Cortical thickness analysis
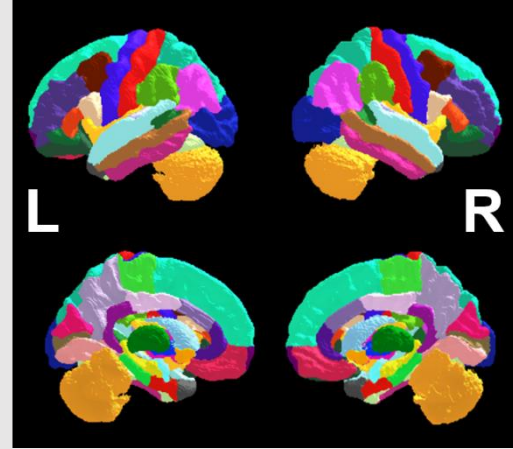
20210701

Outline
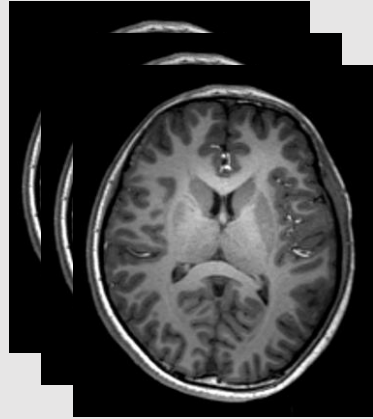
- Methods
  i. Workflow of Cortical Thickness analysis
  ii. Desikan Killiany Atlas

- Results
  i. teenagers' mothers (corresponding to table 3)
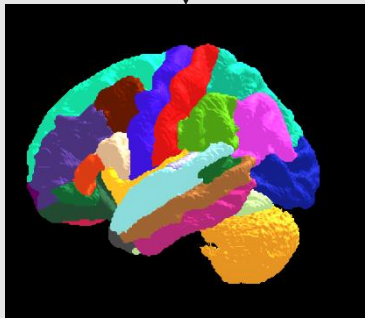 ii. Teenagers (corresponding to table 4)

Methods

Workflow

Image processing

Statistical analysis

T1-w image (N=59)

Image processing
(`recon-all`)
(by Freesurfer)

Desikan Killiany Atlas
Volume (N=59)

Cortical Parcellation (Desikan-Killiany Atlas)
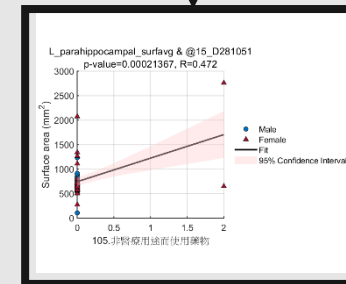- 68 VOIs

Cortical Parcellation Statistics
- Average cortical thickness
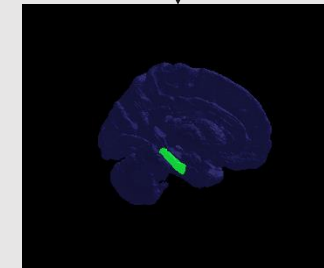- Average surface area

Pearson correlation with Cortical Parcellation Statistics
(Bonferroni corrected p-value< 0.000735, 0.05/68) (by SPSS)
- Assessments from teenagers (25)
- Assessments from their mothers (46)
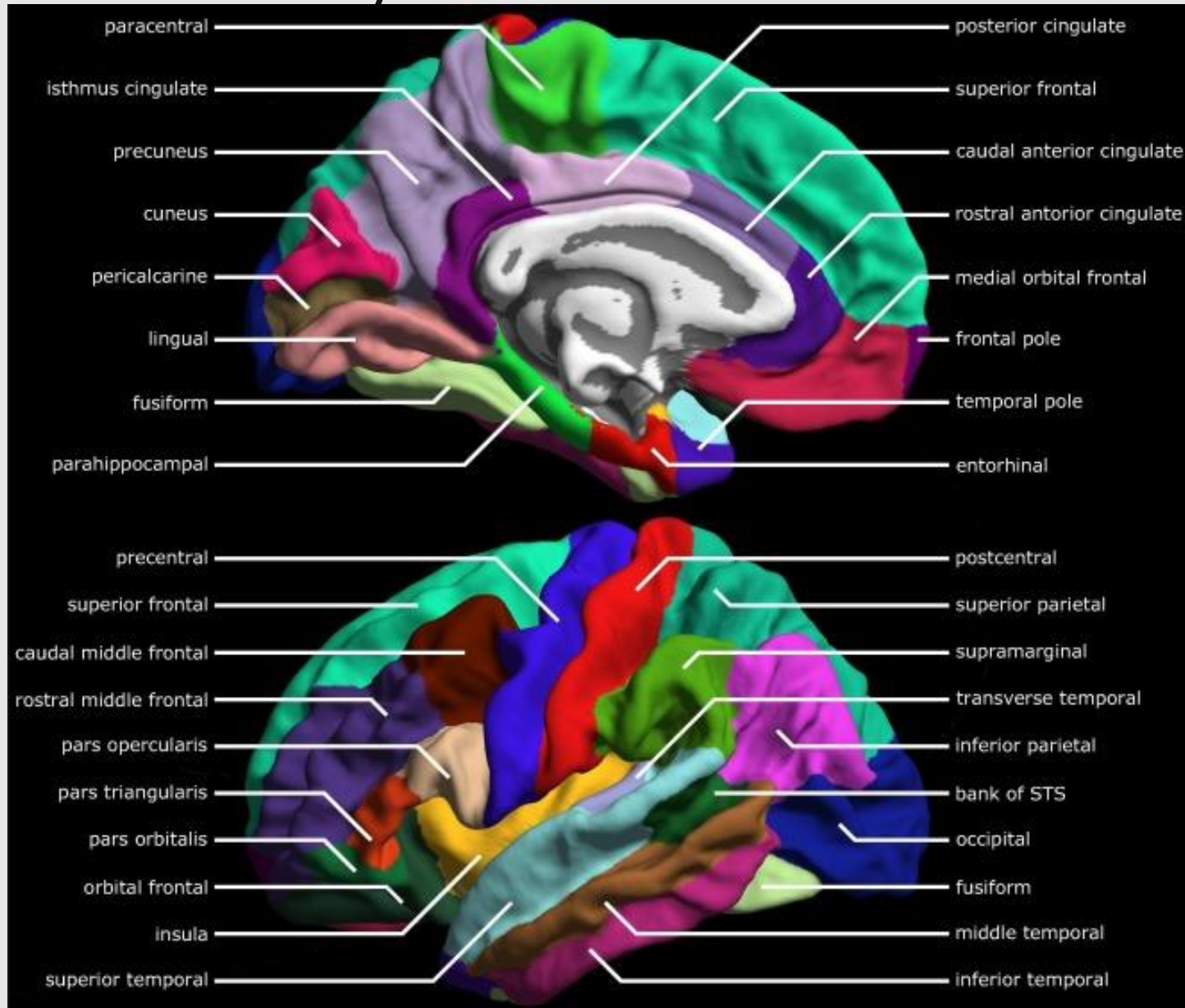
Scatter plot   3D Volume rendering

4

Desikan Killiany Atlas

Nagtegaal, Steven HJ, et al. "Changes in cortical thickness and volume after cranial radiation treatment: A systematic review." Radiotherapy and Oncology 135 (2019): 33-42.

Statistical analysis

- Multivariate linear regression was performed to find the association between cortical measurements of teenage brain and EDC concentration.

- To eliminate multiple-comparison effects, Bonferroni correction (0.05/68) was performed for 68 cortical regions.

