Reviewer’s report

Title: Risk variants of the α-synuclein locus and REM sleep behavior disorder in Parkinson's disease: a genetic association study

Version: 0 Date: 14 Nov 2017

Reviewer: Bruno Benitez

Reviewer’s report:

Bjørnarå et al performed a candidate gene association analysis testing four SNPs in two loci, SNCA and MAPT, and their association with Rapid eye movement sleep behavior disorder. Although their findings are interesting, there are a couple of points that need to be addressed.

Major

No principal component analysis was performed in neither the Scandinavian nor PPMI samples to exclude samples from other ethnicities. The self-report ethnicity is not enough for genetic studies.

There is no inclusion of power calculation.

There is no inclusion of Multiple test correction even though multiple SNPs were evaluated. There is no mention of how heterogeneity in both samples for the meta-analysis was evaluated.

Minor

Authors should consider the addition of a short paragraph acknowledging the limitations of the study.

There is no inclusion of the 95% confidence intervals for the OR.

There is no mention of the statistically significant differences in the duration of the disease and use of SSRIs/SNRIs between the RBD and a non-RBD group which could be confounded factors of the analysis.

Using a questionnaire in PD patients with an average disease duration of ~11 years, it is worth discussing the prevalence of cognitive impairment in the PD cohort and their ability to answer the questions of the RBDSQ.

A more detailed description of the imputation protocol from the PPMI samples are needed.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

No

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

**Quality of written English**
Please indicate the quality of language in the manuscript:

Acceptable

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