

Supplementary Figures

Darius Bost et al.

July 1, 2021

1 Forest Plots

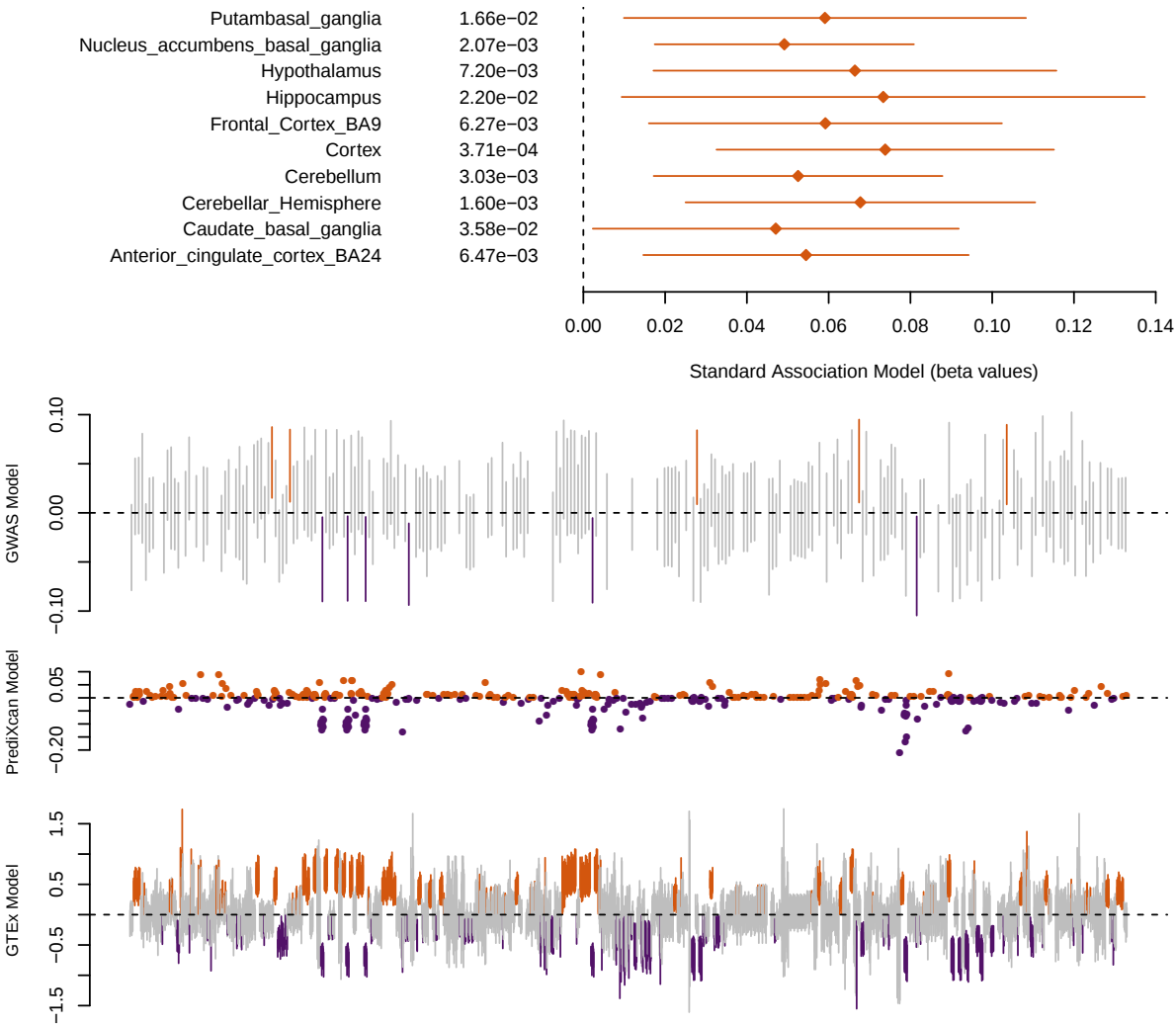
Forest Plot of transcript of interest in a trait across all tissues(across all cohorts †). The top plot shows predicted expression in all tissues/cohorts where a positive correlation (β s) with the given trait is orange and purple when the correlation is negative. The second plot shows the GWAS trait association (β s) for SNPs that appear in any of the PrediXcan models. The SNPs are all within 1 MB of the gene of interest but are not spaced by their physical separations. The PrediXcan and GTEx models display (β s) of the same set of SNPs in the GWAS plot among all the tissues(single tissue for across cohorts) and are ordered the same so all SNPs are aligned.

1.1 Across Tissue Phom Results

Across Tissue

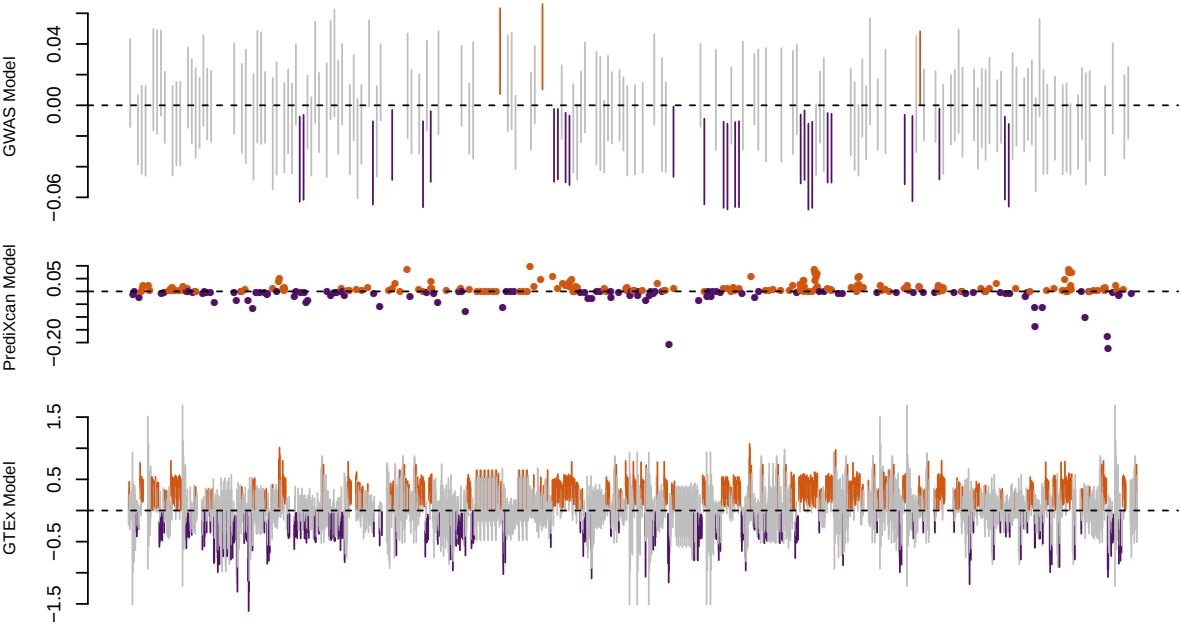
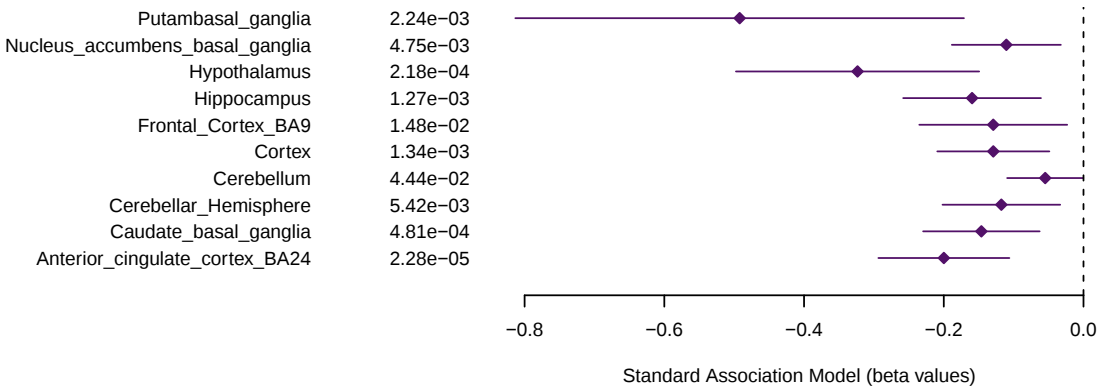
ENSG00000021488 (SLC7A9)
NIC ~ Across_Tissue

sHom p-value
 1.16e-07
sHet 1.85e-04



ENSG00000054219 (LY75)
MJ ~ Across_Tissue

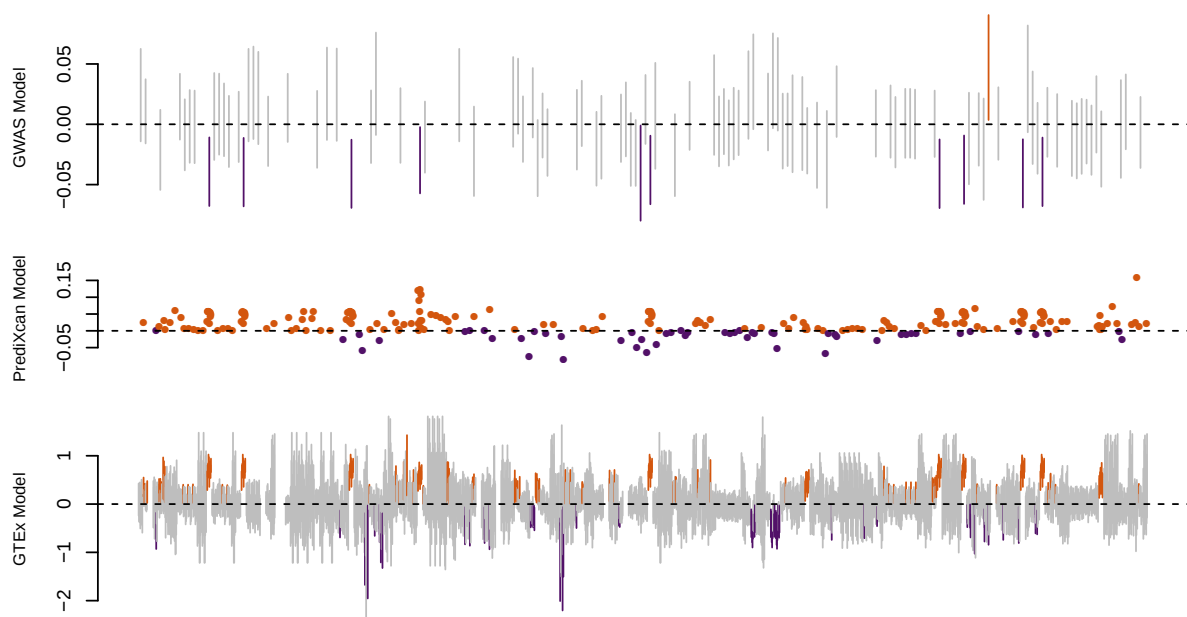
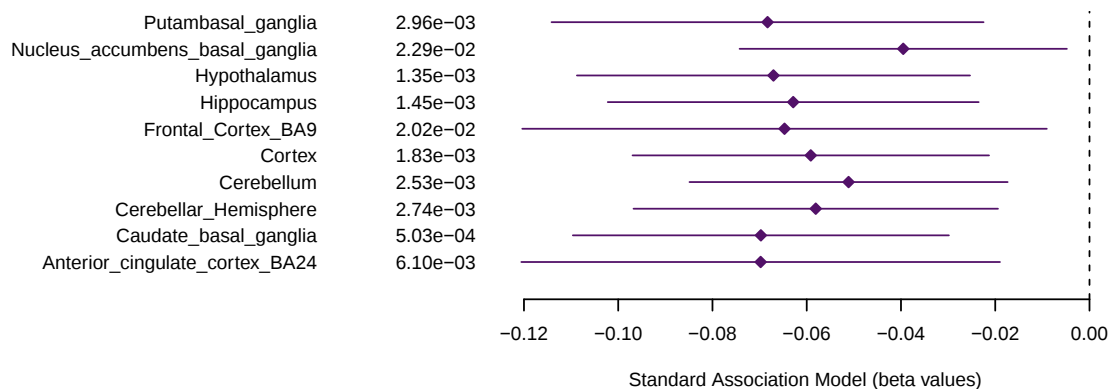
sHom p-value
sHet 1.10e-08
1.22e-05



ENSG00000084072 (PPIE)

Family_Alcoholism ~ Across_Tissue

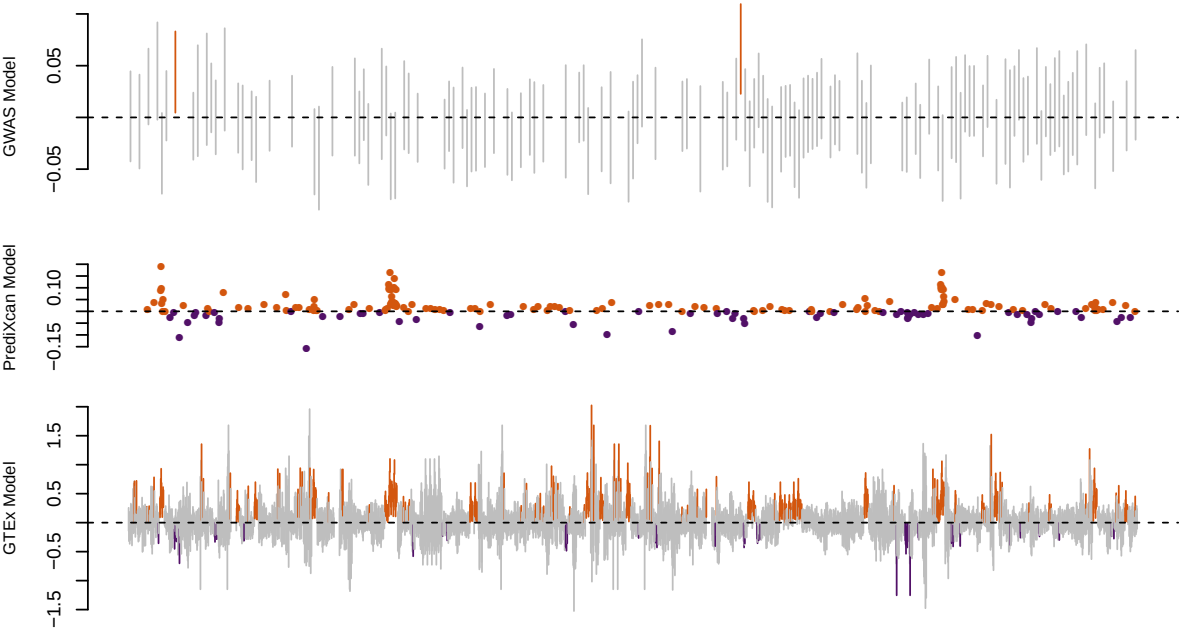
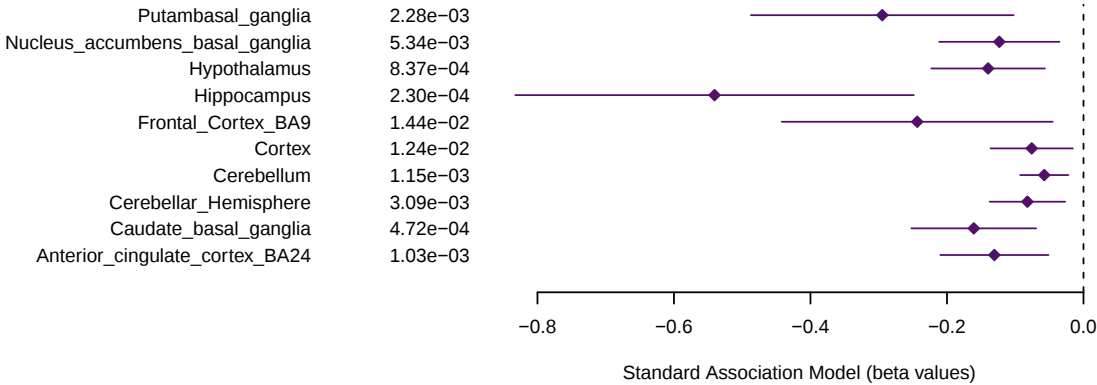
sHom p-value
3.37e-08
sHet 4.76e-05



ENSG00000103245 (CIAO3)

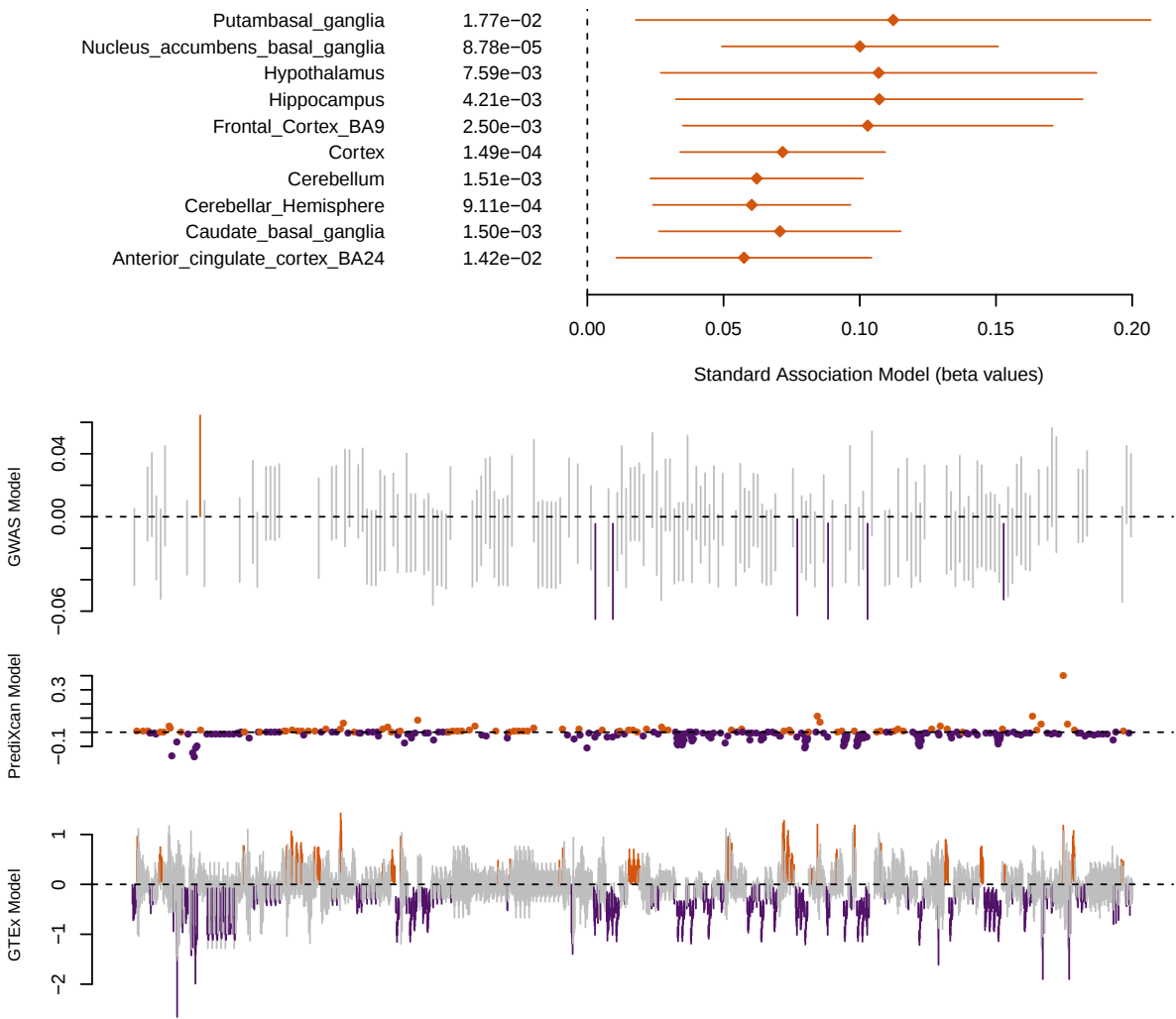
Alc_Dep ~ Across_Tissue

sHom p-value
8.84e-08
sHet 1.42e-04



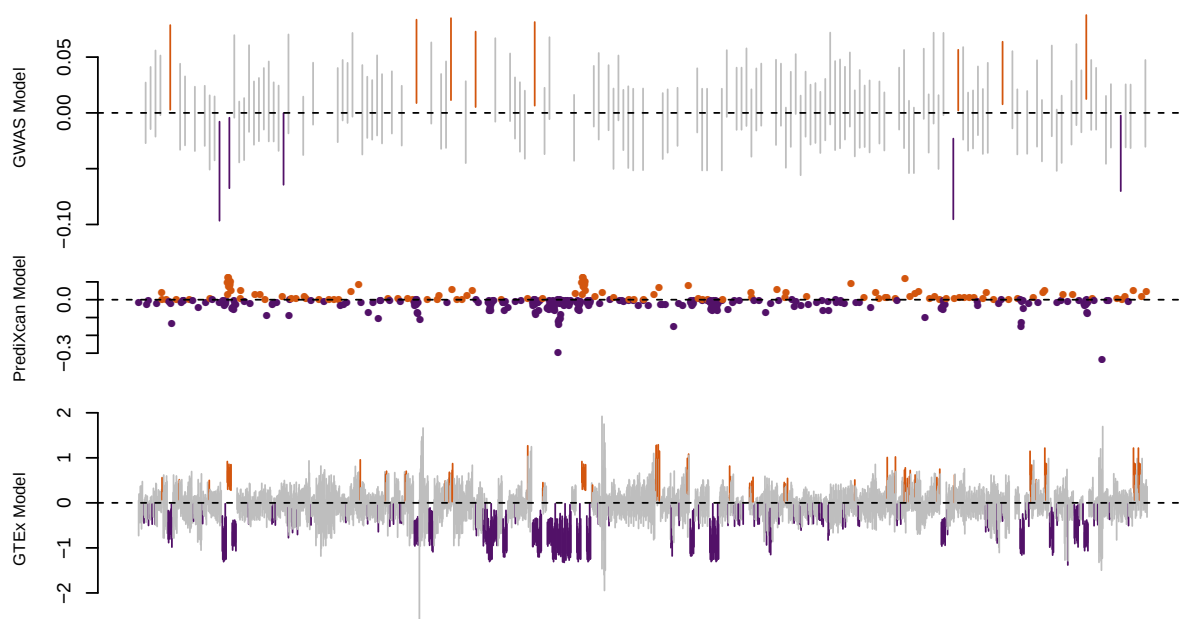
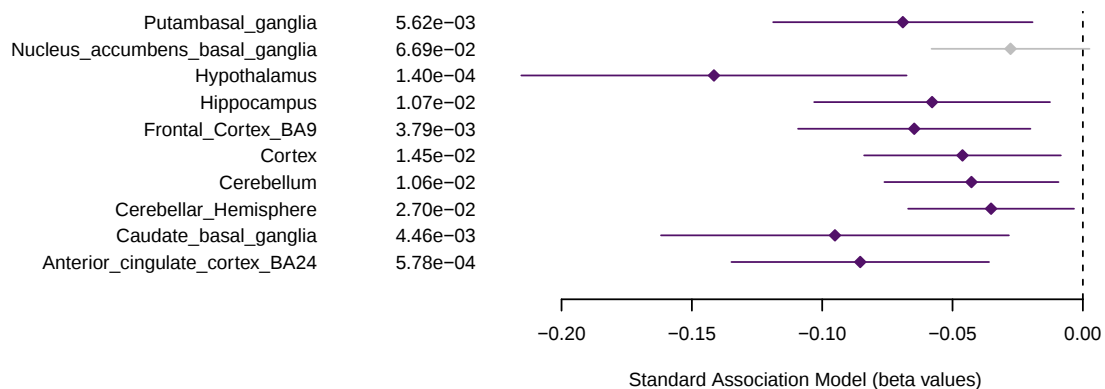
ENSG00000112031 (MTRF1L)
MJ ~ Across_Tissue

sHom p-value
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sHet 2.77e-05



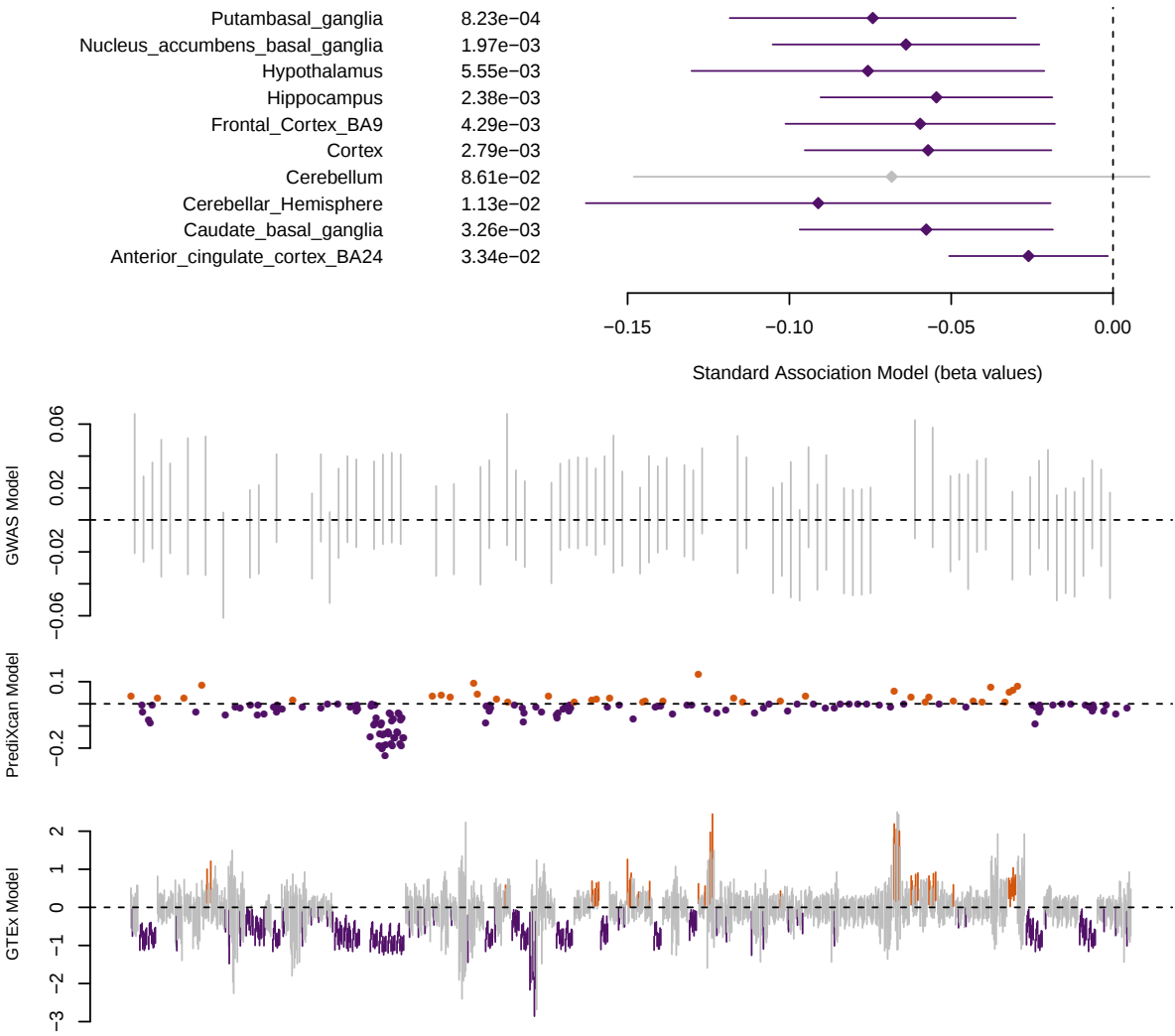
ENSG00000122085 (MTERF4) Family_Alcoholism ~ Across_Tissue

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sHet 2.67e-04



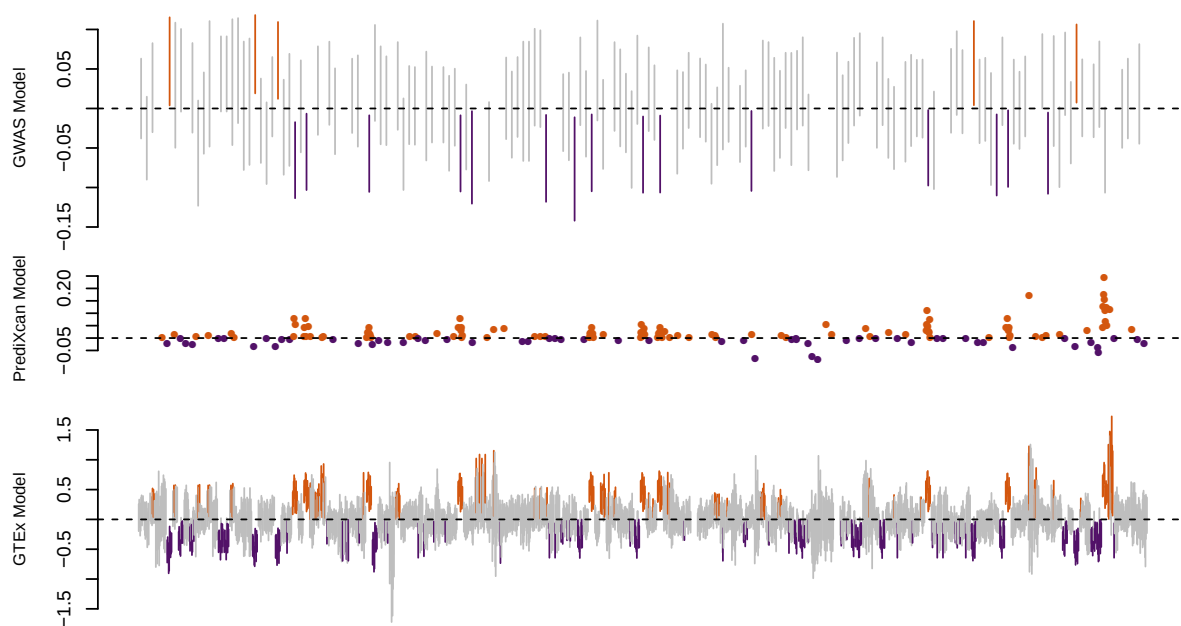
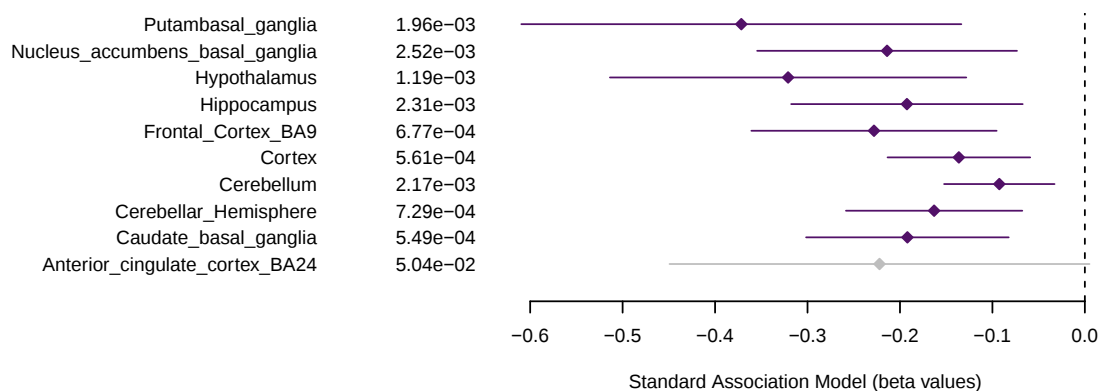
ENSG00000124713 (GNMT)
Family_Alcoholism ~ Across_Tissue

sHom p-value
 4.09e-07
sHet 3.53e-04



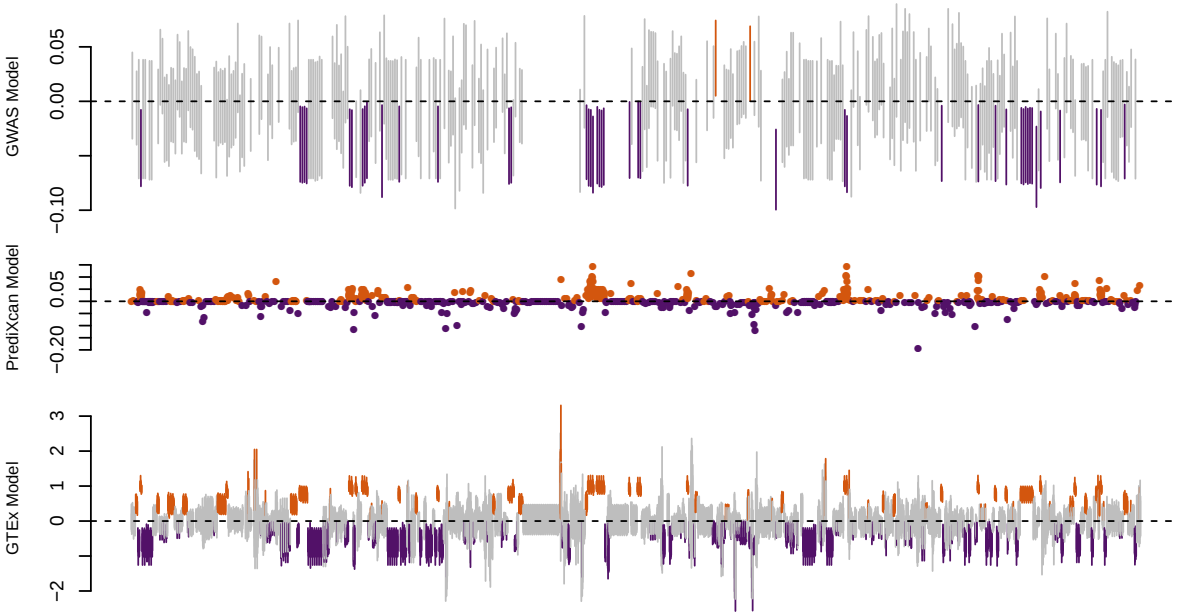
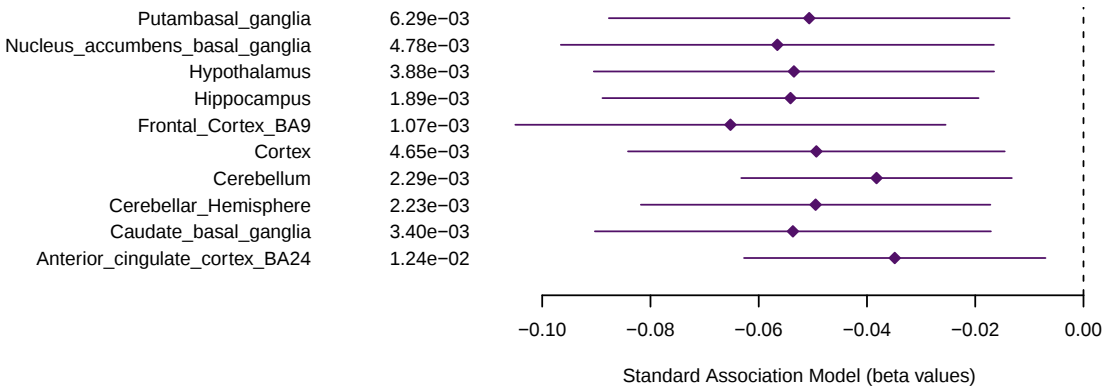
ENSG00000131845 (ZNF304) Marijuana_Strong_Desire ~ Across_Tissue

sHom p-value
 6.55e-09
 sHet 8.44e-06



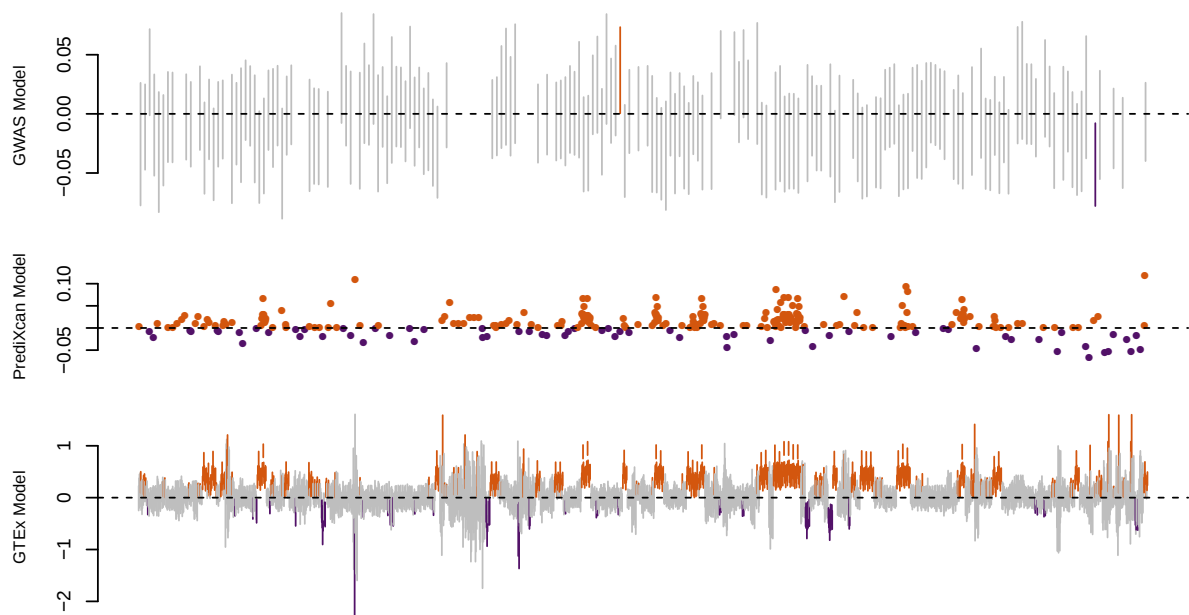
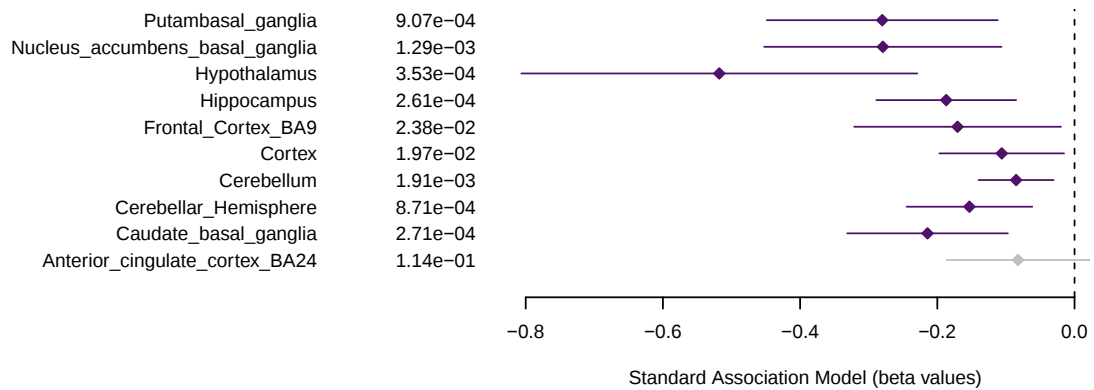
ENSG00000149089 (APIP)
Alc_Dep ~ Across_Tissue

sHom p-value
sHet 8.85e-04



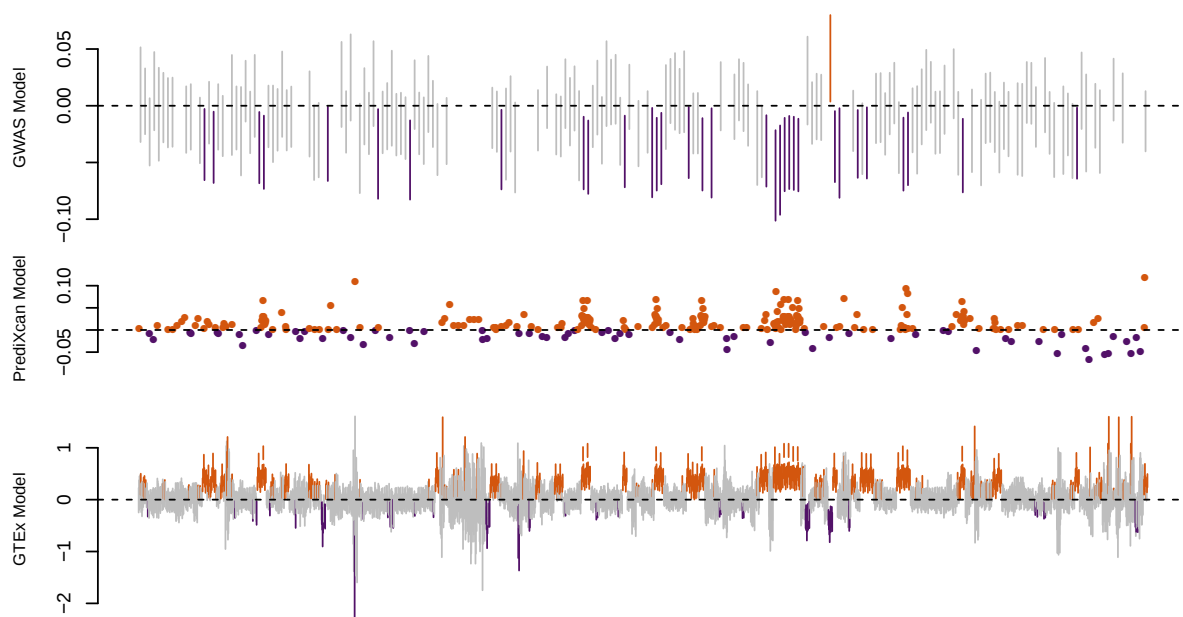
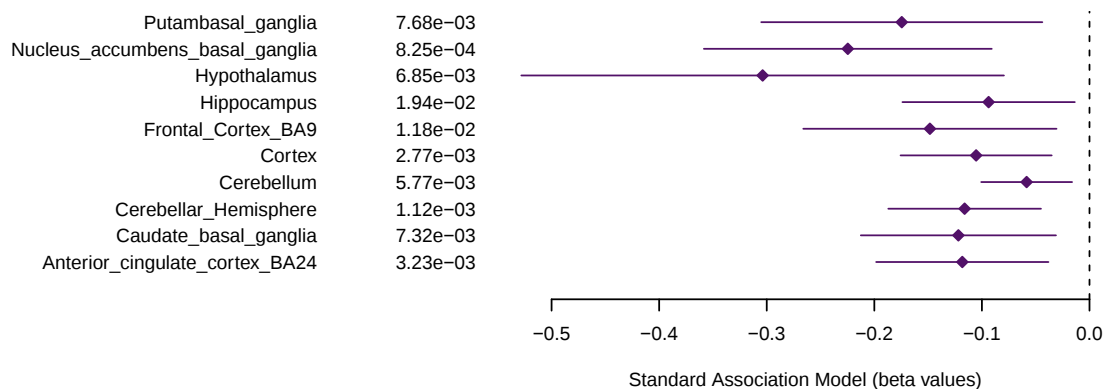
ENSG00000165502 (RPL36AL) Alc_Dep ~ Across_Tissue

sHom 1.26e-07
sHet 2.68e-04



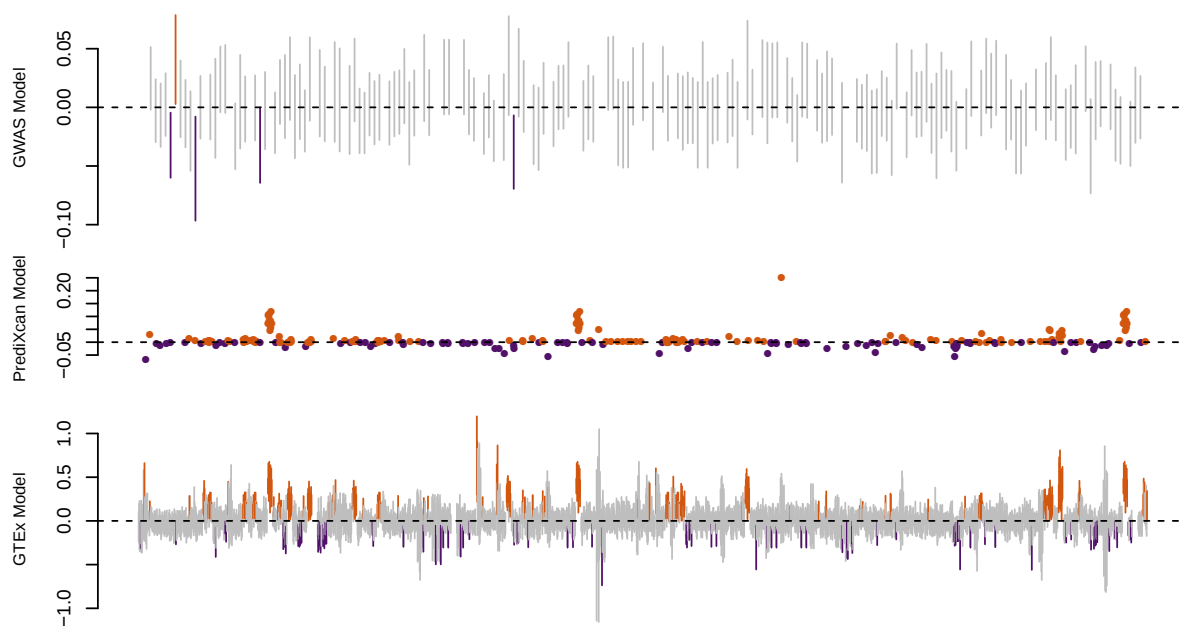
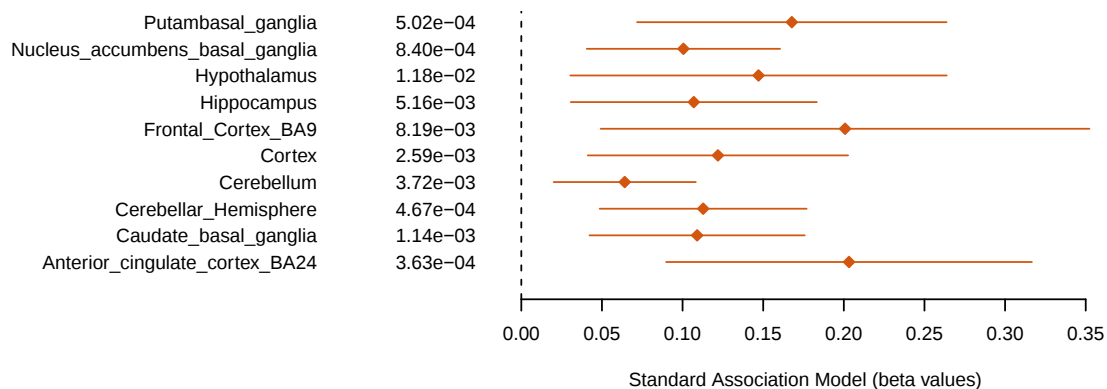
ENSG00000165502 (RPL36AL) Family_Alcoholism ~ Across_Tissue

sHom 1.26e-07
sHet 2.68e-04



ENSG00000168385 (SEPTIN2) Family_Alcoholism ~ Across_Tissue

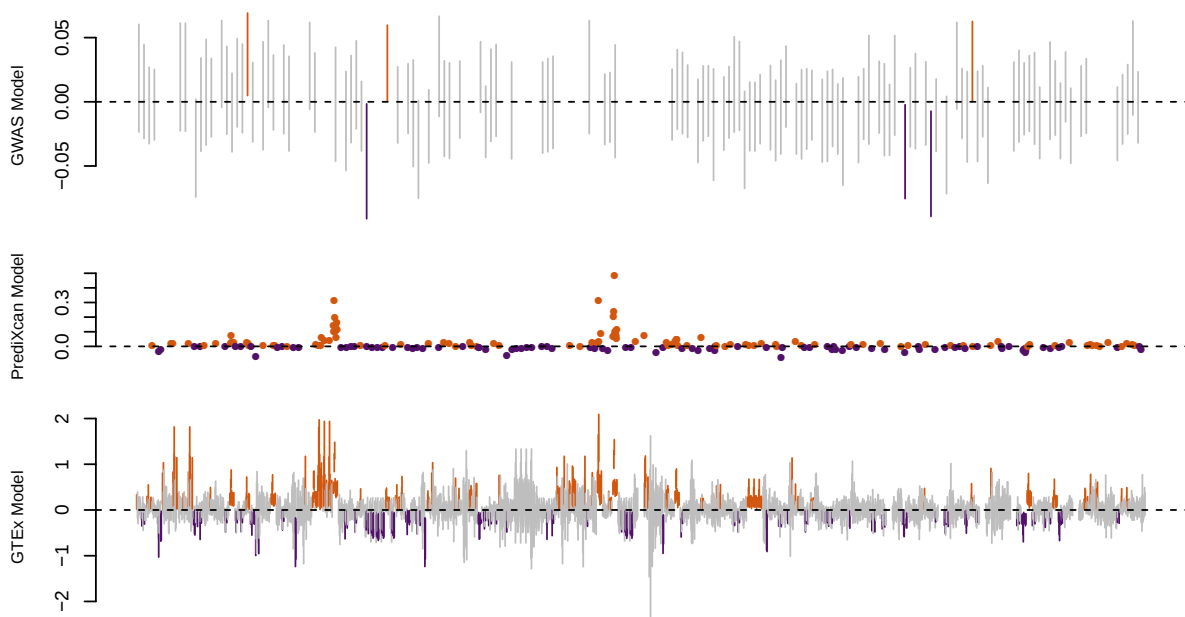
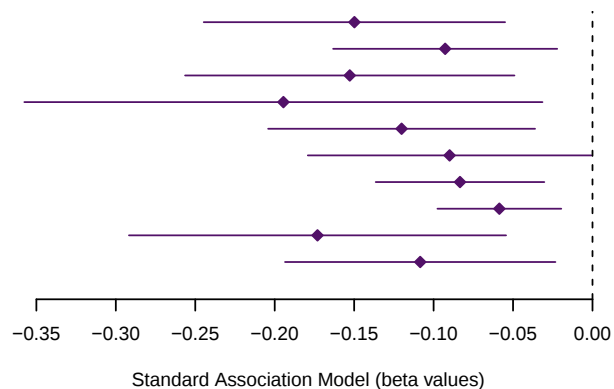
sHom p-value
5.51e-09
sHet 1.36e-05