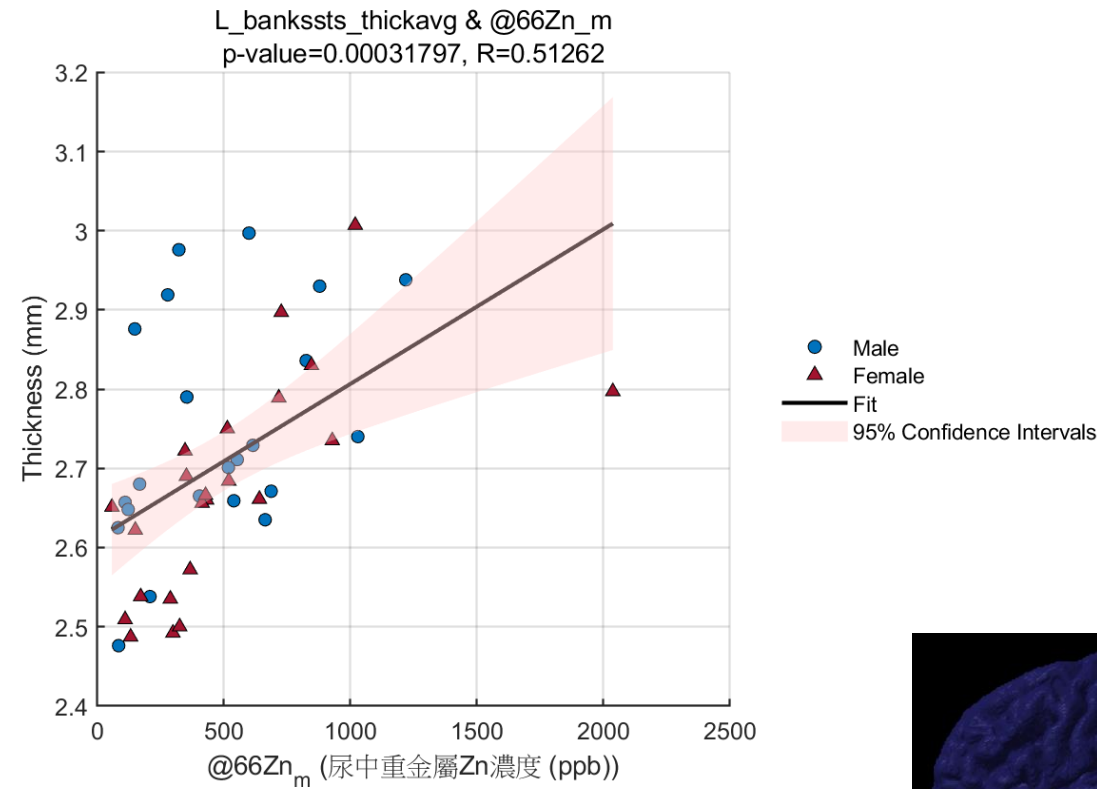- A Bonferroni-corrected p-value of less than 0.05 was considered as statistically significant.
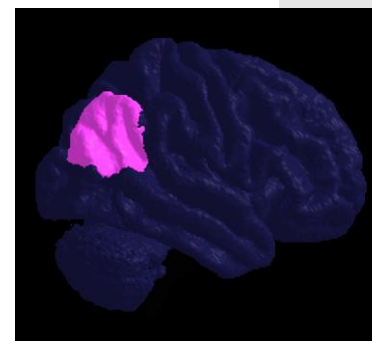
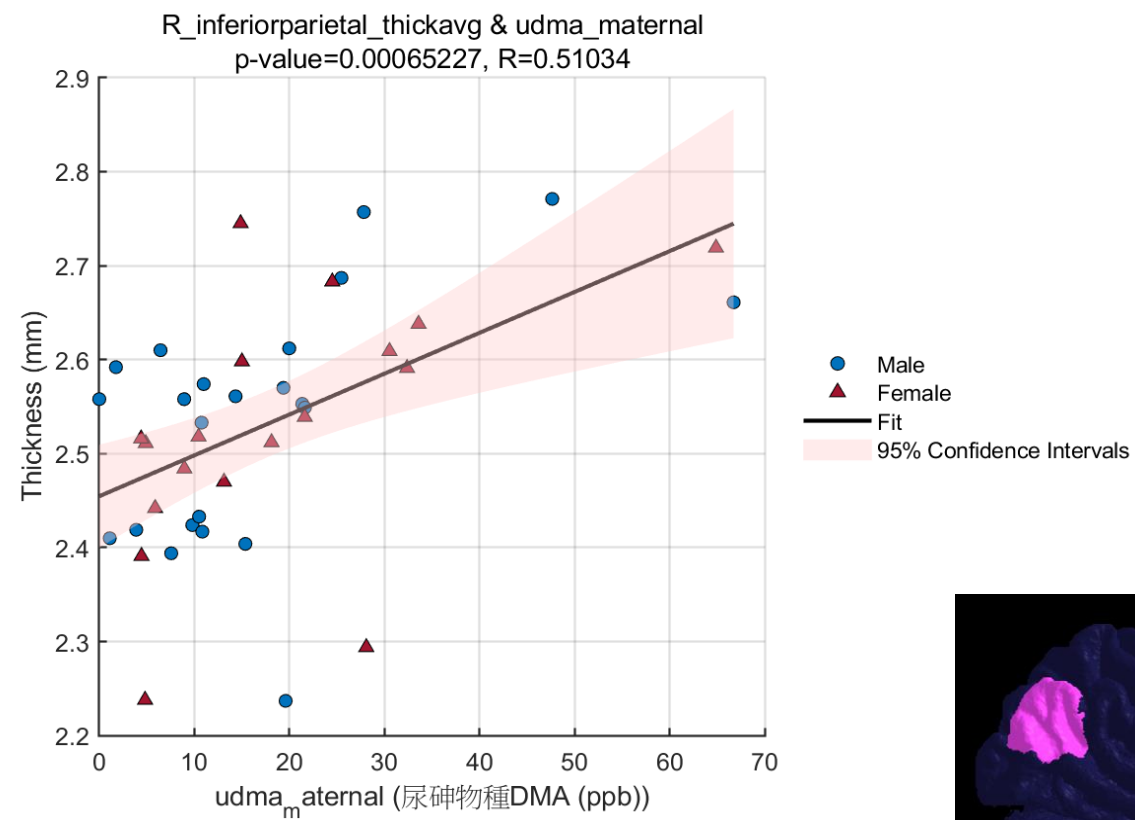# Results – Mothers (see table 3)

