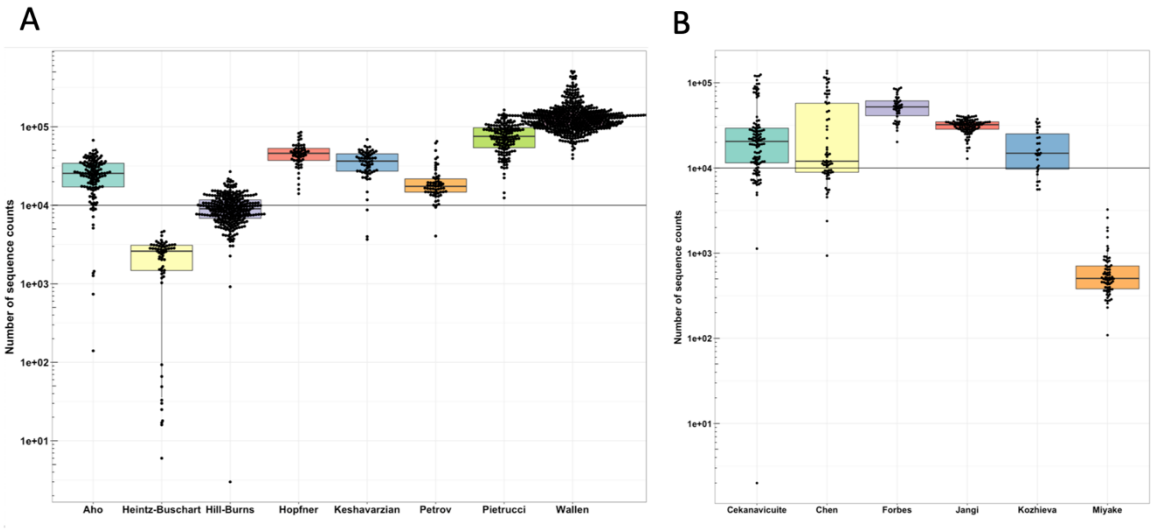
Supplementary material

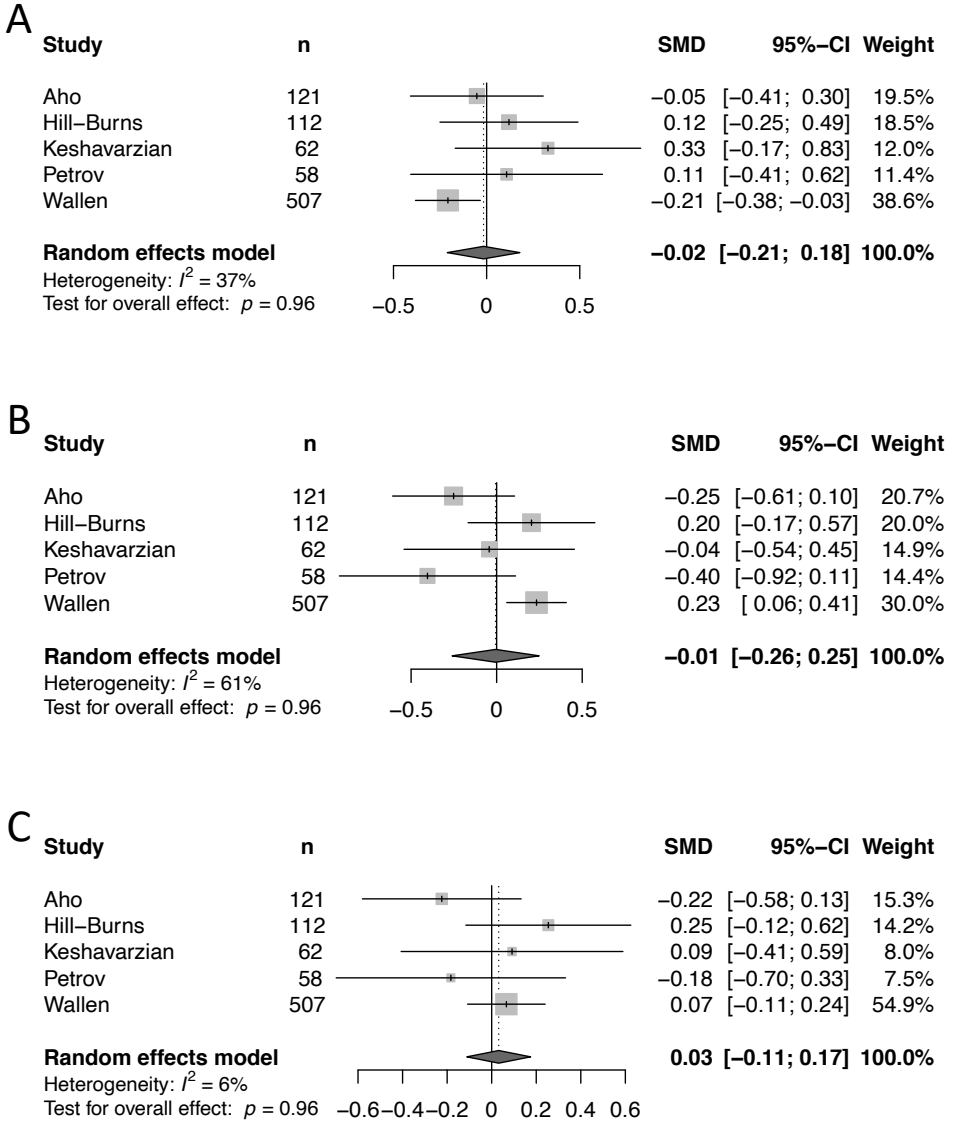
Supplementary Figure 1: Number of sequence counts for each study

A) Number of sequence counts for each PD study. Each point corresponds to one sample. The horizontal line corresponds to the threshold of 10 000 sequences under which the sample was removed. B) Number of sequence counts for each MS study. Each point corresponds to one sample. The horizontal line corresponds to the threshold of 10 000 sequences under which the sample was removed.