ENSG00000170802 (FOXN2) Family_Alcoholism ~ Across_Tissue

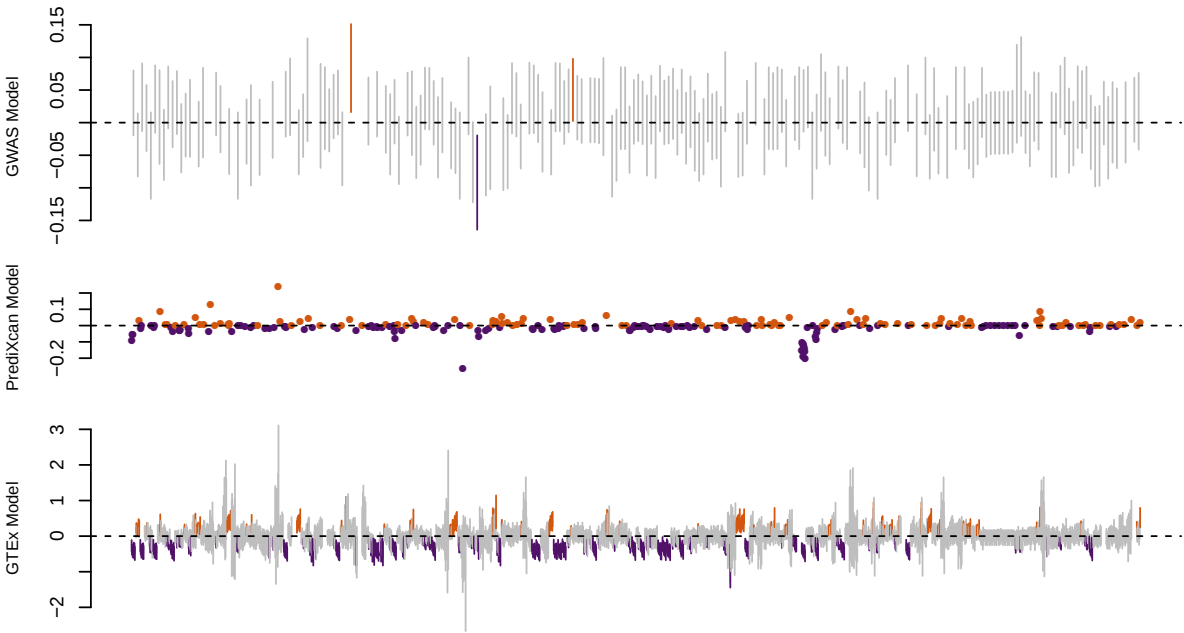
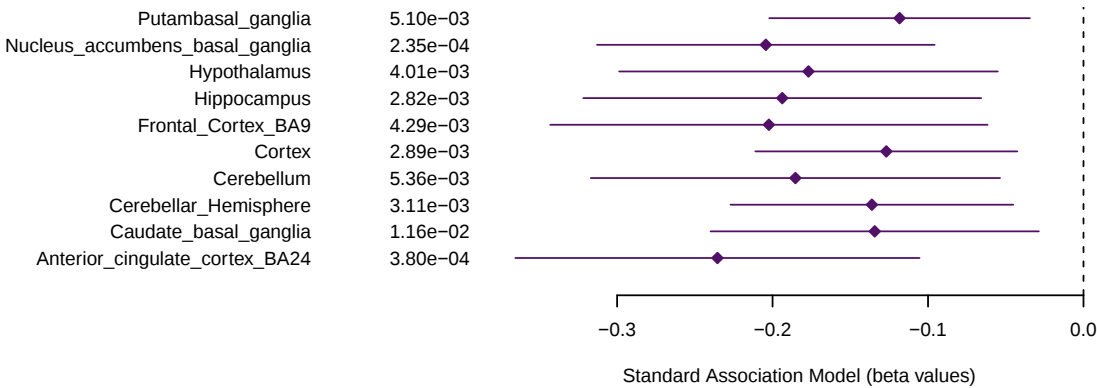
sHom p-value
2.01e-07
sHet 2.90e-04

Putambasal_ganglia	1.64e-03
Nucleus_accumbens_basal_ganglia	8.65e-03
Hypothalamus	3.29e-03
Hippocampus	1.72e-02
Frontal_Cortex_BA9	4.33e-03
Cortex	4.39e-02
Cerebellum	1.73e-03
Cerebellar_Hemisphere	2.70e-03
Caudate_basal_ganglia	3.63e-03
Anterior_cingulate_cortex_BA24	1.09e-02



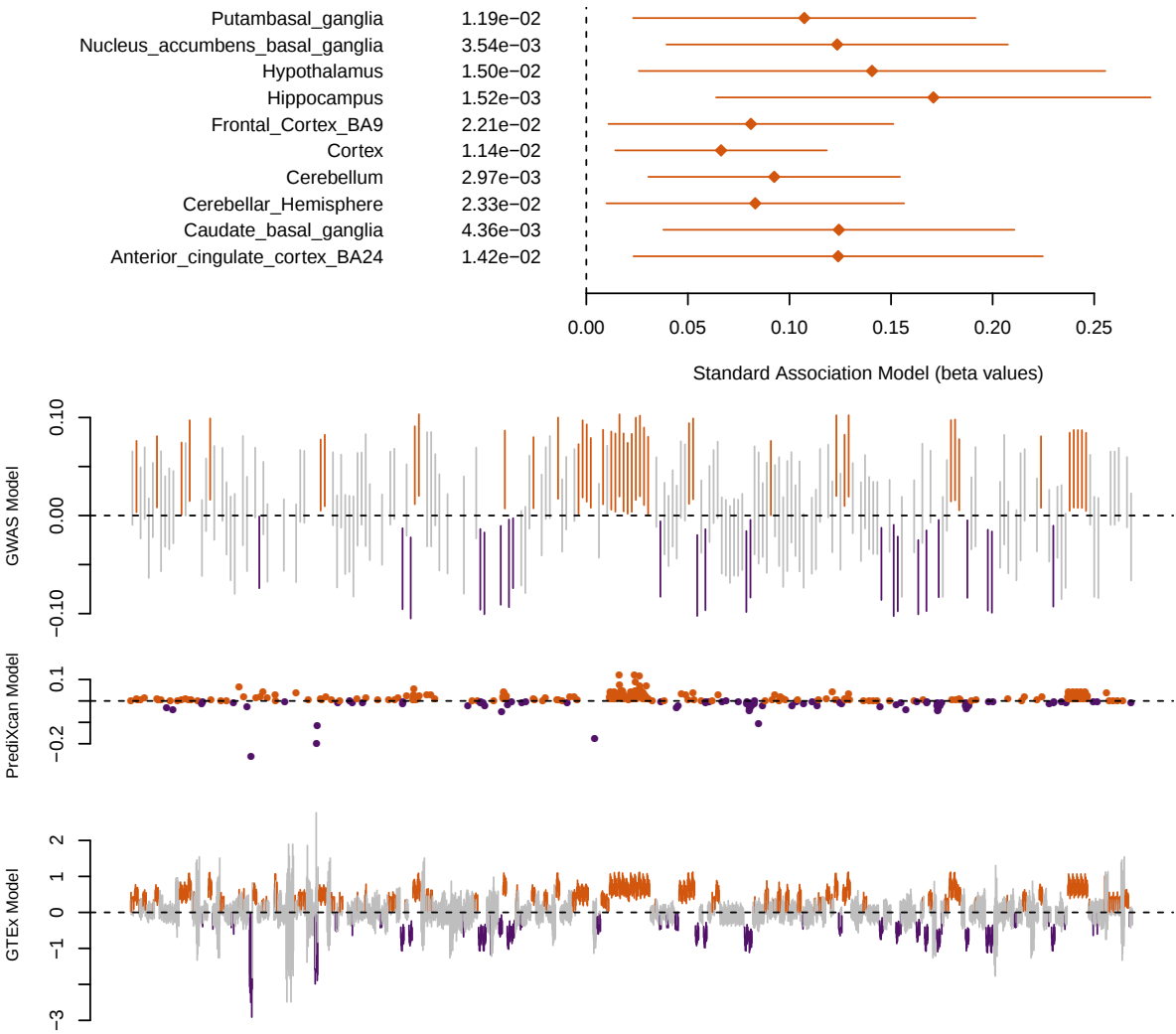
ENSG00000180376 (CCDC66)
Marijuana_Strong_Desire ~ Across_Tissue

sHom p-value
2.03e-08
sHet 4.58e-05



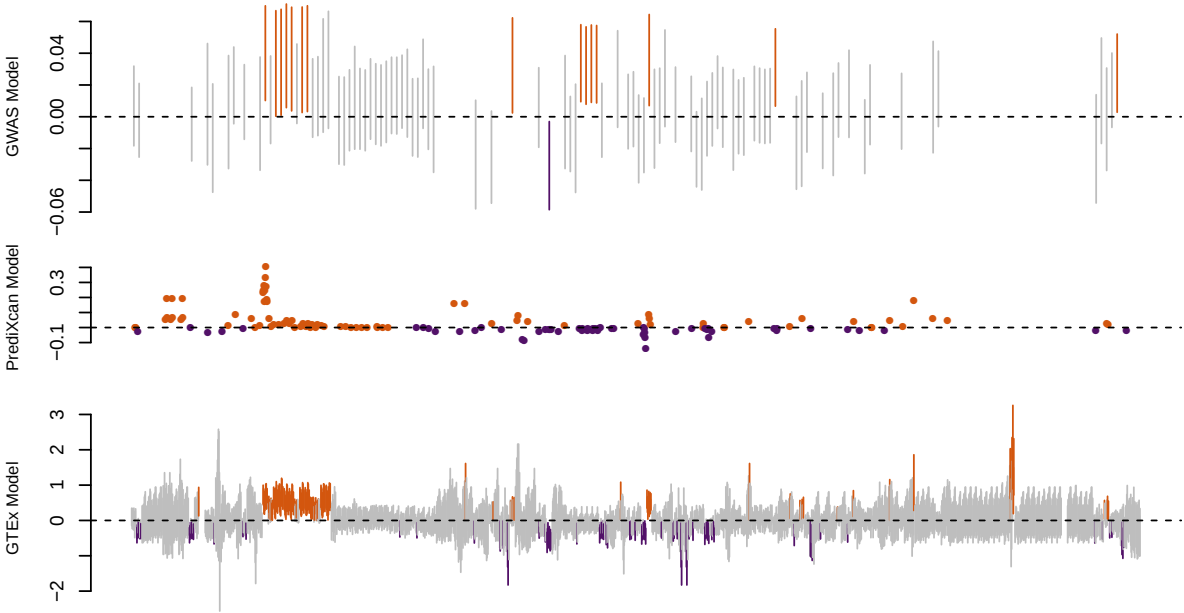
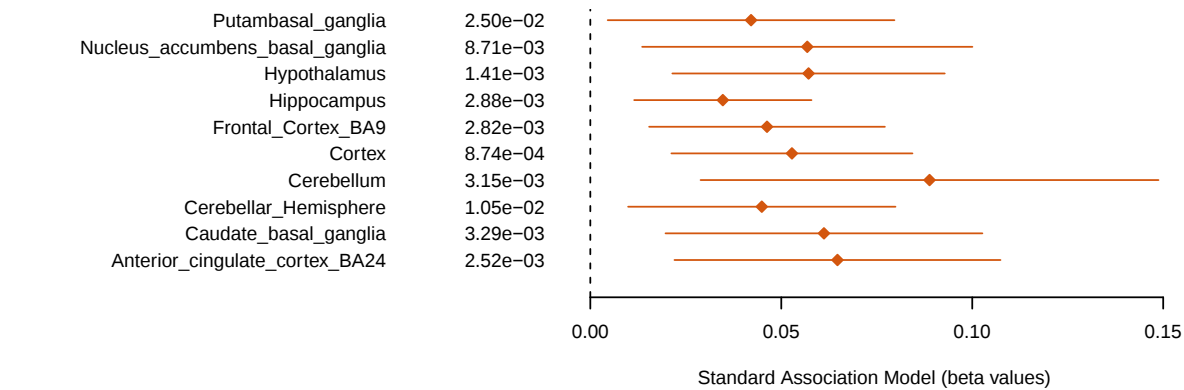
ENSG00000186468 (RPS23)
NIC ~ Across_Tissue

sHom p-value
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sHet 7.21e-04



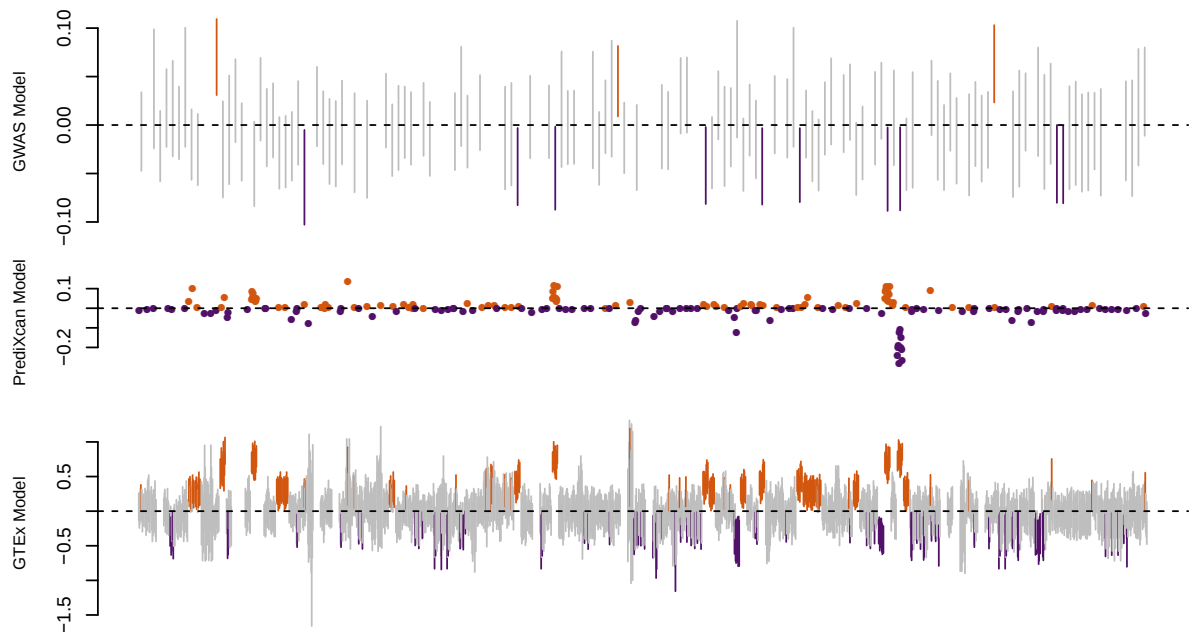
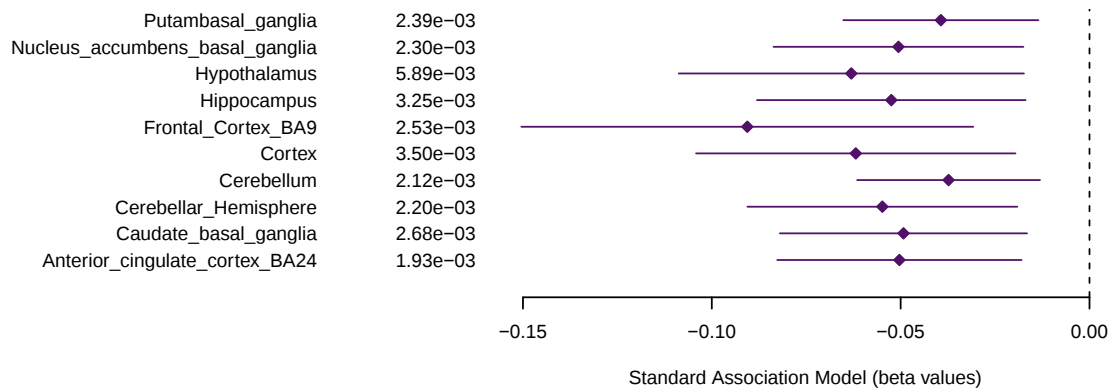
ENSG00000189306 (RRP7A)
MJ ~ Across_Tissue

sHom p-value
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sHet 1.73e-04



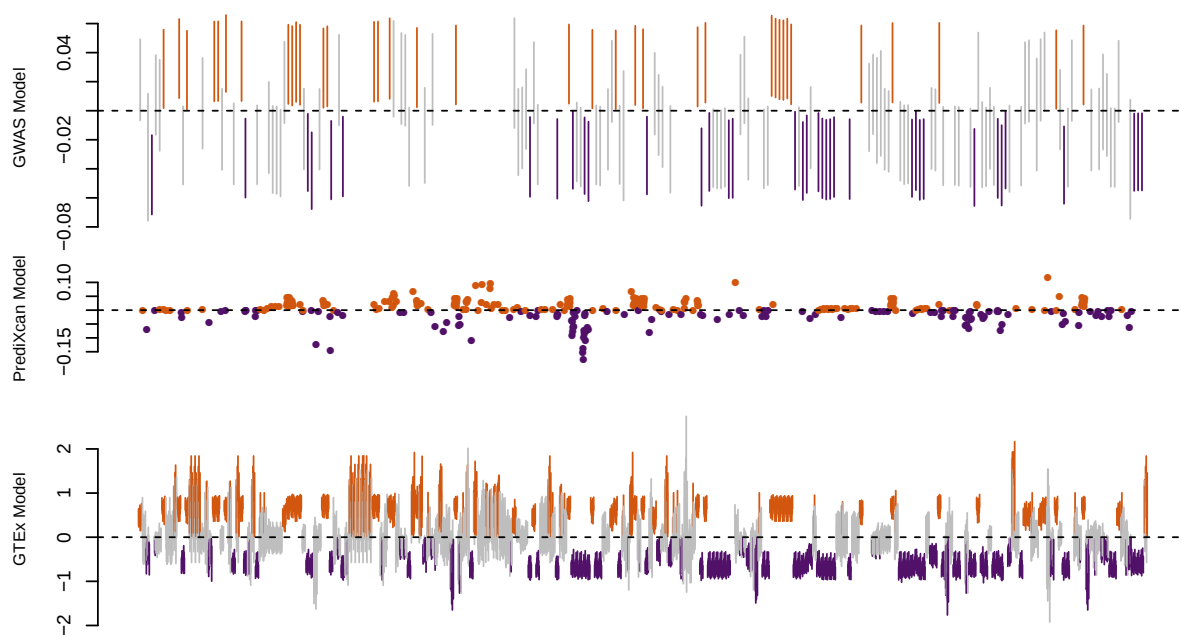
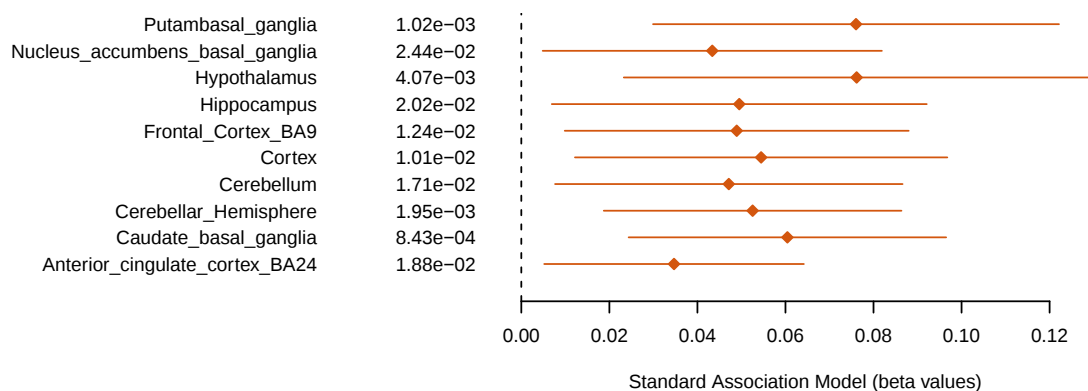
ENSG00000197558 (SSPO) NIC ~ Across_Tissue

sHom p-value
1.08e-08
sHet 3.11e-05



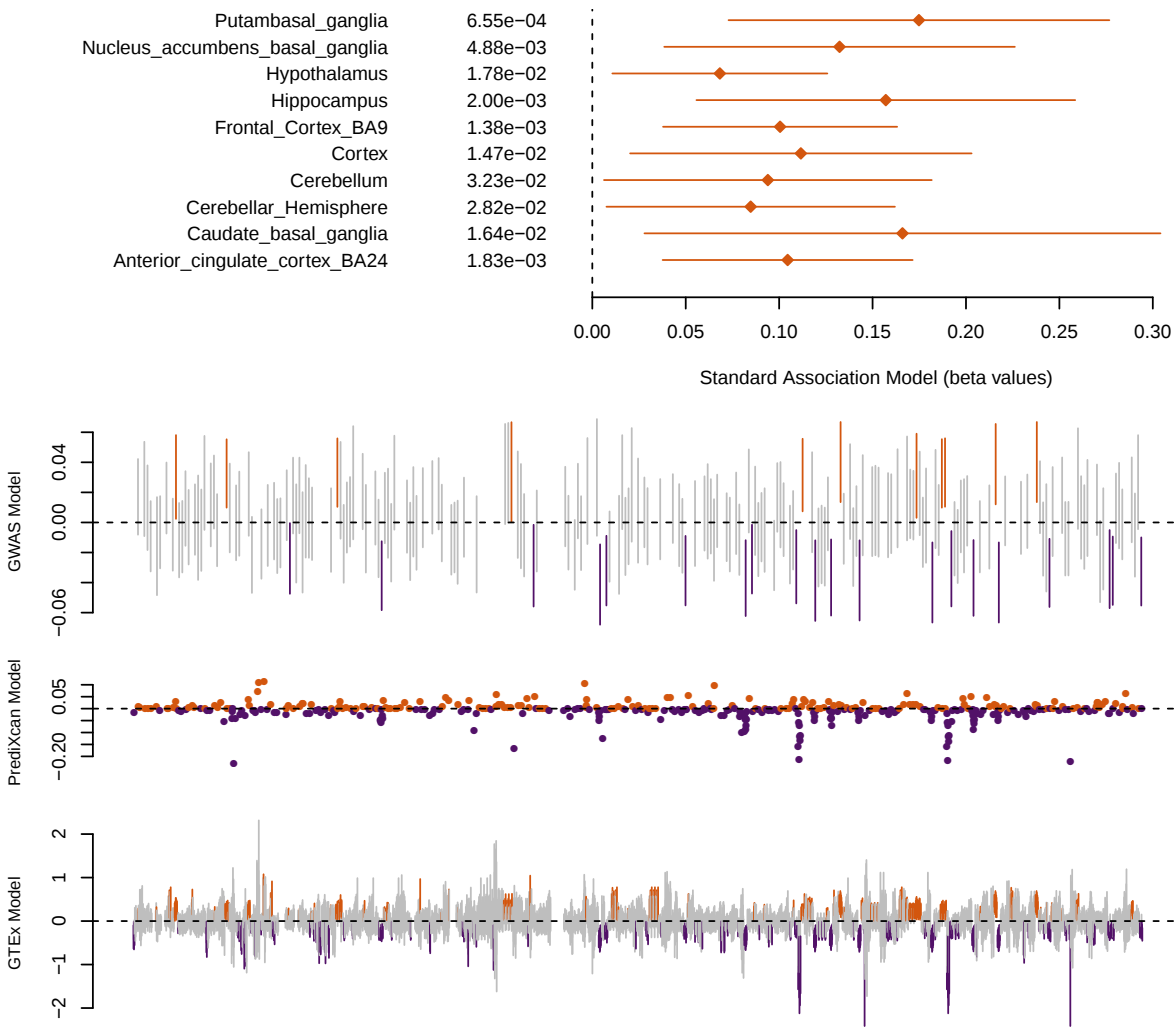
ENSG00000213462 (ERV3-1) Family_Alcoholism ~ Across_Tissue

sHom 4.51e-07
sHet 6.96e-04



ENSG00000237765 (FAM200B)
MJ ~ Across_Tissue

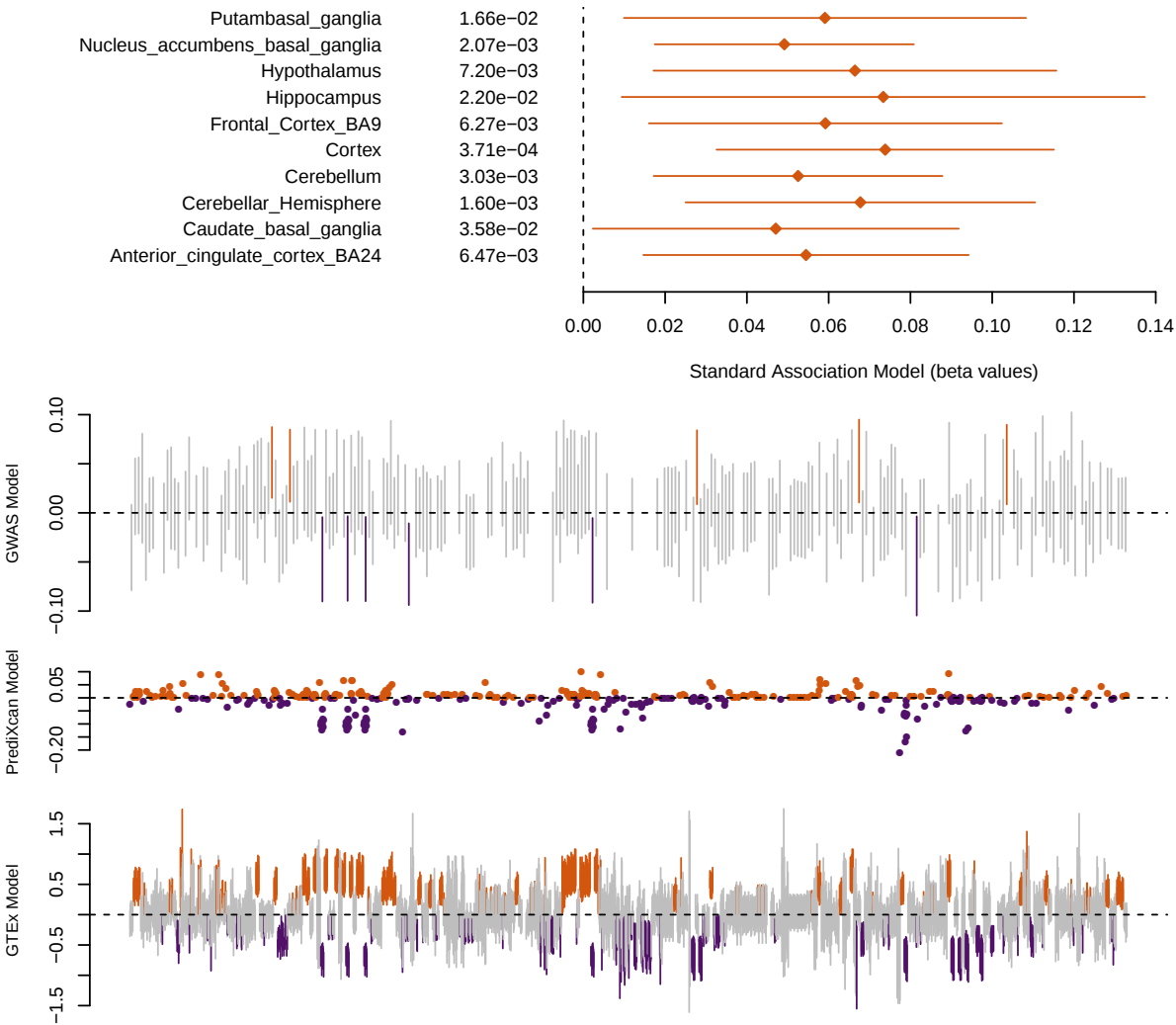
sHom p-value
6.87e-07
sHet 1.12e-03



1.2 Across Tissue Phet Results

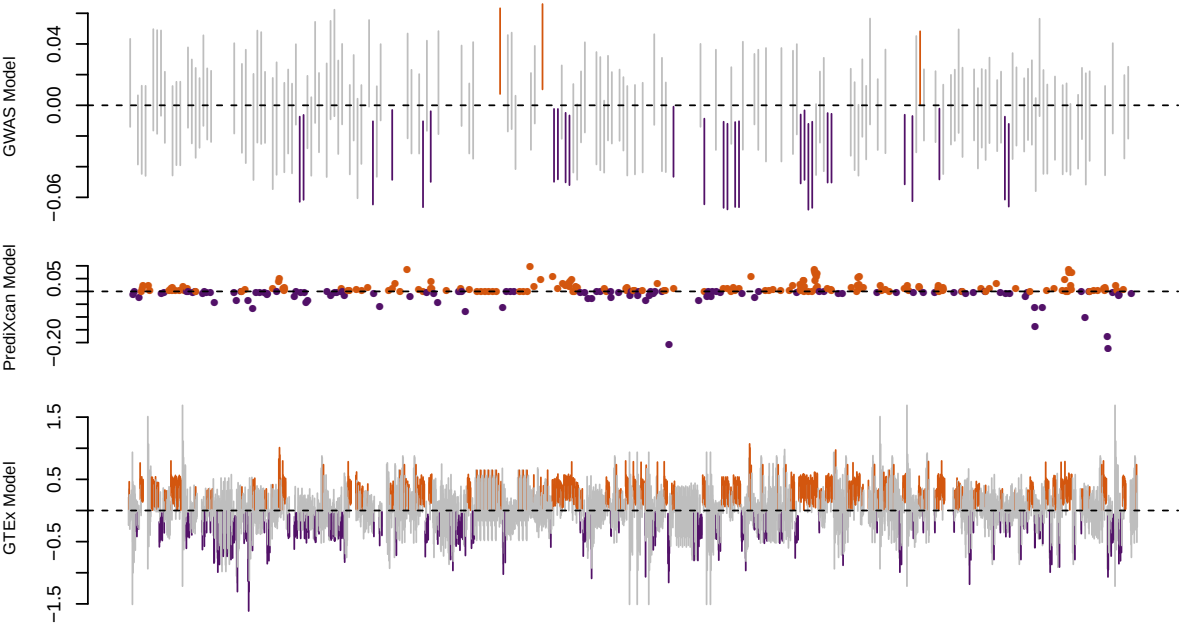
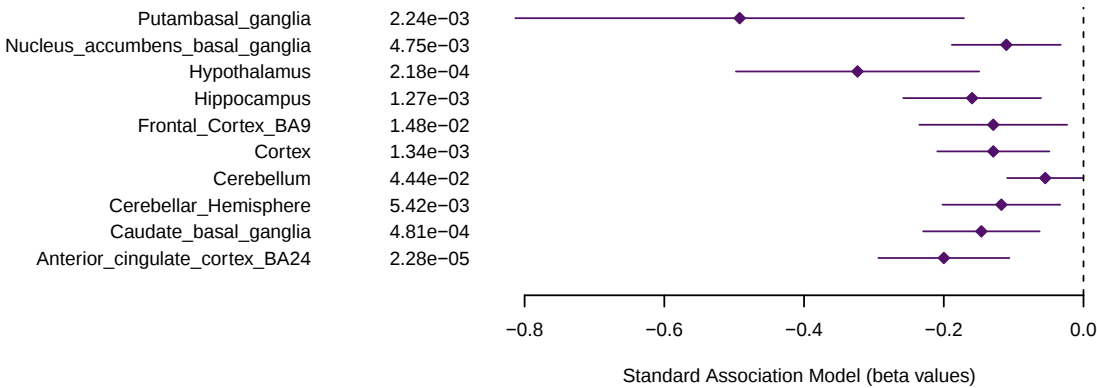
ENSG00000021488 (SLC7A9)
NIC ~ Across_Tissue

sHom p-value
 1.16e-07
sHet 1.85e-04



ENSG00000054219 (LY75)
MJ ~ Across_Tissue

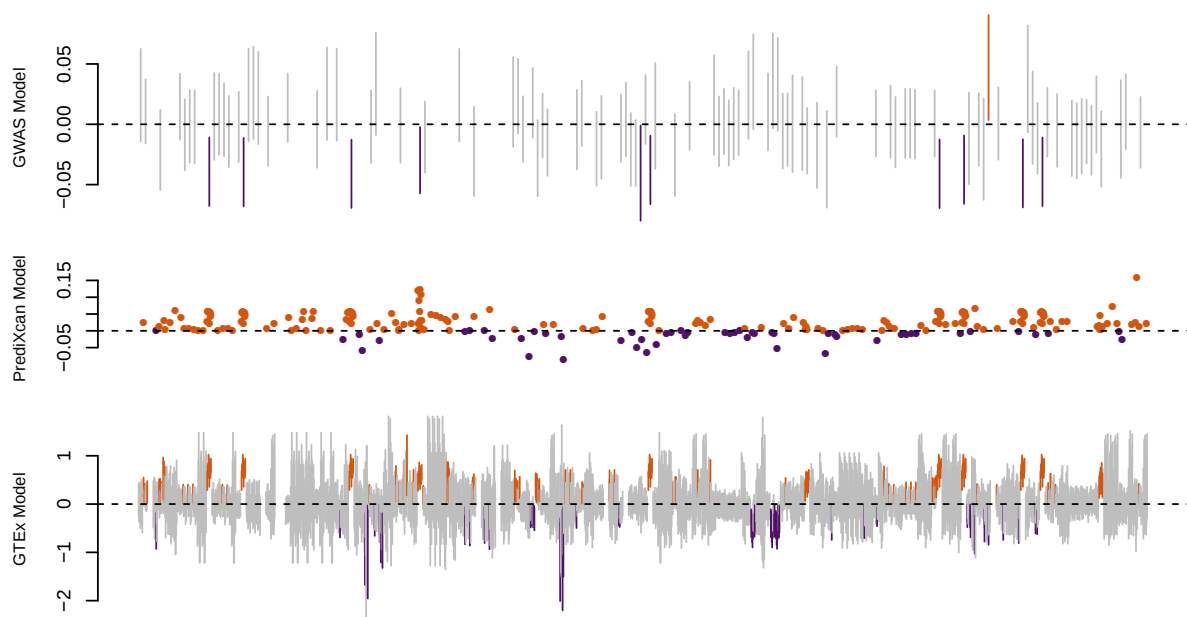
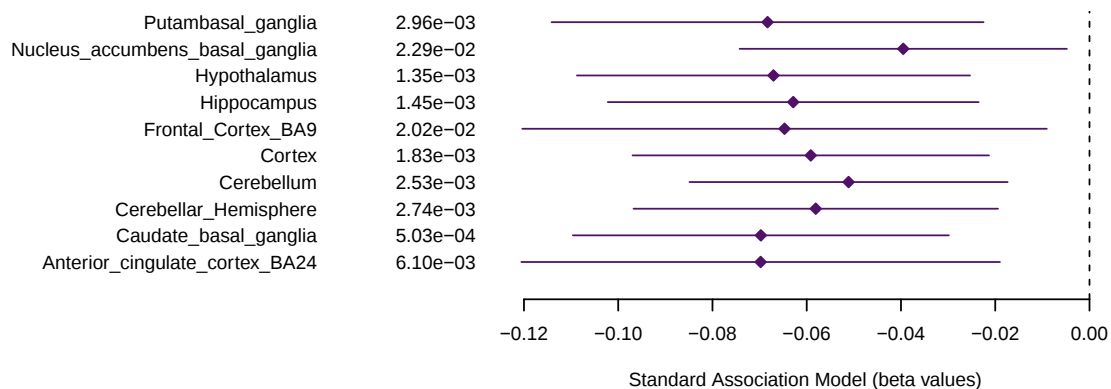
sHom p-value
 1.10e-08
sHet 1.22e-05



ENSG00000084072 (PPIE)