Results

Significant correlation between cortical thickness of specific brain regions and EDC measurements for all teenagers' mothers (see Table 3)
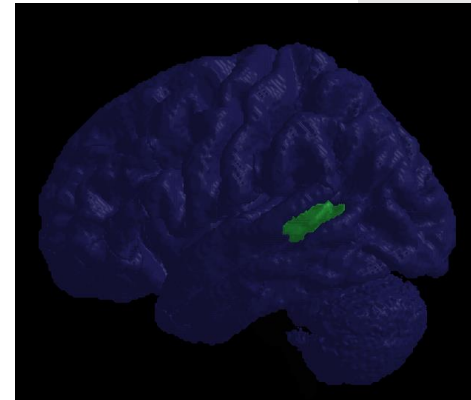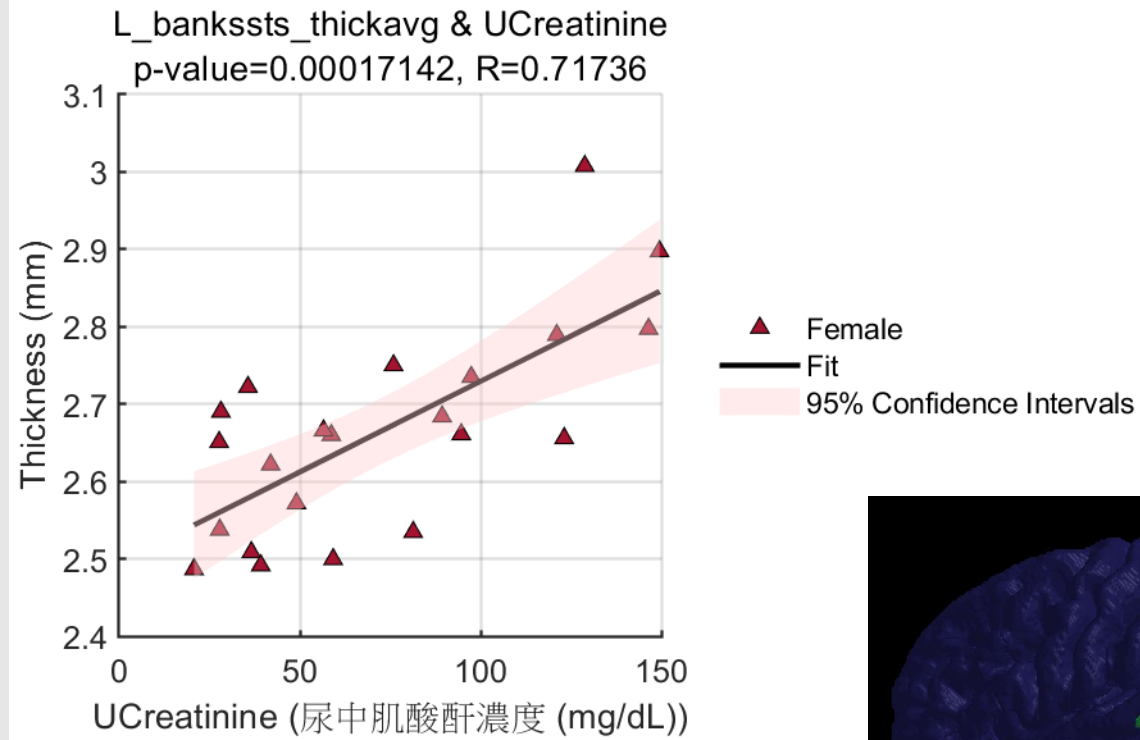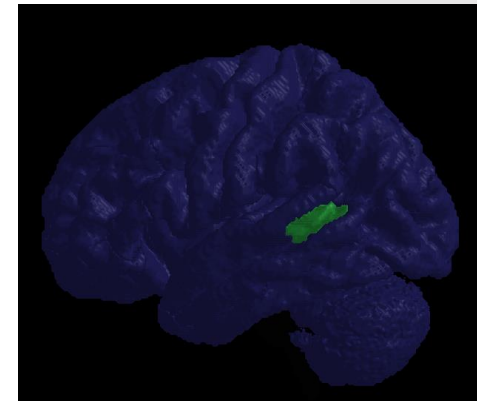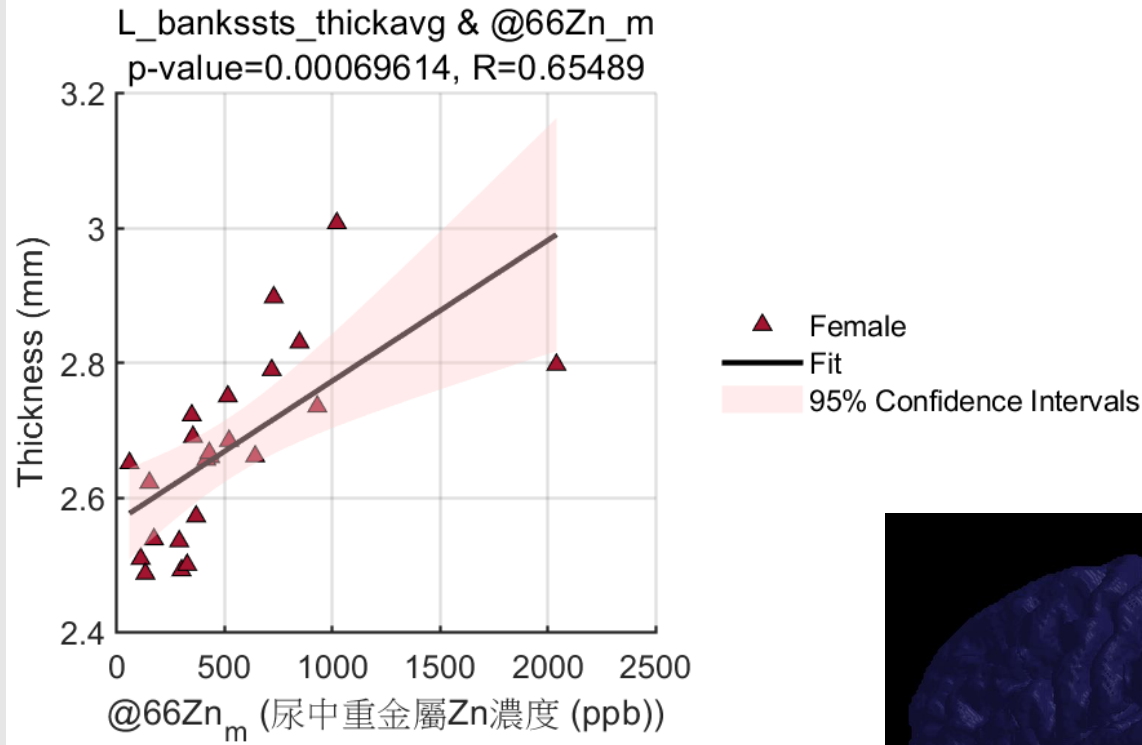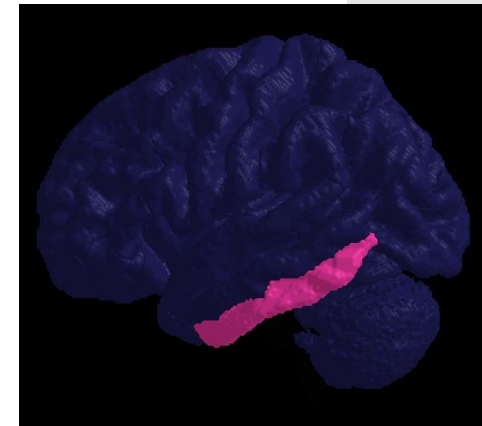
@66Zn_m
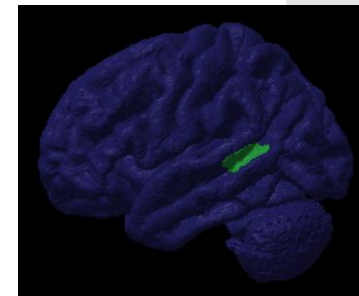
udma_maternal

