**The SPID-GBA study:**

**Sex distribution, Penetrance, Incidence & Dementia in GBA-PD**

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**Supplementary Figure 1: Analyzed *GBA* variants, population frequencies and effect on glucocerebrosidase (GCase) activity.**

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**A)** Schematic representation of the *GBA* gene with the position of the four analyzed variants. Variant legacy name is in bold. **B)** Populationfrequencies of p.E326K, p.T369M, p.N370S and p.L444P available on gnomAD database (https://gnomad.broadinstitute.org). **C)** Residual enzymatic activity of mutant GCase reported in literature; the mean percentages for each mutant are highlighted in grey. a residual activity of the variant allele calculated considering 100% the average activity measured in non-carrier PD patients and assuming that both alleles equally contribute to the total amount of protein.

**Supplementary Figure 2: Impact on GCase activity and on PD, PDD, and DLB risk of the four analyzed *GBA* variants.**



The effect of each *GBA* variant on the GCase activity (mean values expressed as percentage of the wild type) was estimated from literature data (Supplementary Figure 1) [Malini et al., 2014; Alcalay et al., 2015; Sanchez-Martinez et al., 2016].

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