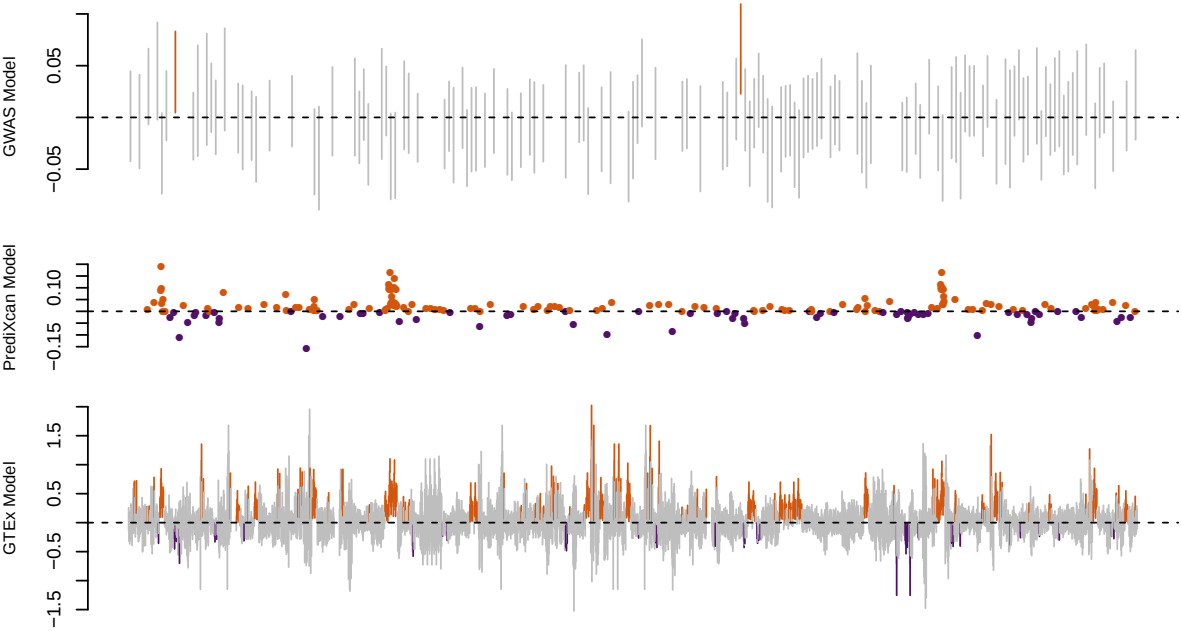
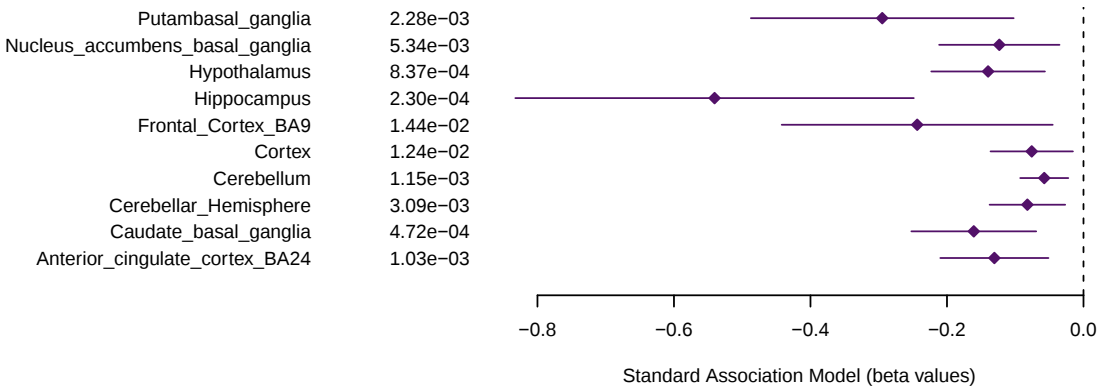
Family_Alcoholism ~ Across_Tissue

sHom p-value
3.37e-08
sHet 4.76e-05



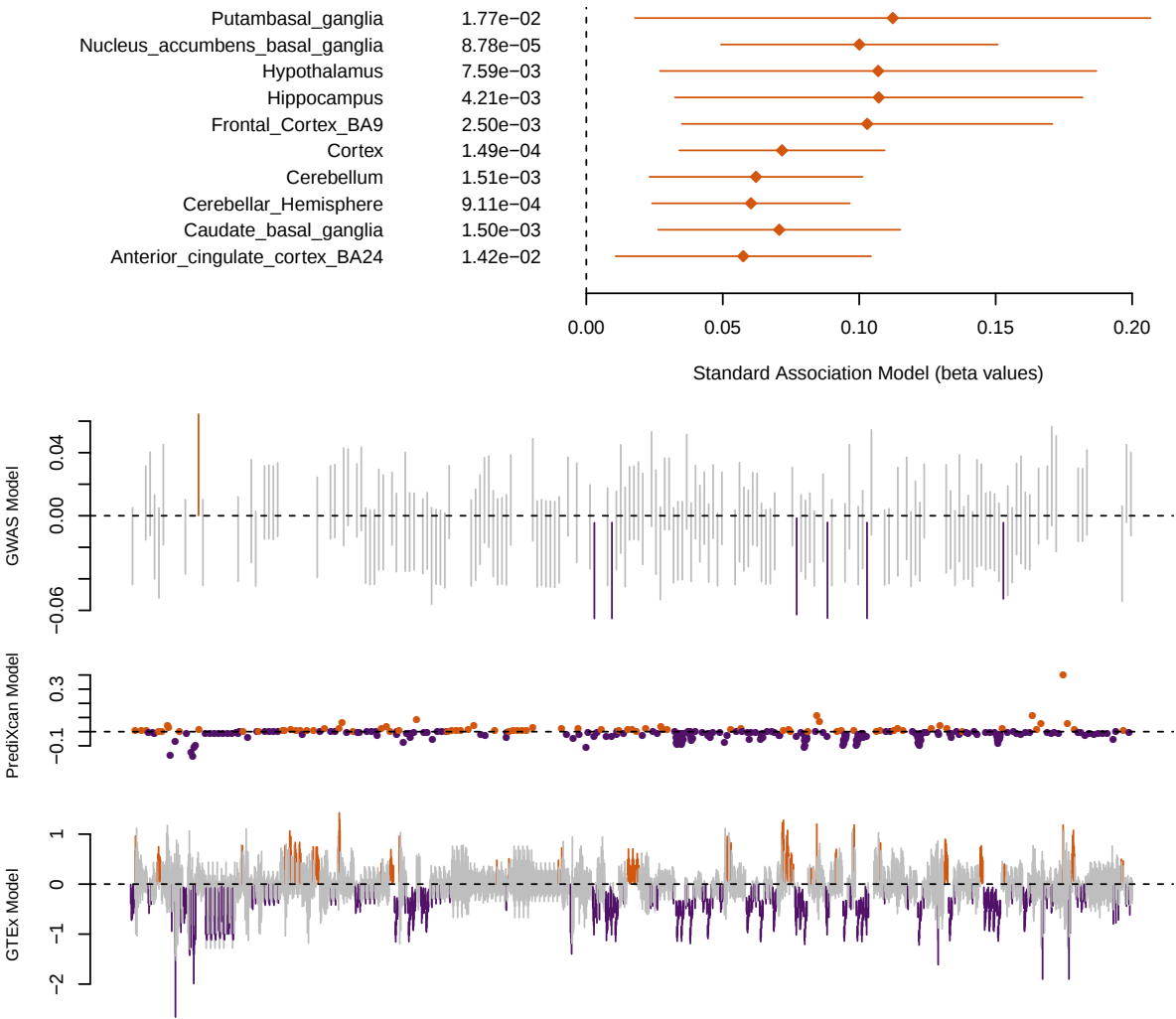
ENSG00000103245 (CIAO3)
Alc_Dep ~ Across_Tissue

sHom p-value
8.84e-08
sHet 1.42e-04



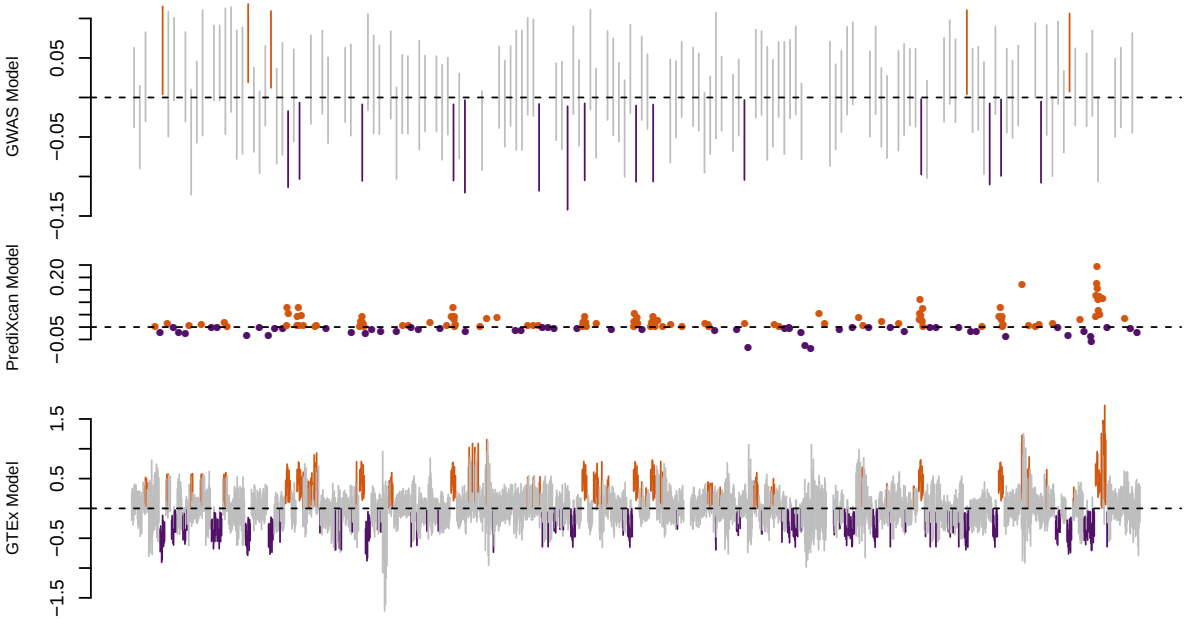
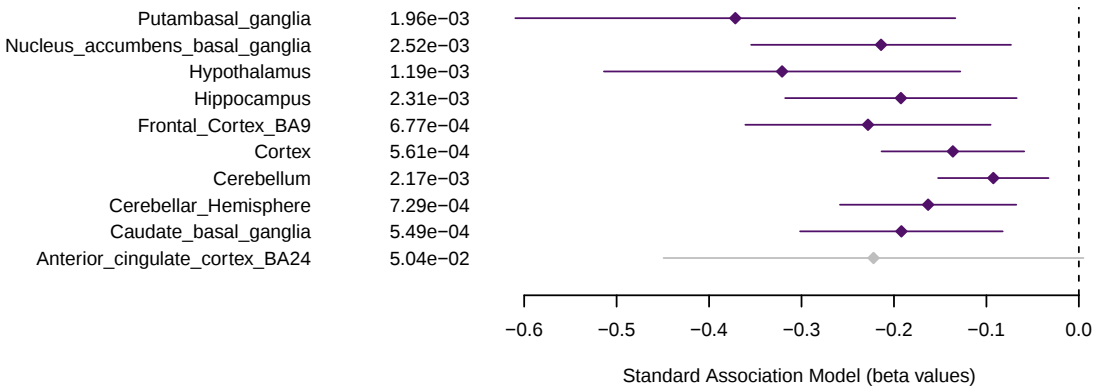
ENSG00000112031 (MTRF1L)
MJ ~ Across_Tissue

sHom p-value
 1.87e-08
sHet 2.77e-05



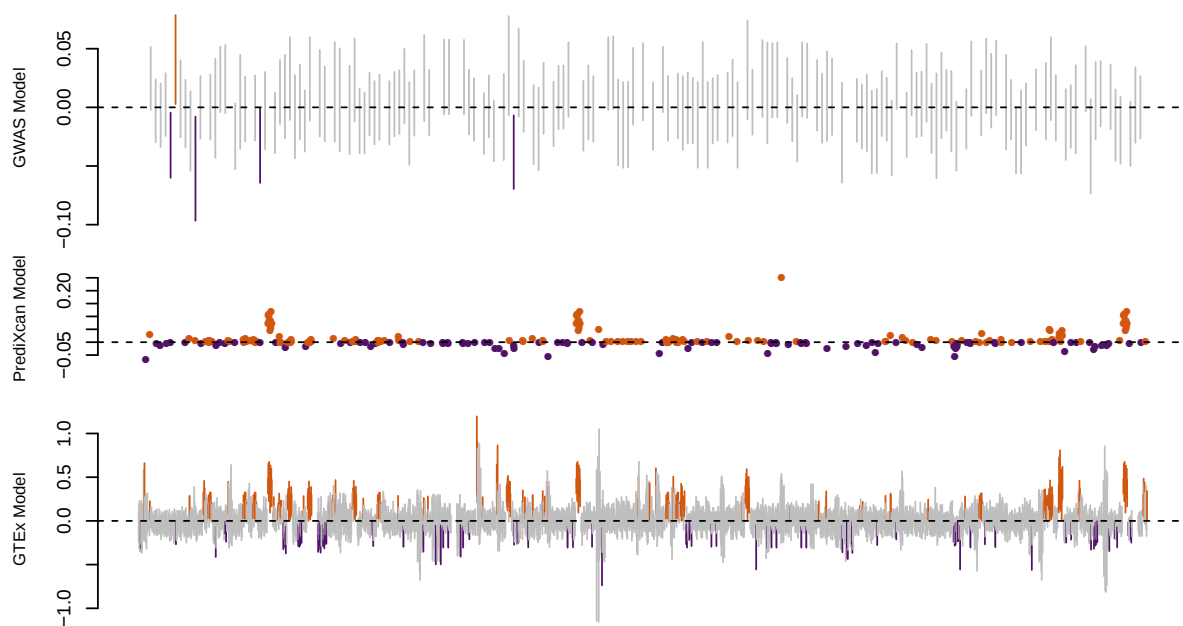
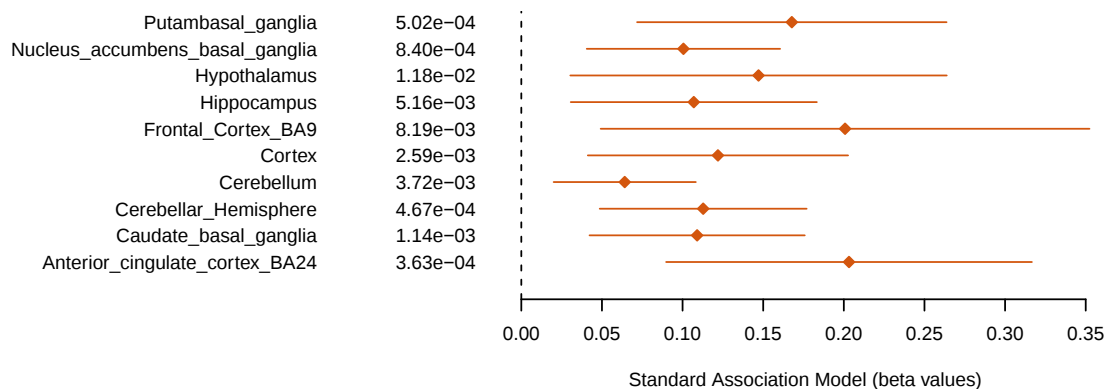
ENSG00000131845 (ZNF304)
Marijuana_Strong_Desire ~ Across_Tissue

sHom p-value
sHet 8.44e-06



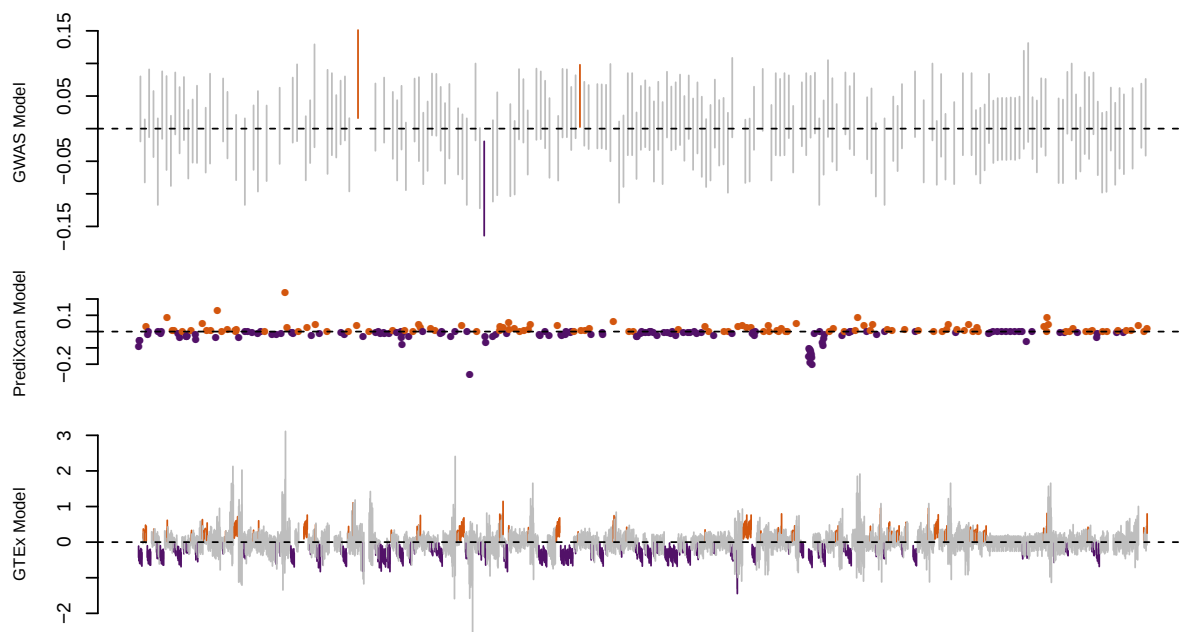
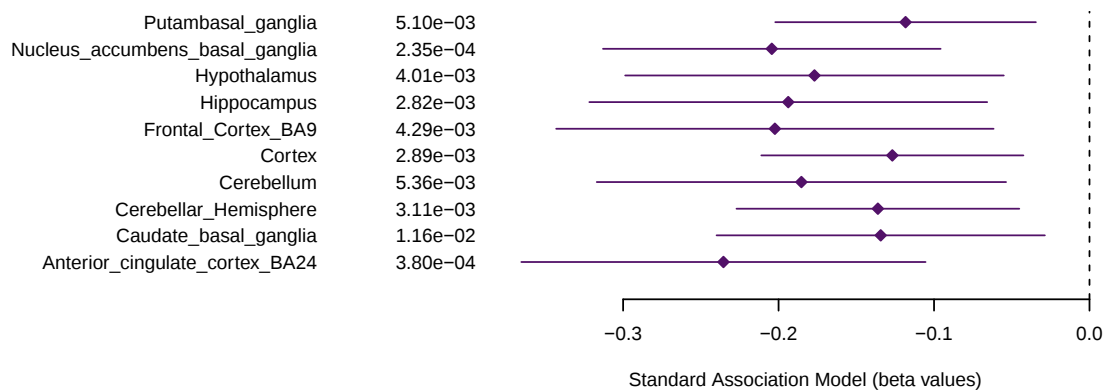
ENSG00000168385 (SEPTIN2) Family_Alcoholism ~ Across_Tissue

sHom p-value
5.51e-09
sHet 1.36e-05



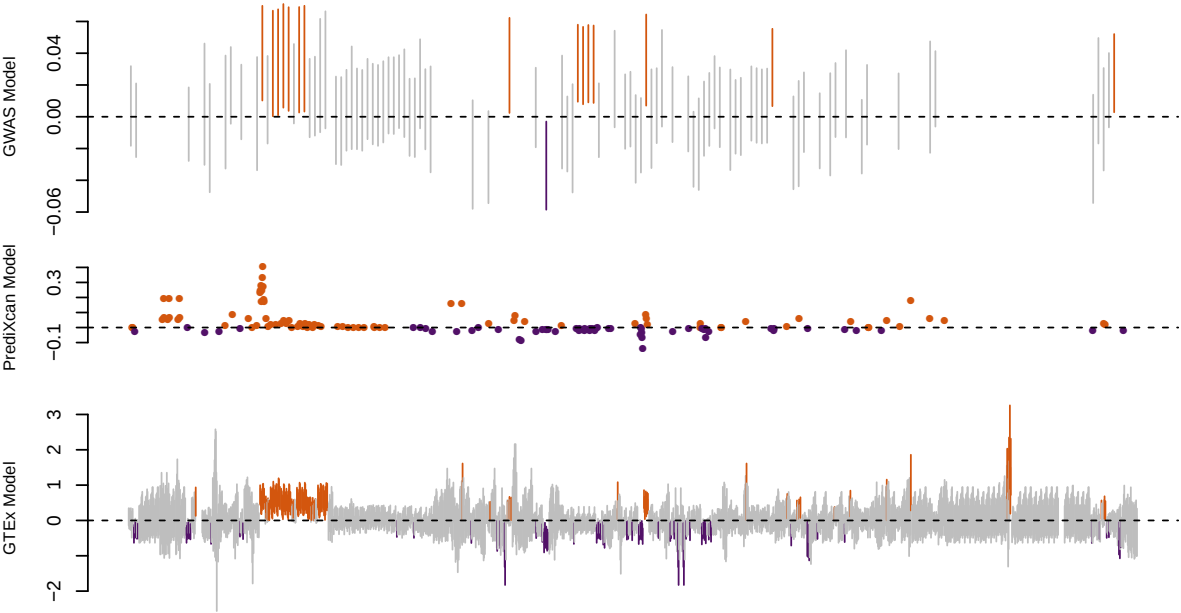
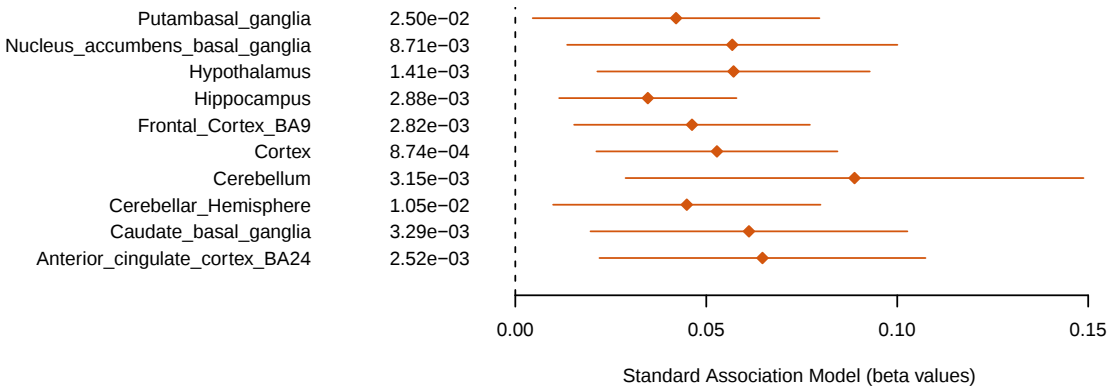
ENSG00000180376 (CCDC66) Marijuana_Strong_Desire ~ Across_Tissue

sHom 2.03e-08
 sHet 4.58e-05



ENSG00000189306 (RRP7A)
MJ ~ Across_Tissue

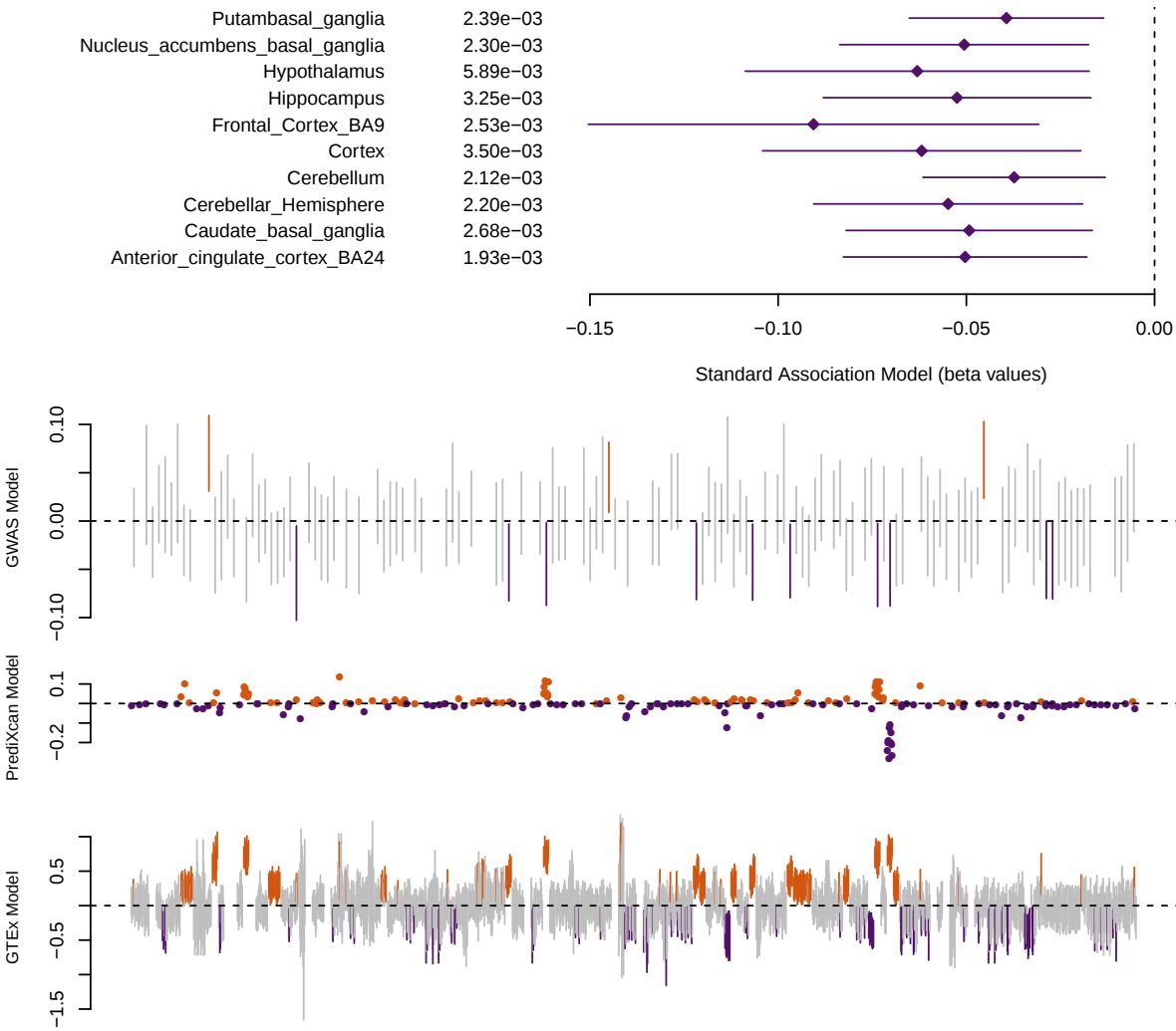
sHom p-value
 1.04e-07
sHet 1.73e-04



ENSG00000197558 (SSPO)

NIC ~ Across_Tissue

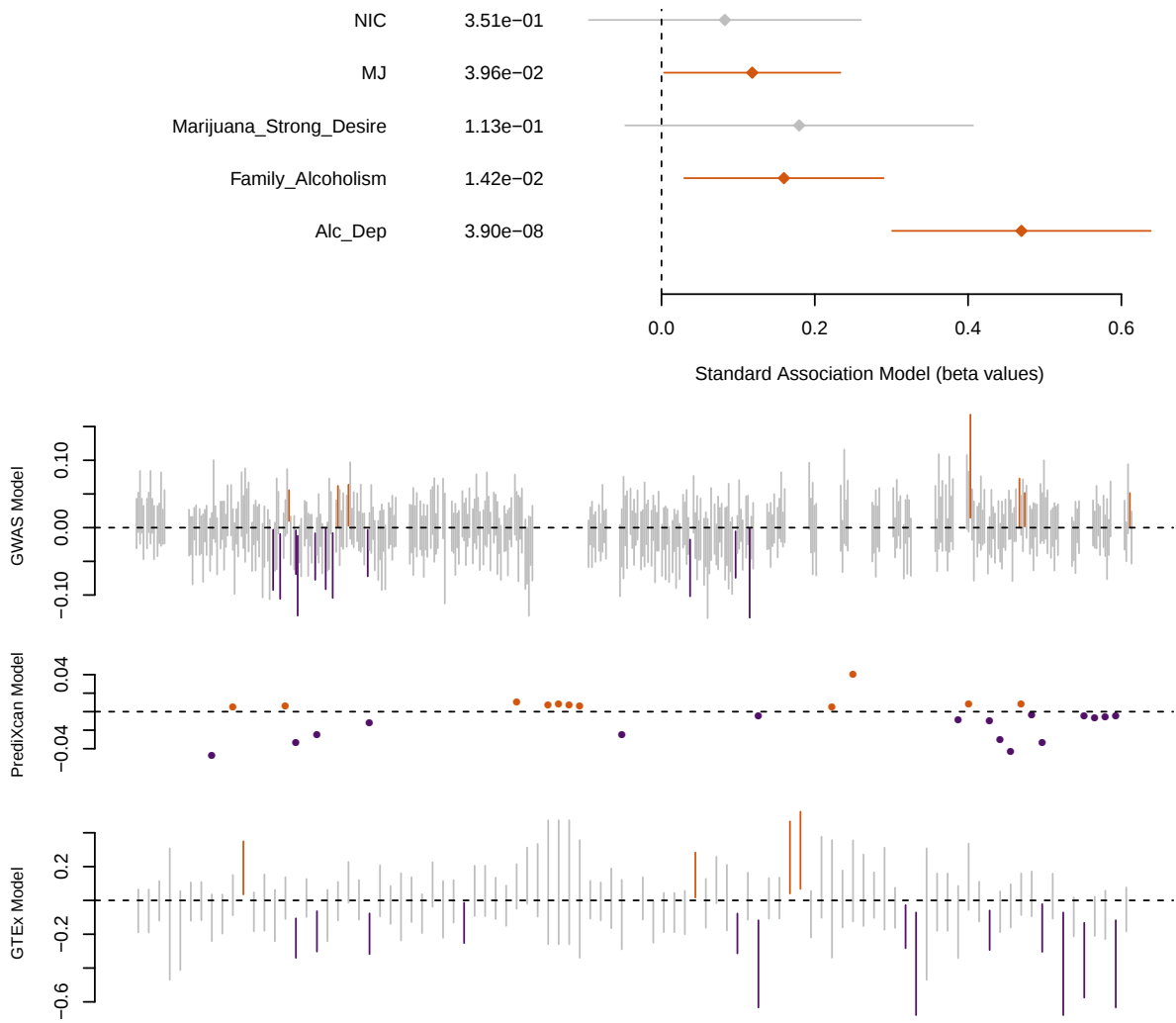
sHom p-value
sHet 1.08e-08
 3.11e-05



1.3 Across Cohort Phom Results †

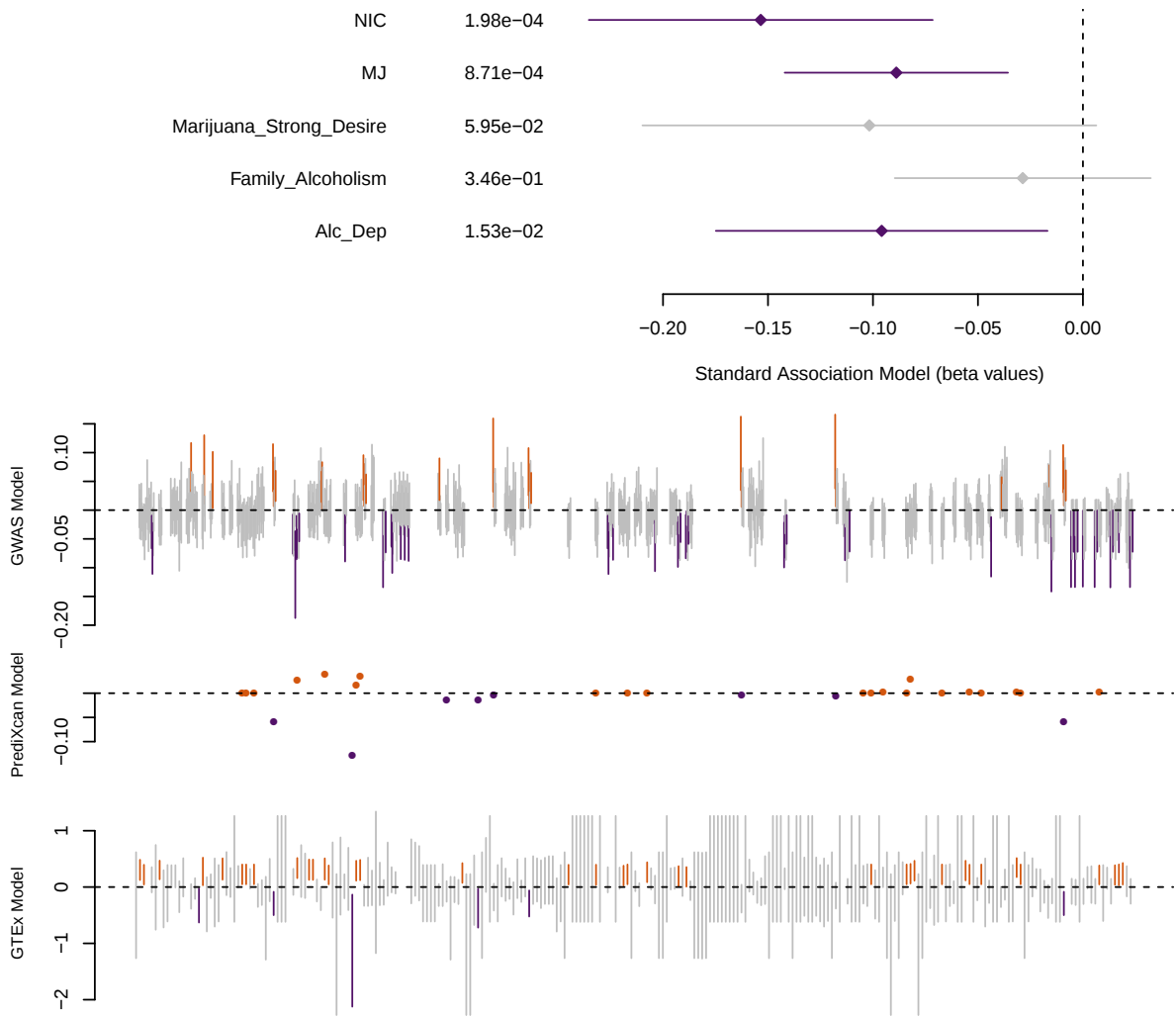
ENSG00000005206 (SPPL2B)
Across_Cohort ~ Hippocampus

sHom p-value
 2.87e-05
sHet 1.80e-05



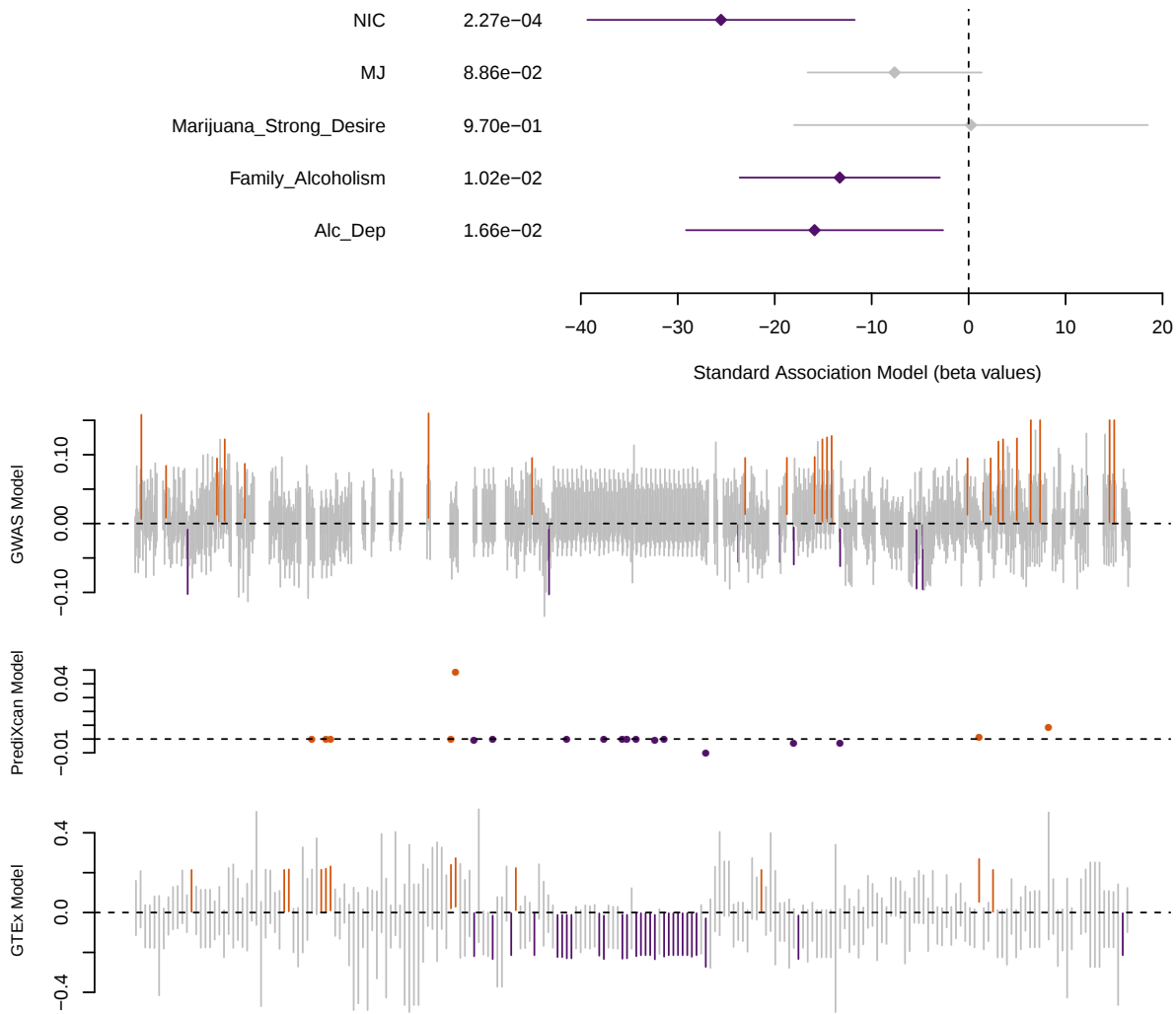
ENSG00000141127 (PRPSAP2)
Across_Cohort ~ Hypothalamus

sHom p-value
 6.52e-06
sHet 6.95e-05



ENSG00000198160 (MIER1)
Across_Cohort ~ Cortex

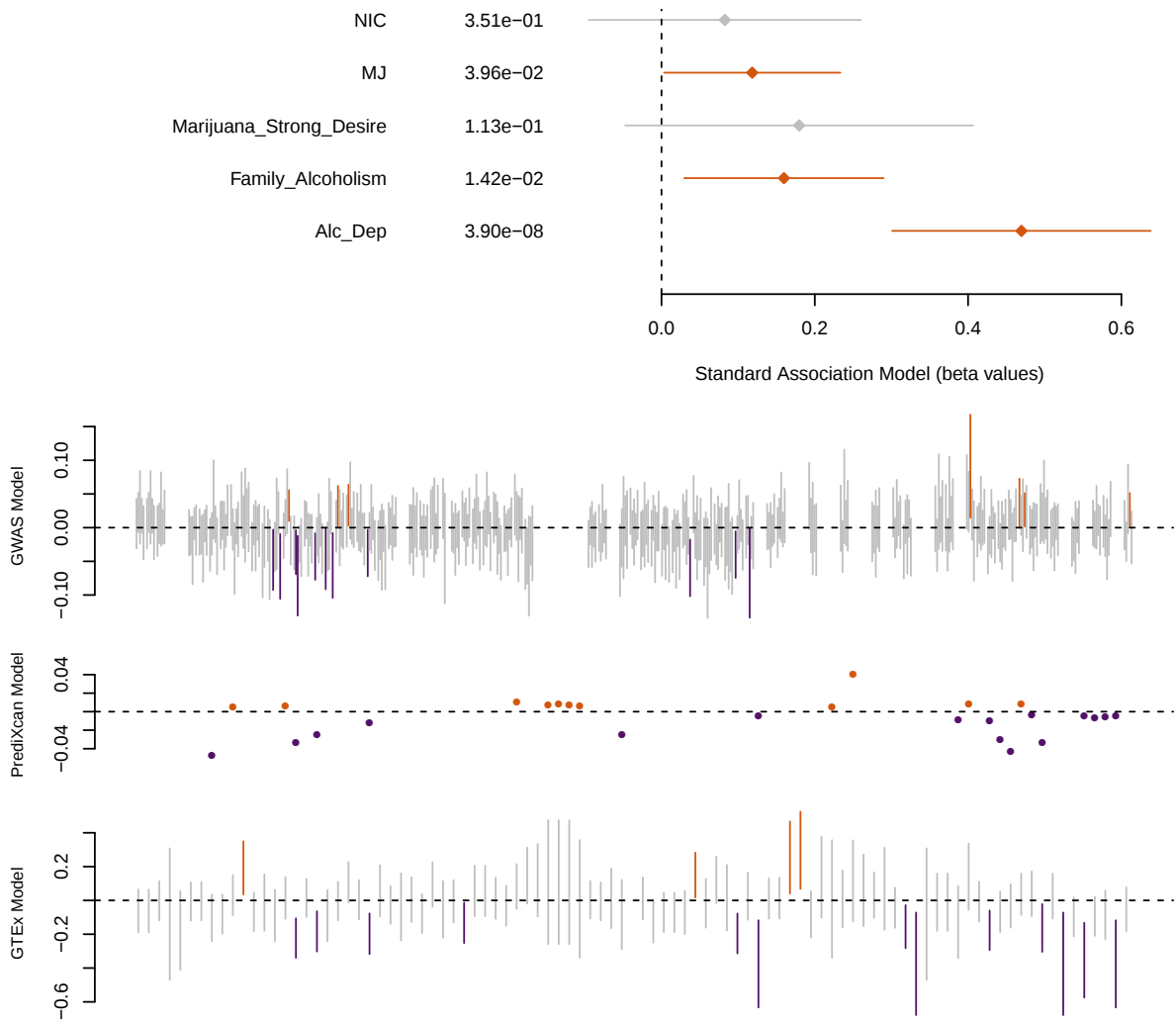
sHom p-value
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sHet 8.21e-04



1.4 Across Cohort Phet Results †

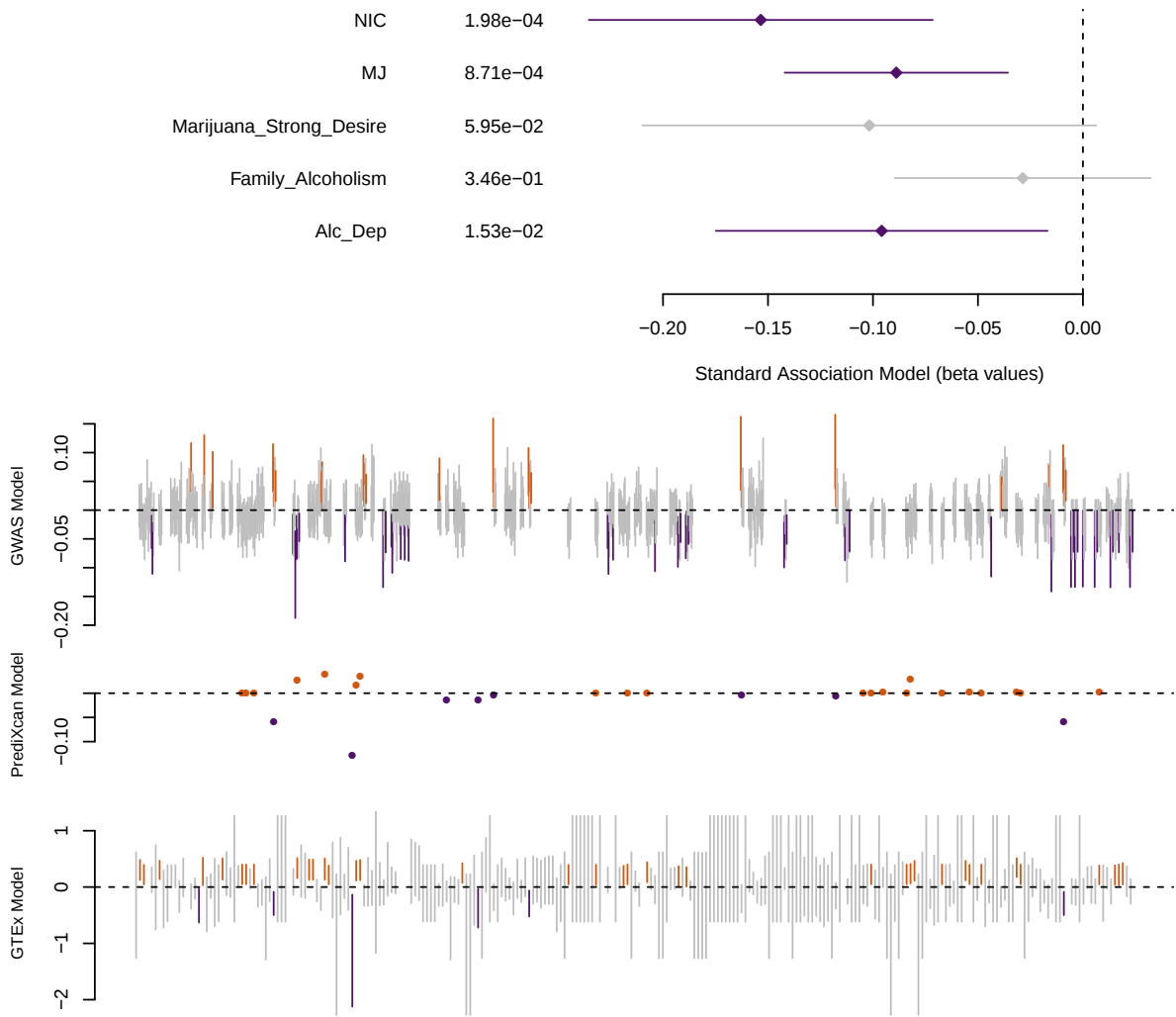
ENSG00000005206 (SPPL2B)
Across_Cohort ~ Hippocampus

sHom p-value
 2.87e-05
sHet 1.80e-05



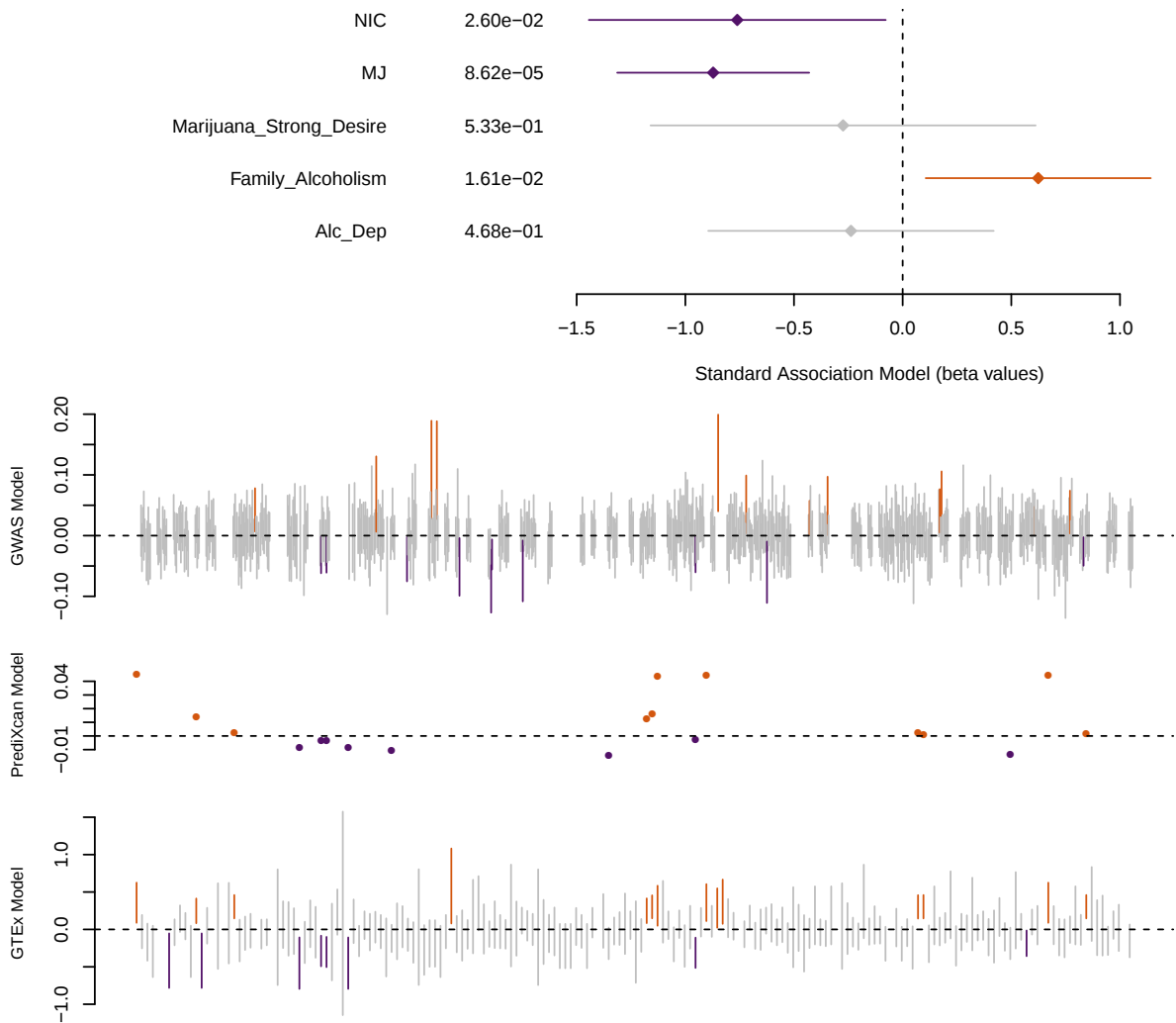
ENSG00000141127 (PRPSAP2)
Across_Cohort ~ Hypothalamus

sHom p-value
 6.52e-06
sHet 6.95e-05



ENSG00000173705 (SUSD5)
Across_Cohort ~ Frontal_Cortex_BA9

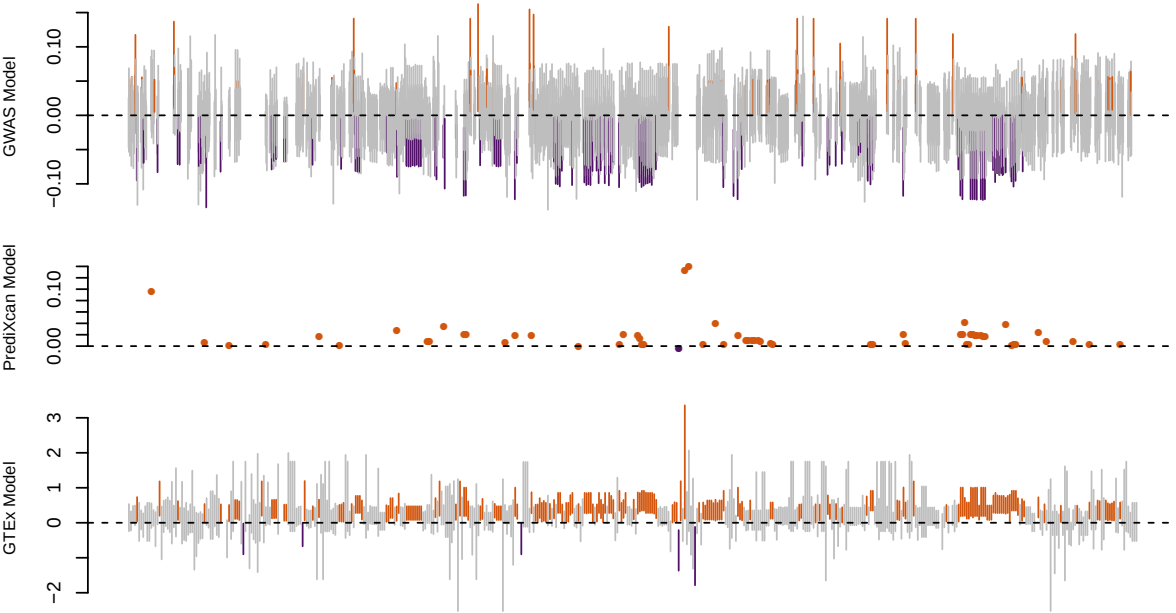
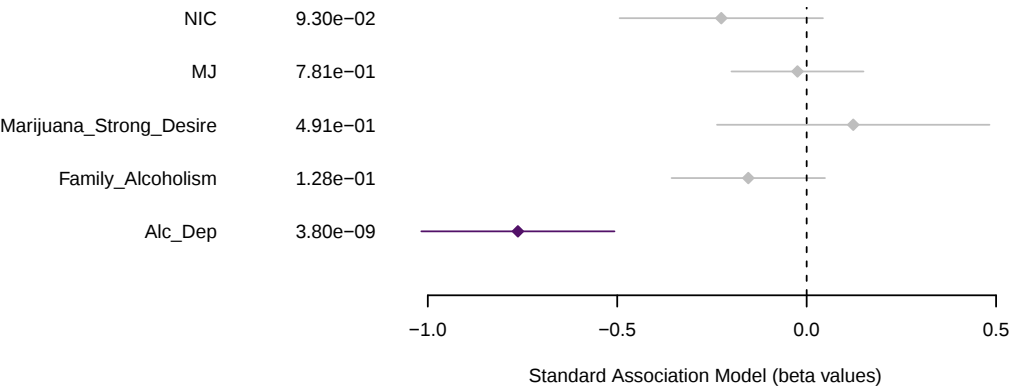
sHom p-value
sHet 5.10e-02
6.39e-05



