

# main

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## 1 Prepare GCT files for the gtex eqtl pipeline

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- Inputs:
  - raw counts
  - sample table
- Outputs:
  - GCT files of counts and tpm for selected samples and genes
  - A lookup table of sample\_ids and brain\_ids
  - A list of chromosomes to use

```
[1]: import pandas as pd

[2]: def to_gct(filename, df):
    description_df = pd.DataFrame({'Description': df.index.values}, index=df.
    ↪index)
    dfo = pd.concat([description_df, df], axis=1)
    dfo.index.name = 'Names'
    with open(filename, "wt") as out:
        print("#1.2", file=out)
        print(df.shape[0], df.shape[1], sep="\t", file=out)
        dfo.to_csv(out, sep="\t")
```

### 1.1 Load data

```
[3]: fam_df = pd.read_csv("/ceph/projects/v4_phase3_paper/inputs/genotypes/_m/
    ↪LIBD_Brain_TopMed.fam",
    sep="\t", header=None, names=["BrNum", "ID", "V2", "V3",
    ↪"V4", "V5"])
pheno_df = pd.read_csv("/ceph/projects/v4_phase3_paper/inputs/phenotypes/_m/
    ↪caudate_phenotypes.csv")
pheno_df = pheno_df[(pheno_df["Dx"].isin(["CTL", "SZ"])) &
    (pheno_df["Race"].isin(["AA", "EA"])) &
    (pheno_df["Age"] > 13)].copy()
pheno_df["ids"] = pheno_df.RNum
pheno_df.set_index("ids", inplace=True)
```

```

tpm_df = pd.read_csv("/ceph/projects/v4_phase3_paper/inputs/counts/
↳text_files_counts/tpm/_m/caudate/transcript/tpm.csv", index_col=0)
counts_df = pd.read_csv("/ceph/projects/v4_phase3_paper/inputs/counts/
↳text_files_counts/_m/caudate/tx_counts.txt",
                        sep="\t", index_col=0)

```

## 1.2 Select individuals

```

[4]: samples_rnum = list(set(pheno_df.index).intersection(set(counts_df.columns)))
samples = list(set(pheno_df.loc[samples_rnum,:].BrNum).intersection(set(fam_df.
↳BrNum)))
new_fam = fam_df[(fam_df["BrNum"].isin(samples))].
↳drop_duplicates(subset="BrNum")
new_fam.to_csv("keepFam.txt", sep='\t', index=False, header=False)
new_fam.shape

```

[4]: (399, 6)

```

[5]: new_pheno = pheno_df.loc[:, ["RNum", "BrNum"]]\
      .reset_index().set_index("BrNum")\
      .loc[new_fam.BrNum].reset_index().set_index("ids")
new_pheno.head(2)

```

```

[5]:      BrNum      RNum
ids
R13226  Br823  R13226
R12926  Br836  R12926

```

```

[6]: interaction_df = pheno_df.loc[:, ["RNum", "BrNum", "Sex"]]\
      .reset_index().set_index("BrNum")\
      .loc[new_fam.BrNum]
interaction_df["Sex"] = interaction_df.Sex.astype("category").cat.codes
interaction_df.loc[:, ["Sex"]].to_csv("sex_interaction_list.txt", sep='\t')

```

## 1.3 Select genes

```

[7]: genes = list(set(counts_df.index).intersection(set(tpm_df.index)))
len(genes)

```

[7]: 198093

## 1.4 Output files

```

[8]: to_gct("counts.gct", counts_df.loc[genes,new_pheno.index])
to_gct("tpm.gct", tpm_df.loc[genes,new_pheno.index])
new_pheno.loc[:, ["RNum", "BrNum"]].to_csv("sample_id_to_brnum.tsv", sep="\t",
↳index=False)

```

```
[9]: pd.DataFrame({'chr': ['chr'+xx for xx in [str(x) for x in range(1,23)] +  
    ↪ ['X']]})\n    .to_csv('vcf_chr_list.txt', header=False, index=None)
```

```
[ ]:
```