Kinetic parameters of alpha-synuclein seed amplification assay correlate with cognitive impairment in patients with Lewy body disorders

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Supplemental Text:

R code for figures and analyses

##Spearman correlation

```
library(readxl)

dat<-read_xlsx("C:/… XXX.xlsx")

cor.test(dat$k_Moca,dat$DD_tt2,method="spearman")

cor.test(dat$k_Moca,dat$DD_LAG,method="spearman")

cor.test(dat$k_UPDRS3,dat$DD_tt2,method="spearman")

cor.test(dat$k_Moca,dat$k_UPDRS3,method="spearman")
```

test for normal distribution and Mann-Whitney U test

```
library(readxl)

data <-read_xlsx("C:/… XXX.xlsx")

data$dementia <- as.factor(data$dementia)

head(data)

shapiro.test(data$TT2)
```

```
with(data, shapiro.test(data$TT2[dementia == "0"]))

with(data, shapiro.test(data$TT2[dementia == "1"]))

wilcox.test(TT2~dementia, data = data, exact = FALSE, correct = FALSE, conf.int = TRUE)

z <- qnorm(p/2)

r <- z/sqrt(n)

z

r
```

test for normal distribution and unpaired t-test

```
library(readxl)

data <-read_xlsx("C:/… XXX.xlsx")

data$dementia <- as.factor(data$dementia)

head(data)

shapiro.test(data$LAG)

with(data, shapiro.test(data$LAG[dementia == "0"]))

with(data, shapiro.test(data$LAG[dementia == "1"]))

res <- t.test(LAG~dementia, data = data, var.equal = TRUE)

res
```

boxplot figure 2B

```
library(ggplot2)

library(readxl)

data <-read_xlsx("C:/… XXX.xlsx")

p <- ggplot(data, aes(x=dementia, y=TT2)) +

 geom_boxplot(outlier.shape = NA) +

 stat_summary(fun.y=mean, geom="errorbar", width = .75, linetype = "dashed", color="red",
aes(ymax =..y.., ymin =..y..)) +

 geom_jitter(alpha=0.8, width=0.3, size=2, colour="black") +
```

```
 ylim(15, 40) +
 theme_classic()
p
```

boxplot supplemental figure S2B

```
library(ggplot2)
data <-read_xlsx("C:/… XXX.xlsx")
p <- ggplot(data, aes(x=dementia, y=LAG)) +
 geom_boxplot(outlier.shape = NA) +
 stat_summary(fun.y=mean, geom="errorbar", width = .75, linetype = "dashed", color="red",
aes(ymax =..y.., ymin =..y..)) +
 geom_jitter(alpha=0.8, width=0.3, size=2, colour="black") +
 ylim(15, 40) +
 theme_classic()
p
```

figure 2A

```
library(ggplot2)
library(readxl)
test2 <-read_xlsx("C:/… XXX.xlsx")
ggp <- ggplot(test2, aes(Moca,TT2)) +
 geom_point() +
 xlim(0,30) + ylim(15,40) +
 scale_x_continuous(expand = c(0, 0), limits=c(0, NA))
ggp
ggp+ stat_smooth(method= "lm",formula= y ~ poly(x,2),) +
theme_classic()
```

```
## supplemental figure S2A
library(ggplot2)
library(readxl)
test2 <-read_xlsx("C:/… XXX.xlsx")
ggp <- ggplot(test2, aes(Moca,LAG)) +
 geom_point() +
 xlim(0,30) + ylim(15,40) +
 scale_x_continuous(expand = c(0, 0), limits=c(0, NA))
ggp
ggp+ stat_smooth(method= "lm",formula= y ~ poly(x,2),) +
theme_classic()

##figure 2C and supplemental figure S2C
library(ggplot2)
library(readxl)
test2 <-read_xlsx("C:/… XXX.xlsx")
tt2<-test2$DD_tt2
lag<-test2$DD_LAG
updrs<-test2$k_UPDRS3
ggp <- ggplot(test2, aes(updrs,tt2)) +
 geom_point() +
 xlim(0,65) + ylim(14,40) +
 scale_x_continuous(expand = c(0, 0), limits=c(0, NA))
ggp
ggp+ stat_smooth(method= "lm",formula= y ~ poly(x,2),) +
 theme_classic()
ggp <- ggplot(test2, aes(updrs,lag)) +
 geom_point()+
```

```
 xlim(0,65) + ylim(15,40) +
 scale_x_continuous(expand = c(0, 0), limits=c(0, NA))
ggp
ggp+ stat_smooth(method= "lm",formula= y ~ poly(x,2),) +
 theme_classic()
```

##supplemental figure S3

```
test2 <-read_xlsx("C:/… XXX.xlsx")
moca<-test2$Moca
updrs<-test2$UPDRS3
ggp <- ggplot(test2, aes(updrs,moca)) +
 geom_point()+
 xlim(0,65) + ylim(0,31) +
 scale_x_continuous(expand = c(0, 0), limits=c(0, NA))
ggp
ggp+ stat_smooth(method= "lm",formula= y ~ poly(x,2),) +
 theme_classic()
```

linear model

```
ana<-read.table(file = "XXX.csv", header = TRUE, na.strings = "NA", sep = ";", dec = ".")
f1 <- lm(DD_tt2 ~ 1, data=ana)
f2 <- lm(DD_tt2 ~ k_Moca, data=ana)
f3 <- lm(DD_tt2 ~ k_Moca + k_UPDRS3, data=ana)
anova(f1, f2, f3)
f1 <- lm(DD_tt2 ~ 1, data=ana)
f2 <- lm(DD_tt2 ~ k_UPDRS3, data=ana)
f3 <- lm(DD_tt2 ~ k_Moca + k_UPDRS3, data=ana)
anova(f1, f2, f3)
```

```
## principal component analysis figure 1C
library(tidyr)
library(dplyr)
library(ggplot2)
library(hablar)
library(stringr)
library("FactoMineR")
library("factoextra")
library("corrplot")
setwd("C:/…")
d<-read.table(file = "XXX.csv", header = TRUE, na.strings = "NA", sep = ";", dec = ".")
summary(d)
head(d)
ana <- d
res.pca <- PCA(ana, graph = TRUE, scale.unit = TRUE, ncp = 9)
eig.val <- get_eigenvalue(res.pca)
eig.val
var <- get_pca_var(res.pca)
corrplot(var$cos2, is.corr=FALSE, cl.ratio = 1, cl.align = "r", cl.lim = c(0, 1),)

## power analysis
library(pwr)
pwr.r.test(n = NULL, r = 0.4, sig.level = 0.05, power = 0.9, alternative = c("two.sided"))

## cohen´s kappa
library(readxl)
dat<-read_xlsx("C:/… XXX.xlsx")
```

```
library(DescTools)

resulttab <- xtabs (~ dat$TUD + dat$ISNB)

resulttab

CohenKappa(resulttab, conf.level= 0.95)
```