (SNPs) from genes involved in the metabolism, synthesis and transport of VitD and its levels.

METHODS

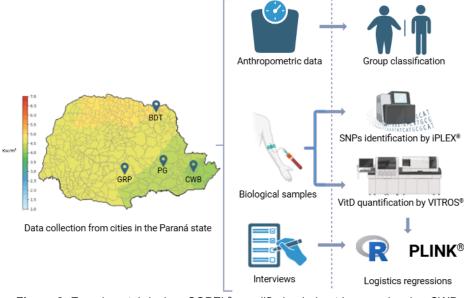


Figure 2: Experimental design. COPEL³ modified solarimetric map showing CWB (Curitiba N=412), PG (Ponta Grossa N=77), GRP (Guarapuava N=128) and BDT (Bandeirantes N=159).

RESULTS AND DISCUSSION

Low VitD levels were associated with OB and OW (OR=0.62) regardless of the city (table 1).

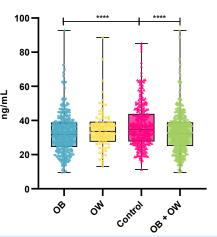
| Variables | OR | IC 95% | р | pcorr ¹ |
|----------------------------------|------|-------------|-------|--------------------|
| N° of pregnancies | 1.67 | 1.22 - 2.32 | 0.002 | 0.005 |
| Diagnosis of autoimmune diseases | 2.86 | 1.39 - 6.10 | 0.005 | 0.008 |
| VitD levels | 0.62 | 0.43 - 0.88 | 0.009 | 0.009 |

¹False discovery rate correction for multiple testing Abbreviations: IC = Confidence Interval, OR = Odds ratio

Table 1: Multivariate regression of the obesity group showing the variables that were associated with the phenotype.

In the OB (32.3 ng/mL) and the OB + OW (32.90 ng/mL) groups VitD levels were lower (p<0.0001) than those with normal BMI (38.5 ng/mL) (fig 3).

BMI (38.5 ng/mL) (fig 3). Figure 3: VitD levels of OB (N=359), OW (N=86), OB + OW (N=445) and Control group (N=320).



Two SNPs from *CG* gene were associated with protection against obesity and overweight (table 2).

| SNP | Position | Allele | Type | Group | OR | Test | IC 95% | pcorr1 | | |
|--|------------|--------|----------|---------|------|------|-------------|--------|--|--|
| rs7041 | 4:71752617 | Α | Asp/Glu | OW + OB | 0.55 | DOM | 0.37 - 0.82 | 0.01 | | |
| rs2282679 | 4:71742666 | G | intronic | OW + OB | 0.60 | DOM | 0.43 - 0.85 | 0.01 | | |
| rs7041 | 4:71752616 | Α | Asp/Glu | OB | 0.56 | DOM | 0.37 - 0.85 | 0.04 | | |
| rs2282679 | 4:71742666 | G | intronic | OB | 0.63 | DOM | 0.44 - 0.91 | 0.04 | | |
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¹False discovery rate correction for multiple testing with Benjamini-Hochberg method Abbreviations: IC = Confidence interval, OR = Odds ratio

Table 2: PLINK logistic regression.

A/A (rs7041) and G/G (rs2282679) homozygotes presented lower VitD levels (fig 4). The OB group had lower VitD levels regardless of genotype (fig 5).

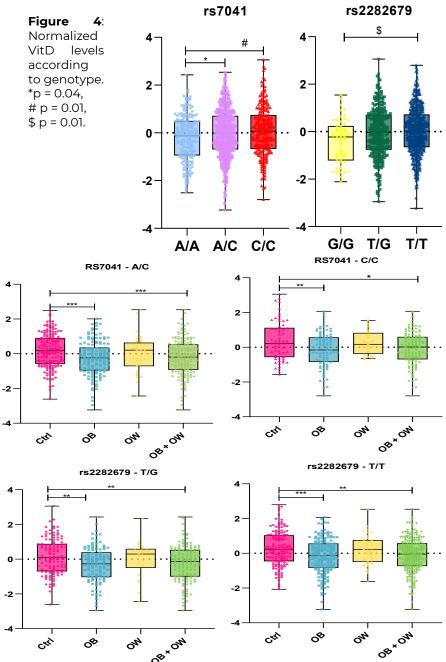


Figure 5: Normalized VitD levels between genotypes acording to group.

CONCLUSION

We identified VitD–related variants associated with higher BMI and vitD levels in the Paraná state population. However, further research is needed to clarify their pathophysiological roles in obesity, including effects on VitD bioavailability and metabolites, since both associated SNPs act as eQTLs for *GC* and other genes potentially involved in energy homeostasis.⁴