R_inferiorparietal_thickavg & udma_maternal
p-value=0.00065227, R=0.51034

Results

Significant correlation between cortical thickness of specific brain regions and EDC measurements for mothers with male teenagers (see Table 3)
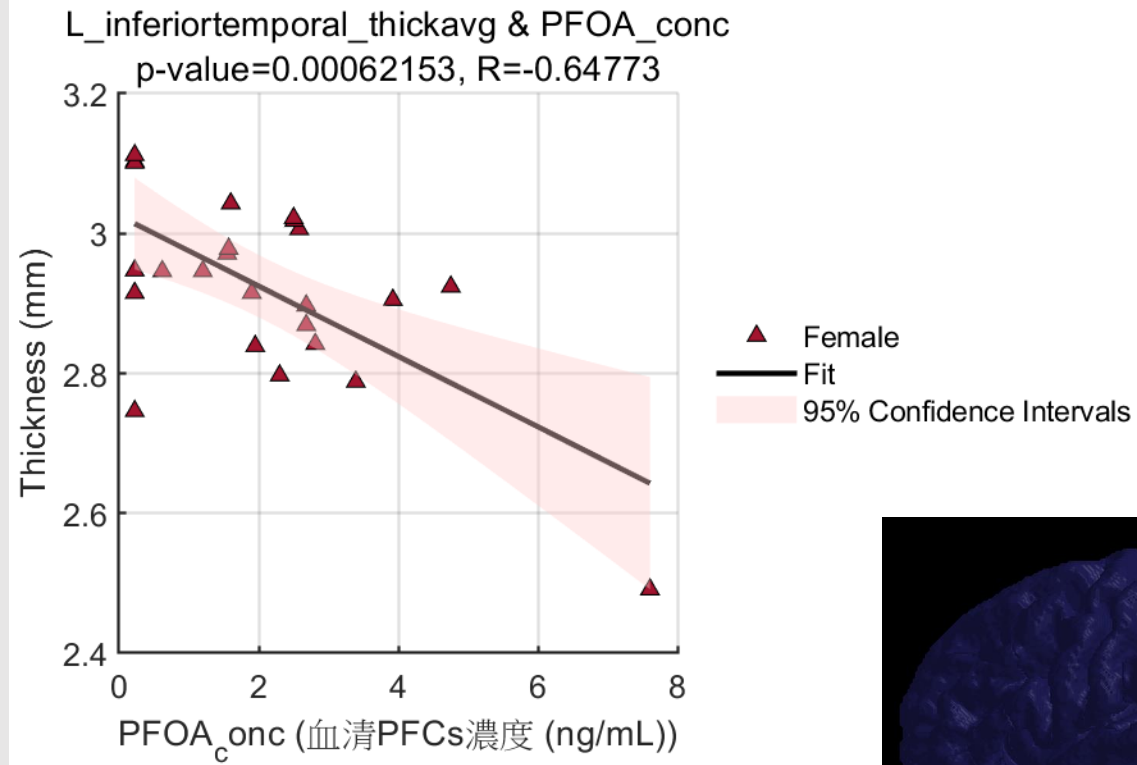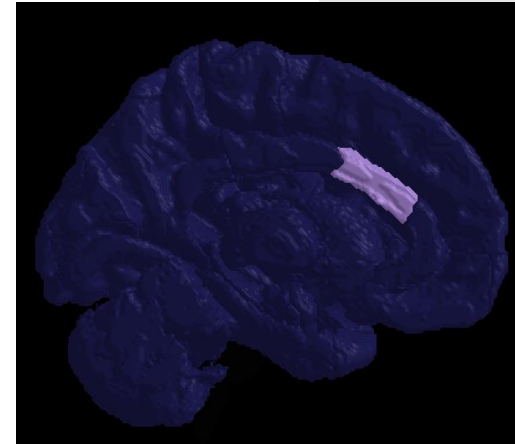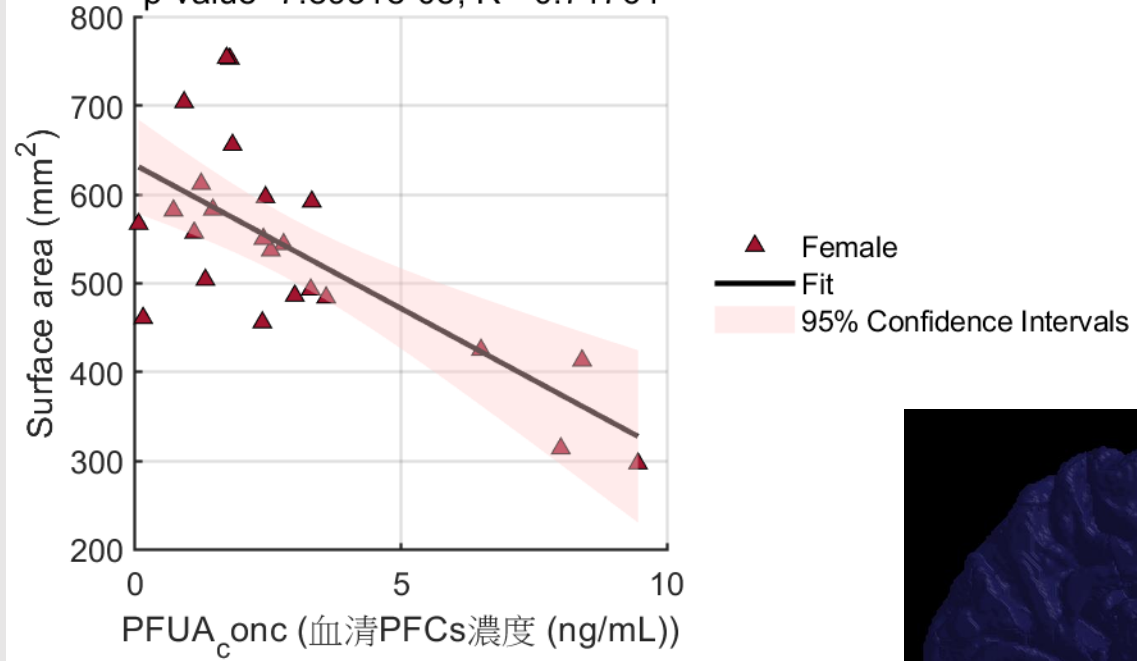
No significant region

Results

Significant correlation between cortical thickness of specific brain regions and EDC measurements for mothers with female teenagers (see Table 3)

UCreatinine

@66Zn_m

L_bankssts_thickavg & @66Zn_m
p-value=0.00069614, R=0.65489

PFOA_conc

PFUA_conc
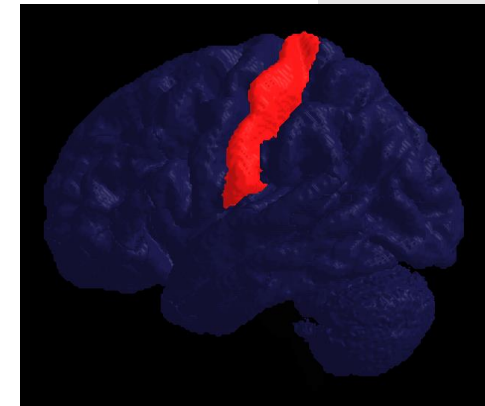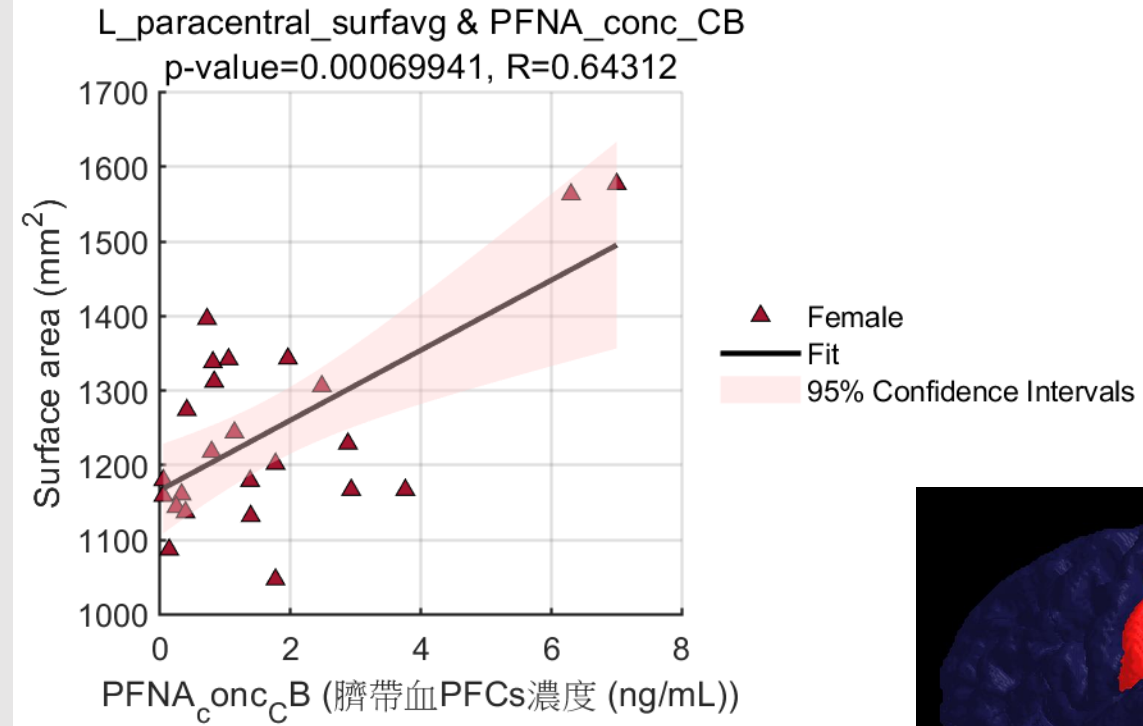

