main

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1 Prepare GCT files for the gtex eqtl pipeline

Apuã Paquola

Edited by Kynon J Benjamin

- 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/exon/tpm.csv", index_col=0)
counts_df = pd.read_csv("/ceph/projects/v4_phase3_paper/inputs/counts/
 ↪text_files_counts/_m/caudate/exon_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]:

ids	BrNum	RNum
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]:
```
135599
```

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']]})\
  .to_csv('vcf_chr_list.txt', header=False, index=None)
```

[ ]:
```

```