

## Figure2\_gaussian

June 21, 2016

```
In [1]: %matplotlib inline
import pandas as pd
import numpy as np
import matplotlib
import matplotlib.pyplot as plt
from matplotlib.backends.backend_pdf import PdfPages
import scipy.stats as stats
import scipy.cluster.hierarchy as sch
from operator import *
pd.core.config.option_context('mode.use_inf_as_null', True)
import seaborn as sns
rcdefsns = plt.rcParams.copy()
import brewer2mpl
import os
import sys

matplotlib.rcParams['axes.linewidth'] = 3
matplotlib.rcParams['axes.edgecolor'] = 'k'
matplotlib.rcParams['axes.spines.top'] = 'False'
matplotlib.rcParams['axes.spines.right'] = 'False'
matplotlib.rcParams['axes.facecolor'] = 'white'

In [11]: islet_bulk_uniq=pd.read_csv('islet_bulk_uniq_data_cnts.csv',index_col=0)
islet_bulk_uniq_cpm=(islet_bulk_uniq/islet_bulk_uniq.sum())*1e6

t2d=pd.read_csv(' ../New.T2D-Counts.csv',index_col=0)
t2d_cpm=(t2d/t2d.sum())*1e6

nd=pd.read_csv(' ../New.NonT2D-Counts.csv',index_col=0)
nd_cpm=(nd/nd.sum())*1e6

islet_bulk_phenoData=pd.read_csv('islet_bulk_uniq_phenodata.csv',index_col=0)
islet_bulk_fetureData=pd.read_csv('islet_bulk_uniq_featuredata.csv',index_col=0)

t2d_phenoData=pd.read_csv(' ../New.T2D-CellClassification.csv',index_col=0)
nd_phenoData=pd.read_csv(' ../NewNonT2D-CellClassification.csv',index_col=0)

In [12]: idx_T2D_intact=islet_bulk_phenoData[(islet_bulk_phenoData['Phenotype']=='T2D') & (islet_bulk_p
idx_ND_intact=islet_bulk_phenoData[(islet_bulk_phenoData['Phenotype']=='ND') & (islet_bulk_phe

In [13]: idx_beta_cells_t2d=t2d_phenoData[t2d_phenoData['cell.type']=='INS'].index
idx_alpha_cells_t2d=t2d_phenoData[t2d_phenoData['cell.type']=='GCG'].index
idx_gamma_cells_t2d=t2d_phenoData[t2d_phenoData['cell.type']=='PPY'].index
idx_delta_cells_t2d=t2d_phenoData[t2d_phenoData['cell.type']=='SST'].index
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idx_beta_cells_nd=nd_phenoData[nd_phenoData['cell.type']=='INS'].index
idx_alpha_cells_nd=nd_phenoData[nd_phenoData['cell.type']=='GCG'].index
idx_gamma_cells_nd=nd_phenoData[nd_phenoData['cell.type']=='PPY'].index
idx_delta_cells_nd=nd_phenoData[nd_phenoData['cell.type']=='SST'].index
idx_acinar_cells_nd=nd_phenoData[nd_phenoData['cell.type']=='PRSS1'].index
idx_stellate_cells_nd=nd_phenoData[nd_phenoData['cell.type']=='COL1A1'].index
idx_ductal_cells_nd=nd_phenoData[nd_phenoData['cell.type']=='KRT19'].index

In [15]: t2d_means_by_celltype=pd.DataFrame(index=t2d.index,columns=['INS','GCG','PPY','SST'])
t2d_means_by_celltype['INS']=(t2d_cpm[idx_beta_cells_t2d]+1.).apply(np.log2).apply(np.mean,1)
t2d_means_by_celltype['GCG']=(t2d_cpm[idx_alpha_cells_t2d]+1.).apply(np.log2).apply(np.mean,1)
t2d_means_by_celltype['PPY']=(t2d_cpm[idx_gamma_cells_t2d]+1.).apply(np.log2).apply(np.mean,1)
t2d_means_by_celltype['SST']=(t2d_cpm[idx_delta_cells_t2d]+1.).apply(np.log2).apply(np.mean,1)

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## Colors and Genes

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Red (#e41a1c) = Beta
Blue (#377eb8) = Alpha
Green (#4daf4a) = Delta
Purple = (#984ea3) Gamma
Orange = (#ff7f00) Epsilon/Ghrelin
Black = (#000000) Stellate - COL1A1
Grey = (#525252) Acinar - PRSS1
Grey = (#969696) Ductal - KRT19
Grey = (#D9D9D9) Nones

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In [16]: ins_engsg=islet_bulk_fetureData[islet_bulk_fetureData['Associated.Gene.Name']=='INS'].index[0]
gcg_engsg=islet_bulk_fetureData[islet_bulk_fetureData['Associated.Gene.Name']=='GCG'].index[0]
ppy_engsg=islet_bulk_fetureData[islet_bulk_fetureData['Associated.Gene.Name']=='PPY'].index[0]
sst_engsg=islet_bulk_fetureData[islet_bulk_fetureData['Associated.Gene.Name']=='SST'].index[0]
coll1a1_engsg=islet_bulk_fetureData[islet_bulk_fetureData['Associated.Gene.Name']=='COL1A1'].index[0]
krt19_engsg=islet_bulk_fetureData[islet_bulk_fetureData['Associated.Gene.Name']=='KRT19'].index[0]
prss1_engsg=islet_bulk_fetureData[islet_bulk_fetureData['Associated.Gene.Name']=='PRSS1'].index[0]

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In [19]: matplotlib.rcParams['figure.figsize'] = (10.0, 5.0)
matplotlib.rcParams['axes.linewidth'] = 3
matplotlib.rcParams['axes.edgecolor'] = 'k'
matplotlib.rcParams['axes.spines.top']='False'
matplotlib.rcParams['axes.spines.right']='False'
matplotlib.rcParams['axes.facecolor']='white'