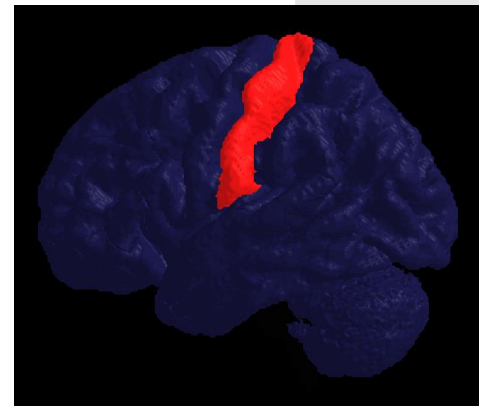L_caudalanteriorcingulate_surfavg & PFUA_conc
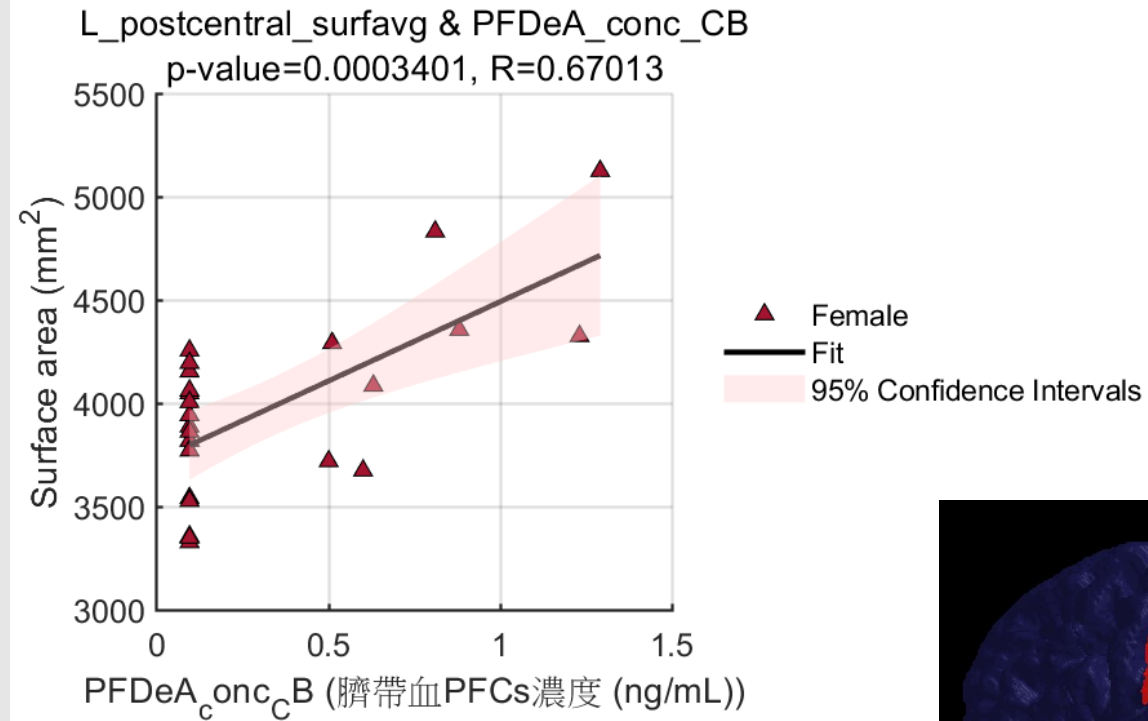p-value=7.8931e-05, R=-0.71764