ENSG00000206344 (HCG27)

Across_Cohort ~ Hypothalamus

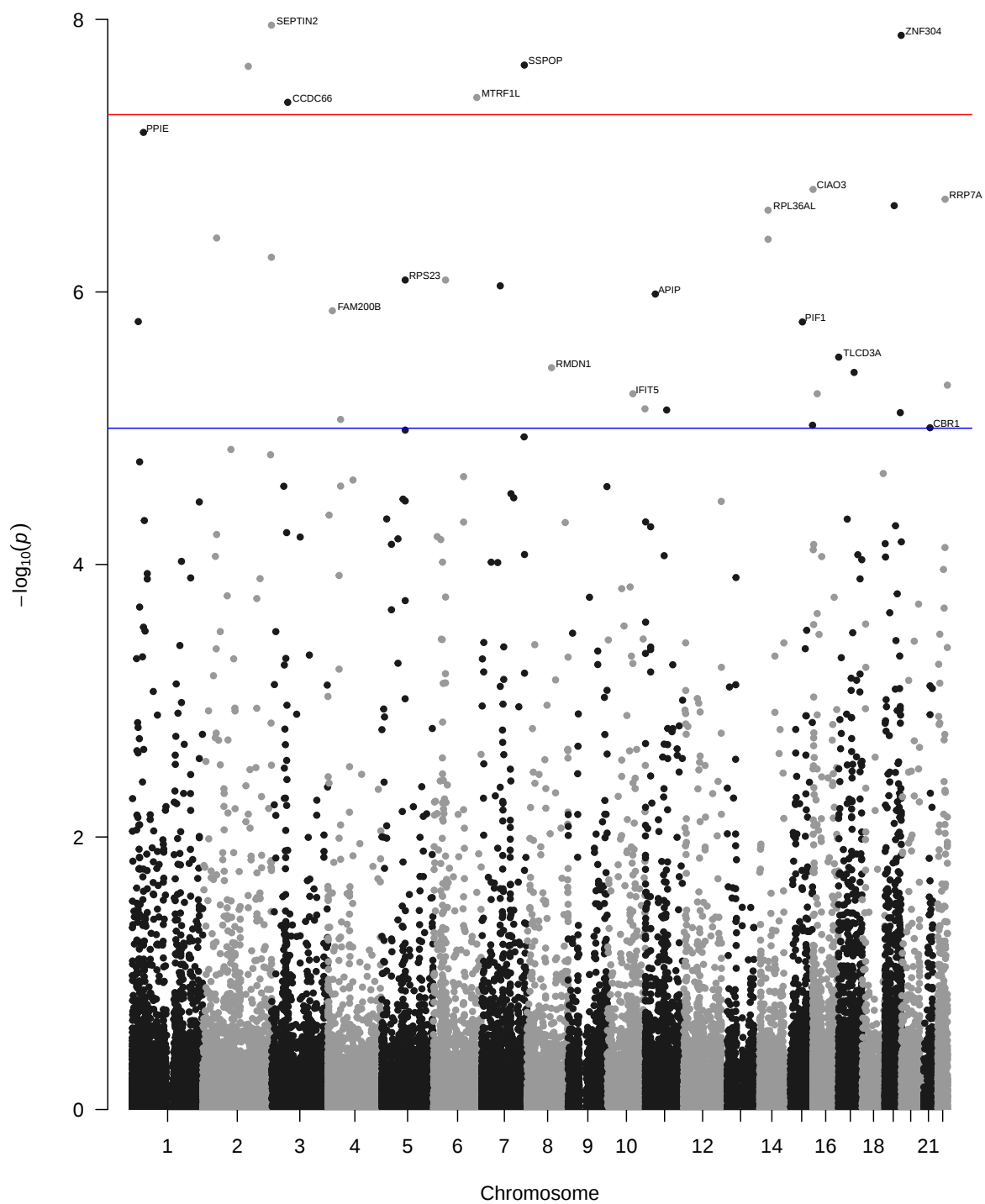
sHom p-value
sHet 3.75e-04
 2.40e-06



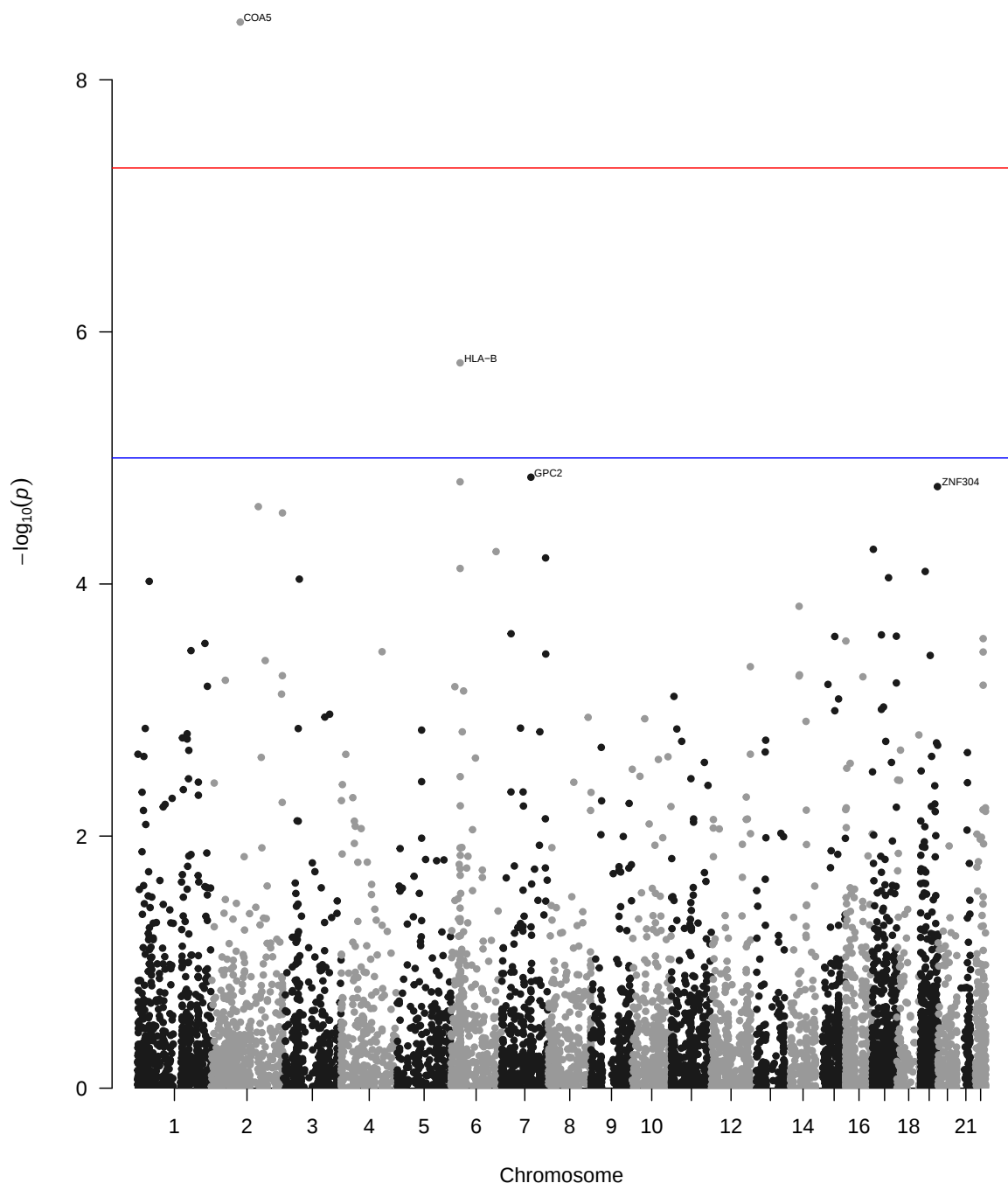
2 Manhattan Plots

Manhattan Plots of the 'phenotype across tissues'/'tissue across all phenotypes' analysis. Displays distribution of implicated genes across genome. Genes annotated are most significant and/or most implicated † genes within a chromosome.

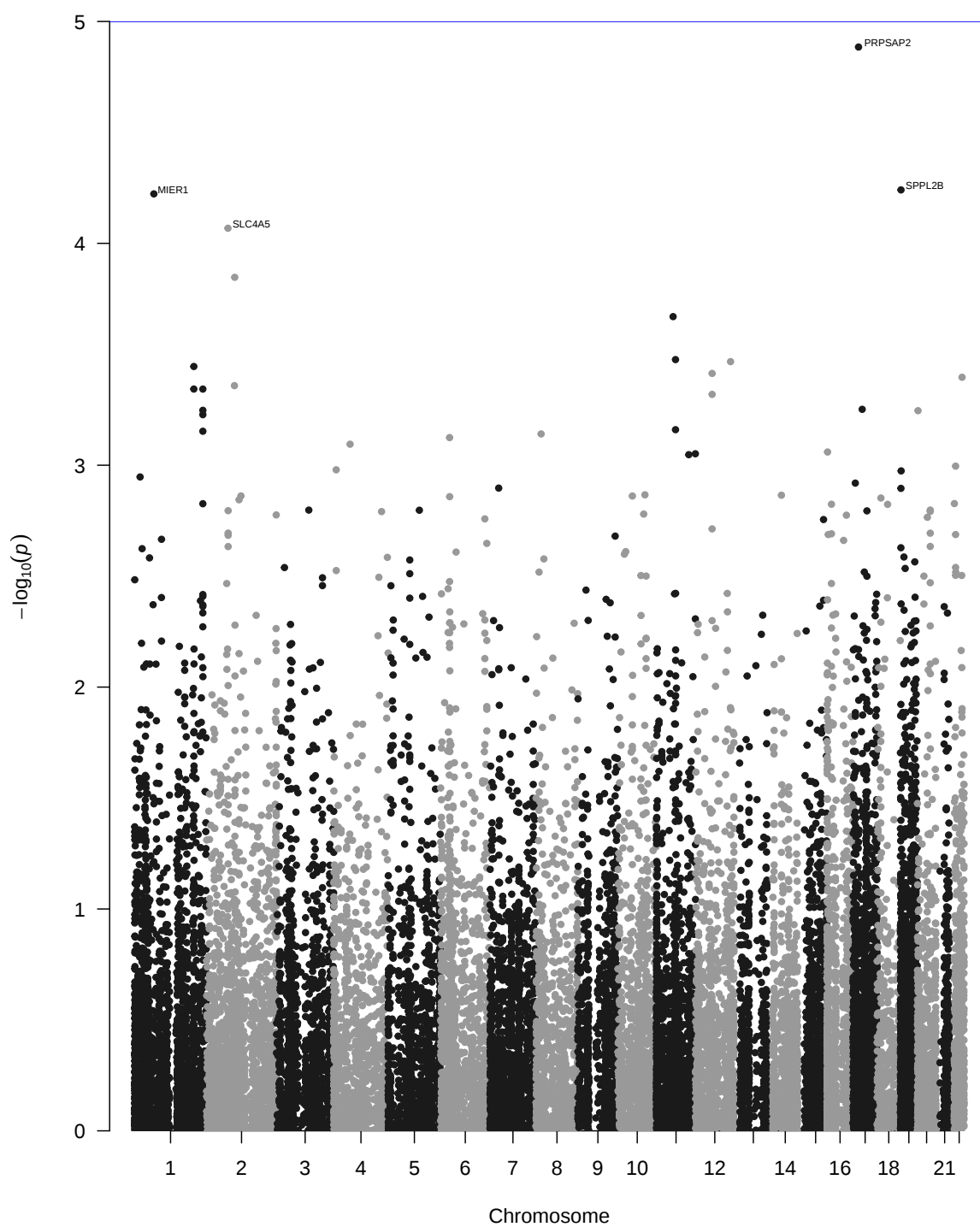
2.1 Across Tissue Phom Results



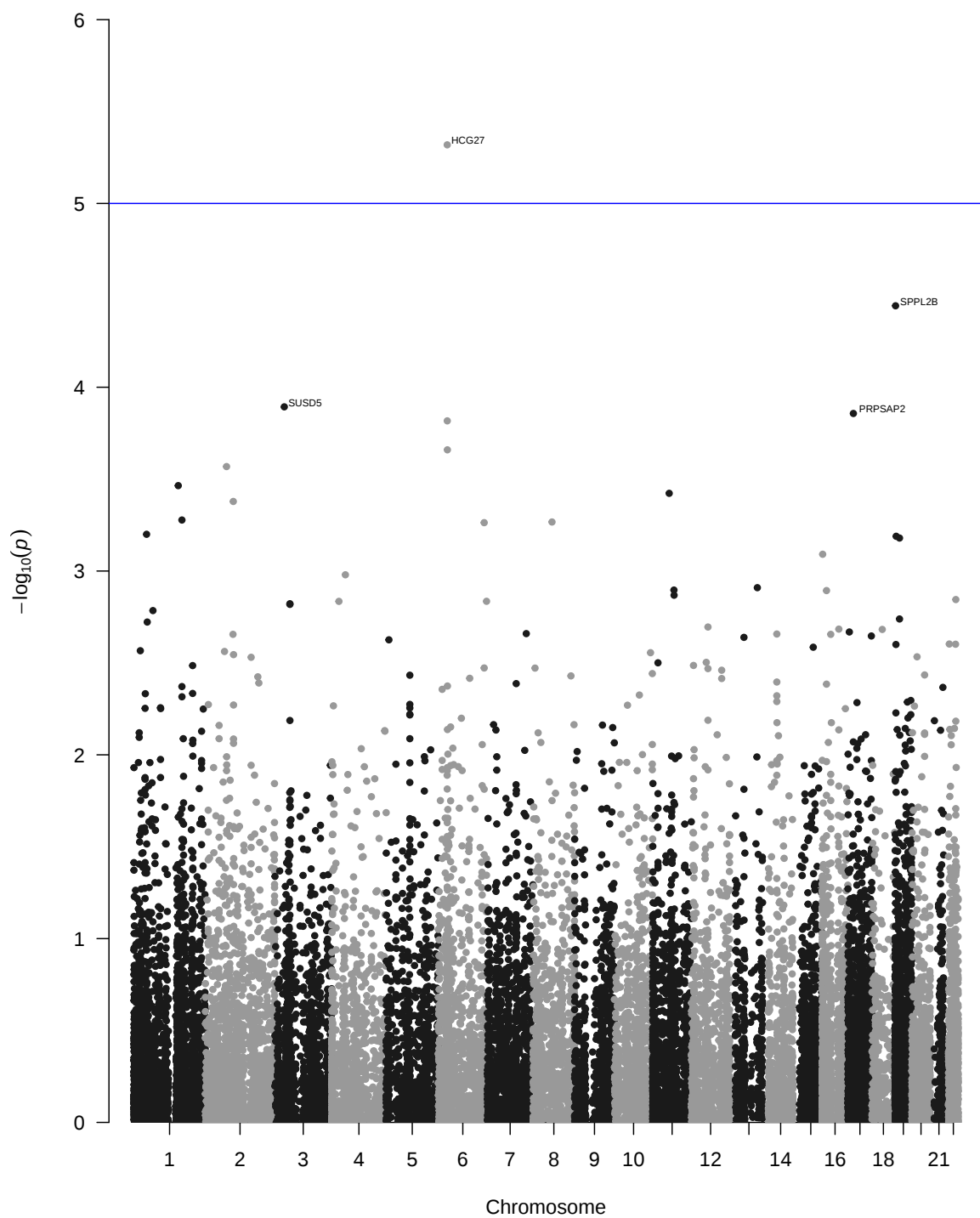
2.2 Across Tissue Phet Results



2.3 Across Cohort Phom Results †



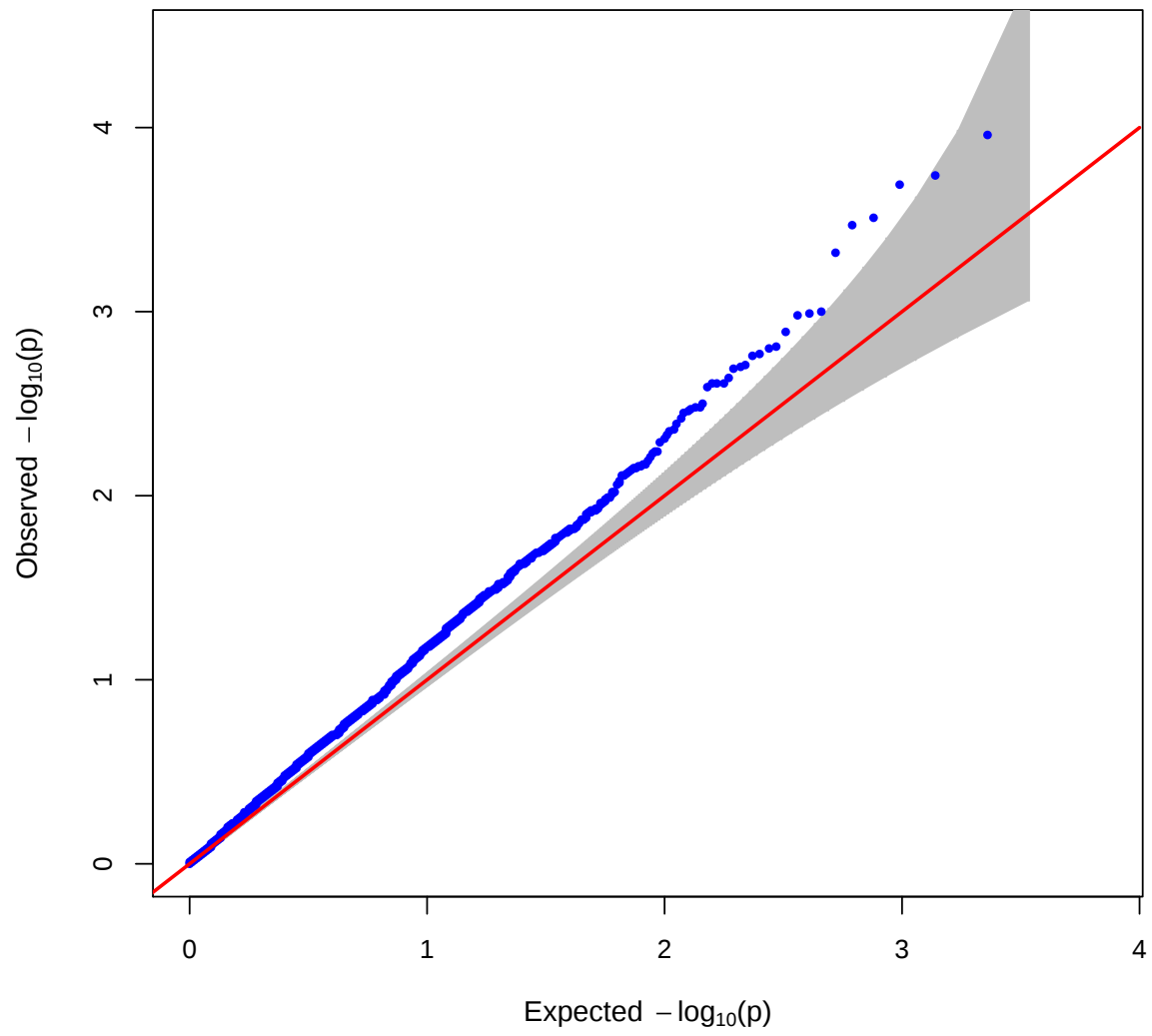
2.4 Across Cohort Phet Results †



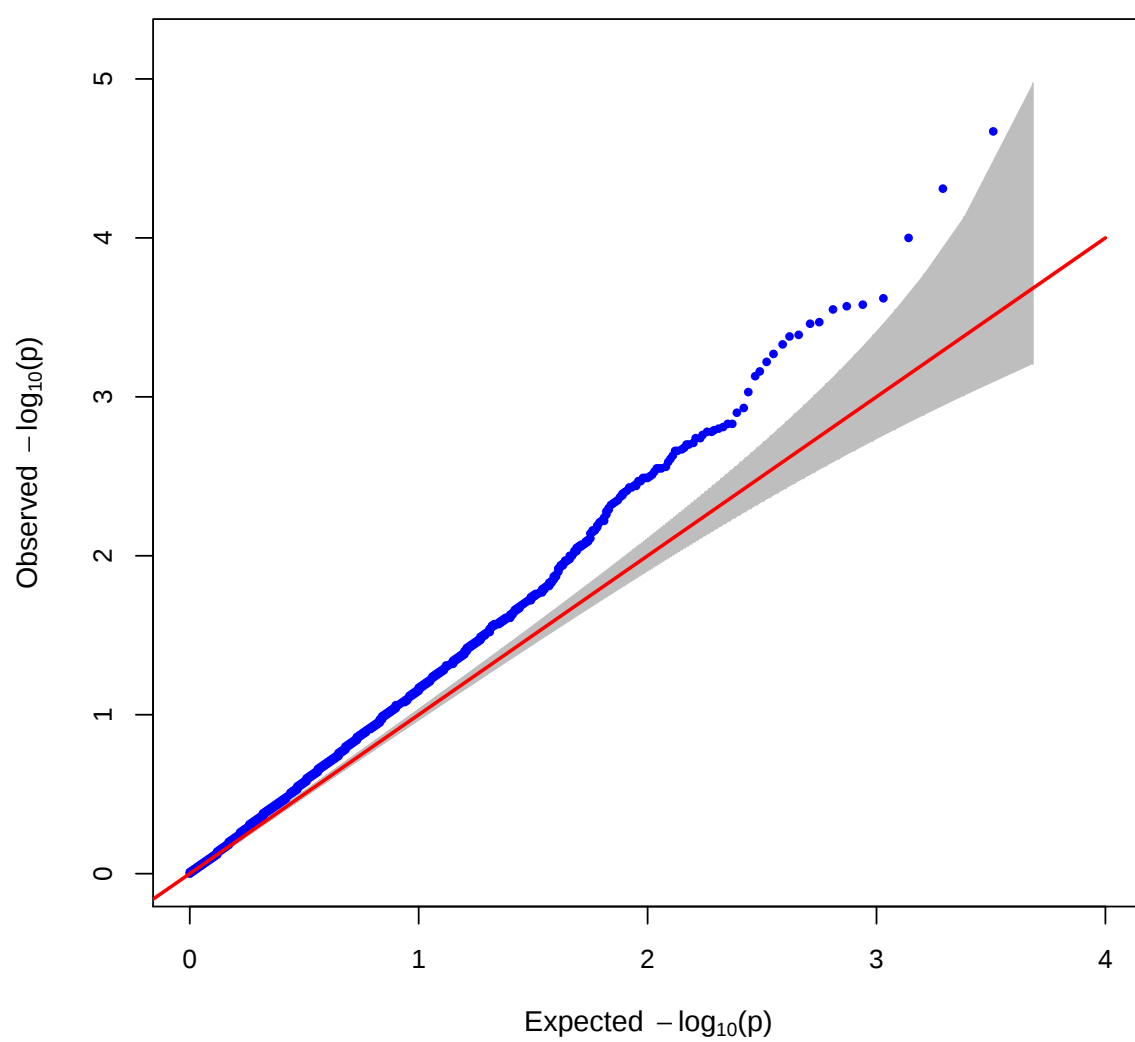
3 QQ-Plots

All quantile-quantile plots produced after GEMMA association is performed. Each tissue-phenotype combination is shown.

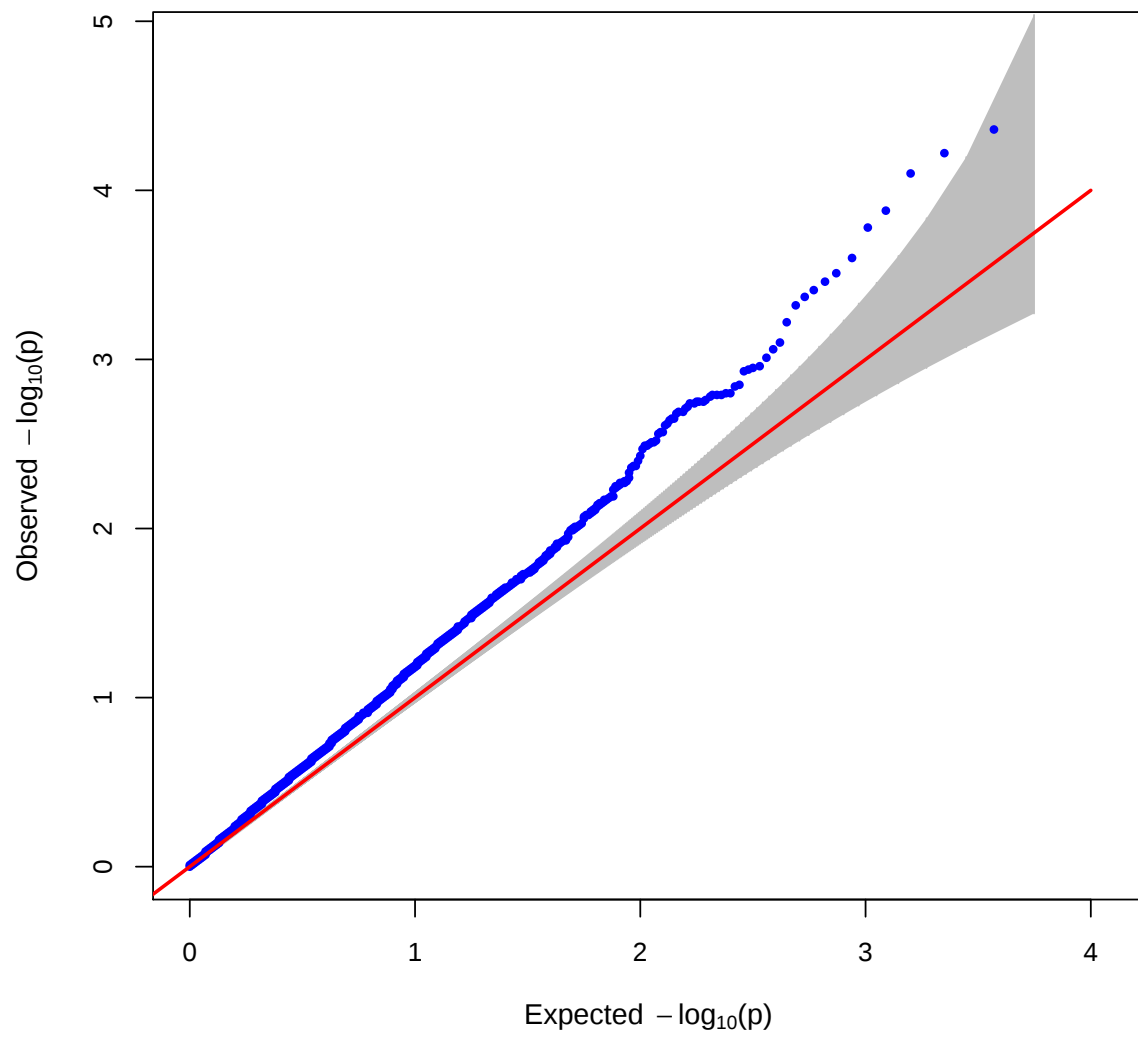
Alc_Dep by Anterior_cingulate_cortex_BA24



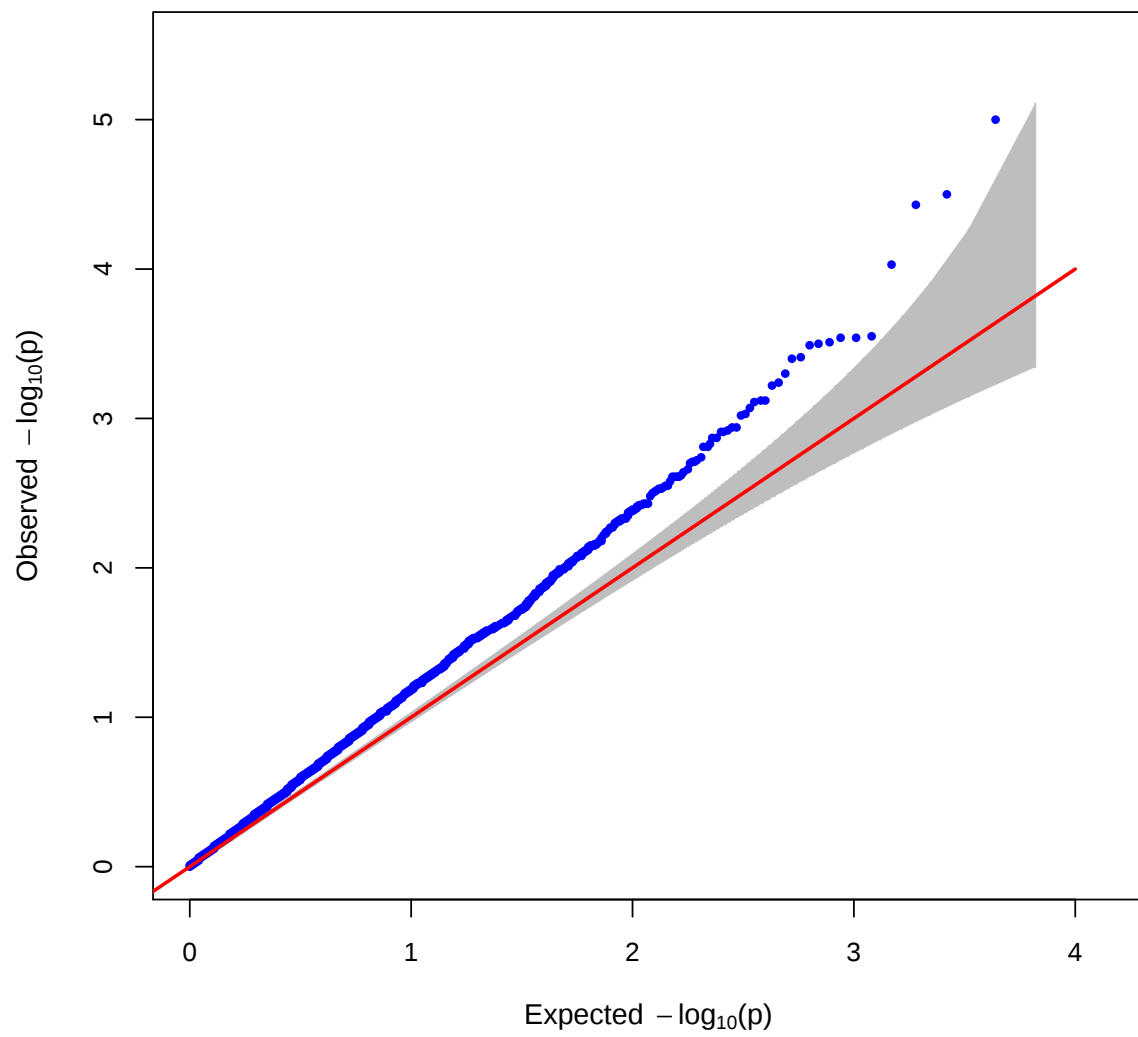
Alc_Dep by Cerebellar_Hemisphere



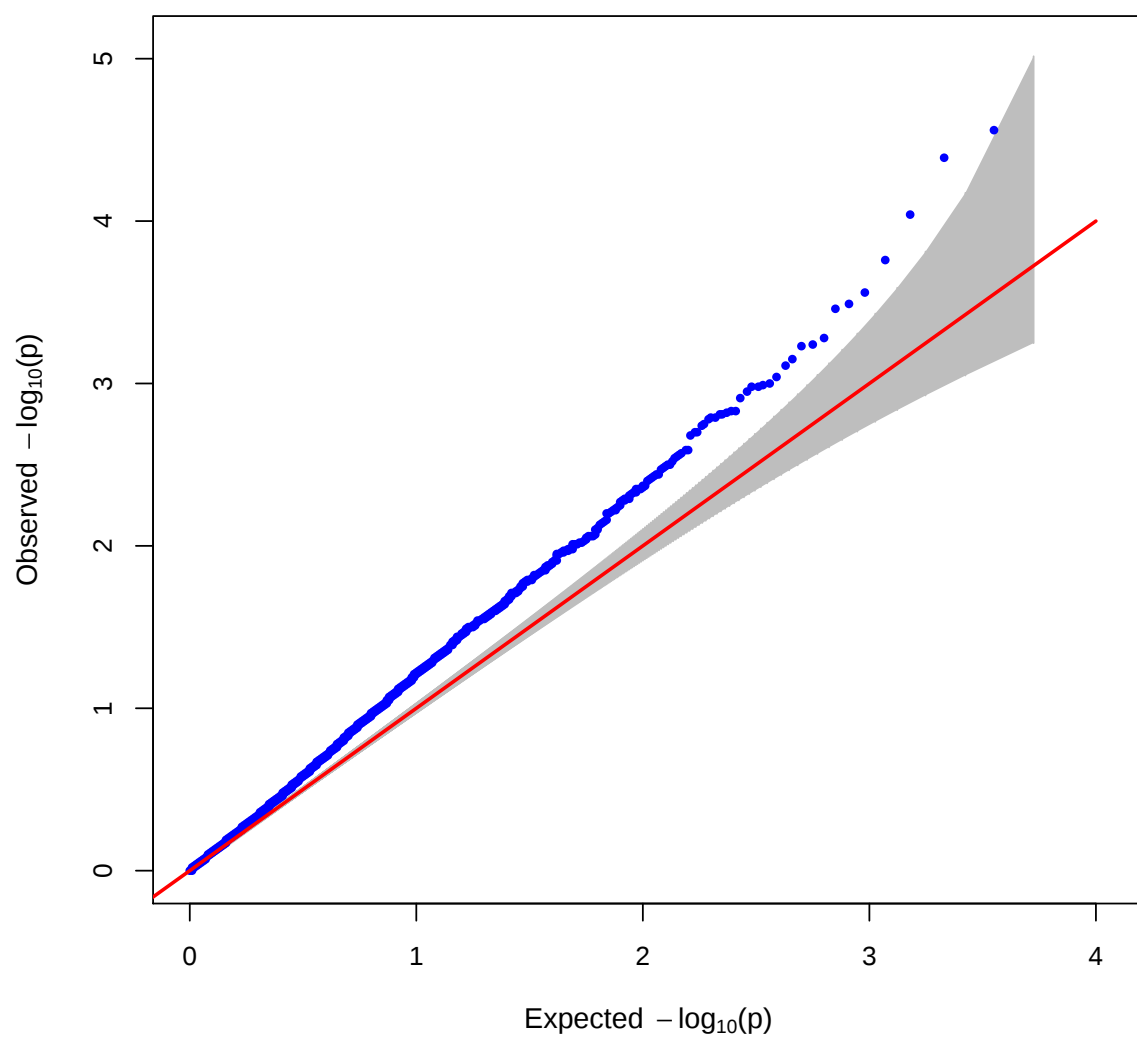
Alc_Dep by Cortex



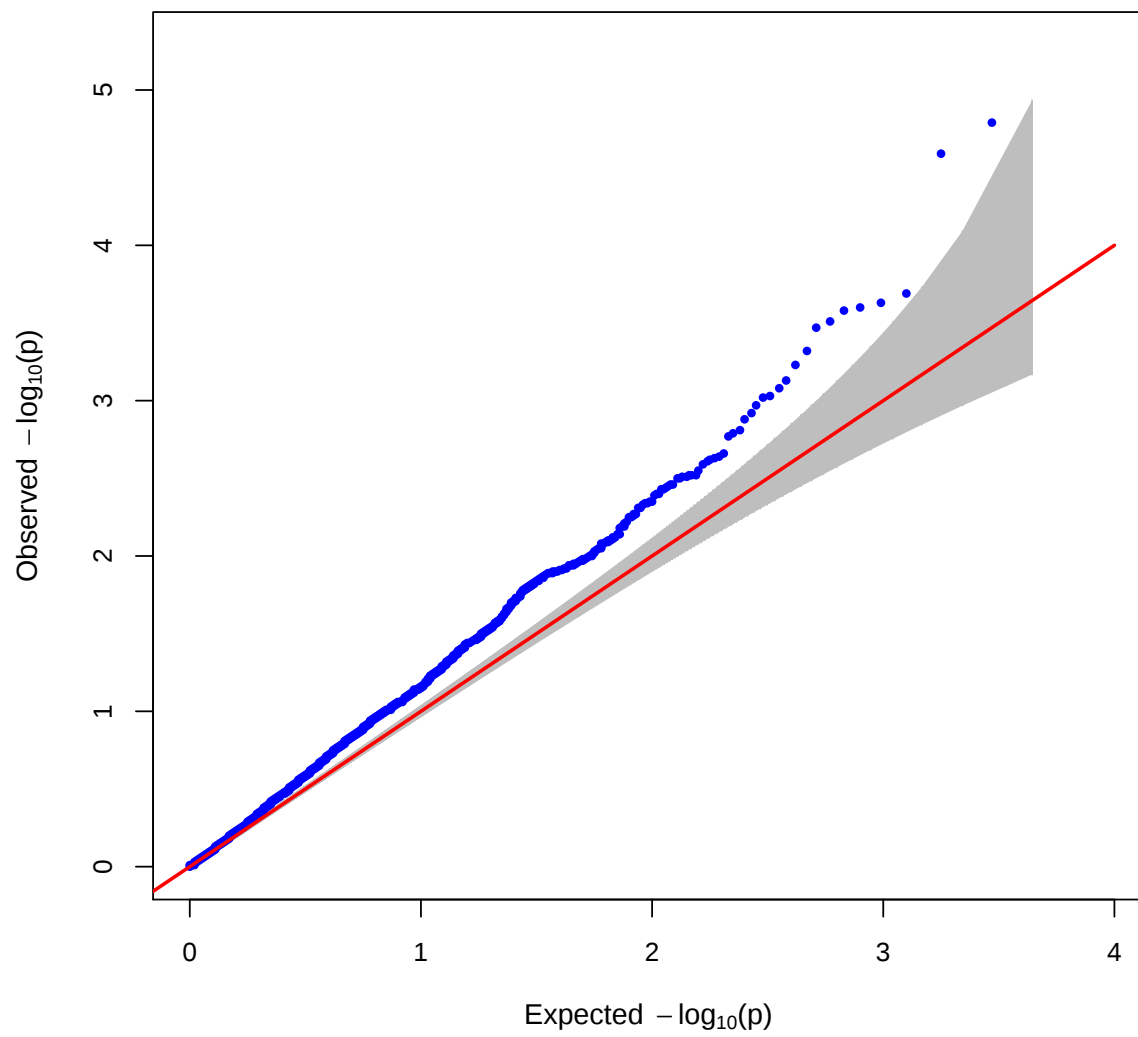
Alc_Dep by Hippocampus



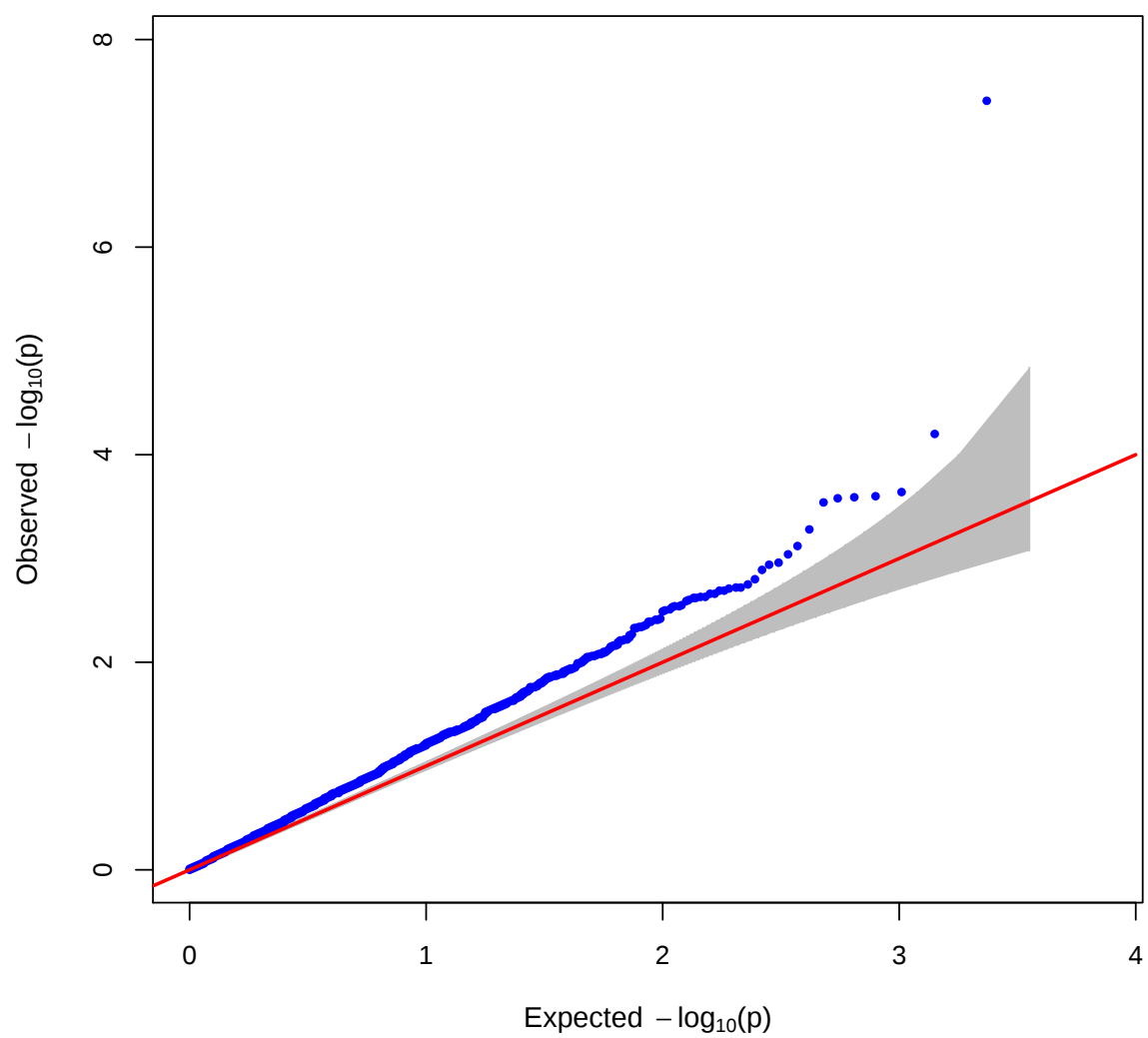
Alc_Dep by Nucleus_accumbens_basal_ganglia