```

```
fig,ax=plt.subplots(1,2)
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sns.kdeplot((nd_cpm.ix[ins_engsg]+1.).apply(np.log2),ax=ax[0],shade=True, color="#e41a1c",lw=3)
ax[0].set_xlim(-4,25)
ax[0].legend().set_visible(False)
ax[0].set_title('INS',fontsize=14)
ax[0].tick_params(axis='both', which='major', labels=14)
ax[0].set_xlabel(r'$\log_2(\text{CPM})$',fontsize=14)

```

```

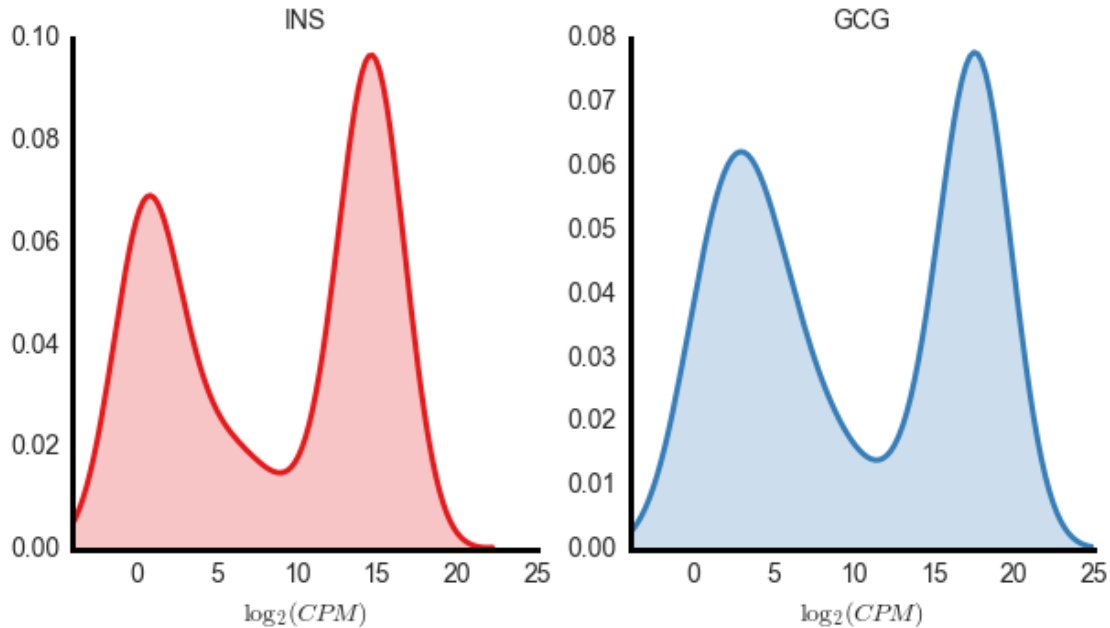
sns.kdeplot((nd_cpm.ix[gcg_engsg]+1.).apply(np.log2),ax=ax[1],shade=True, color="#377eb8",lw=3)
ax[1].set_xlim(-4,25)
ax[1].legend().set_visible(False)
ax[1].set_title('GCG',fontsize=14)

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ax[1].tick_params(axis='both', which='major', labels=14)
ax[1].set_xlabel(r'$\log_2(CPM)$',font=14)

#nd_cpm.ix[gcg_engg].plot(kind='kde',lw=3,color='#e41a1c',ax=ax[1])
```