uas3_maternal

PFNA_conc_CB

L_paracentral_surfavg & PFNA_conc_CB
p-value=0.00069941, R=0.64312

PFDeA_conc_CB

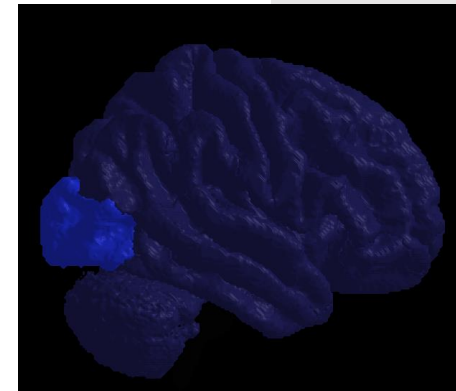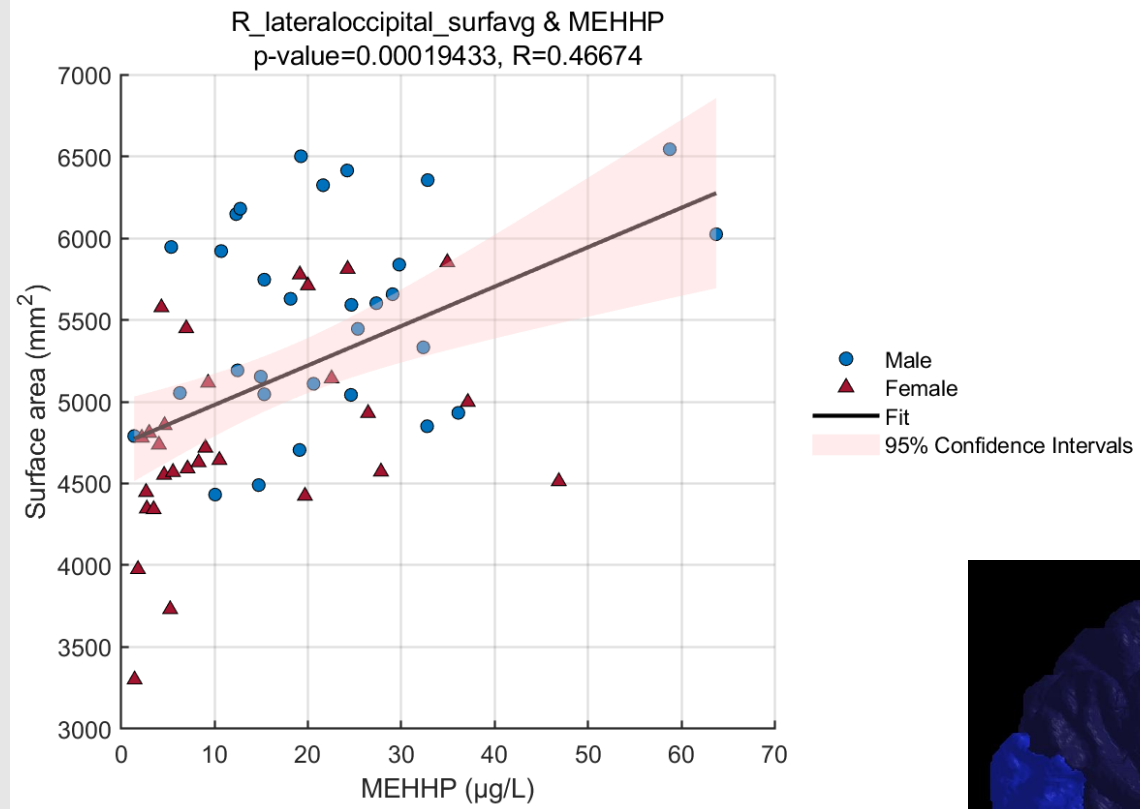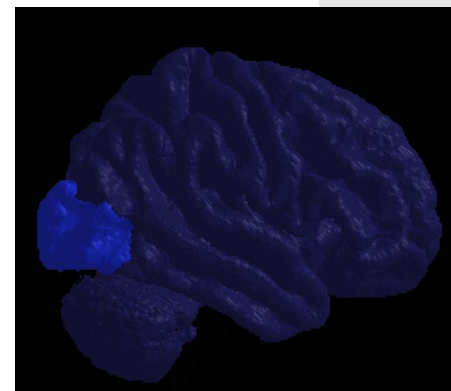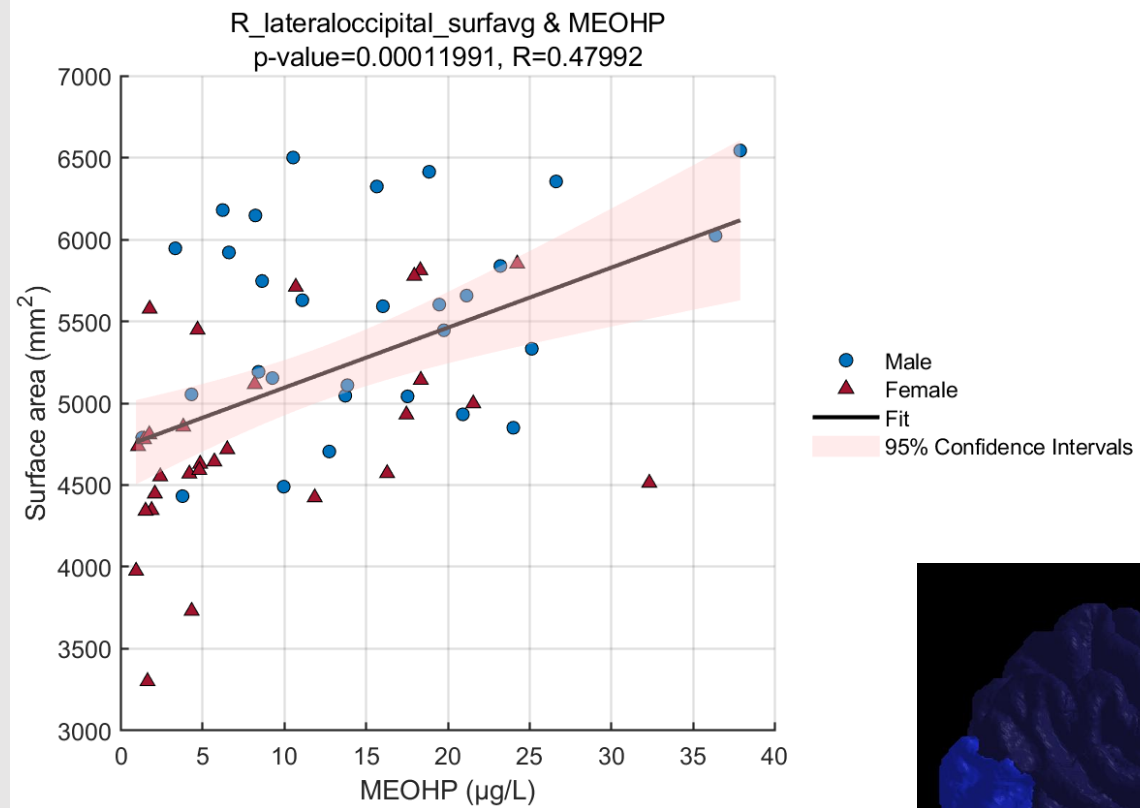L_postcentral_surfavg & PFDeA_conc_CB
p-value=0.0003401, R=0.67013
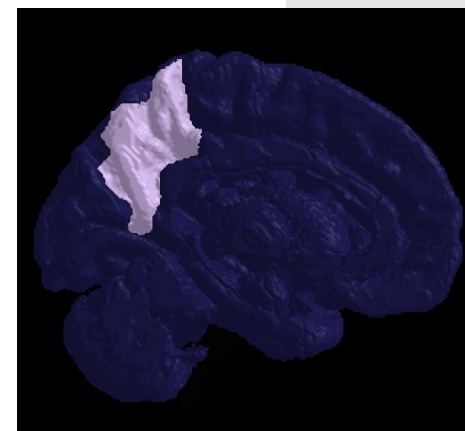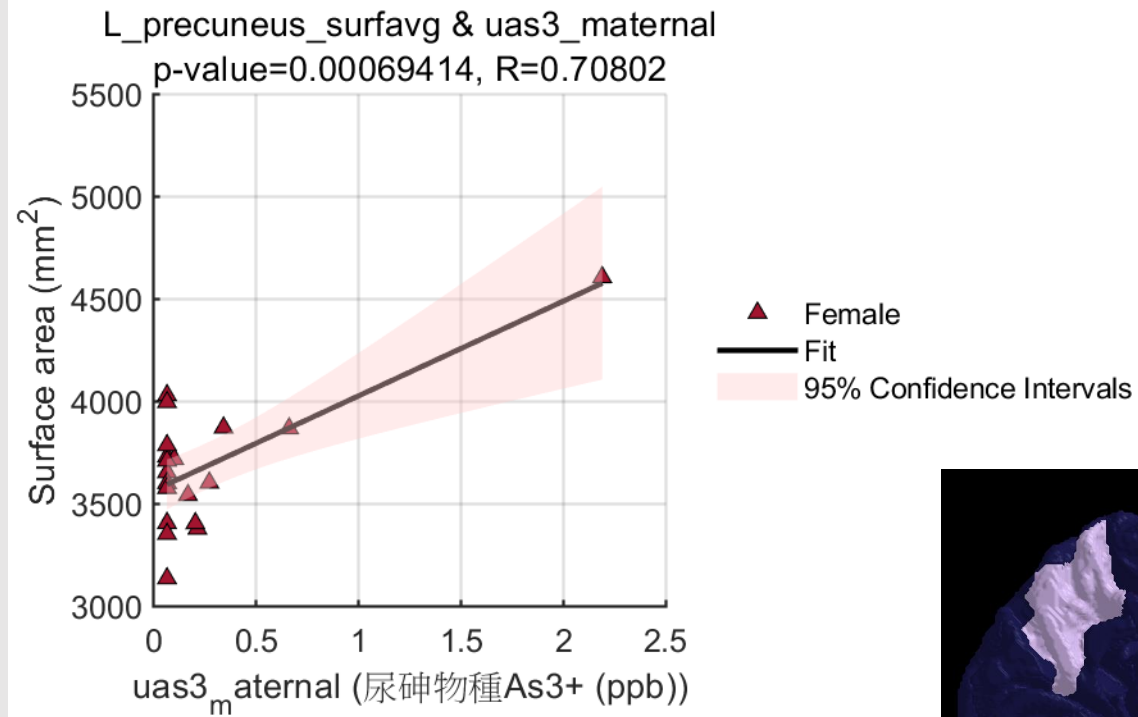
Results – Teenagers
(see table 4)