Supplementary Figure 2: Meta-analysis of richness, evenness and Shannon index for PD studies after adjusting for Age and Sex.

Richness, evenness and Shannon index meta-analyses for Parkinson's Disease studies. A) Forest plot for the richness. B) Forest plot for the evenness. C) Forest plot for the Shannon index.



Supplementary Table 1: original studies from Query#1 (Parkinson's Disease) matching our selection criteria

	16S data	PD vs HC info	Clinical/metadata	Country	N (PD/HC)	Techno	16S region	Included into the meta-analysis?
Keshavarzian *et al.* [1]	SRR1734369	Yes	Yes	USA	34/31	Illumina	V4	Yes
Hill-Burns *et al.* [2]	ERP016332	Yes	Yes	USA	197/130	Illumina	V4	Yes
Petrov *et al.* [3]	Provided by Dr. Petrov	Yes	Yes	Russian	89/66	Illumina	V3-V4	Yes
Hopfner *et al.* [4]	PRJEB14928	Yes	No	Germany	29/29	Illumina	V1-V2	Yes
Li W *et al.* [5]	No	No	No	China	24/14	Illumina	V3-V4 + V4-V5	No
Heintz-Buscart *et al.* [6]	PRJNA381395	Yes	No	Germany	26/38	Illumina	V4	No*
Qian *et al.* [7]	PRJNA391524	No	No	China	45/45	Illumina	V3-V4	No
Lin A *et al.* [8]	No	No	No	China	75/45	Illumina	V4	No
Barichella *et al.* [9]	No	No	No	Italy	193/113	Illumina	V3-V4	No
Pietrucci *et al.* [10]	PRJNA510730	Yes	No	Italy	80/82	Illumina	V3-V4	Yes
Li F *et al.* [11]	No	No	No	China	10/10	Illumina	V3-V4	No
Aho *et al.* [12]	PRJEB27564	Yes	Yes	Finland	64/64	Illumina	V3-V4	Yes
Lin CH *et al.* [13]	No	No	No	China	80/80	Illumina	V3-V4	No
Li C *et al.* [14]	No	No	No	China	51/48	Illumina	V3-V4	No

Vidal-Martinez *et al.* [15]	No access – Not approved by IRB	No	No	USA	10/10	Illumina	V3-V4	No
Hegelmaier *et al.* [16]	No	No	No	German	54/32	Illumina	V1-V3	No
Ren *et al.* [17]	PRJNA561023	No	No	China	27/13	Illumina	V4-V5	No
Baldini *et al.* [18]	No	No	No	Lux/German	147/162	Illumina	V3-V4	No
Wallen *et al.* [19]	PRJNA601994 (but still not available by June 2020)	No	No	USA	323/184	Illumina	V4	No

(*) sequencing files were processed but the sequencing depth was too low for an accurate quantification of alpha-diversity measures.

Supplementary Table 2: original studies for Query#2 (Multiple Sclerosis Disease) matching our selection criteria

	16S data	**MS vs HC info**	**Clinical/metadata**	**Country**	**N (MS/HC)**	**Techno**	**16S region**	**Included into the meta-analysis?**
Miyake *et al.* [20]	For DDBJ accession numbers, see publication	Yes	No	Japan	20/58	Illumina	V1-V2	No*
Chen *et al.* [21]	Ask AC/MF	Yes	No	USA	31/36	Illumina	V3-V5	Yes
Jangi *et al.* [22]	PRJNA321051	Yes	No	Canada	60/43	Illumina	V4	Yes
Cekanaviciute *et al.* [23]	Ask AC/MF	Yes	No	USA	70/70	Illumina	V4	Yes
Forbes *et al* .[24]	PRJNA450340	Yes	No	Canada	19/23	Illumina	V4	Yes
Kozhieva et al. [25]	PRJNA565173	Yes	No	Russian	15/15	Illumina	V3-V4	Yes
Reynders et al. [26]	No	No	No	Belgian	98/120	Illumina	V4	No

(*) sequencing files were processed but the sequencing depth was too low for an accurate quantification of alpha-diversity measures.

Supplementary Table 3: original studies for Query#3 (Alzheimer's Disease) matching our selection criteria

	16S data	AD vs HC info	Clinical/metadata	Country	N (AD/HC)	Techno	16S region	Included into the meta-analysis?
Vogt *et al.* [27]	Under request	Yes	Under request	USA	25/25	Illumina	V4	No
Zhuang et al. [28]	No	No	No	China	43/43	Illumina	V3-V4	No

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