

# **$\alpha$ -synuclein rs356219 Polymorphisms in Patients with Gaucher Disease and Parkinson's Disease**

Ioscovich, Daniel (School: 182368)

Purpose of the Experiment: Mutations in  $\beta$ -glucocerebrosidase, the genetic defect in Gaucher disease (GD), are an important susceptibility factor for Parkinson disease (PD). A PD effector is  $\alpha$ -synuclein (SNCA) hypothesized to selectively interact with  $\beta$ -glucocerebrosidase under lysosomal conditions. SNCA polymorphism rs356219 may be associated with early-age-onset PD, common among patients with GD+PD. The objective of this study was to ascertain rs356219 polymorphic genotypes of GD+PD patients in comparison to GD-only controls. As both diseases are very common and have a proven statistic link, which was not utterly investigated, this research has great significance. Procedures Used: A GD-only sex-, age-, GD genotype-, and enzyme therapy (ERT)-matched control was found for each GD+PD participant. Genomic DNA from patients and controls was amplified by PCR. The 229-bp PCR product was digested overnight at 37°C with BmgBI enzyme to create restriction. The resulting products are 119bp and 110 bp fragments which allow genotype determination of the rs356219 polymorphic area using electrophoresis. Observation/Data/Results: In GD+PD, frequency for AG+GG genotype (9) was greater than AA (5); in GD only, there was equality (7). The risk for PD was expected to increase with the number of minor alleles (G); here this was not significantly greater among GD+PD than GD only. In aggregate, there was no difference between cohorts for frequency of minor polymorphisms. Conclusions/Applications: The 14 GD+PD patients group is the largest to be investigated worldwide as for today. Thus, as a foray into potential genetic GD susceptibility for a synucleinopathy, this study may suggest new directions and hypotheses in the research of the link between GD and PD.