Results

Significant correlation between cortical thickness of specific brain regions and EDC measurements for all teenagers (see Table 4)
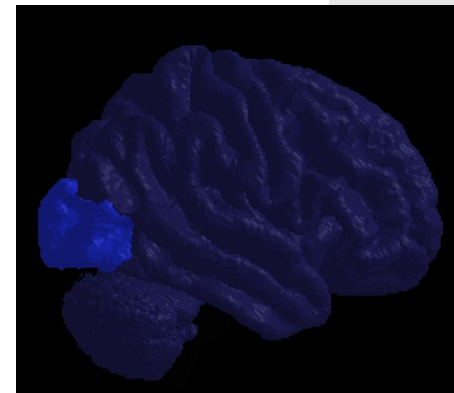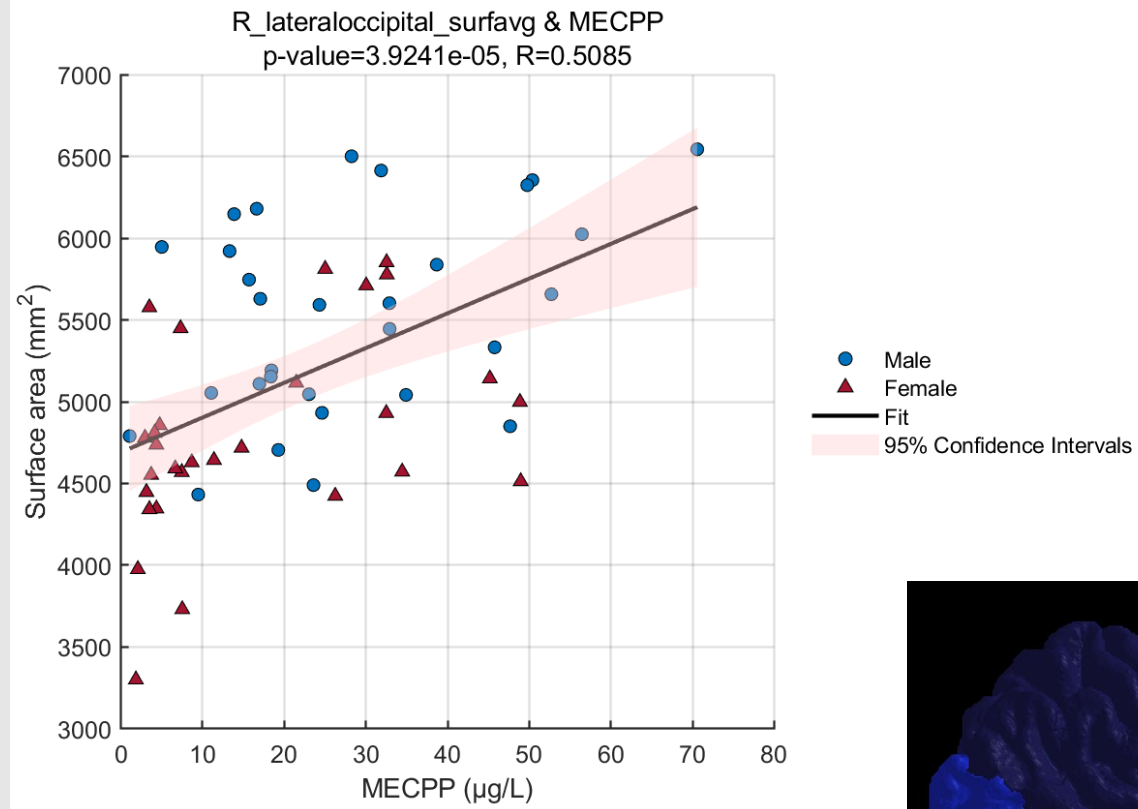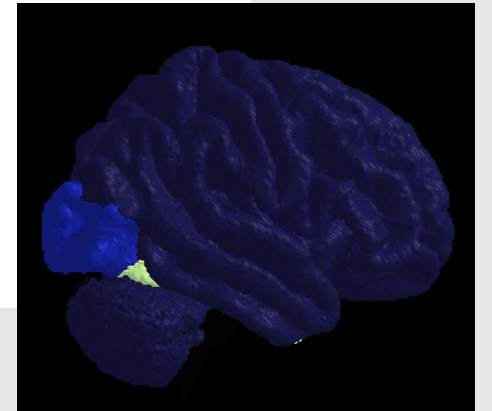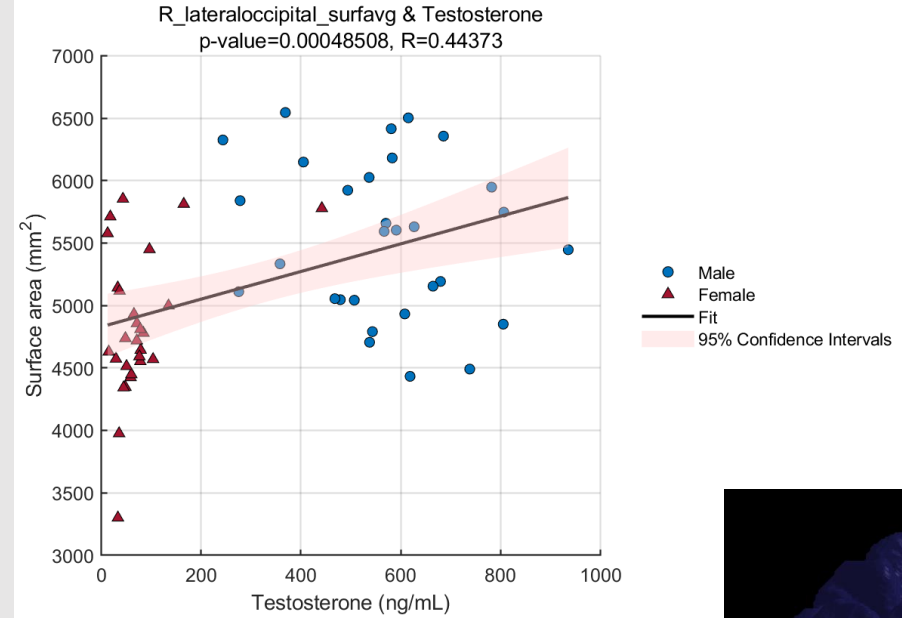
MEHHP

MEOHP

MECPP

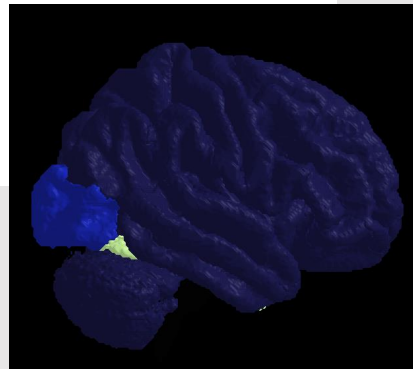R_lateraloccipital_surfavg & MECPP
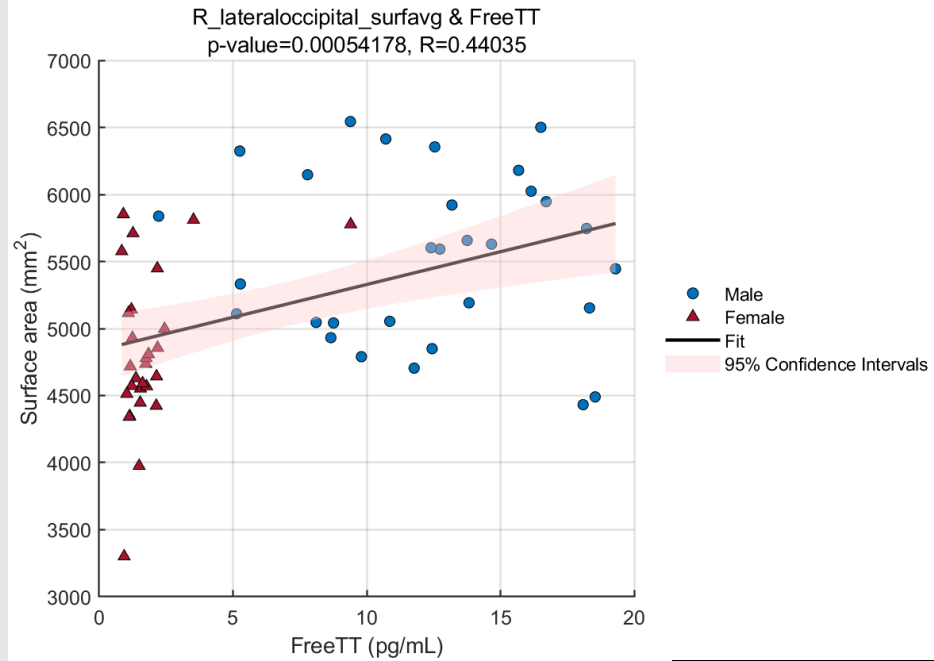p-value=3.9241e-05, R=0.5085
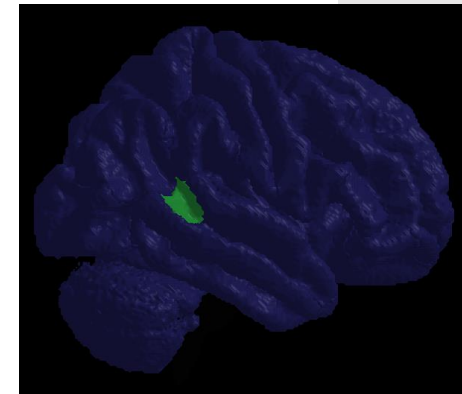
Testosterone
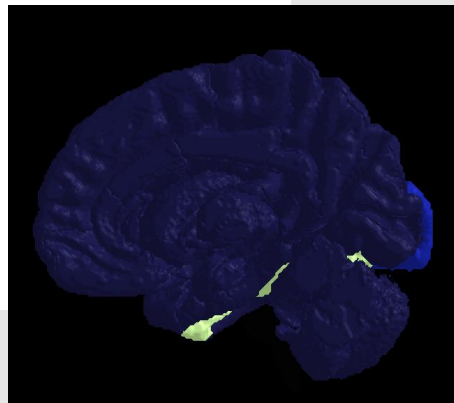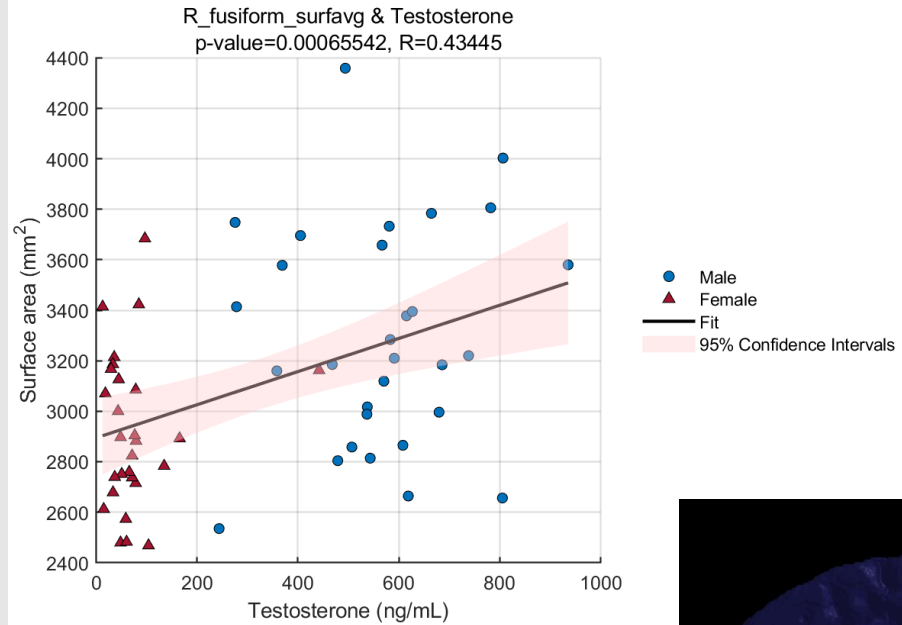
FreeTT