Out[19]: <matplotlib.text.Text at 0x13882eed0>



```
In [20]: %%bash
mkdir Figures_06142016
```

```
In [21]: fig.savefig('Figures_06142016/Figure2_gaussian_panelA.pdf',format='pdf',dpi=600)
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In [47]: fig.savefig('Figure2D.pdf',format='pdf',dpi=600)
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```
In [22]: matplotlib.rcParams['figure.figsize'] = (10.0, 5.0)
matplotlib.rcParams['axes.linewidth'] = 3
matplotlib.rcParams['axes.edgecolor'] = 'k'
matplotlib.rcParams['axes.spines.top']='False'
matplotlib.rcParams['axes.spines.right']='False'
matplotlib.rcParams['axes.facecolor']='white'
```

```
fig,ax=plt.subplots(1,2)
```

```
sns.kdeplot((nd_cpm.ix[sst_engg]+1.).apply(np.log2),ax=ax[0],shade=True, color="#4daf4a",lw=3,
ax[0].set_xlim(-4,25)
ax[0].legend().set_visible(False)
ax[0].set_title('SST',font=14)
ax[0].tick_params(axis='both', which='major', labels=14)
ax[0].set_xlabel(r'$\log_2(CPM)$',font=14)
```

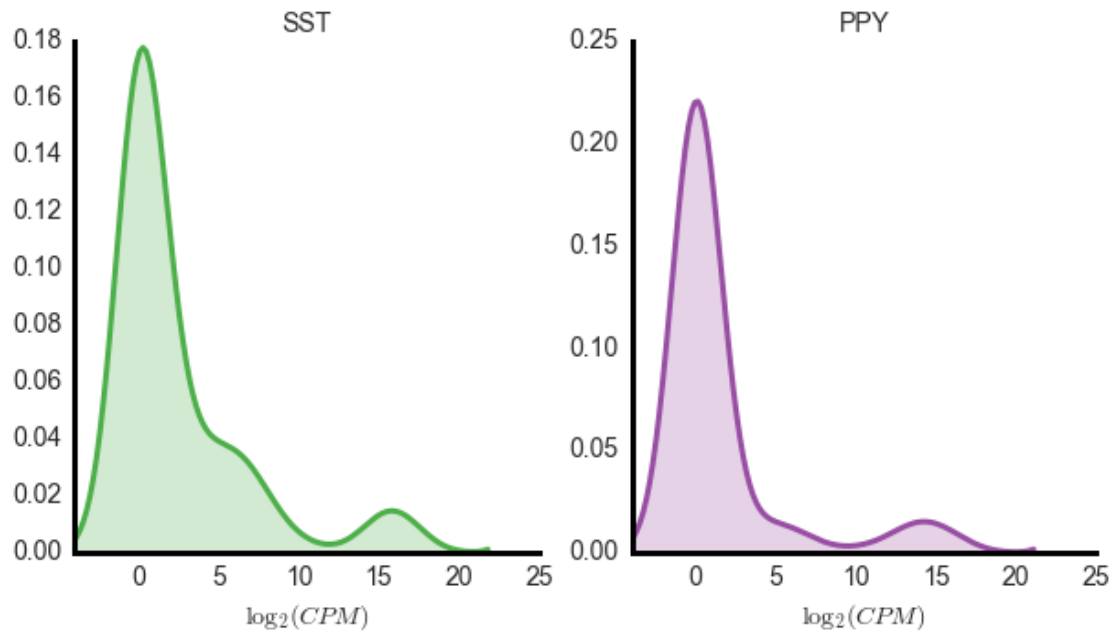
```
sns.kdeplot((nd_cpm.ix[ppy_engg]+1.).apply(np.log2),ax=ax[1],shade=True, color="#984ea3",lw=3,
```

```

ax[1].set_xlim(-4,25)
ax[1].legend().set_visible(False)
ax[1].set_title('PPY',fontsize=14)
ax[1].tick_params(axis='both', which='major', labels=14)
ax[1].set_xlabel(r'$\log_2(CPM)$',fontsize=14)