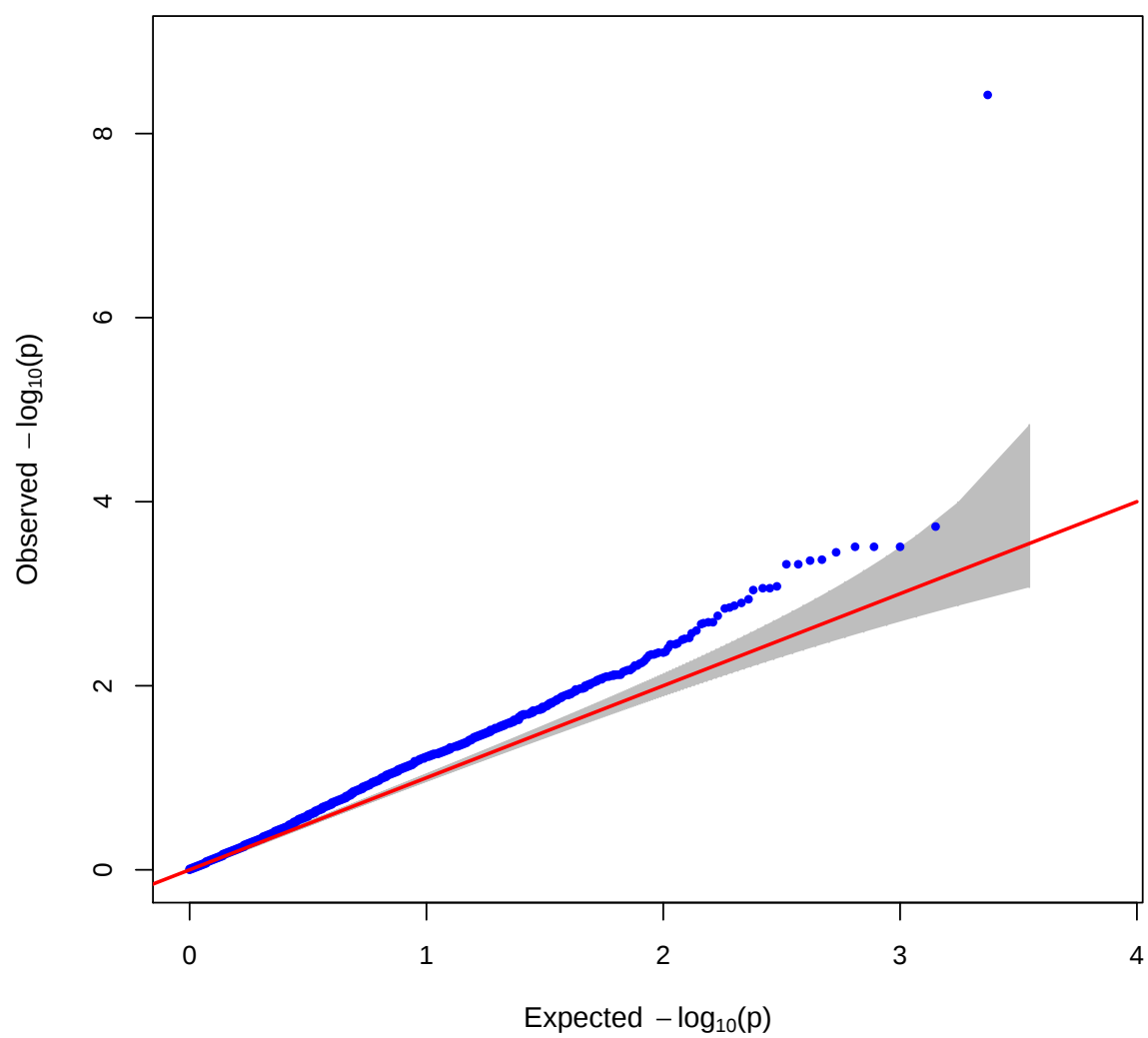
Alc_Dep by Caudate_basal_ganglia



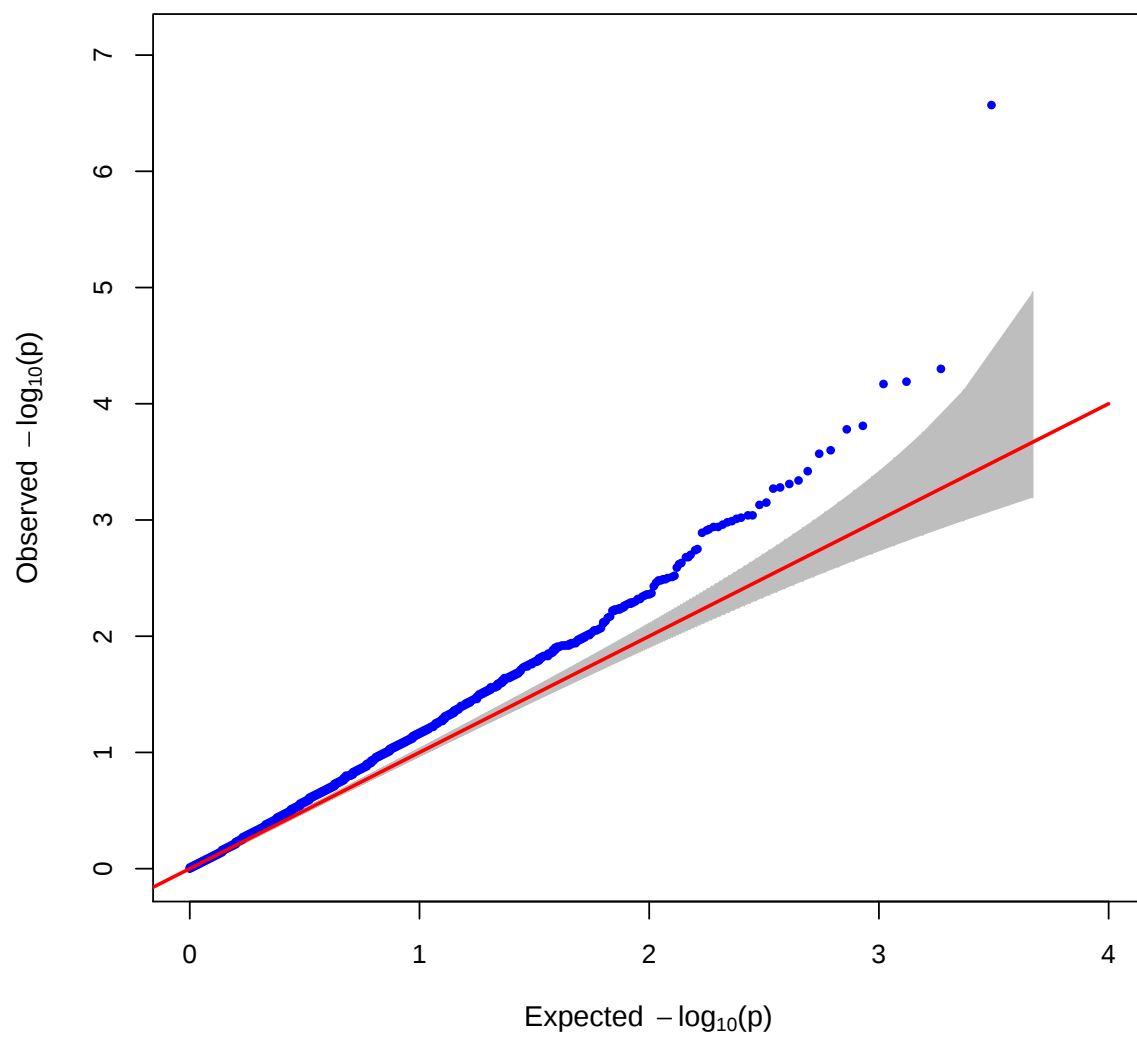
Alc_Dep by Cerebellum



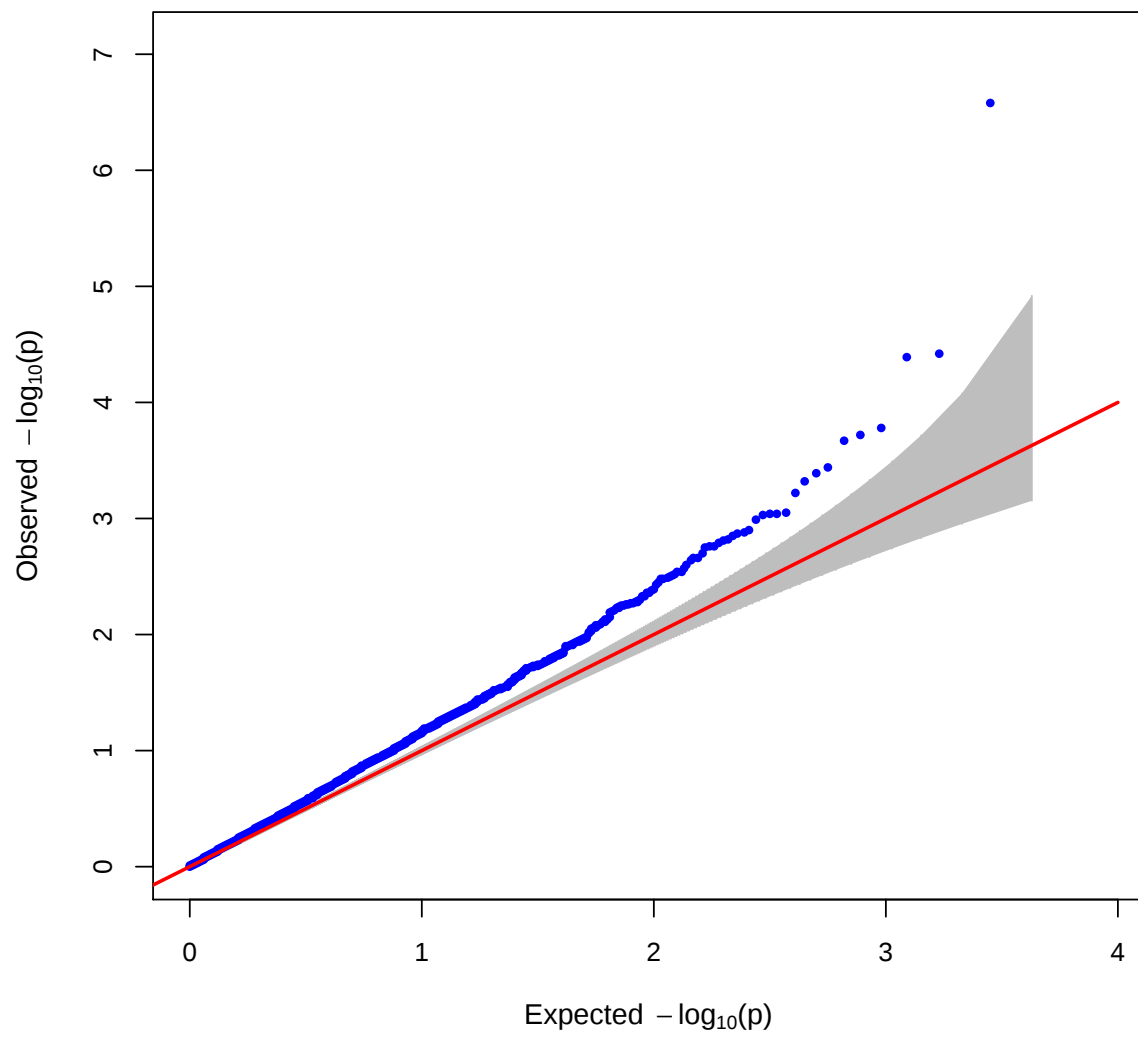
Alc_Dep by Frontal_Cortex_BA9



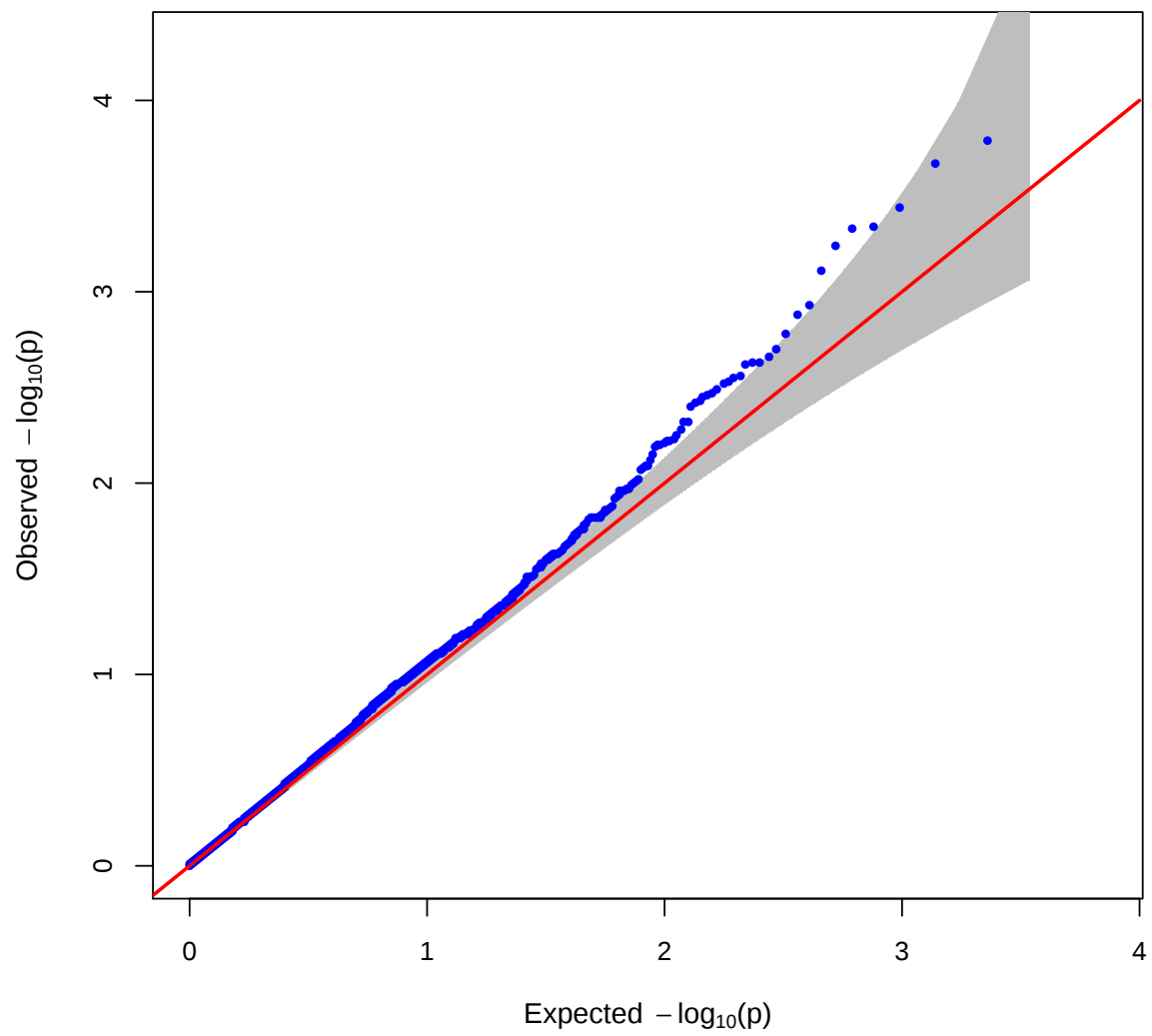
Alc_Dep by Hypothalamus



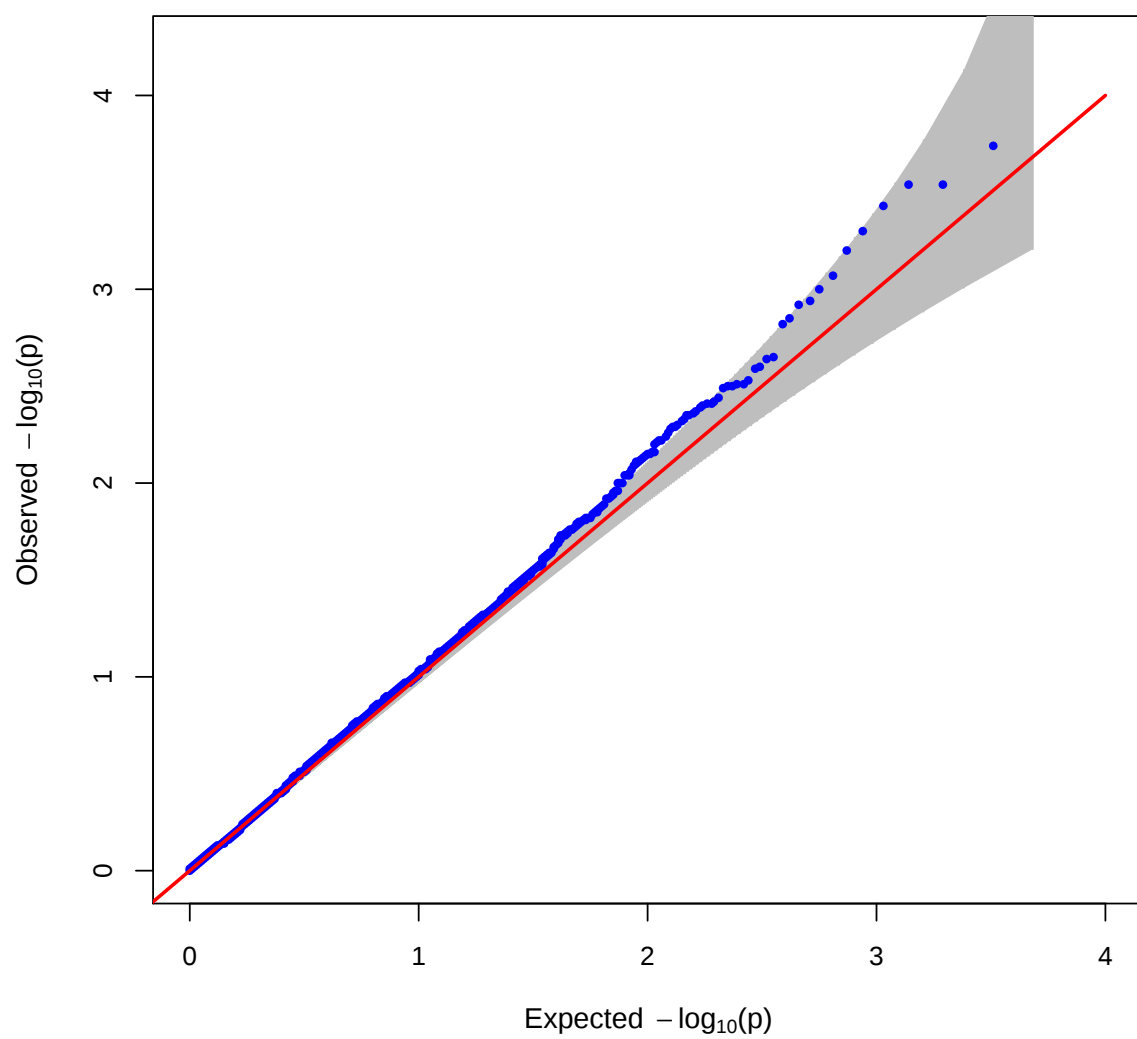
Alc_Dep by Putamen_basal_ganglia



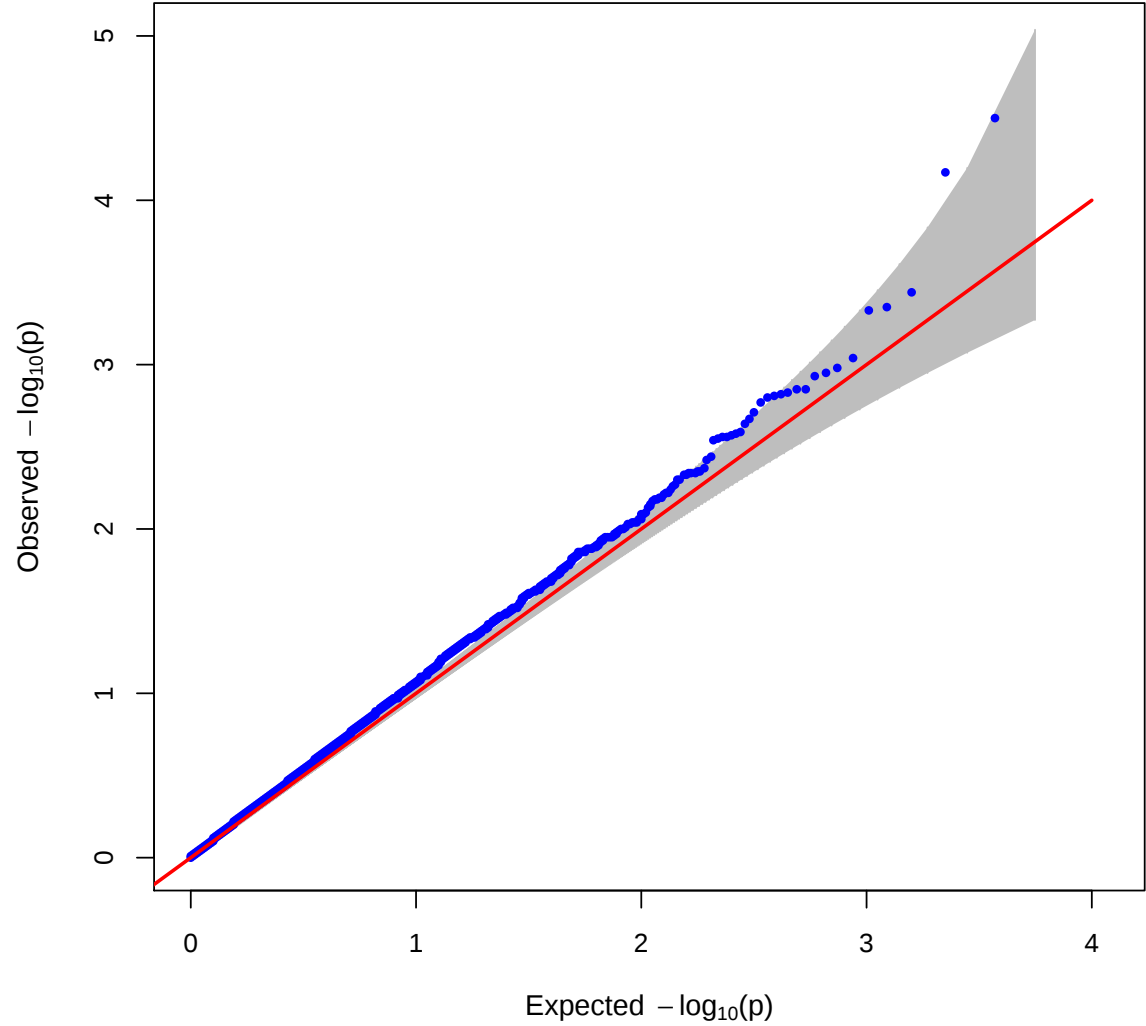
Family_Alcoholism by Anterior_cingulate_cortex_BA24



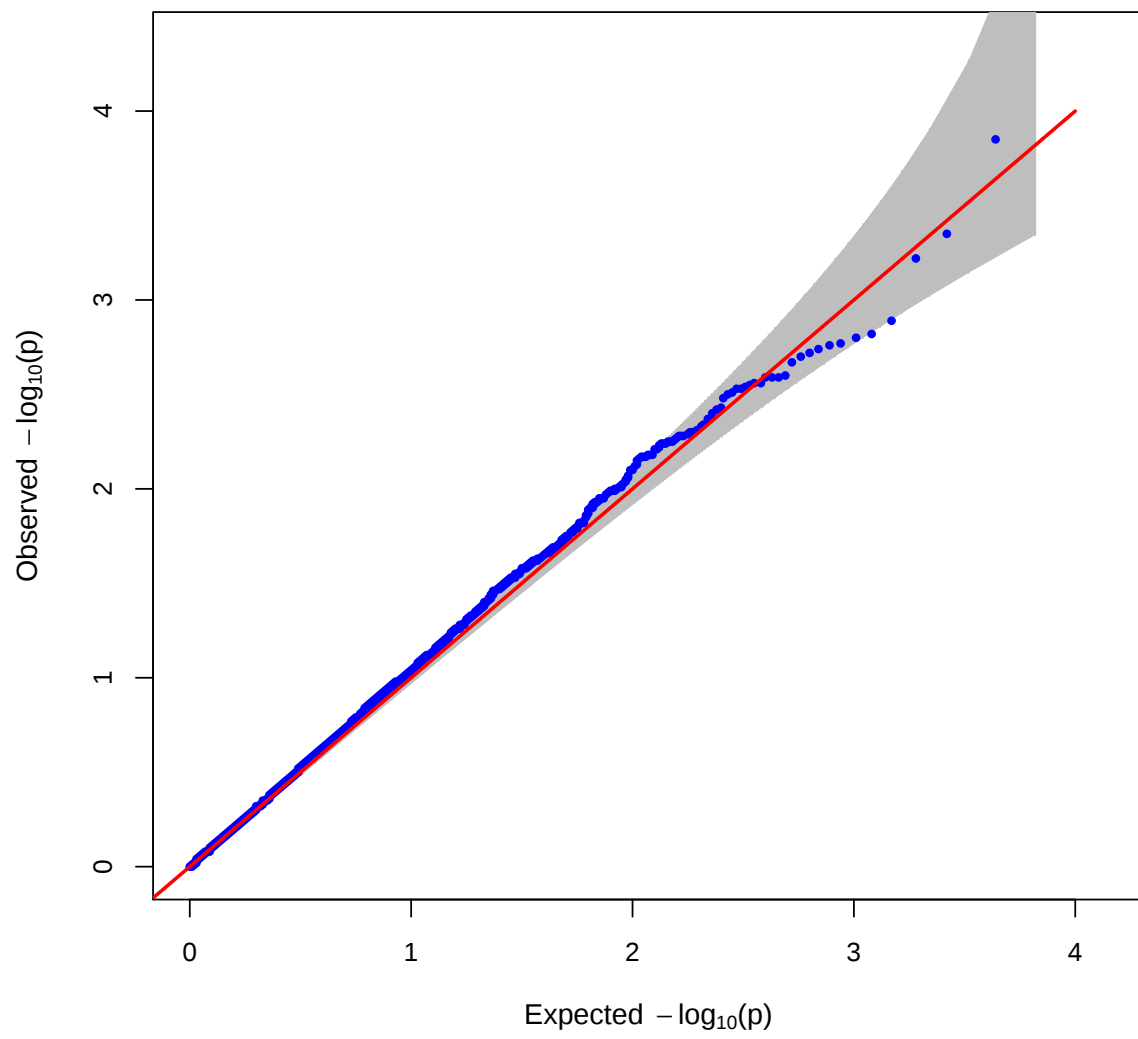
Family_Alcoholism by Cerebellar_Hemisphere



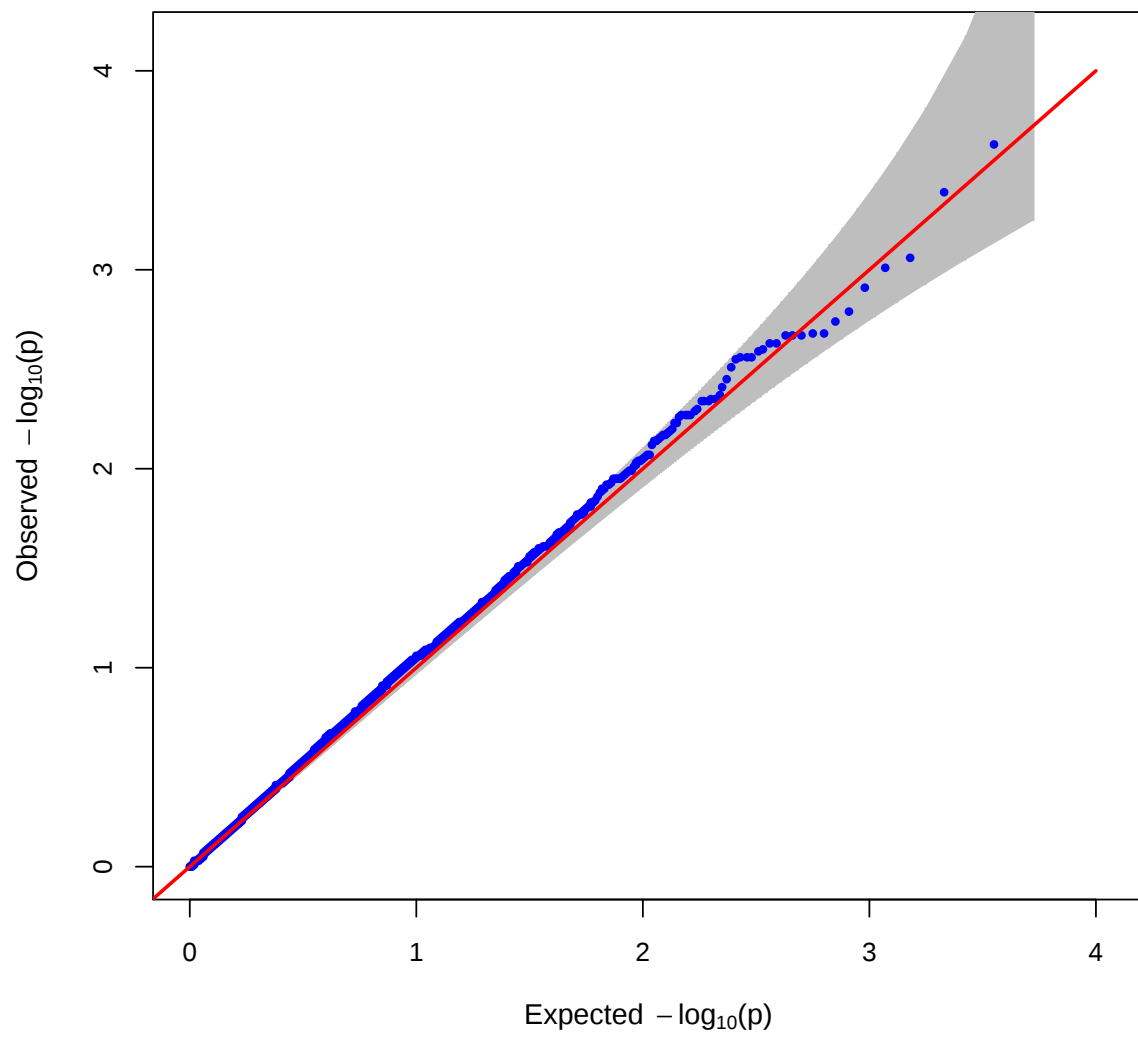
Family_Alcoholism by Cortex



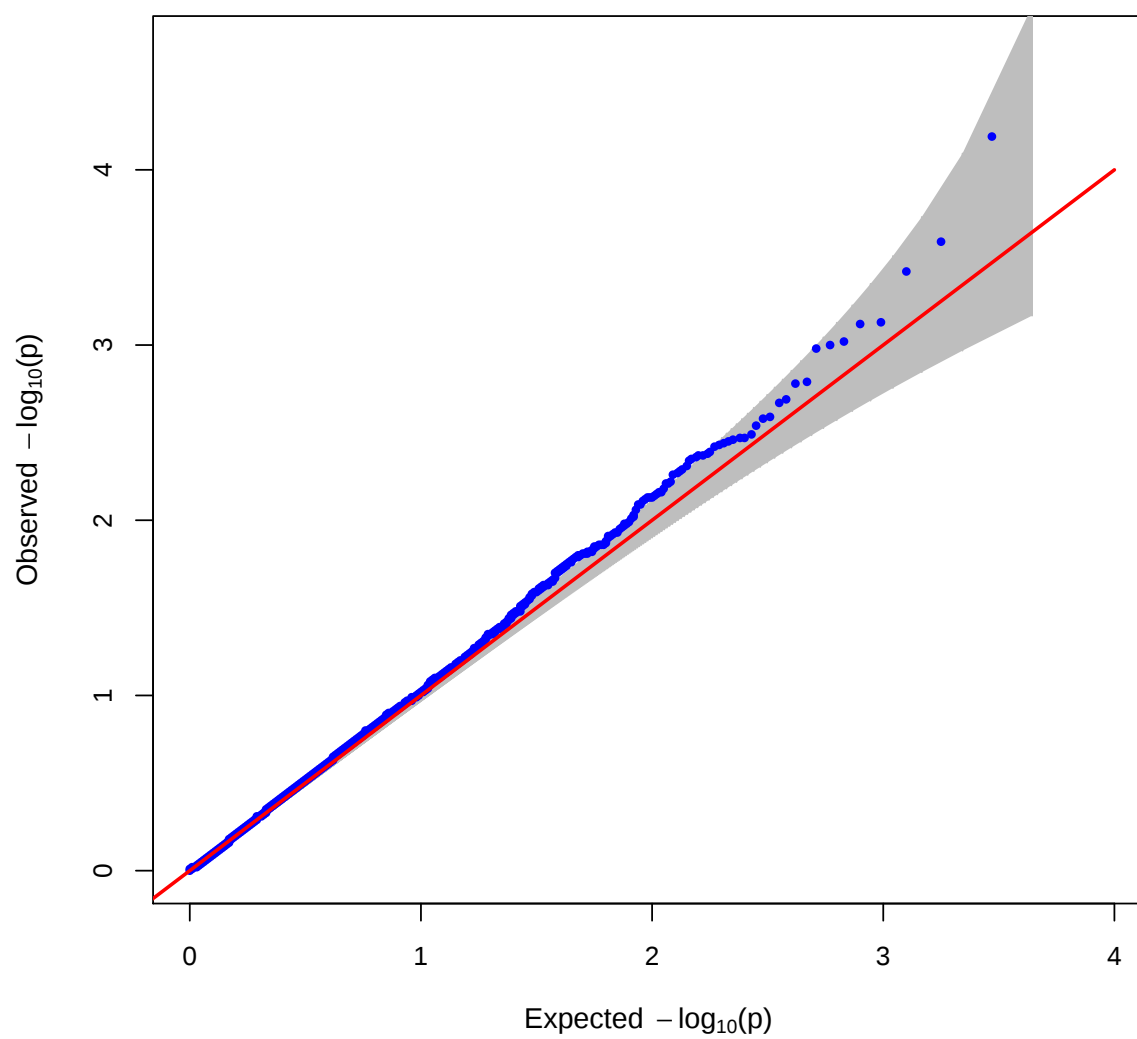
Family_Alcoholism by Hippocampus



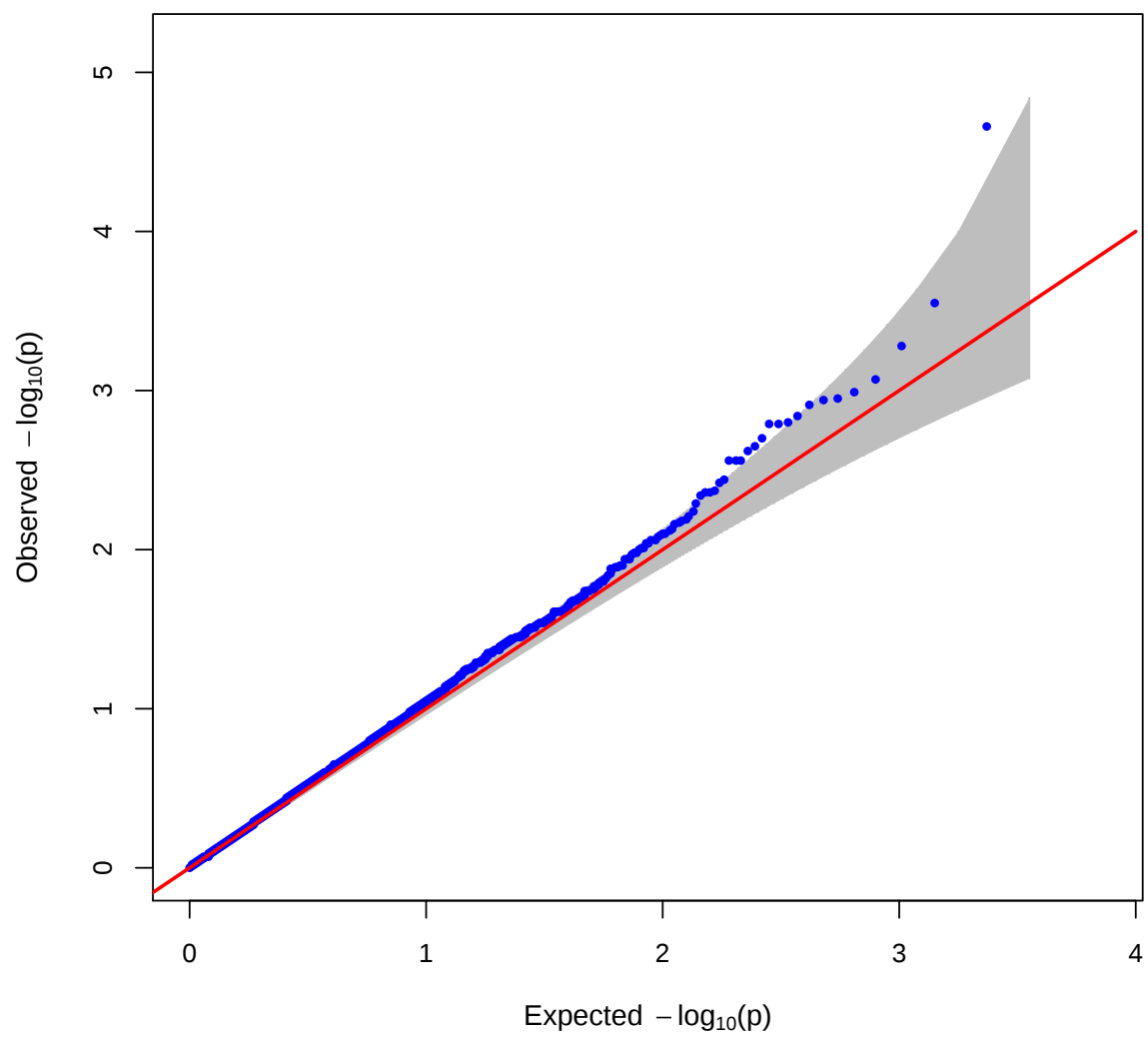
Family_Alcoholism by Nucleus_accumbens_basal_ganglia



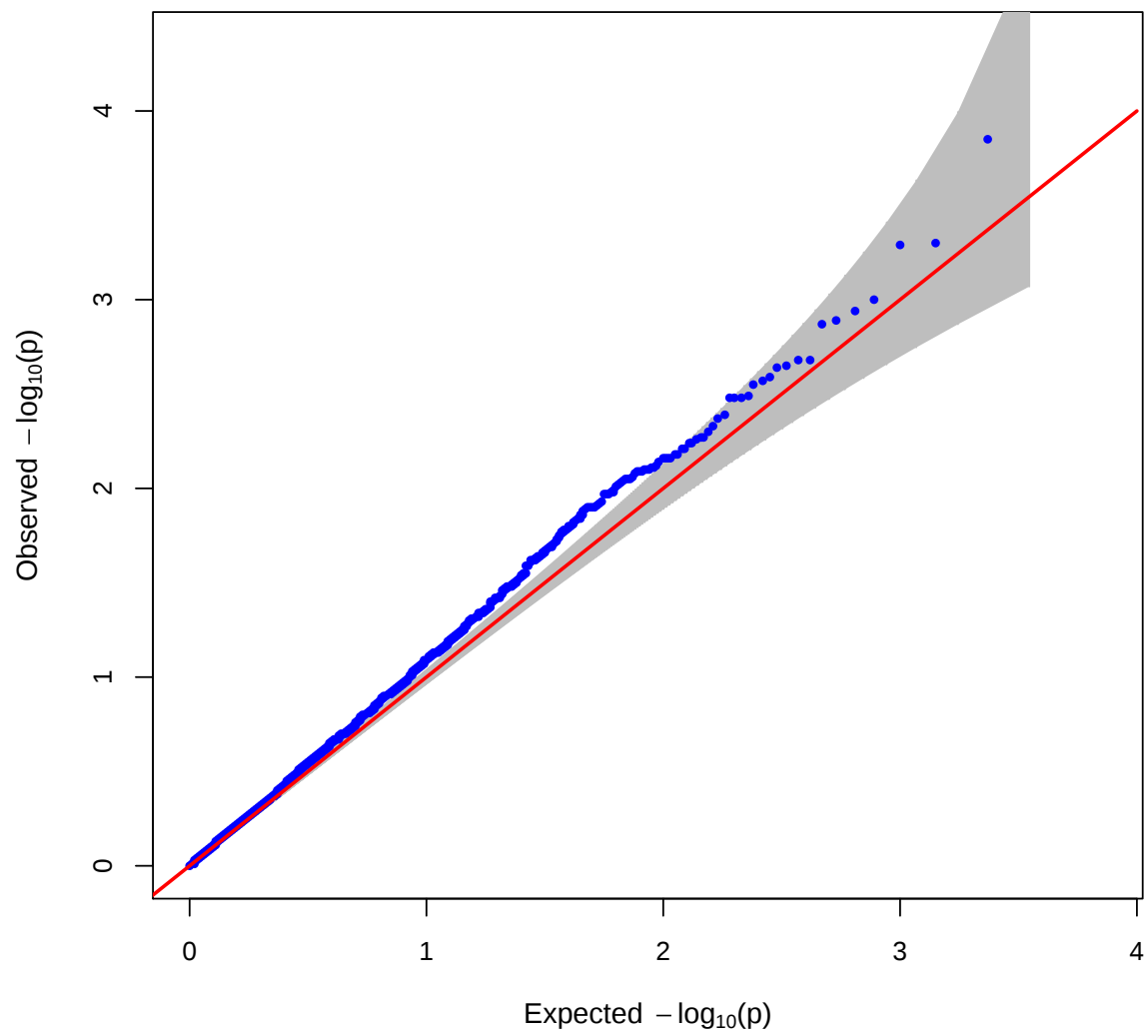
Family_Alcoholism by Caudate_basal_ganglia