Results

Significant correlation between cortical thickness of specific brain regions and EDC measurements for male teenagers (see Table 4)
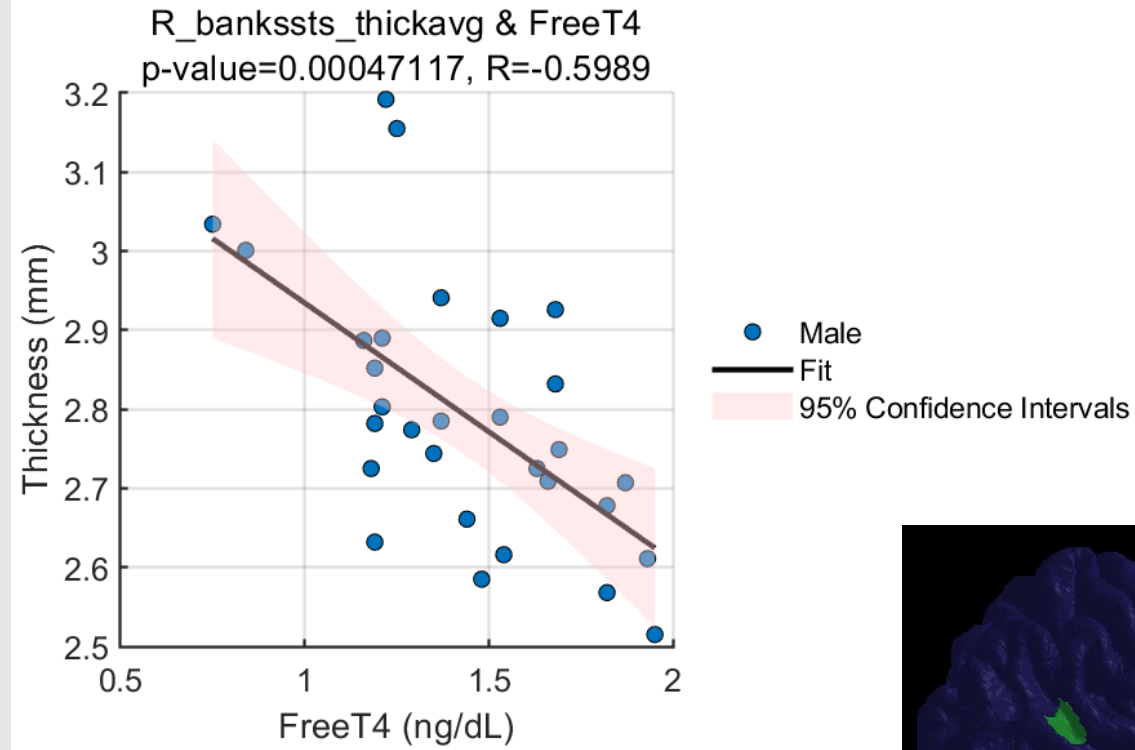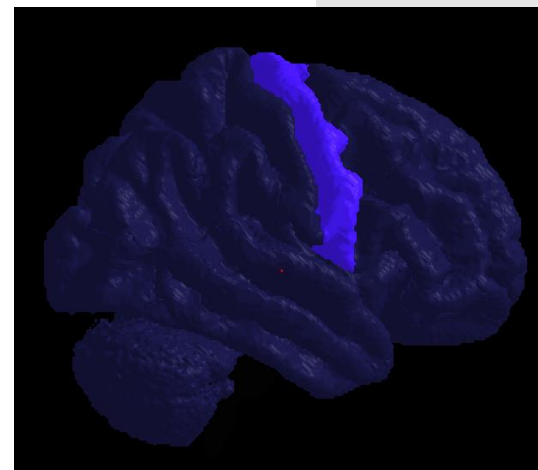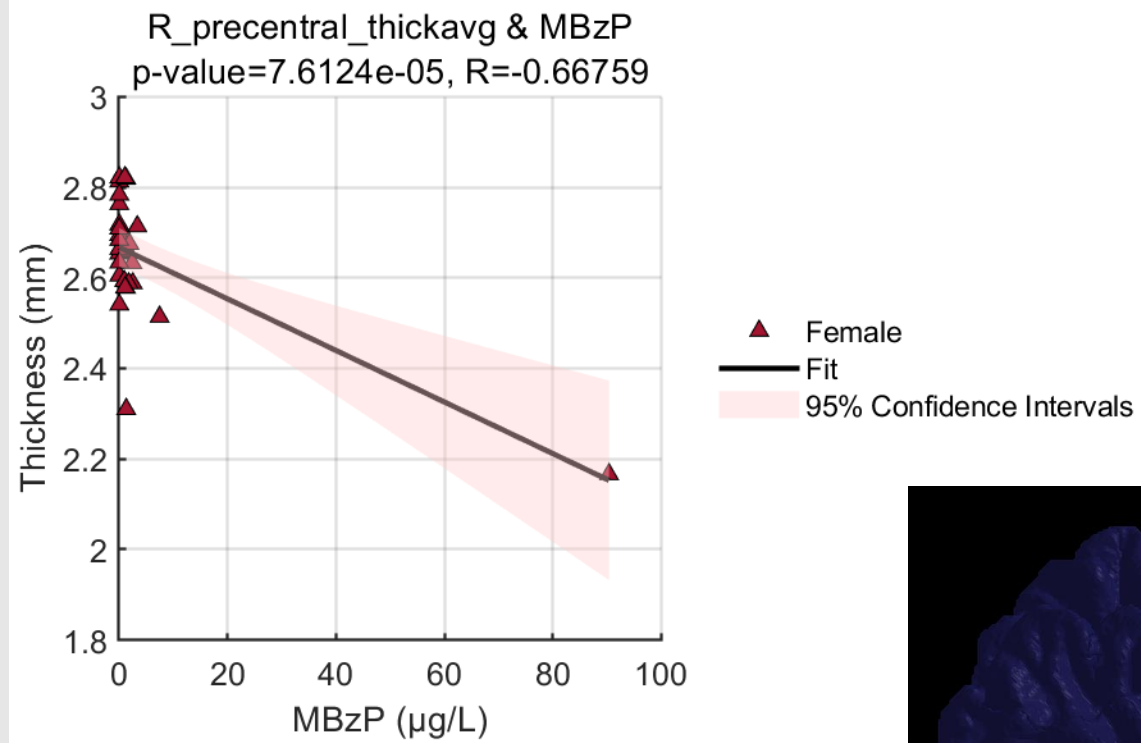
FreeT4

Results

Significant correlation between cortical thickness of specific brain regions and EDC measurements for female teenagers (see Table 4)

MBzP

T3