```

Out[22]: <matplotlib.text.Text at 0x116e8ea90>



```

In [24]: matplotlib.rcParams['figure.figsize'] = (10.0, 5.0)
matplotlib.rcParams['axes.linewidth'] = 3
matplotlib.rcParams['axes.edgecolor'] = 'k'
matplotlib.rcParams['axes.spines.top'] = 'False'
matplotlib.rcParams['axes.spines.right'] = 'False'
matplotlib.rcParams['axes.facecolor'] = 'white'

```

```
fig,ax=plt.subplots(1,2)
```

```

sns.kdeplot((nd_cpm.ix[col1a1_ensg]+1.).apply(np.log2),ax=ax[0],shade=True, color="#000000",lw=
ax[0].set_xlim(-4,25)
ax[0].legend().set_visible(False)
ax[0].set_title('COL1A1',fontsize=14)
ax[0].tick_params(axis='both', which='major', labels=14)
ax[0].set_xlabel(r'$\log_2(CPM)$',fontsize=14)

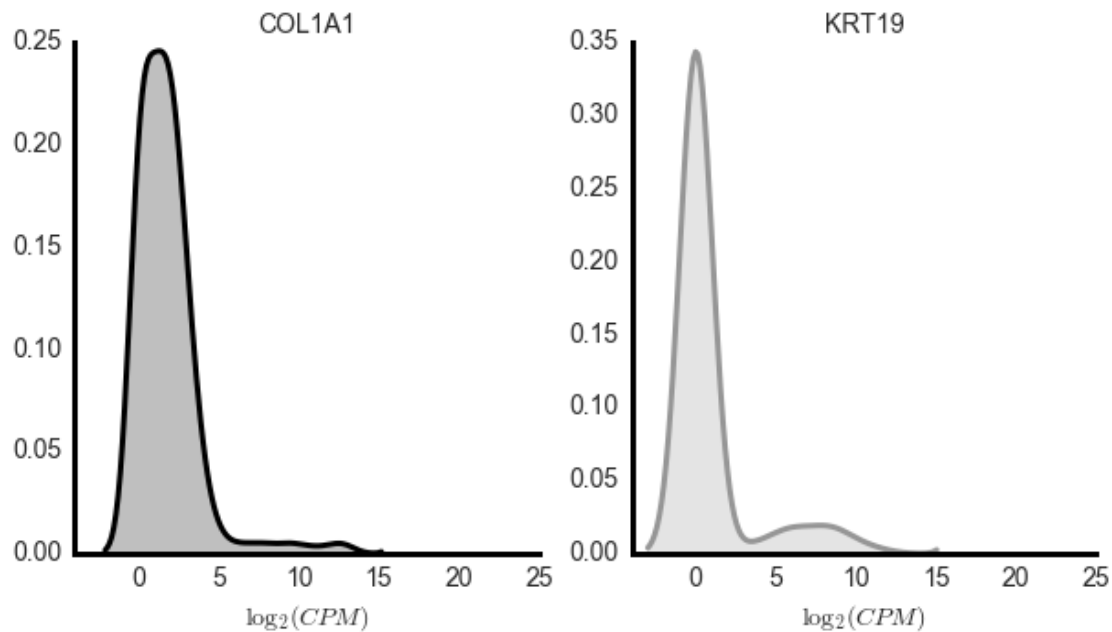
```

```

sns.kdeplot((nd_cpm.ix[krt19_ensg]+1.).apply(np.log2),ax=ax[1],shade=True, color="#969696",lw=
ax[1].set_xlim(-4,25)
ax[1].legend().set_visible(False)
ax[1].set_title('KRT19',fontsize=14)
ax[1].tick_params(axis='both', which='major', labels=14)
ax[1].set_xlabel(r'$\log_2(CPM)$',fontsize=14)