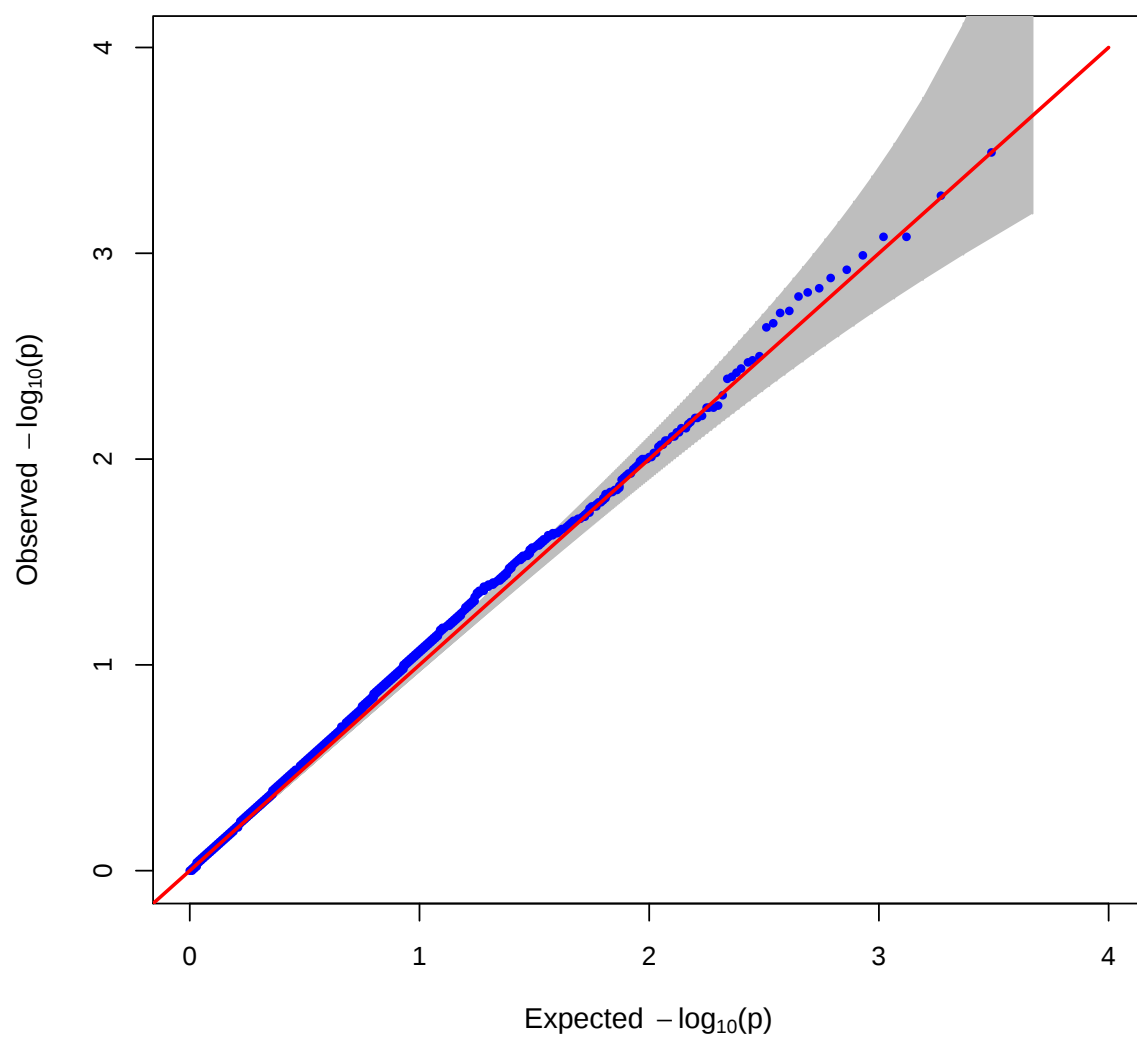
Family_Alcoholism by Cerebellum



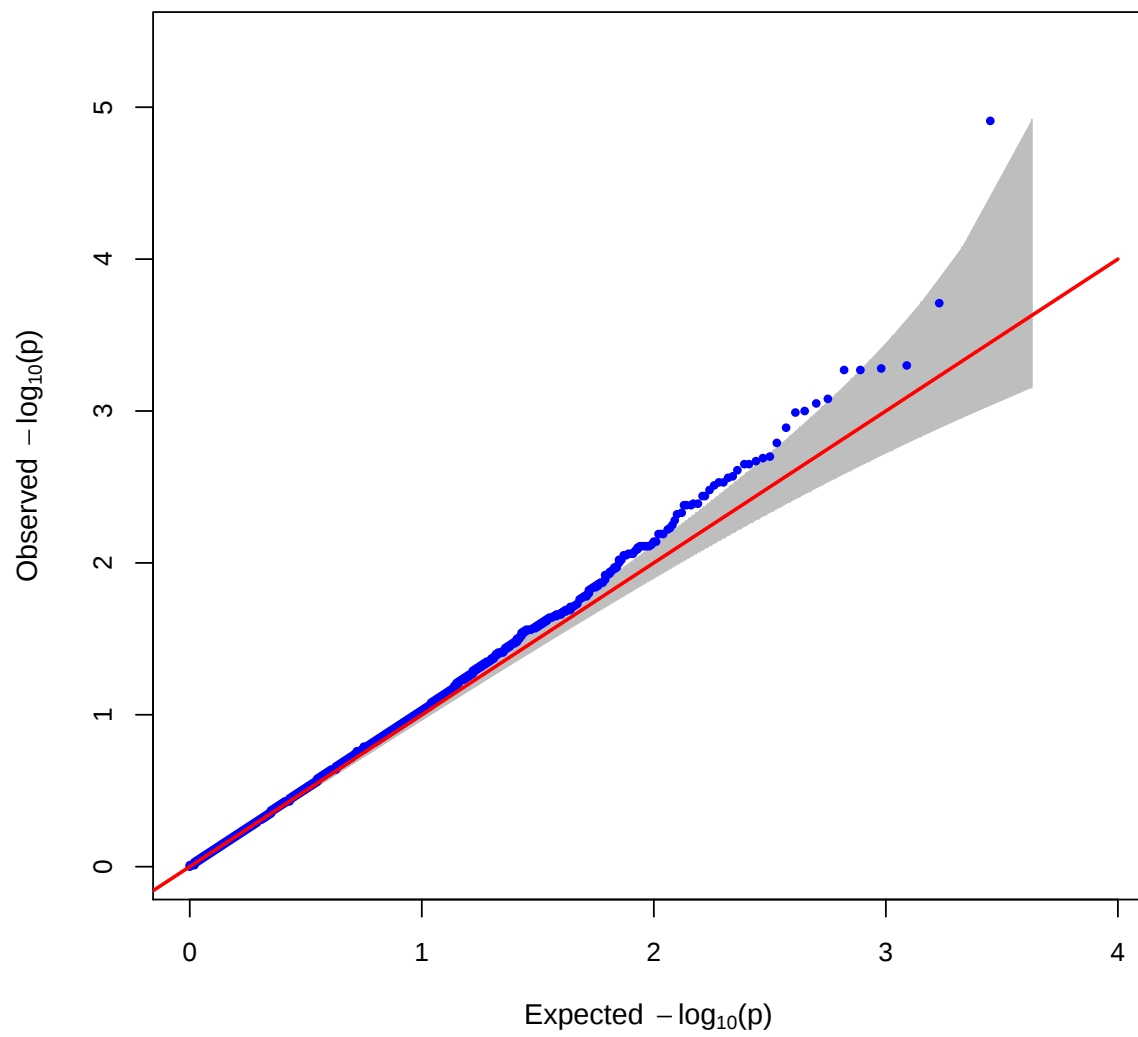
Family_Alcoholism by Frontal_Cortex_BA9



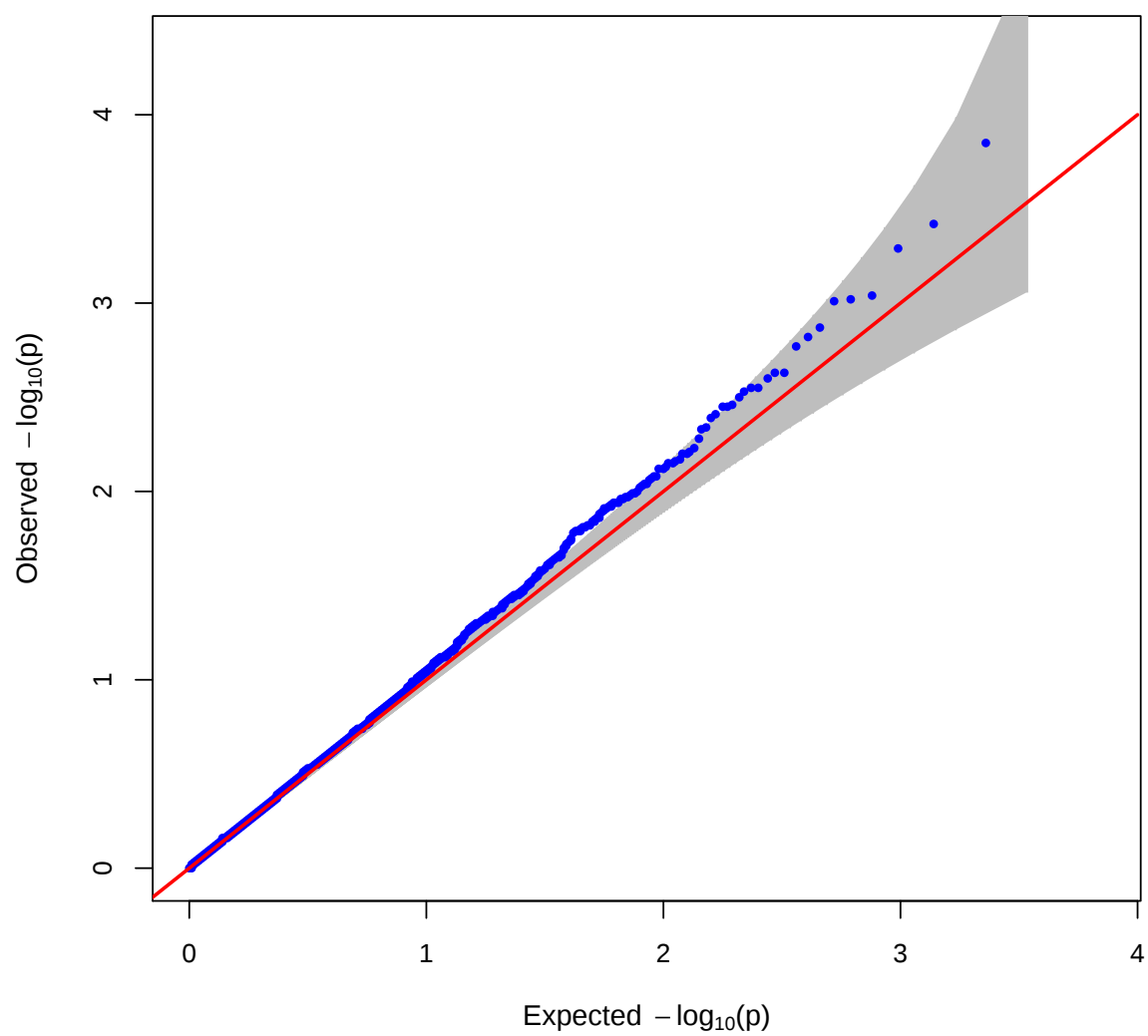
Family_Alcoholism by Hypothalamus



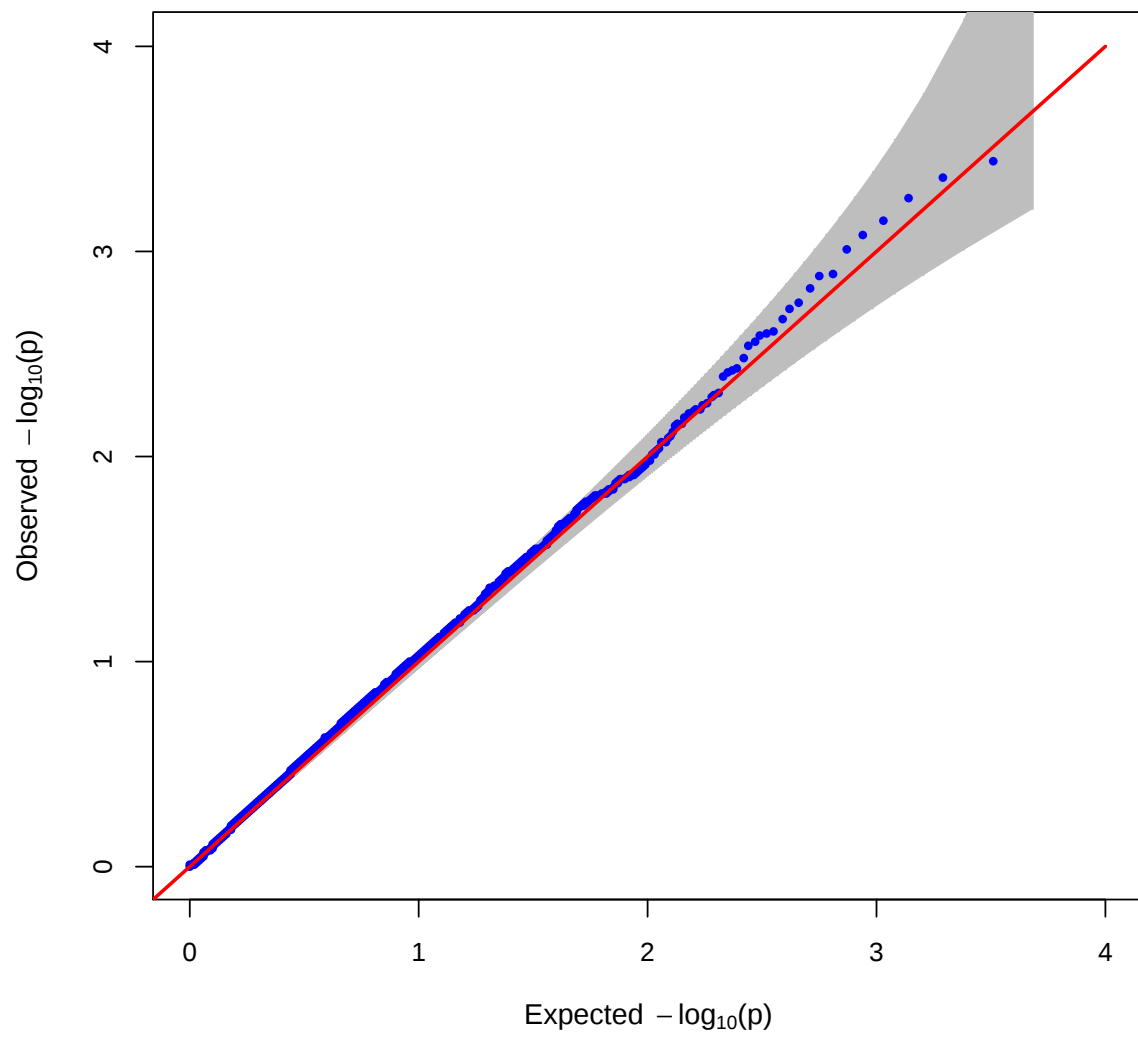
Family_Alcoholism by Putamen_basal_ganglia



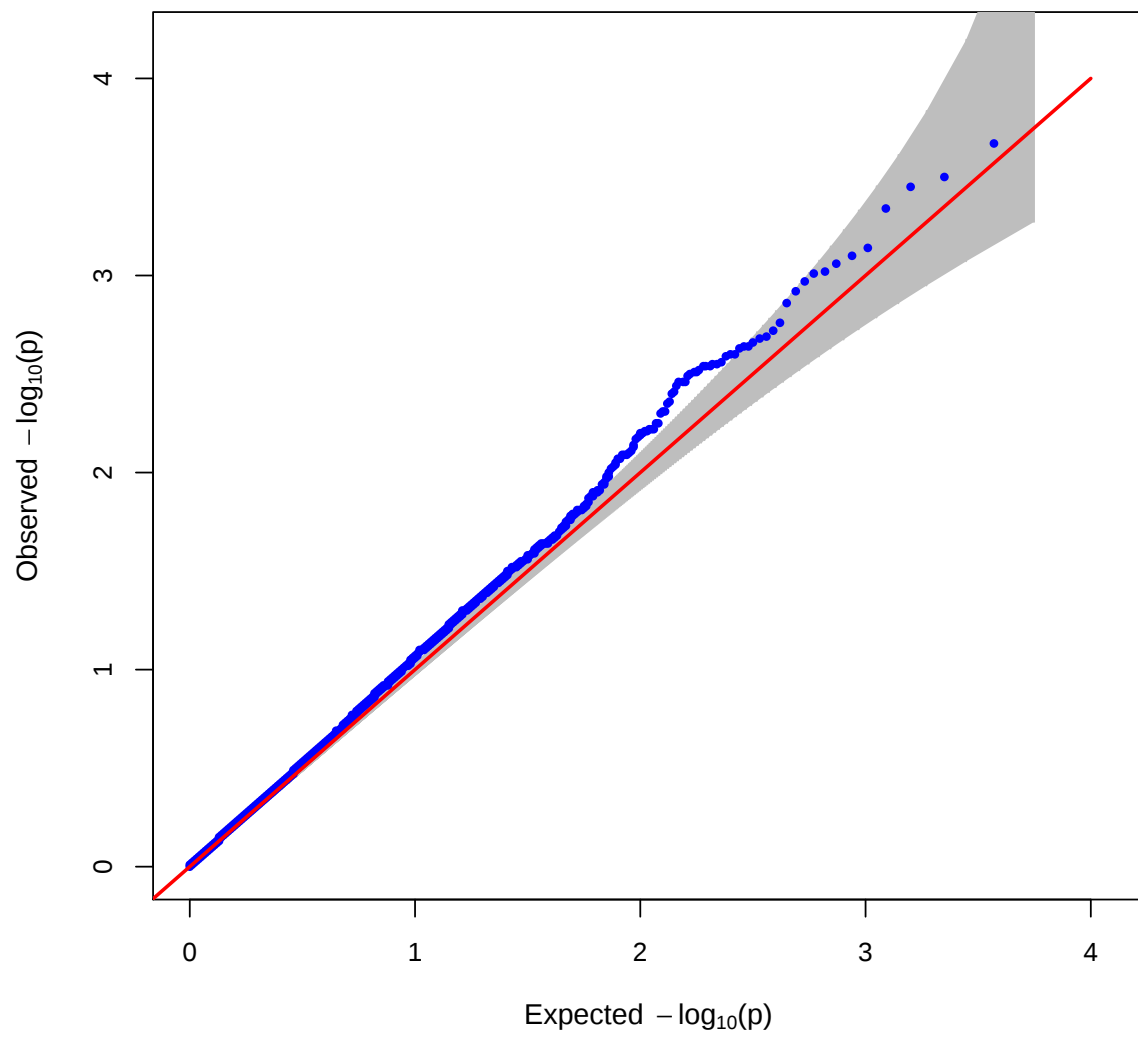
MarijuanaStrDsr by Anterior_cingulate_cortex_BA24



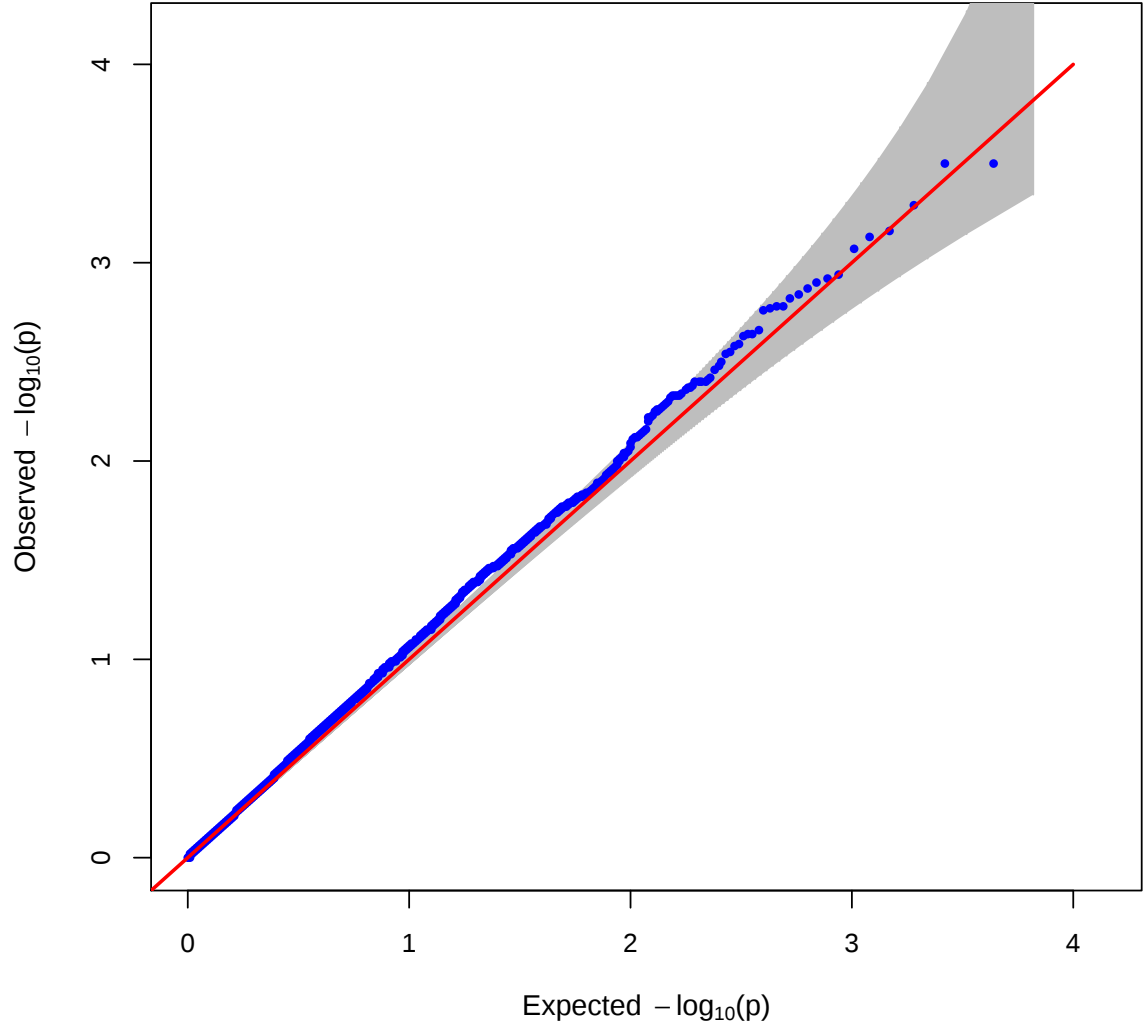
MarijuanaStrDsr by Cerebellar_Hemisphere



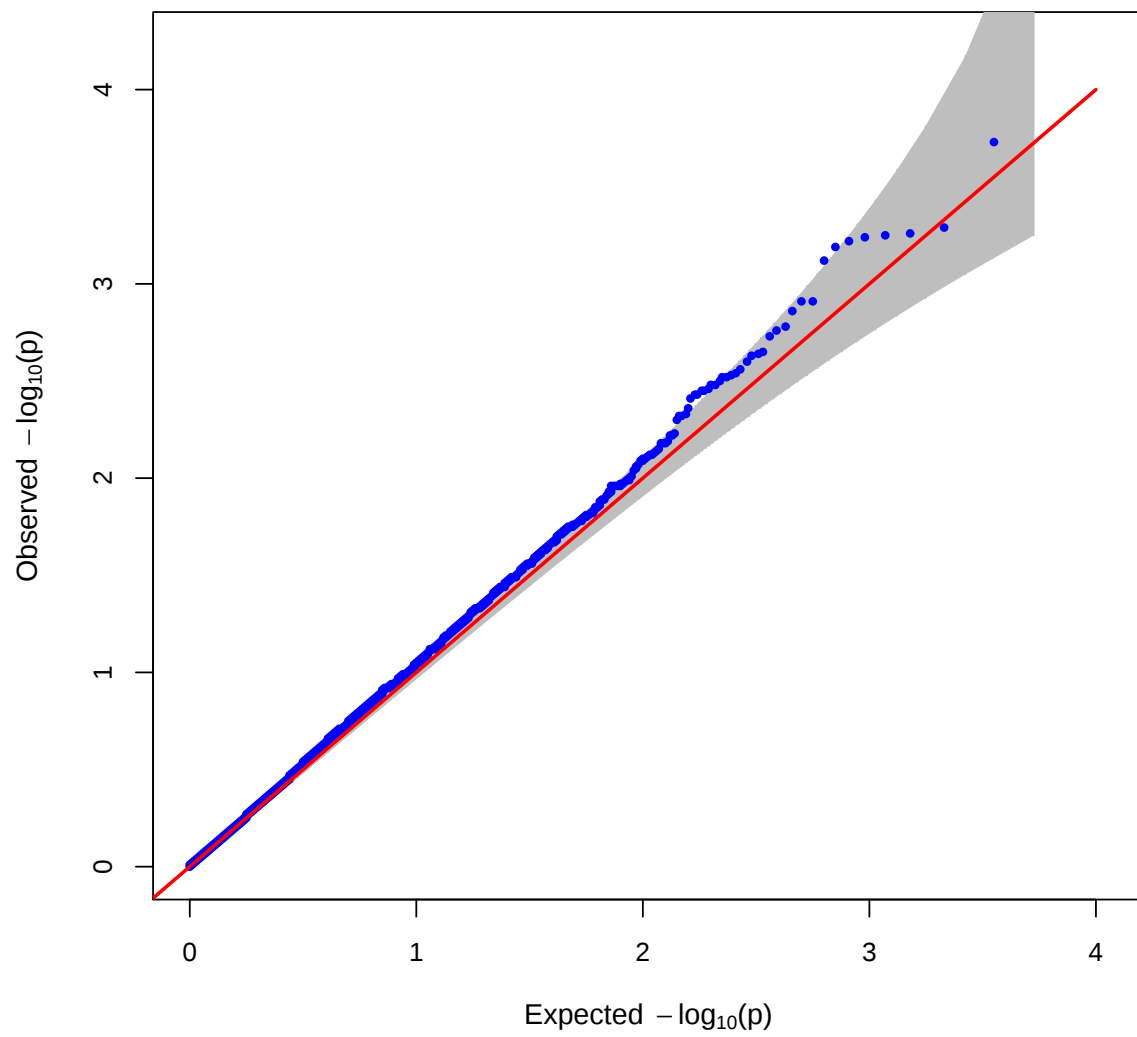
MarijuanaStrDsr by Cortex



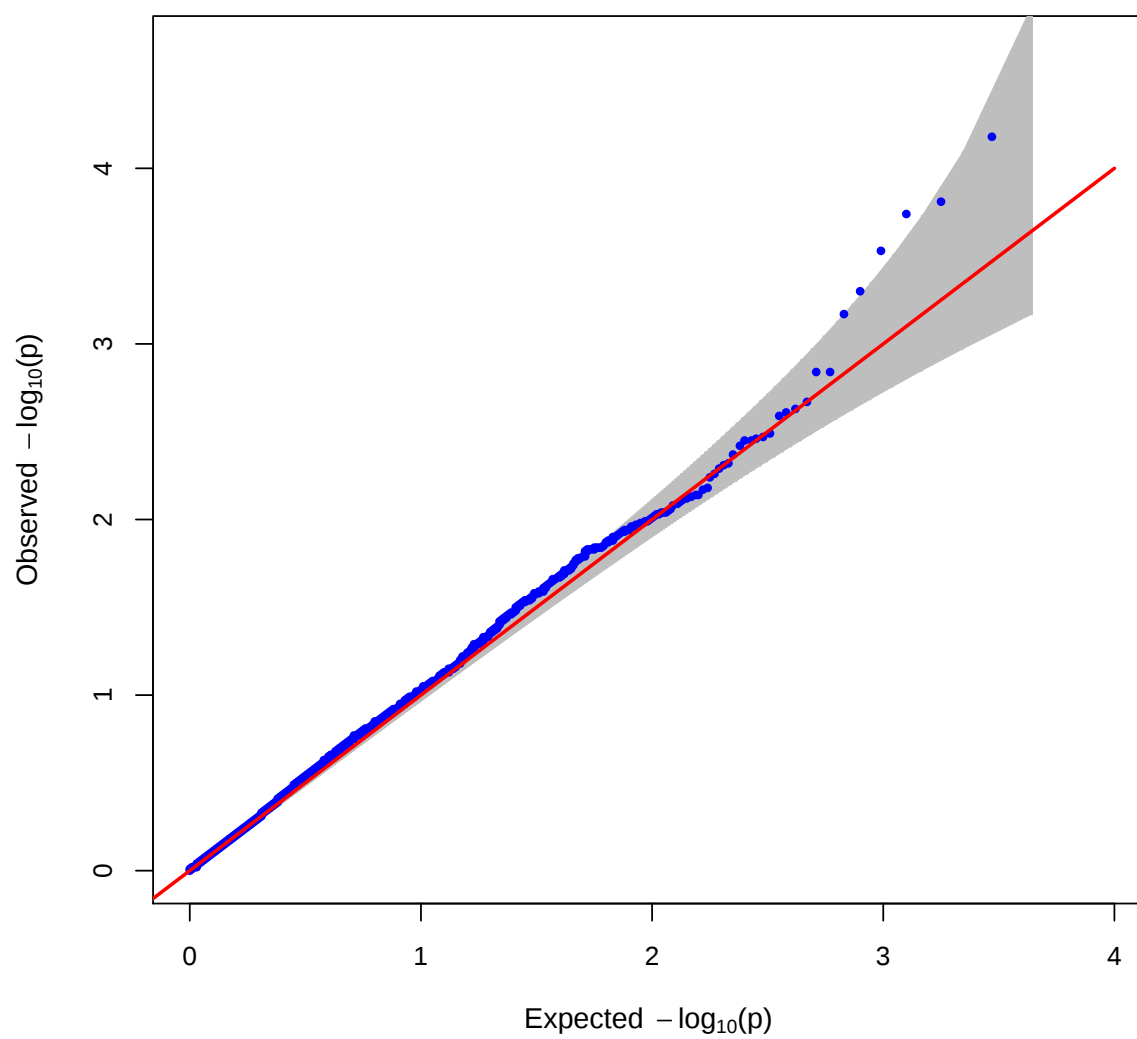
MarijuanaStrDsr by Hippocampus



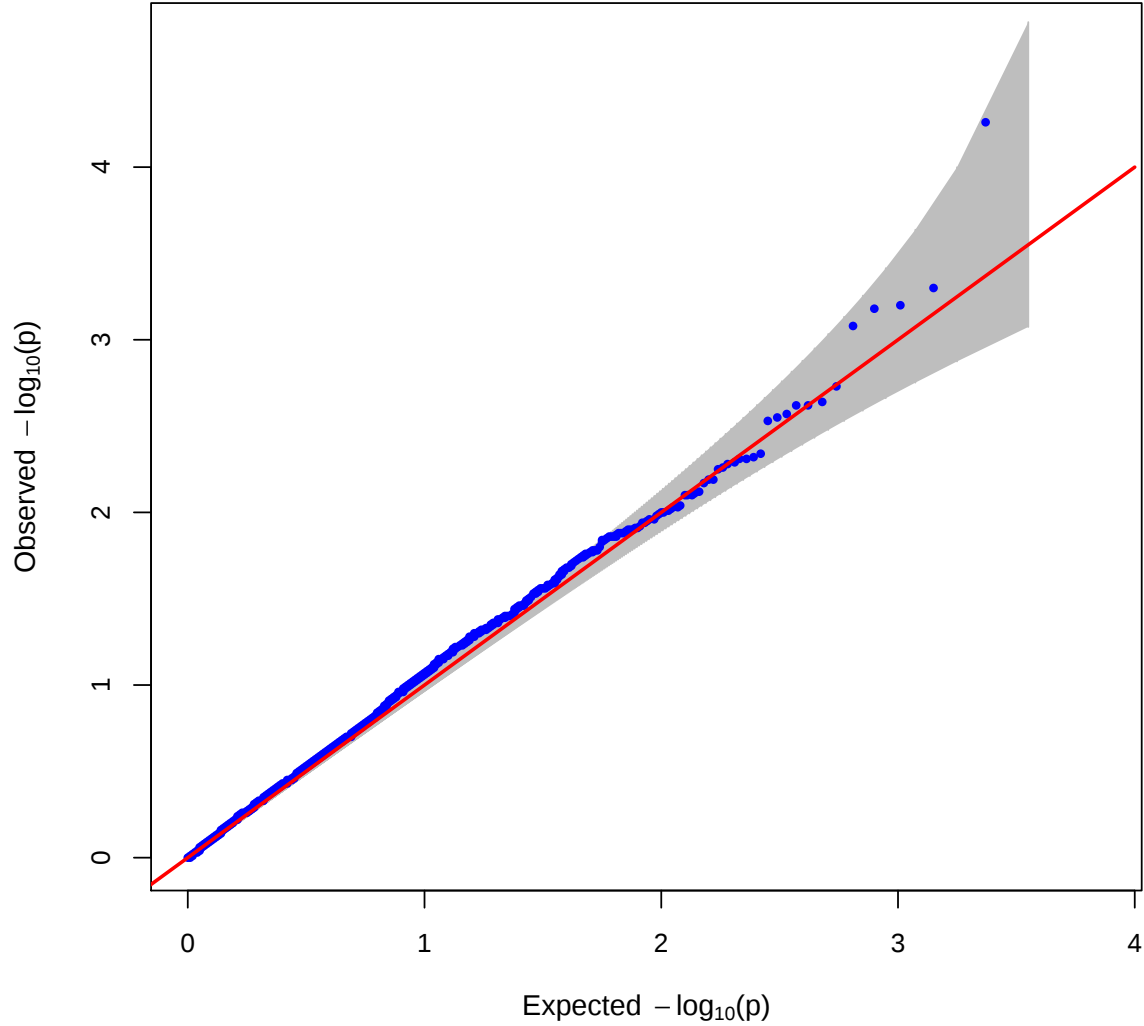
MarijuanaStrDsr by Nucleus_accumbens_basal_ganglia



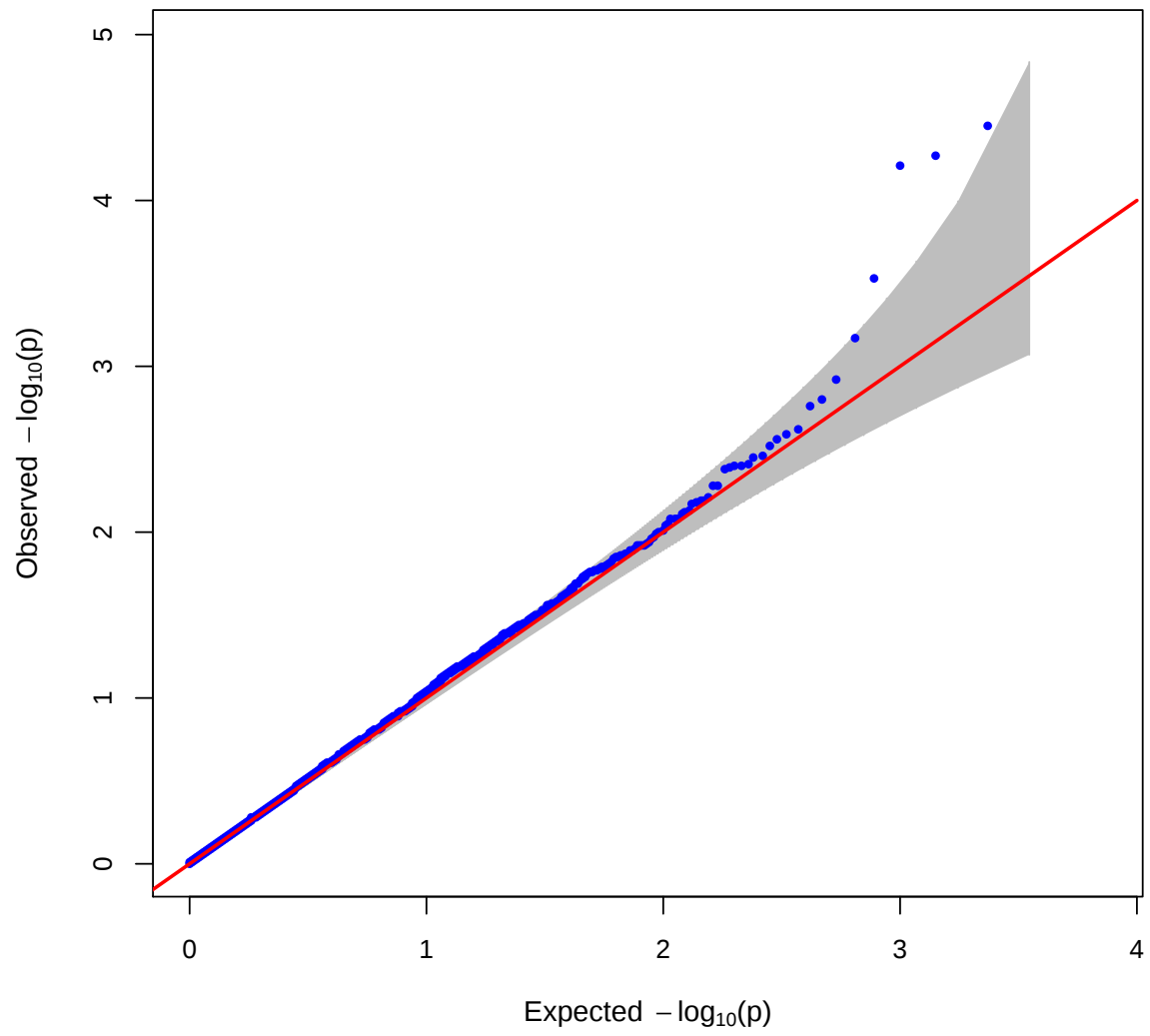
MarijuanaStrDsr by Caudate_basal_ganglia



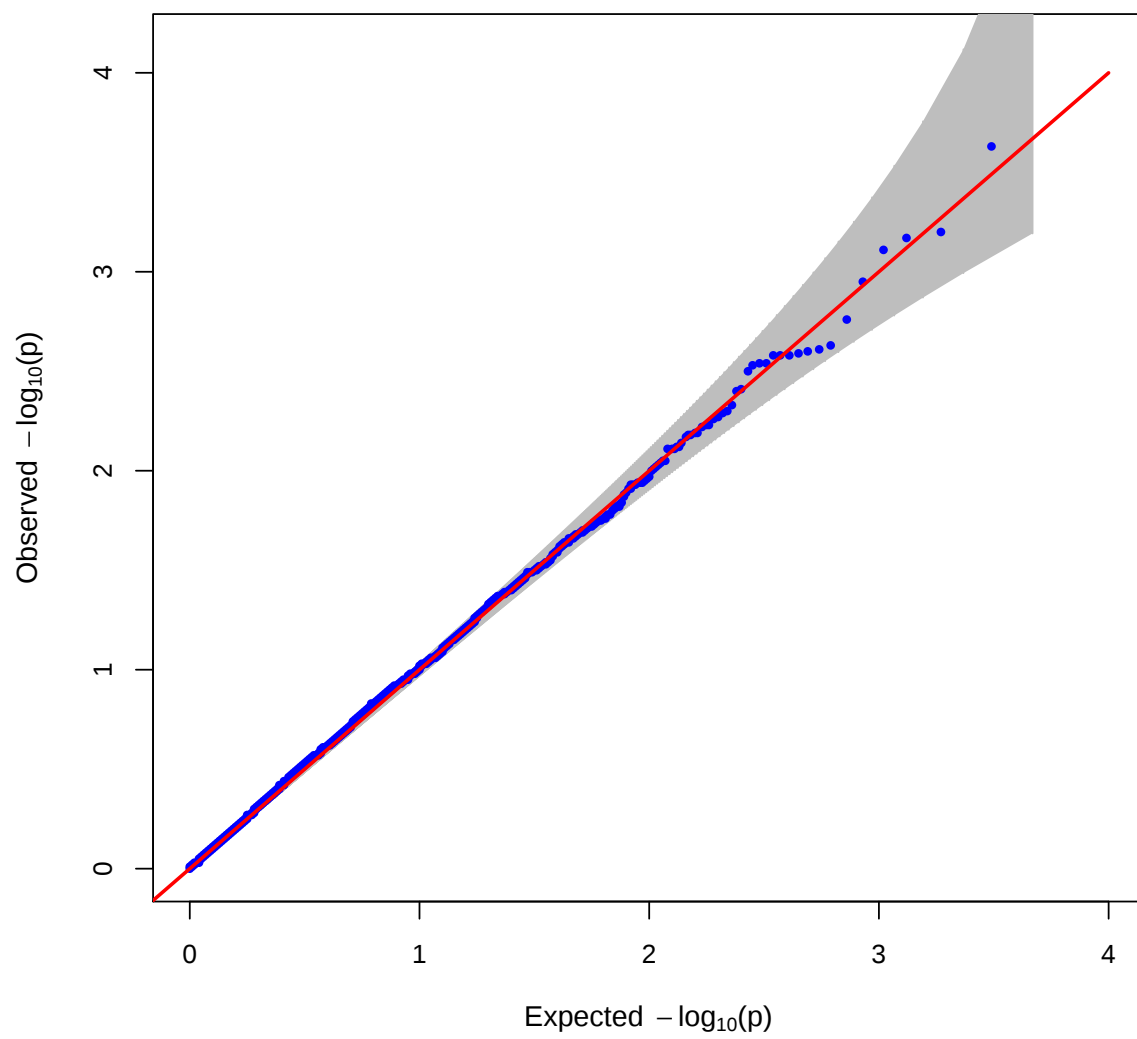
MarijuanaStrDsr by Cerebellum



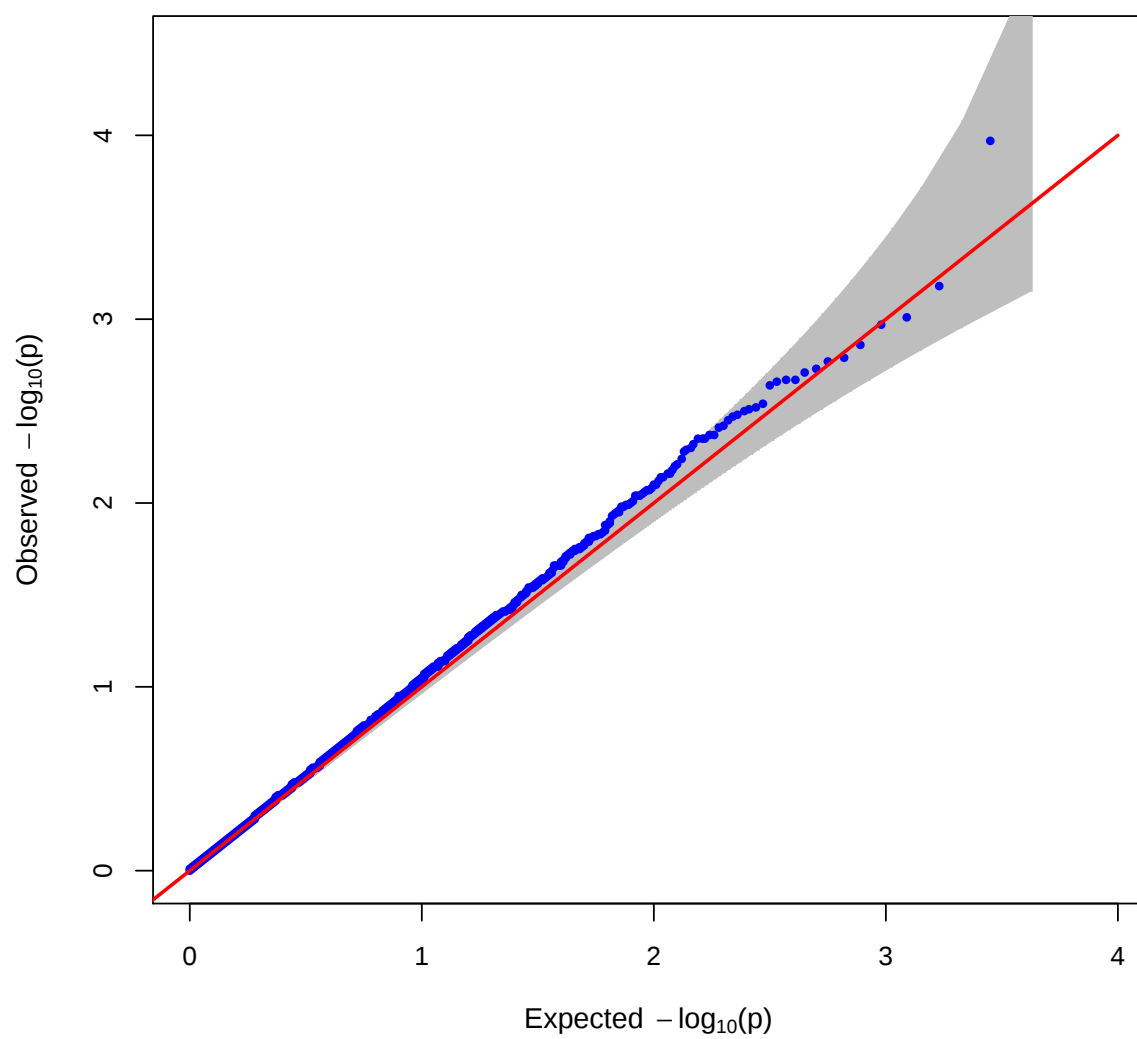
MarijuanaStrDsr by Frontal_Cortex_BA9



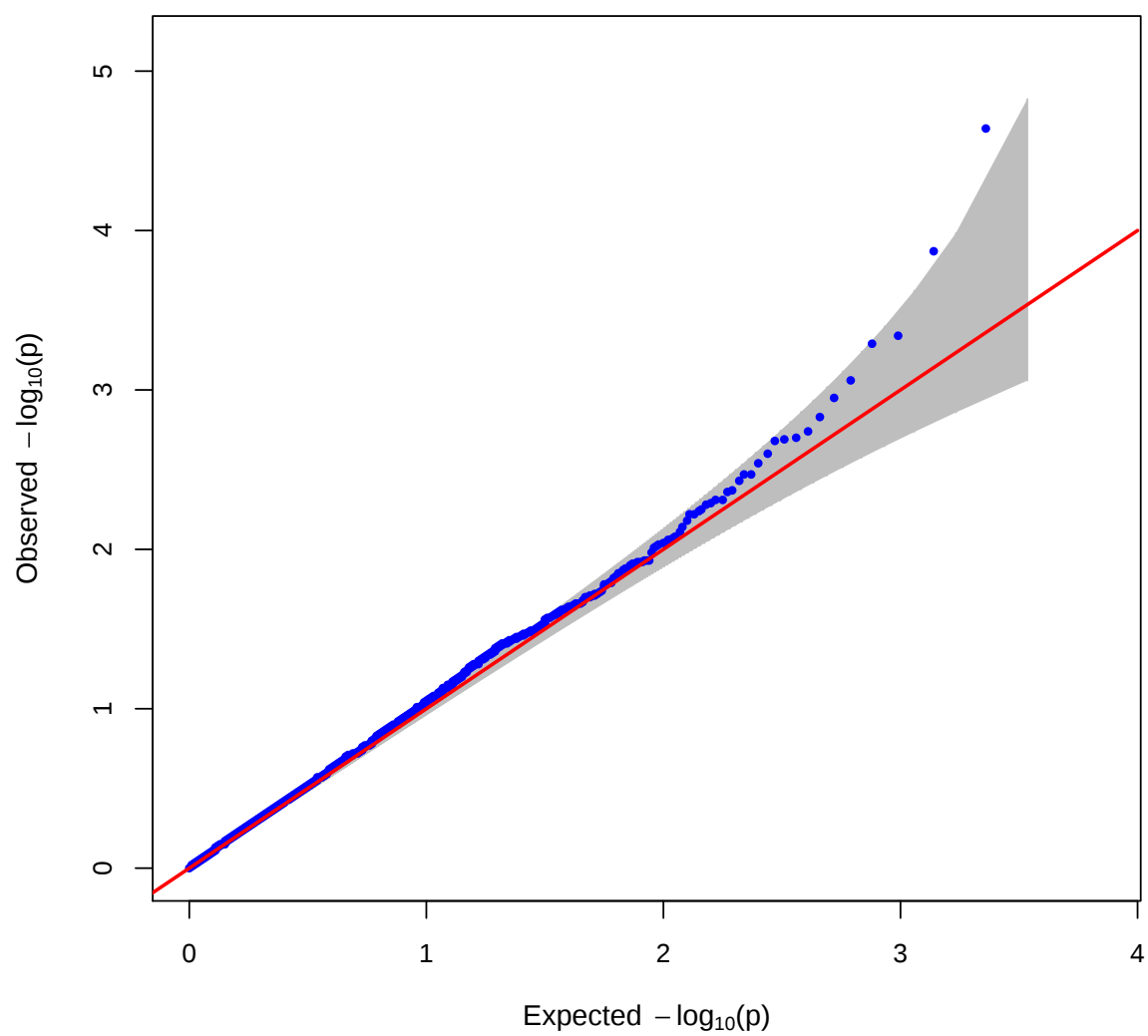
MarijuanaStrDsr by Hypothalamus



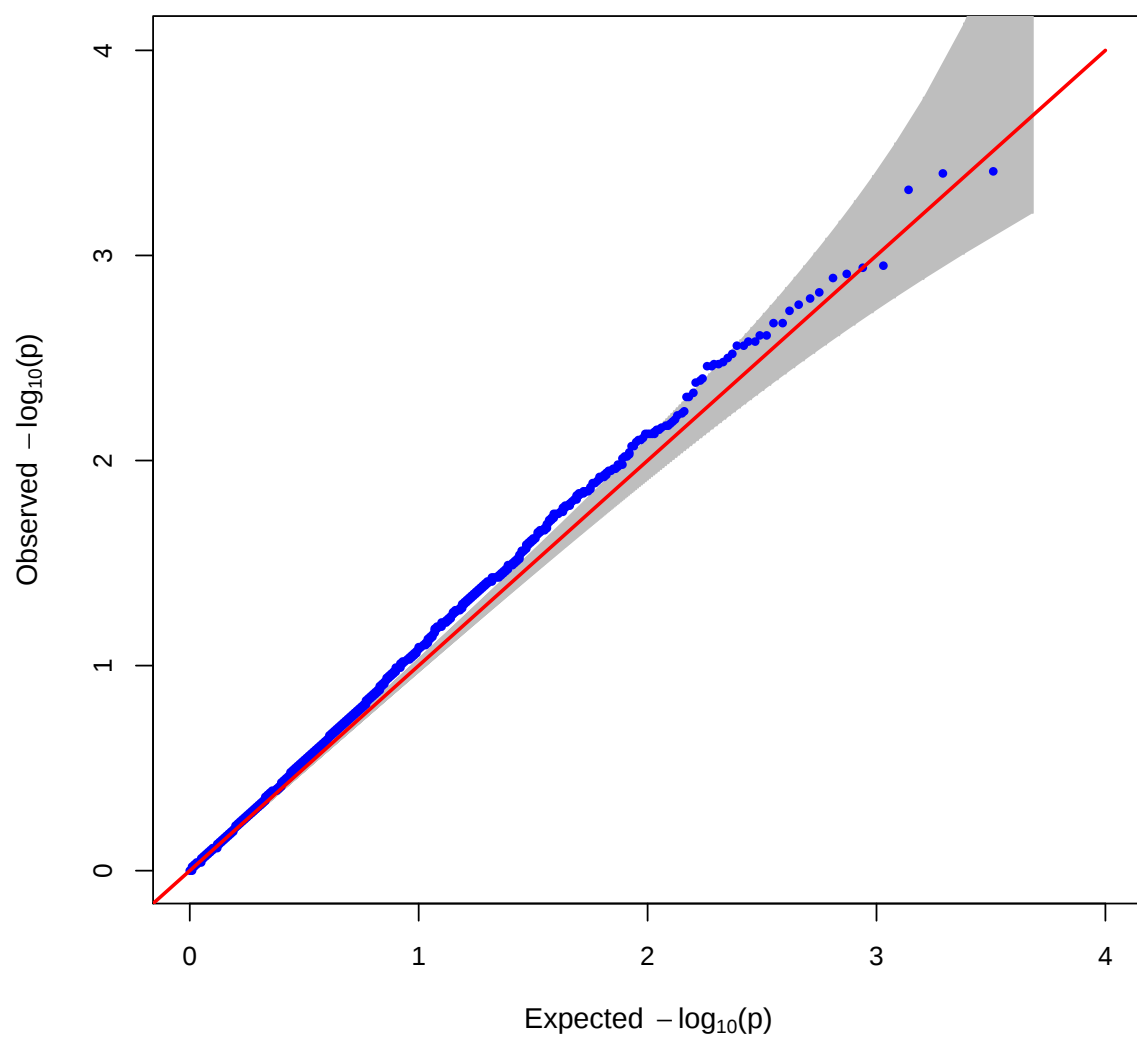
MarijuanaStrDsr by Putamen_basal_ganglia



