

# main

August 21, 2021

## 1 Visualize GO analysis

```
[1]: import numpy as np
import pandas as pd
```

```
[2]: def get_top_GO(tissue, fn, label):
    df = pd.read_excel(fn).sort_values('p_uncorrected').head(10)
    df['Log10'] = -np.log10(df['p_fdr_bh'])
    df['Tissue'] = tissue
    df['Bias'] = label
    return df
```

```
[3]: tissue = 'hippocampus'
config = {
    'All': '../_m/GO_analysis_allDEG.xlsx',
    'AA': '../_m/GO_analysis_downregulated.xlsx',
    'EA': '../_m/GO_analysis_upregulated.xlsx',
}

df = pd.DataFrame()
for bias in ['All', 'AA', 'EA']:
    df = pd.concat([df, get_top_GO(tissue, config[bias], bias)], axis=0)

fac = []
for ii in range(df.shape[0]):
    xx, yy = df[['ratio_in_study']].iloc[ii, 0].split('/')
    fac.append((int(xx) / int(yy)) * 2)

df['geneRatio'] = fac
print(np.min(fac), np.max(fac))
```

0.0 0.17540842648323302

```
[4]: df.to_csv("%s_GO_analysis.tsv" % tissue, sep='\t', index=False)
```

## 1.1 Plot

```
[5]: %load_ext rpy2.ipython
```

```
[6]: %%R -i df
library(ggplot2)
library(tidyverse)

save_plot <- function(p, fn, w, h){
  for(ext in c('.svg', '.png', '.pdf')){
    ggsave(file=paste0(fn,ext), plot=p, width=w, height=h)
  }
}

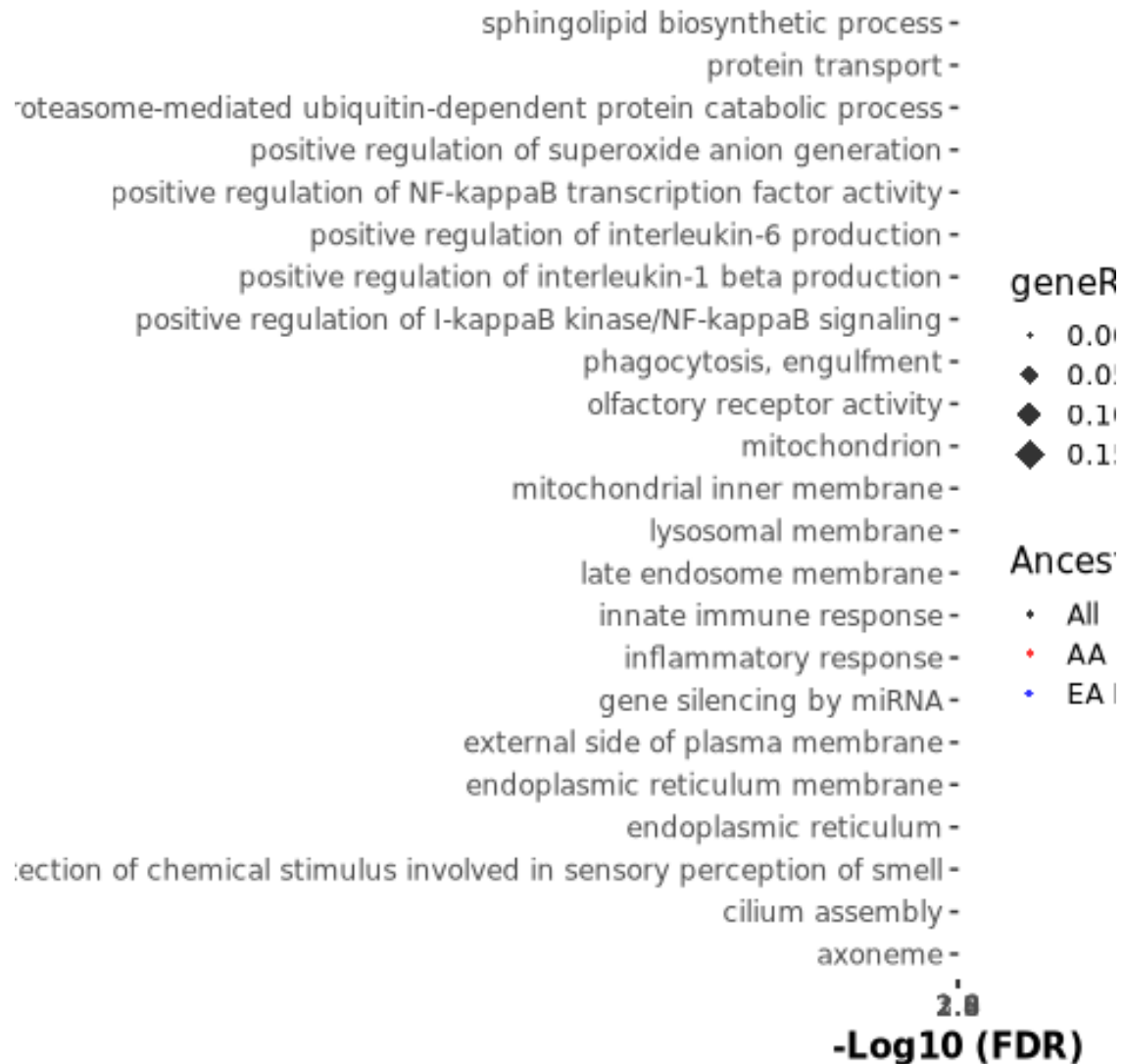
plot_GO <- function(){
  cbPalette <- c("#000000", "Red", "Blue")
  gg1 = df %>%
    ggplot(aes(x=Log10, y=name, color=Bias, size=geneRatio)) +
    geom_point(shape=18, alpha=0.8) + labs(y='', x='-Log10 (FDR)') +
    theme_bw(base_size=15) +
    scale_colour_manual(name="Ancestry", values=cbPalette,
                        labels=c("All", "AA Bias", "EA Bias")) +
    geom_vline(xintercept = -log10(0.05), linetype = "dotted") +
    theme(axis.title=element_text(face='bold'),
          strip.text=element_text(face='bold'))
  return(gg1)
}
```

```
R[write to console]: Attaching packages
                     tidyverse 1.3.1
```

```
R[write to console]:  tidbale  3.1.2      dplyr   1.0.7
                     tidyr   1.1.3      stringr 1.4.0
                     readr   1.4.0      forcats 0.5.1
                     purrr   0.3.4
```

```
R[write to console]: Conflicts
tidyverse_conflicts()
dplyr::filter() masks stats::filter()
dplyr::lag()    masks stats::lag()
```

```
[7]: %%R
gg1 = plot_GO()
print(gg1)
save_plot(gg1, "ancestry_GO_top10_stacked", 10, 6)
```



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