```

Out [24]: <matplotlib.text.Text at 0x11a278c90>



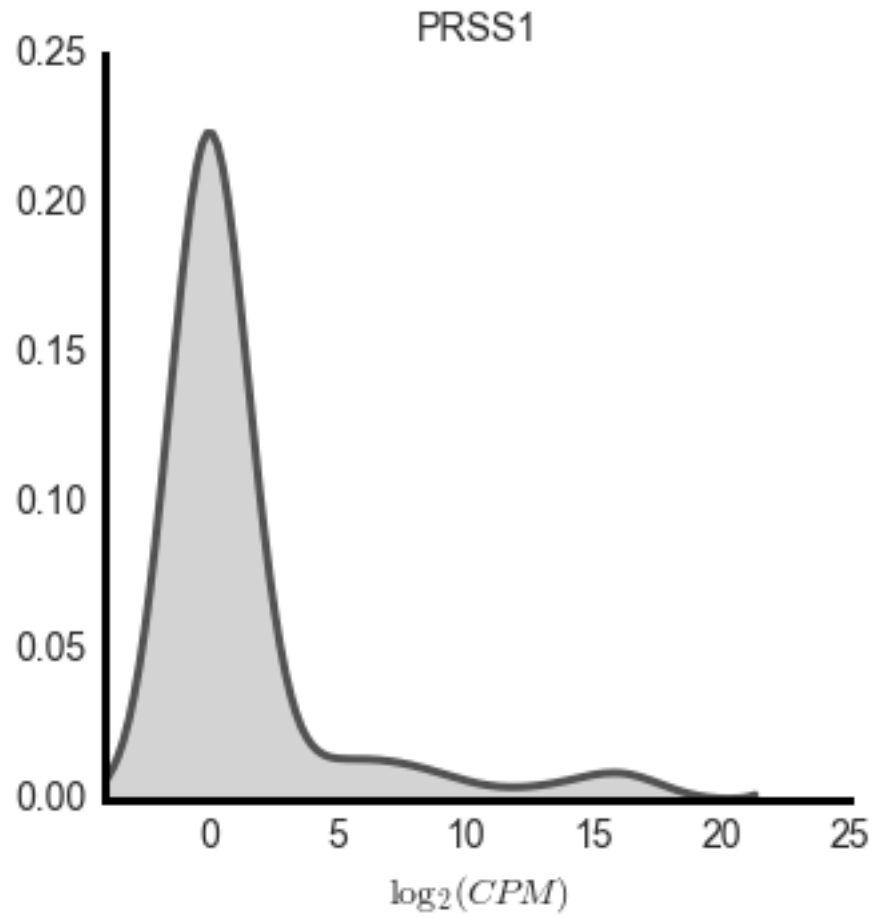
```
In [25]: fig.savefig('Figures_06142016/Figure2D_coll1a1-krt19.pdf',format='pdf',dpi=600)
```

```
In [26]: matplotlib.rcParams['figure.figsize'] = (5.0, 5.0)
matplotlib.rcParams['axes.linewidth'] = 3
matplotlib.rcParams['axes.edgecolor'] = 'k'
matplotlib.rcParams['axes.spines.top'] = 'False'
matplotlib.rcParams['axes.spines.right'] = 'False'
matplotlib.rcParams['axes.facecolor'] = 'white'
```

```
fig,ax=plt.subplots(1)
```

```
sns.kdeplot((nd_cpm.ix[prss1_ensg]+1.).apply(np.log2),ax=ax,shade=True, color="#525252",lw=3,b
ax.set_xlim(-4,25)
ax.legend().set_visible(False)
ax.set_title('PRSS1',fontsize=14)
ax.tick_params(axis='both', which='major', labelsize=14)
ax.set_xlabel(r'$\log_2(CPM)$',fontsize=14)
```

Out [26]: <matplotlib.text.Text at 0x115258c90>



```
In [27]: fig.savefig('Figures_06142016/Figure2D_prss1.pdf',format='pdf',dpi=600)
```

```
In [ ]:
```