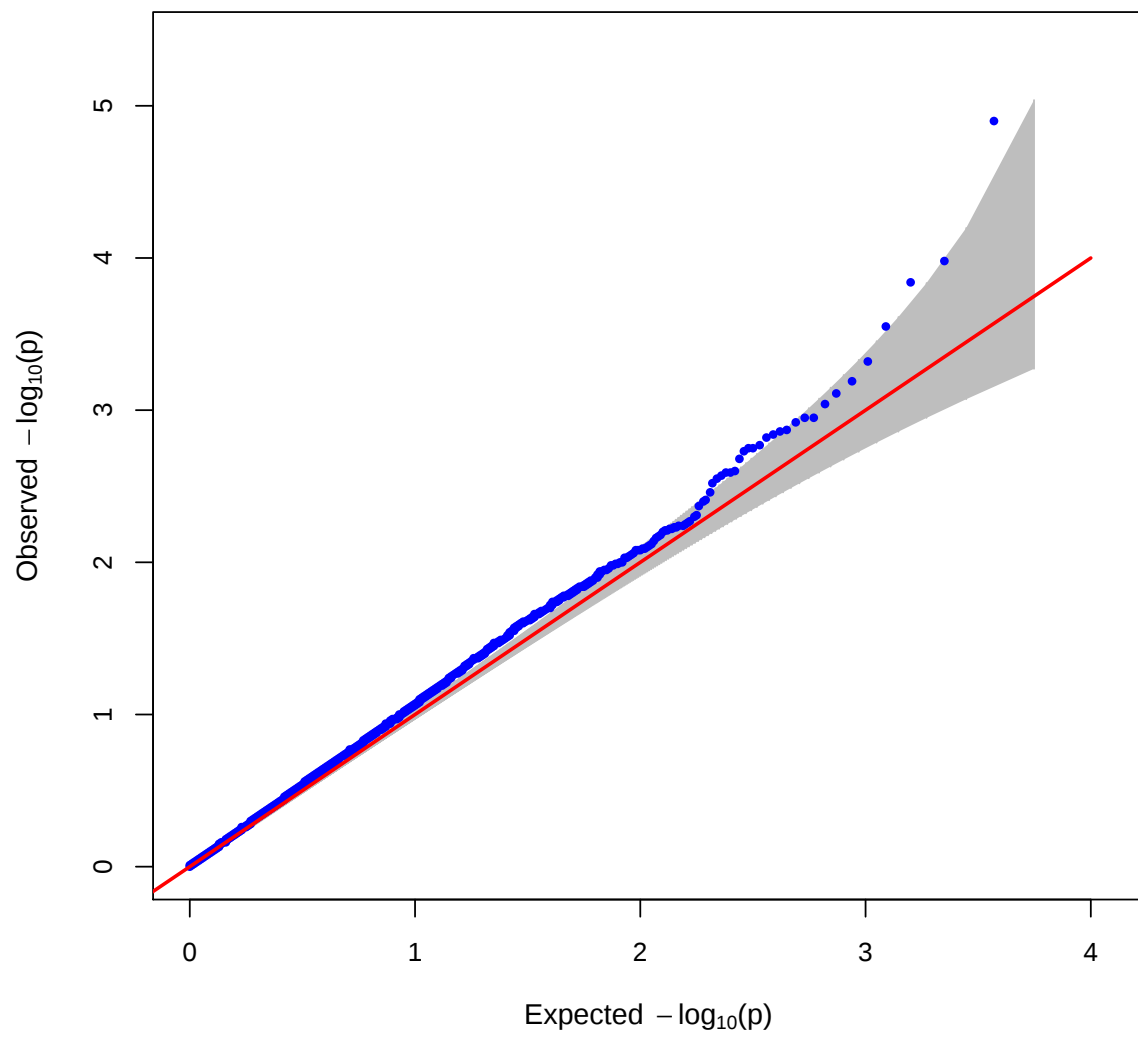
MJ by Anterior_cingulate_cortex_BA24



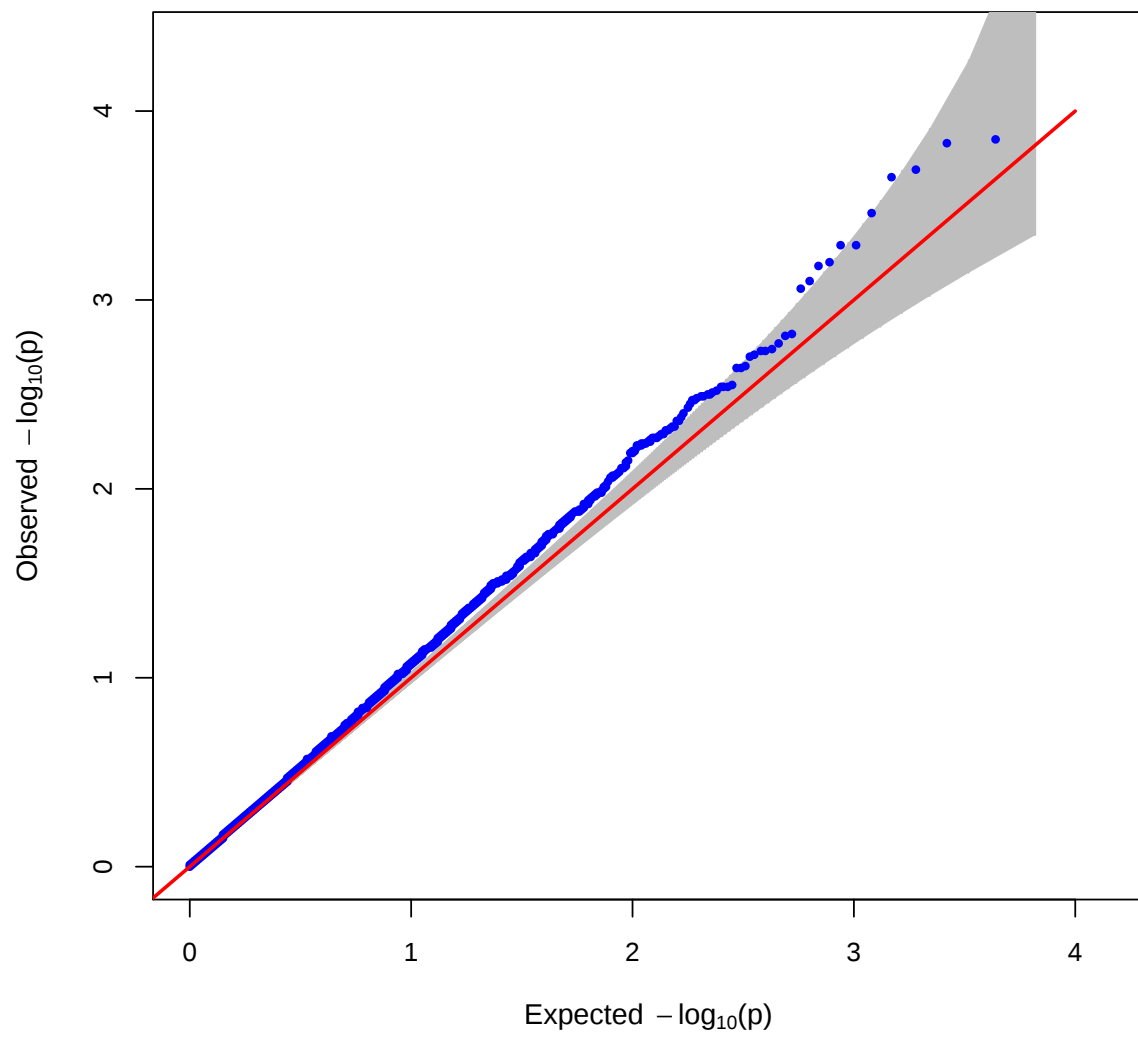
MJ by Cerebellar_Hemisphere



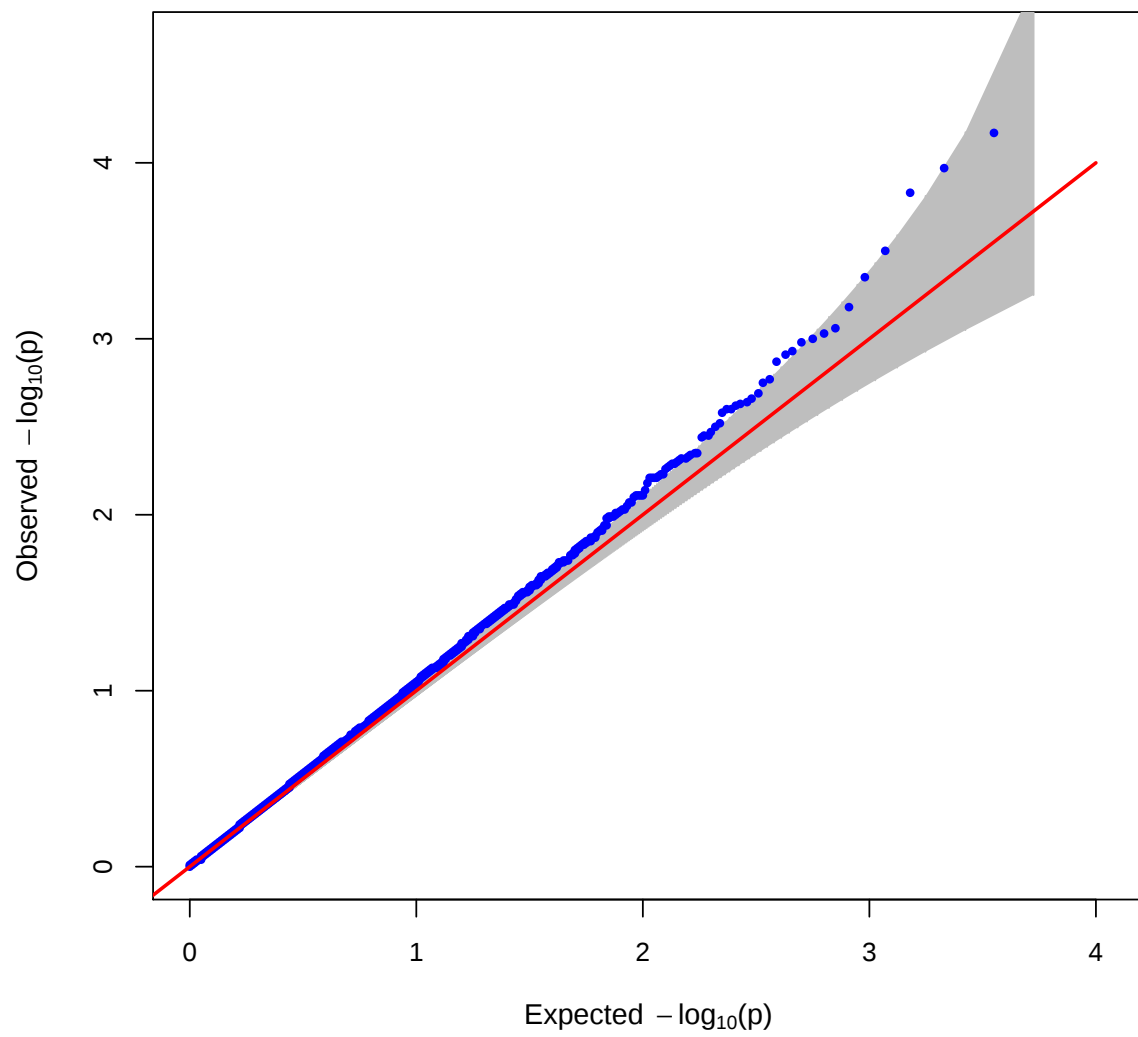
MJ by Cortex



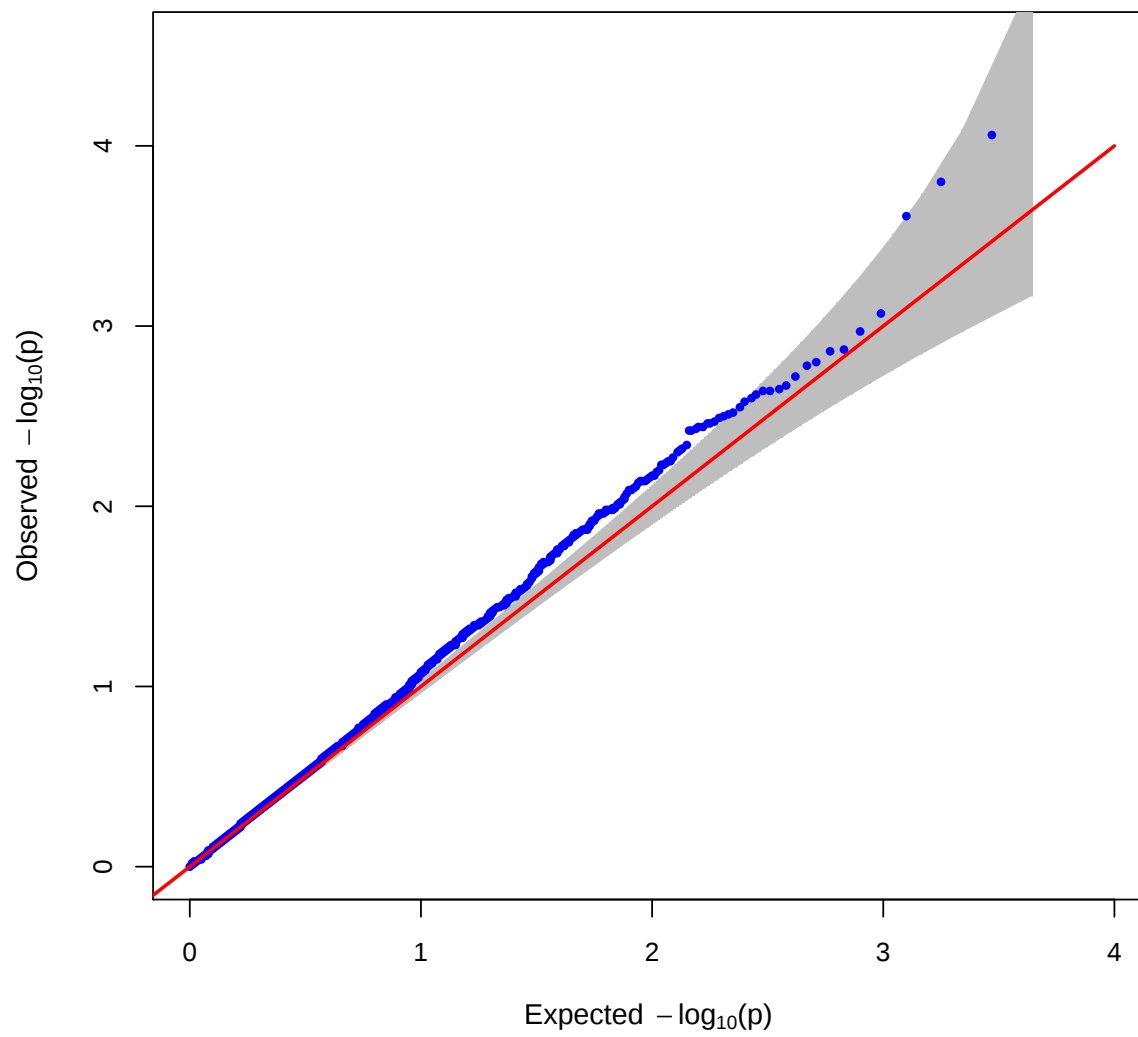
MJ by Hippocampus



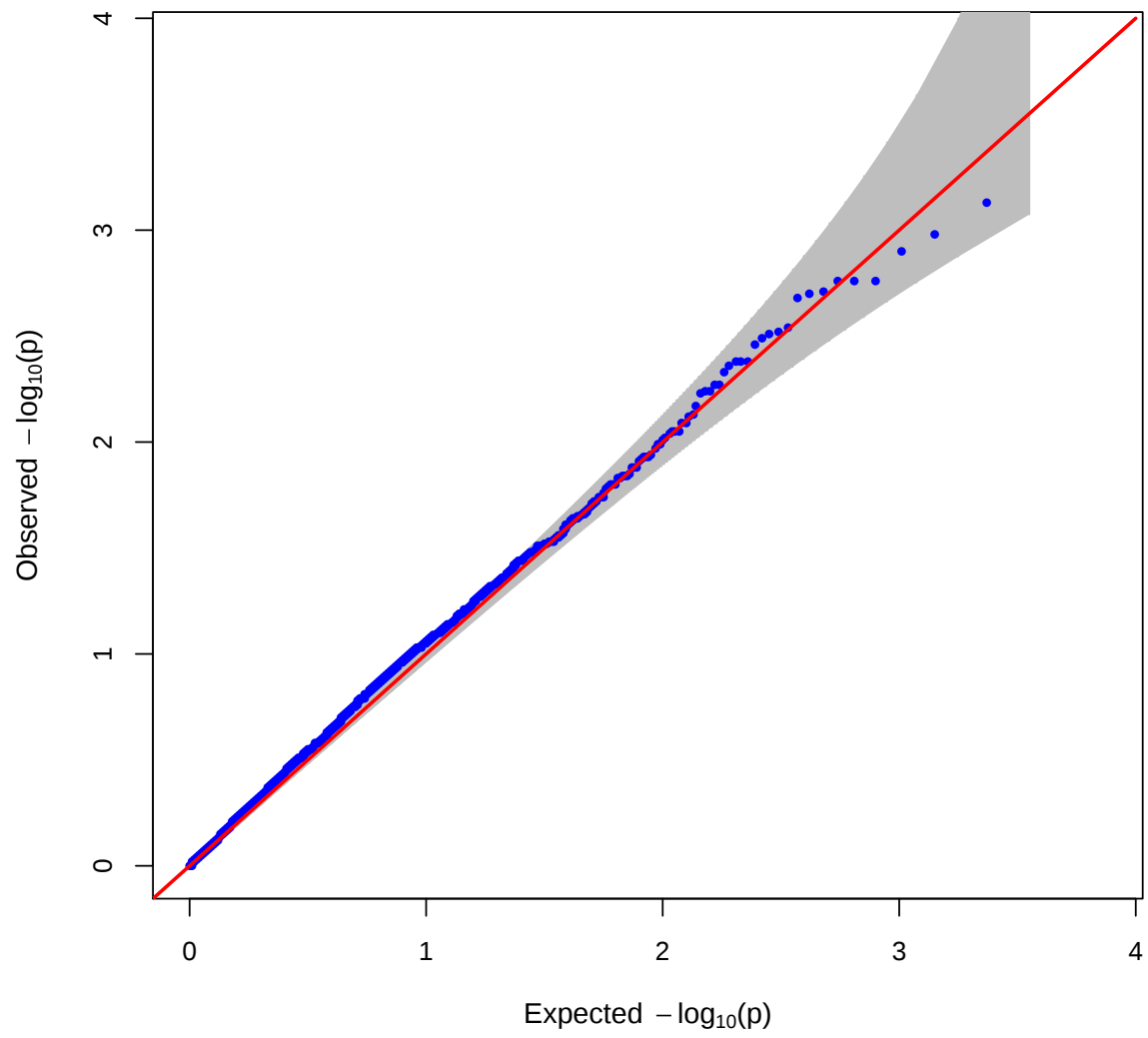
MJ by Nucleus_accumbens_basal_ganglia



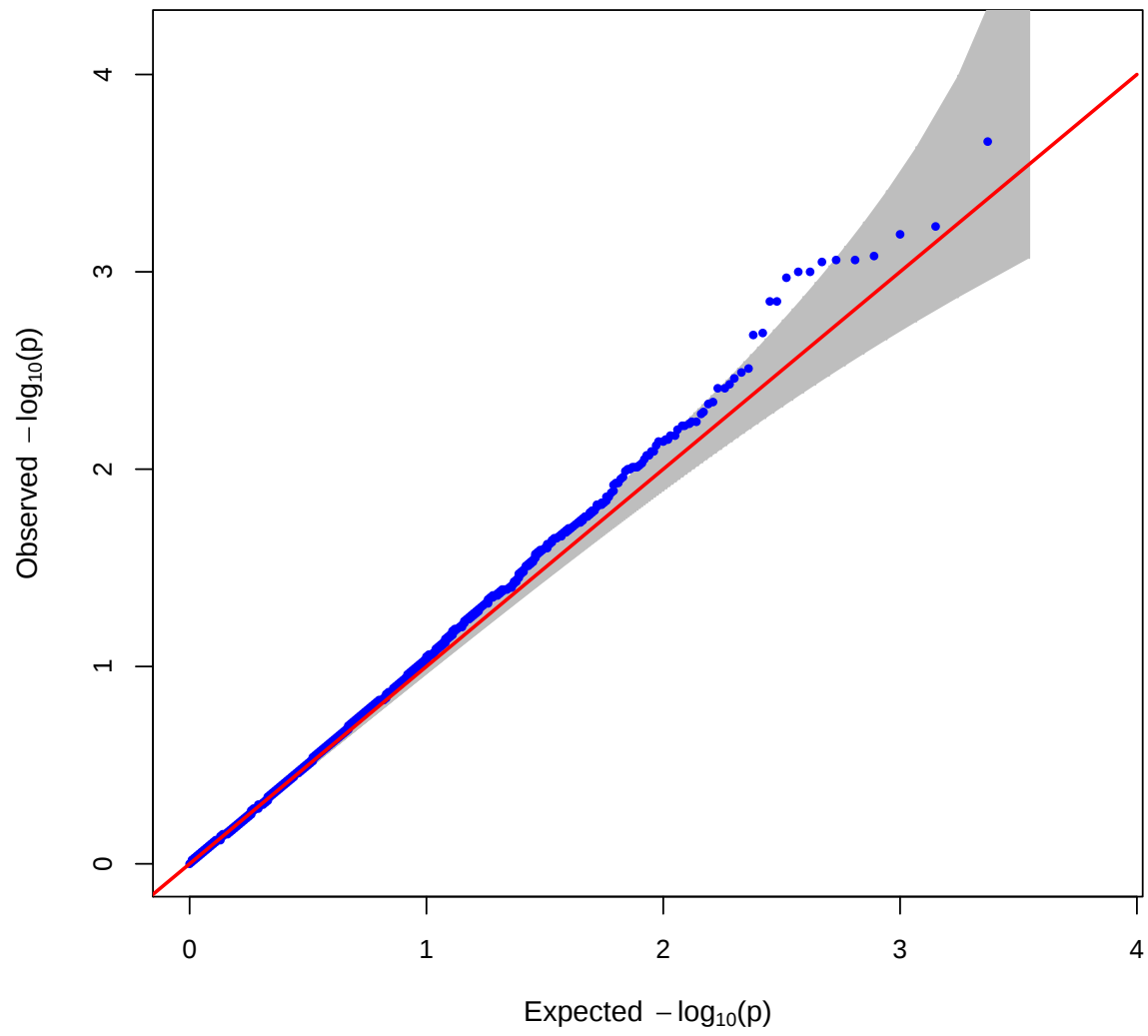
MJ by Caudate_basal_ganglia



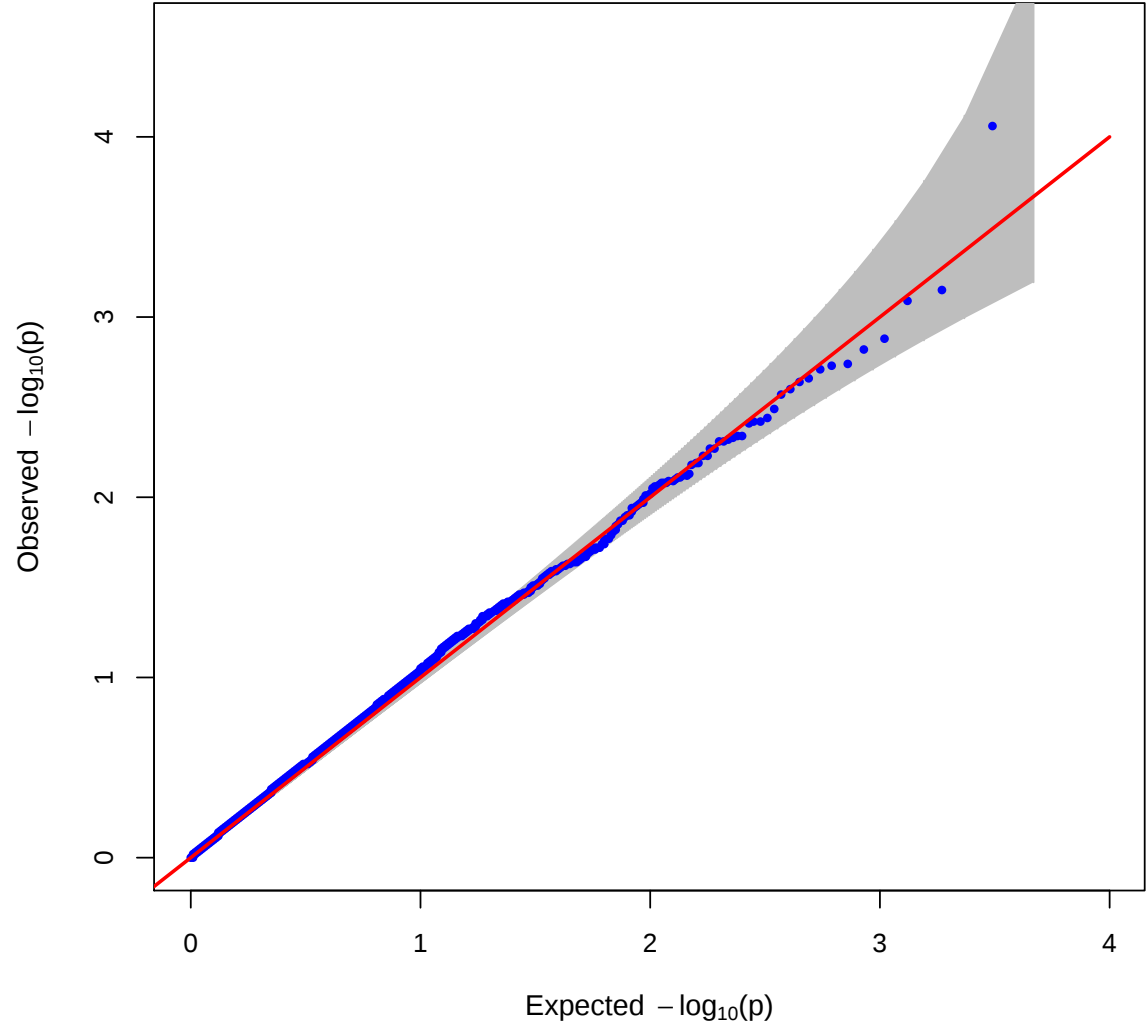
MJ by Cerebellum



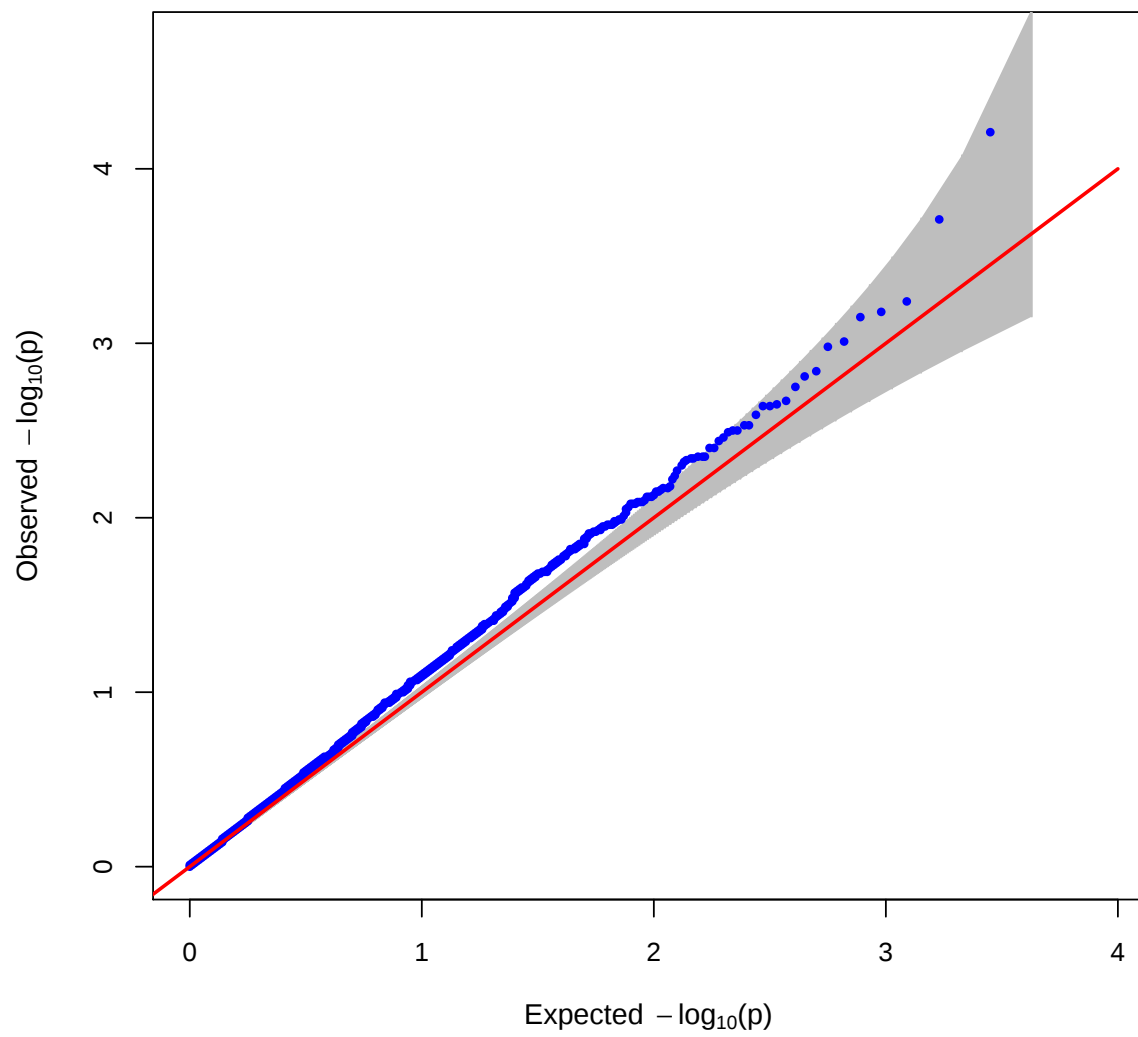
MJ by Frontal_Cortex_BA9



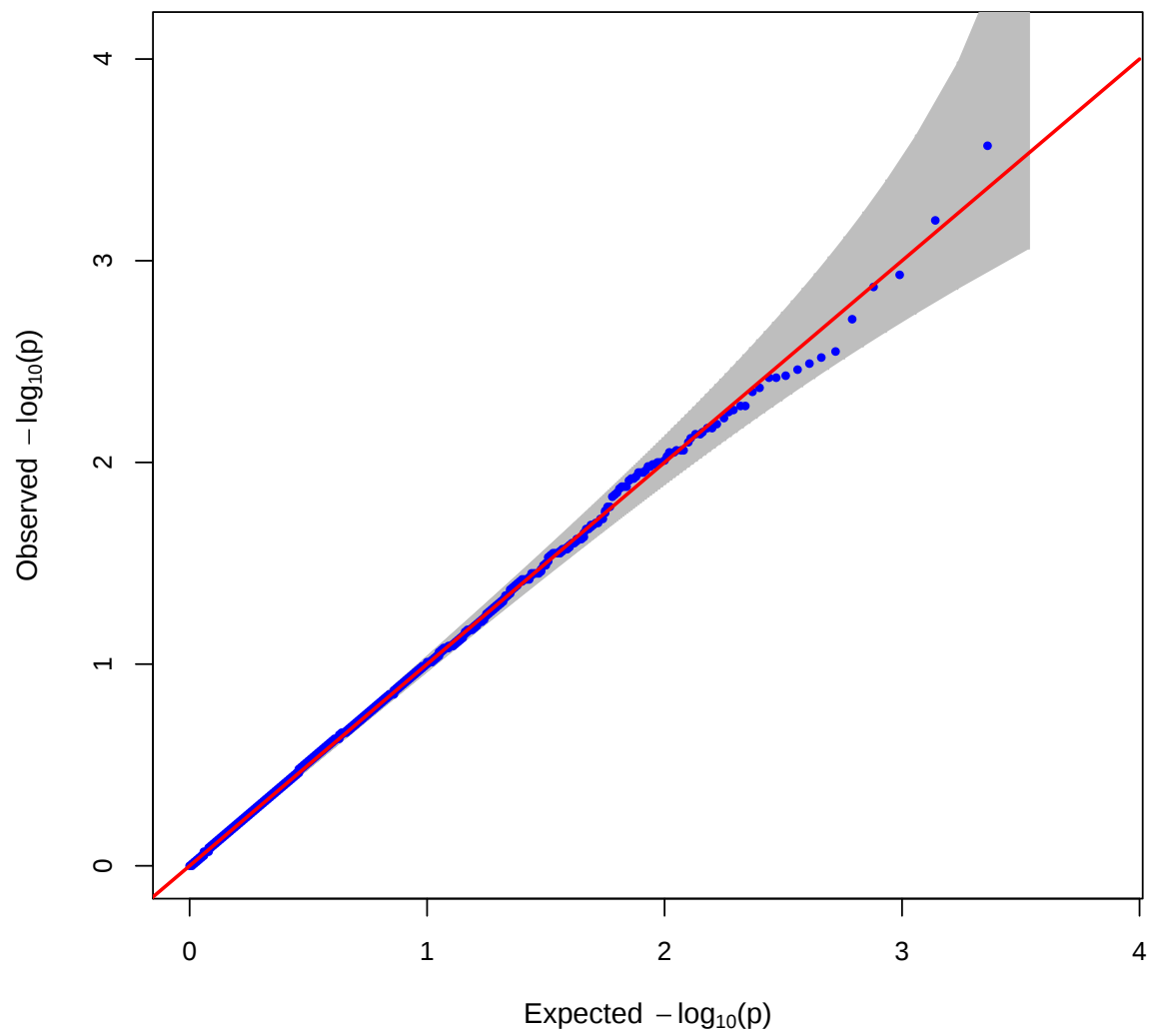
MJ by Hypothalamus



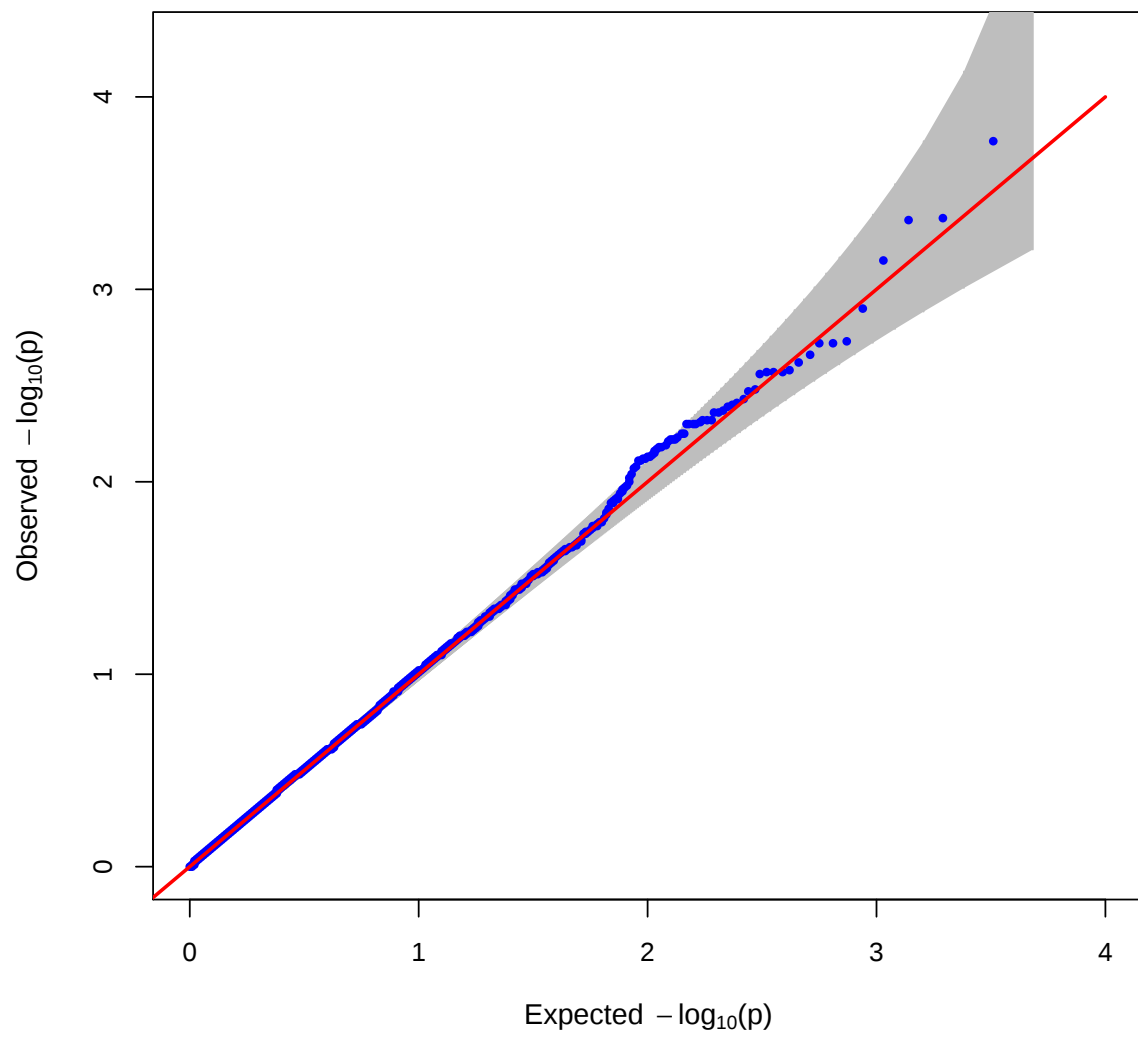
MJ by Putamen_basal_ganglia



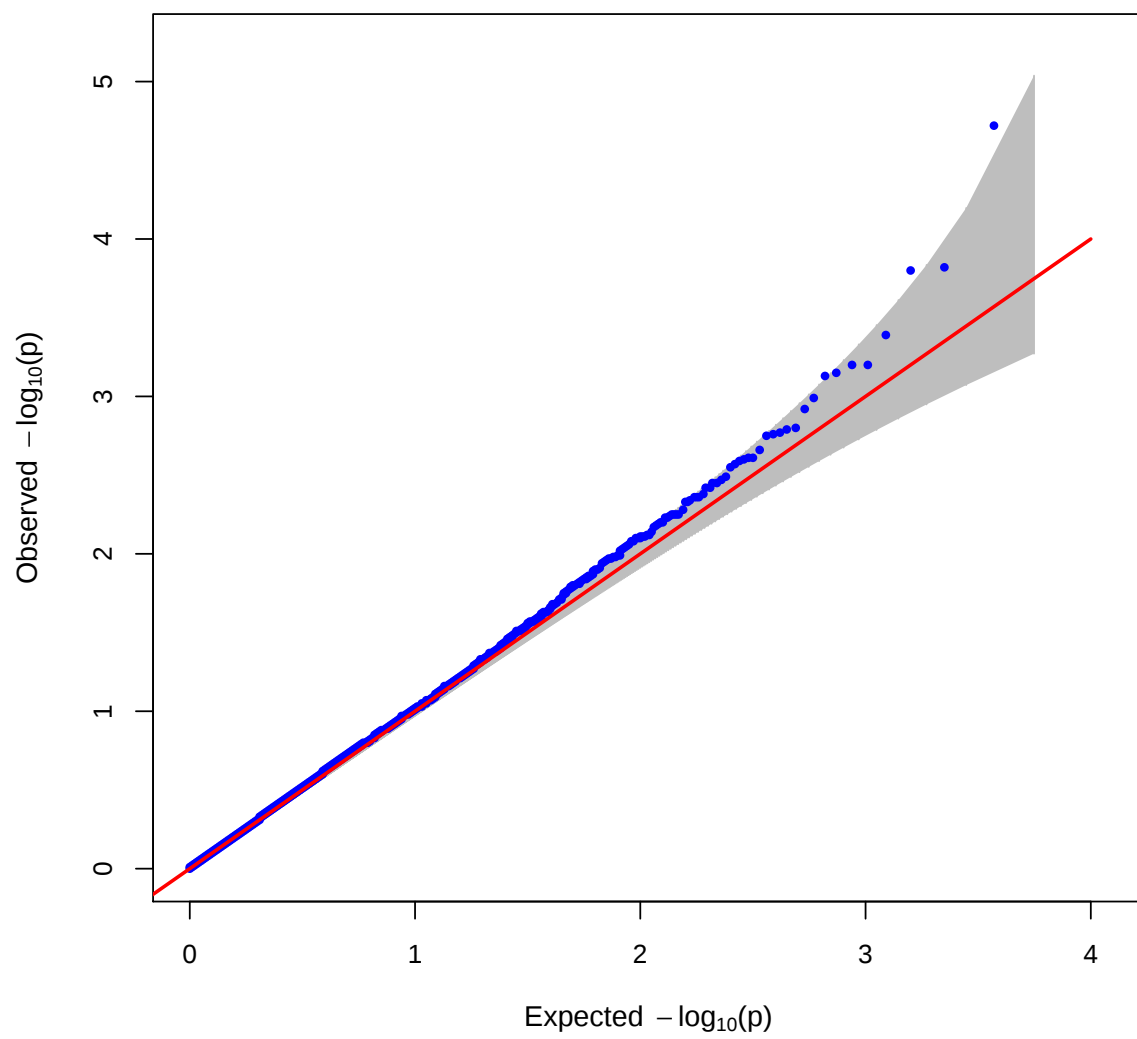
NIC by Anterior_cingulate_cortex_BA24



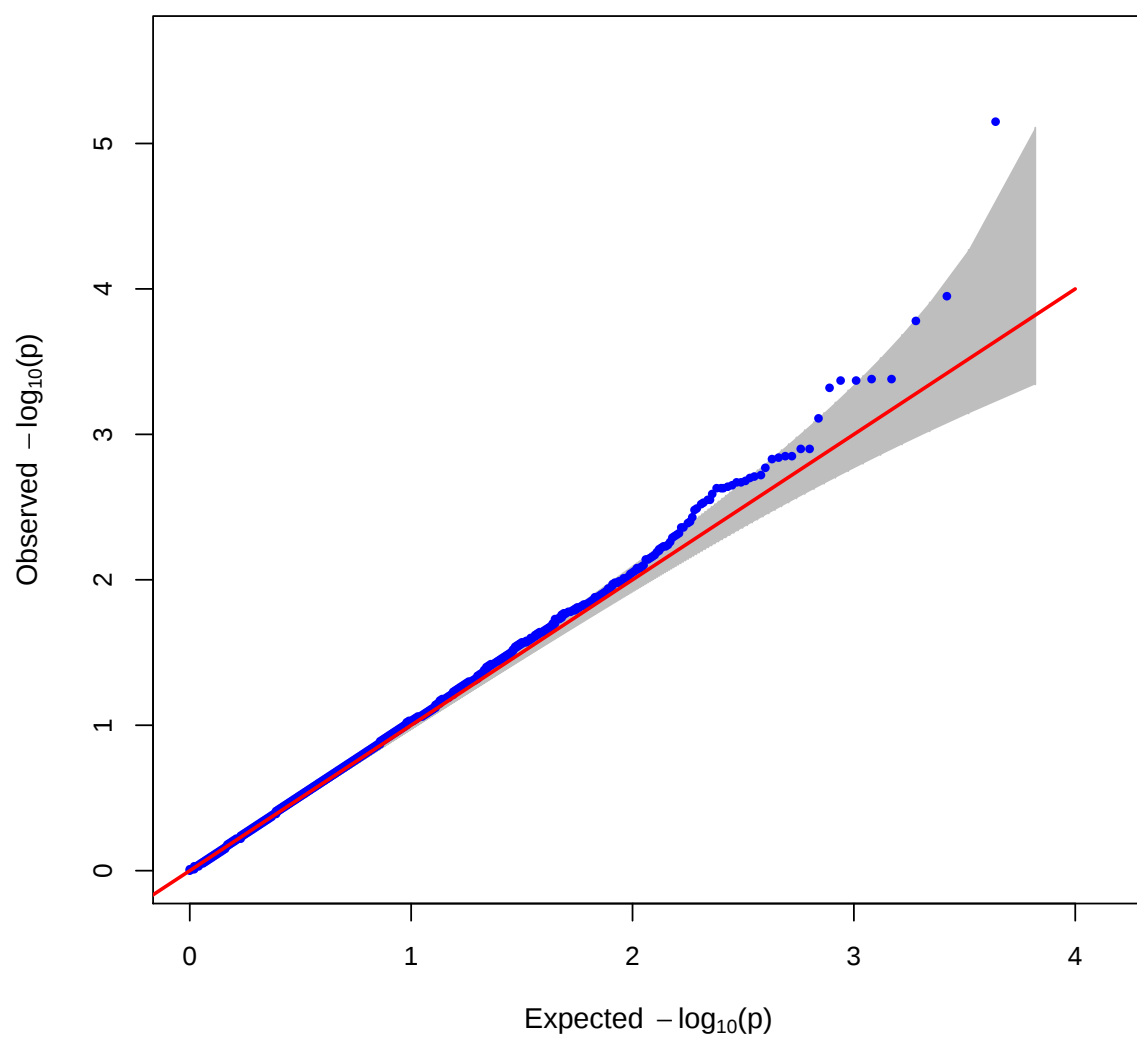
NIC by Cerebellar_Hemisphere



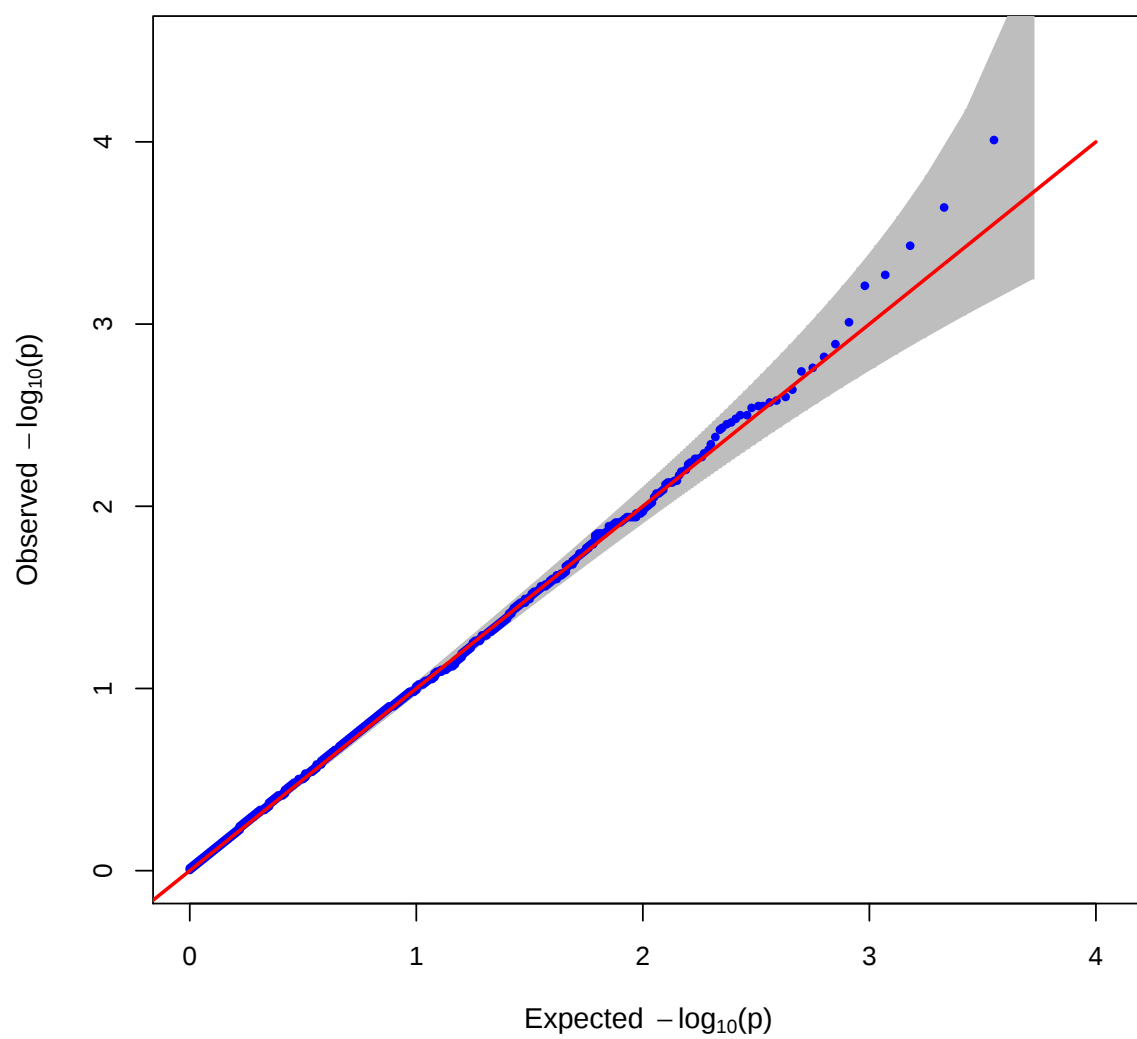
NIC by Cortex



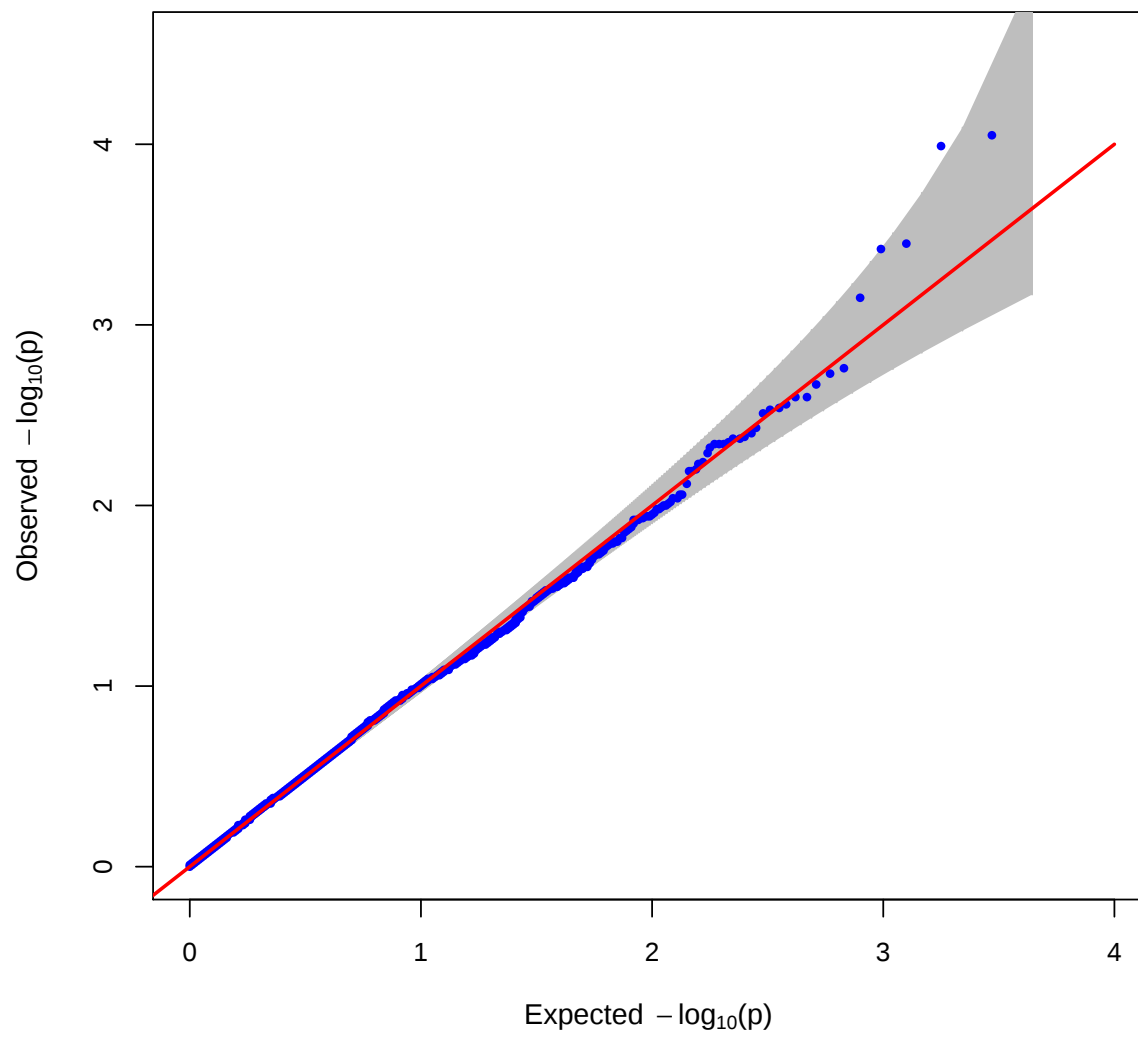
NIC by Hippocampus



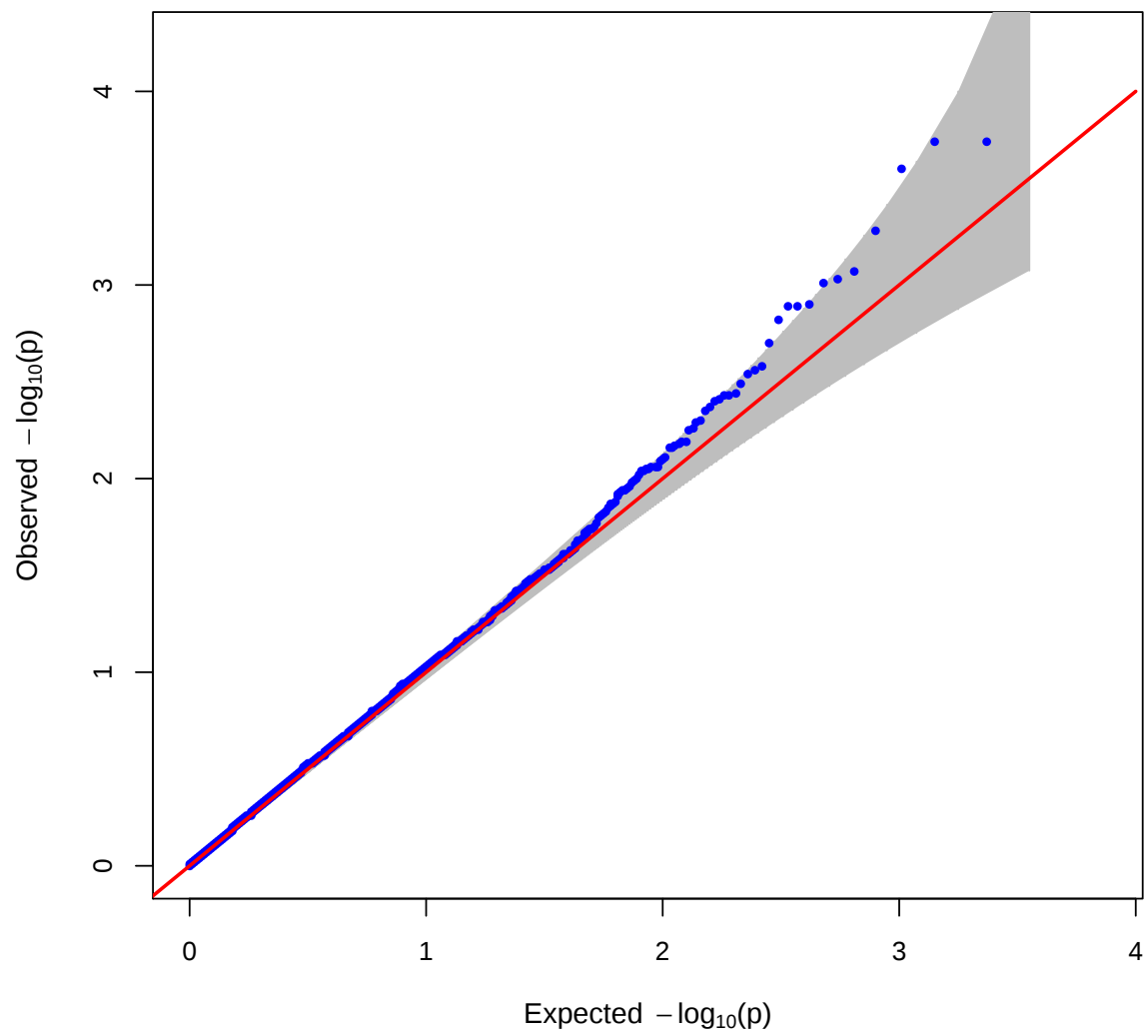
NIC by Nucleus_accumbens_basal_ganglia



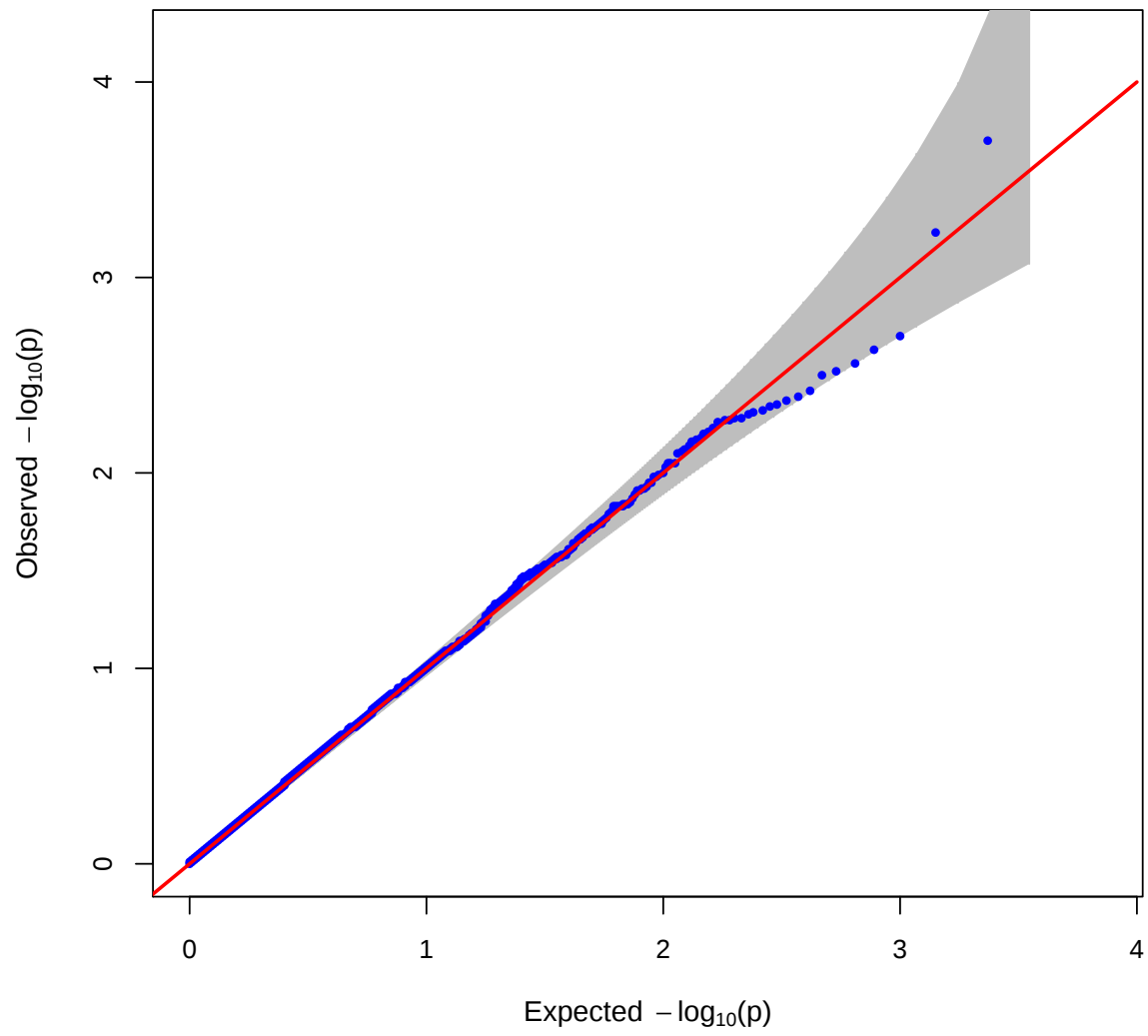
NIC by Caudate_basal_ganglia



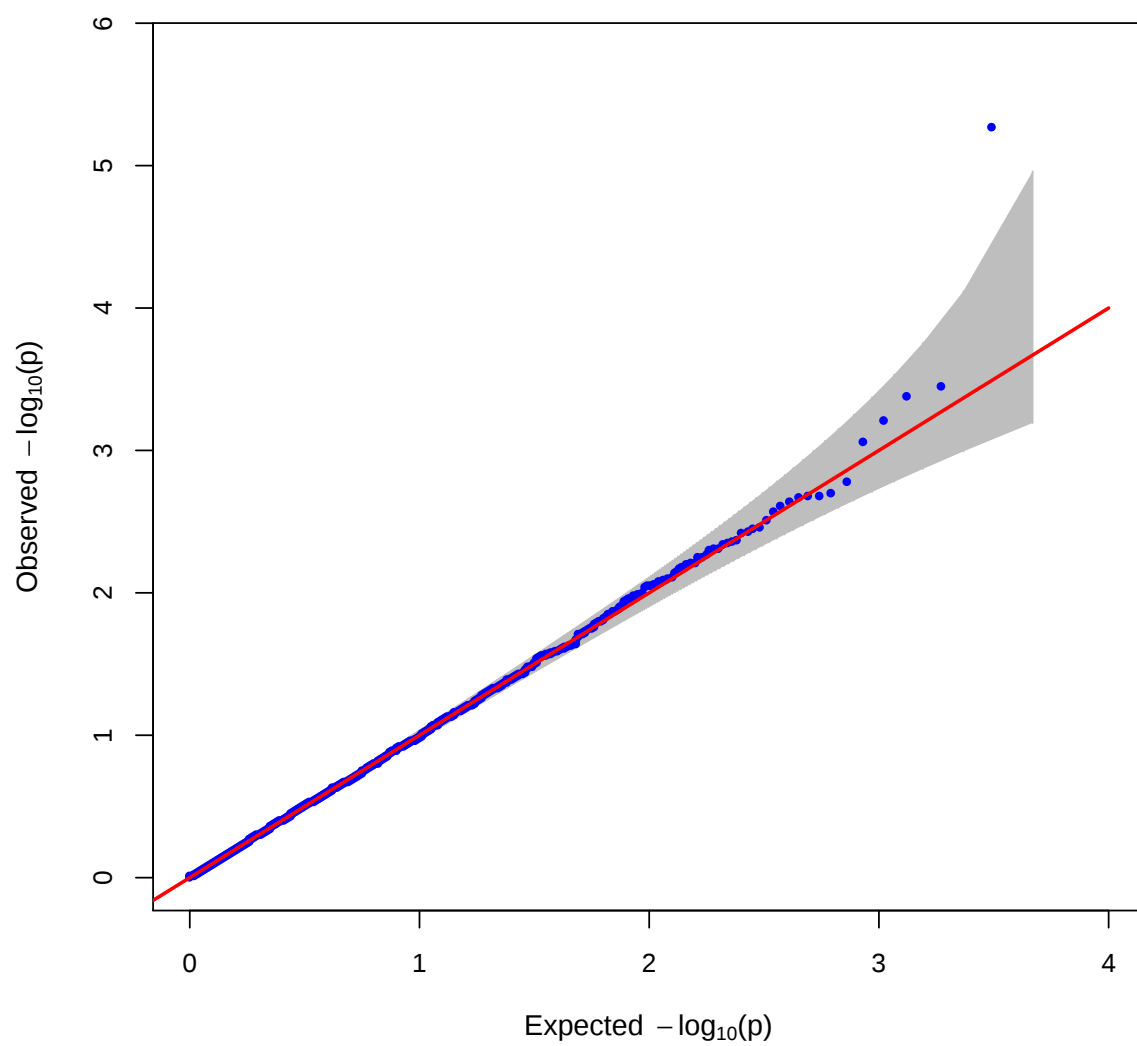
NIC by Cerebellum



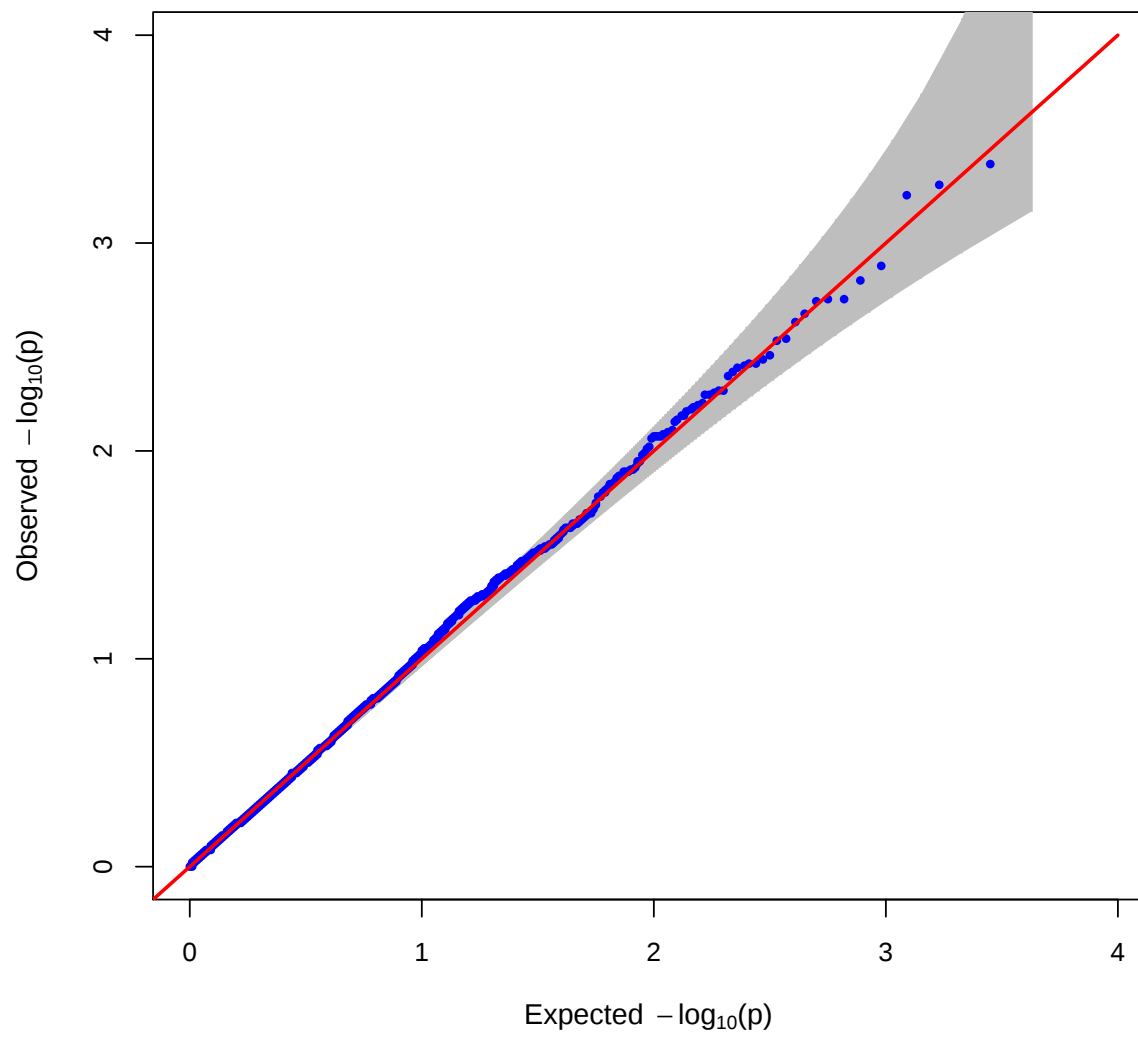
NIC by Frontal_Cortex_BA9



NIC by Hypothalamus

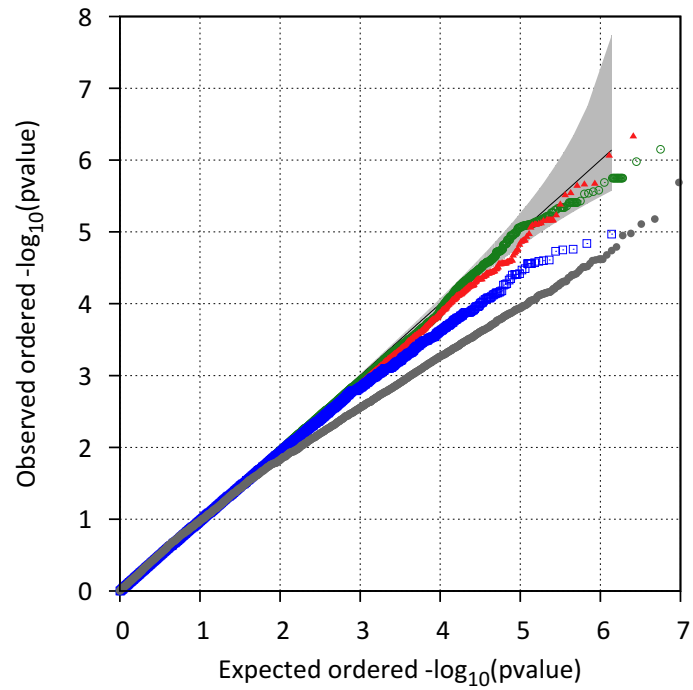


NIC by Putamen_basal_ganglia



4 Single Marker Association QQ-plots

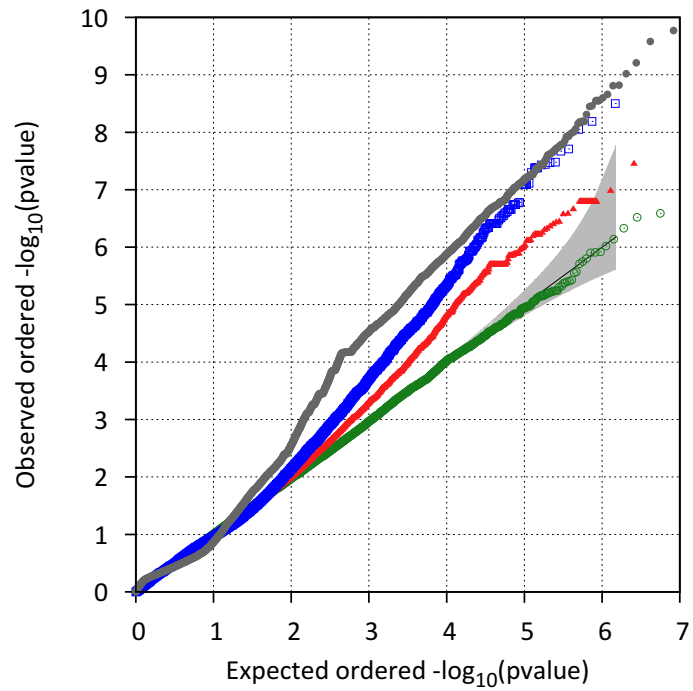
Below are quantile-quantile plots of our EPACTS single marker association results stratified by minor allele frequency (MAF). Lambda was calculated on markers with allele frequencies between 0.05 and 0.5.



lambda = 0.9759519

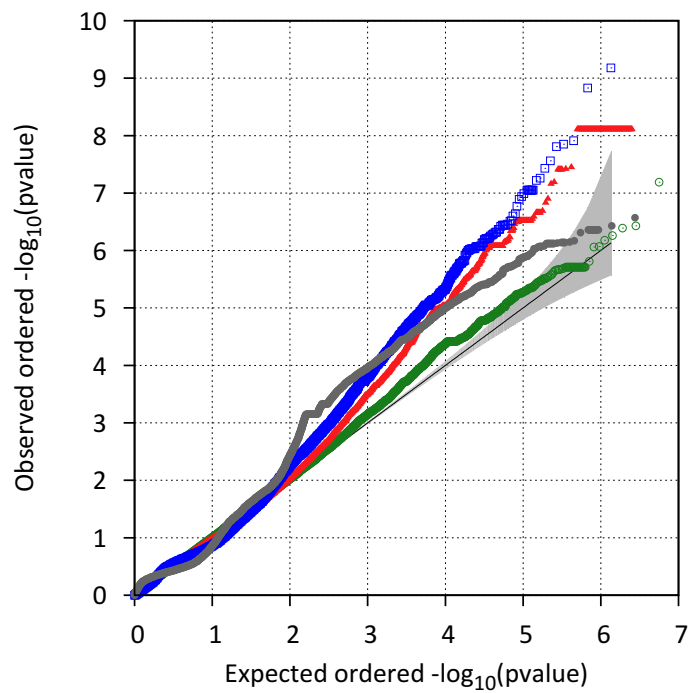
Alcohol Dependence

MAF [.05,.5] (5736387)	○
MAF [.01,.05] (2576751)	▲
MAF [.005,.01] (1380960)	□
MAF [.001,.005] (9712030)	●



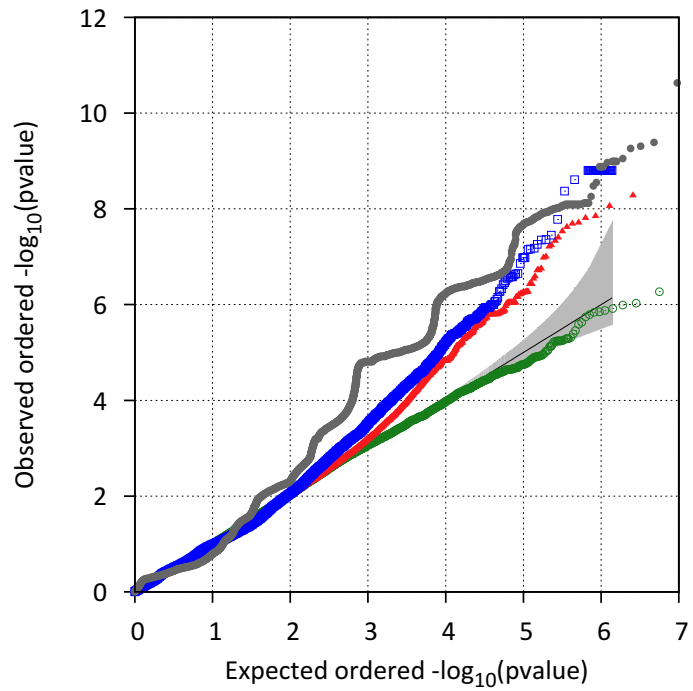
lambda = 1.019263

Family Alcoholism



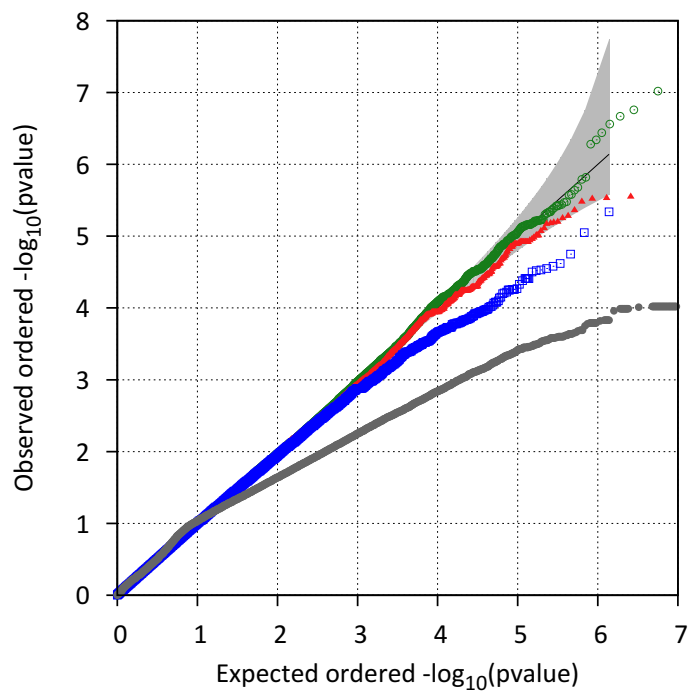
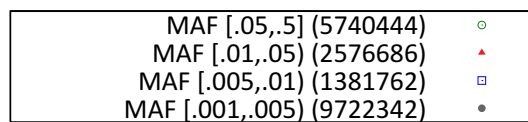
lambda = 1.018789

Cannabis Craving



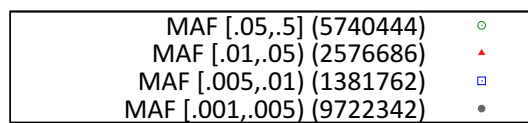
$\lambda = 0.9916276$

Cannabis Dependence



$\lambda = 0.9962726$

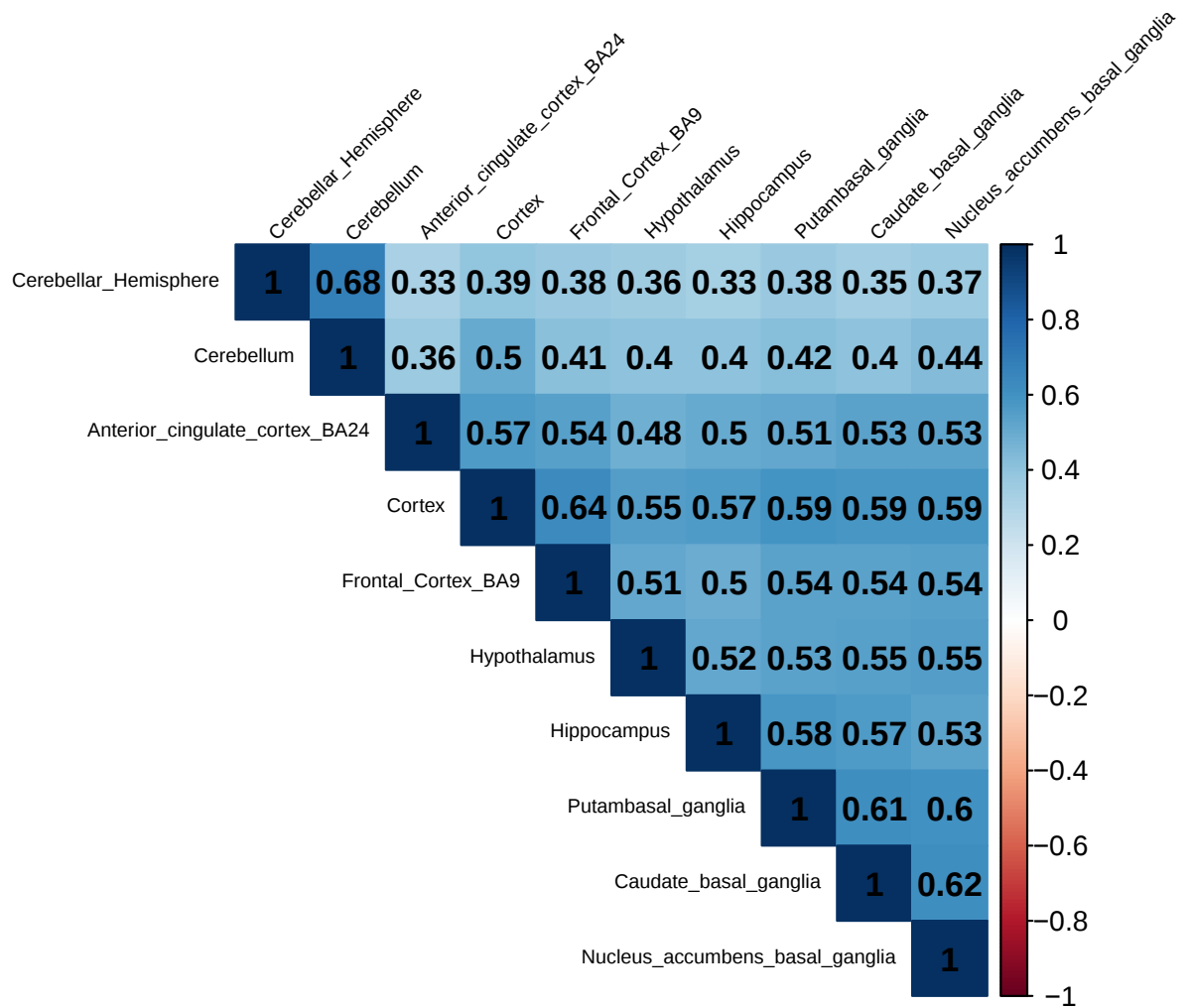
Nicotine Dependence



5 Correlation Matrices

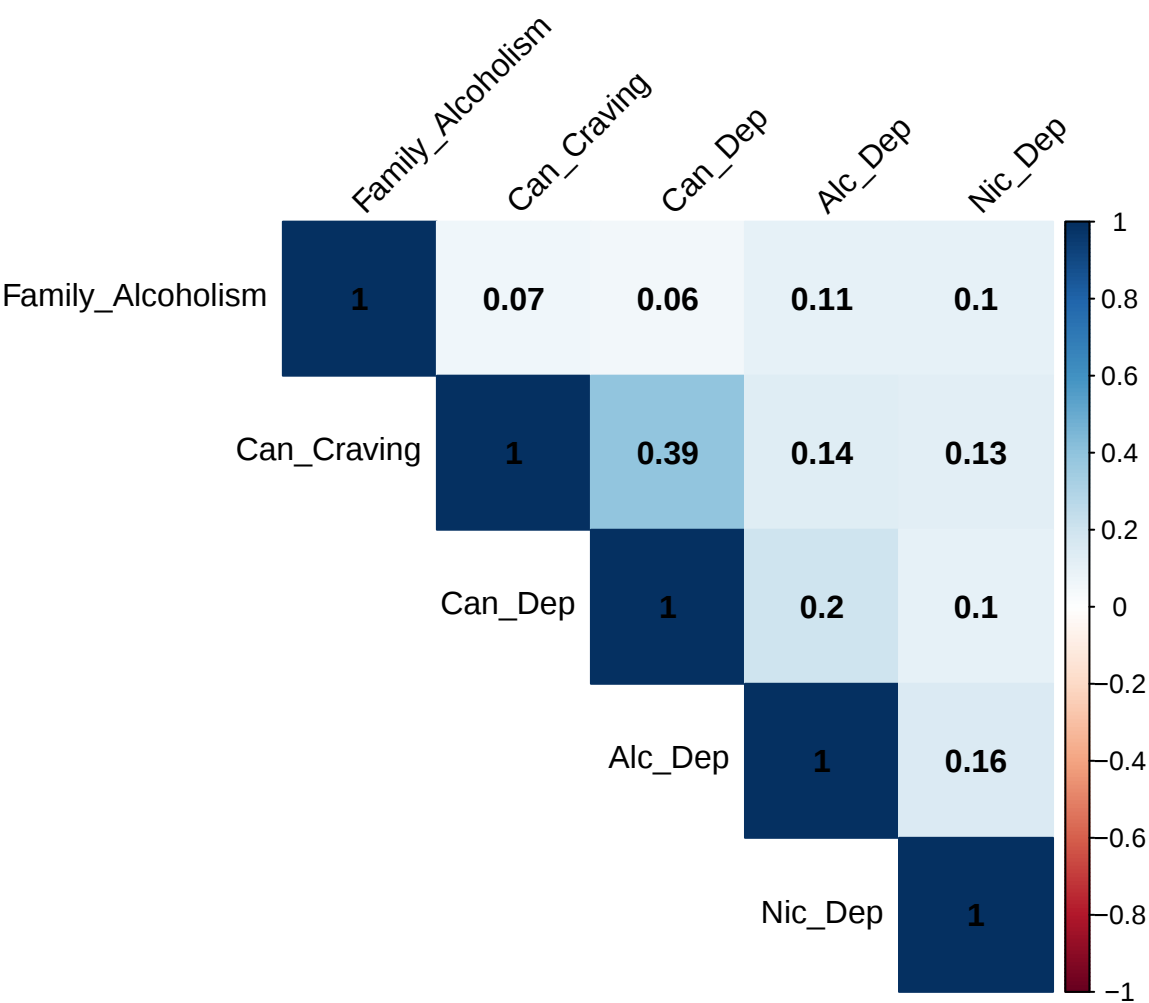
5.1 Tissue by Tissue correlation

This correlation matrix shows the correlation between all tissues based on predicted gene expression for all samples.



5.2 Trait by Trait Correlation

The following correlation matrix displays the correlation between traits based on their disease status across all samples.



	Samples in GTEx (with genotype)
Anterior Cingulate Cortex	147
Caudate Basal Ganglia	194
Cerebellar Hemisphere	175
Cerebellum	209
Cortex	205
Frontal Cortex BA9	175
Hippocampus	165
Hypothalamus	170
Nucleus Accumbens Basal Ganglia	202
Putamen Basal Ganglia	170

Table 4. Samples per tissue in GTEx data upon which Predixcan weights are Estimated.