### main

### August 16, 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_csv(fn, sep='\t').sort_values('p_value').head(10)
         df['Log10'] = -np.log10(df['p_value'])
         df['Tissue'] = tissue
         df['Direction'] = label
         return df
[3]: tissue = 'hippocampus'
     config = {
         'All': '../../_m/DEGs_functional_enrichment.tsv',
         'Up': '../../_m/upreg_DEGs_functional_enrichment.tsv',
         'Down': '../../_m/downreg_DEGs_functional_enrichment.tsv',
     }
     df = pd.DataFrame()
     for bias in ['All', 'Up', 'Down']:
         df = pd.concat([df, get_top_GO(tissue, config[bias], bias)], axis=0)
     df.shape
[3]: (30, 17)
[4]: df.to_csv("%s_functional_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){</pre>
```

```
for(ext in c('.svg', '.png', '.pdf')){
             ggsave(file=paste0(fn,ext), plot=p, width=w, height=h)
        }
     }
     plot_GO <- function(){</pre>
         cbPalette <- c("#000000", "Red", "Blue")
        gg1 = df \%
             ggplot(aes(x=Log10, y=term name, color=Direction)) +
             geom_point(shape=18, alpha=0.8, size=4) + labs(y='', x='-Log10 (pu
     →adjust)') +
             theme_bw() +
             scale_colour_manual(name="Direction", values=cbPalette,
                                 labels=c("All", "Upregulated in SZ", "Downregulated ⊔
     →in SZ")) +
            geom_vline(xintercept = -log10(0.05), linetype = "dotted") +
             theme(axis.text=element_text(size=14),
                   axis.title=element_text(size=18, face='bold'),
                   strip.text=element_text(size=18, face='bold'))
        return(gg1)
     }
    R[write to console]:
                           Attaching packages
                          tidyverse 1.3.1
    R[write to console]: tibble 3.1.2
                                              dplyr 1.0.7
     tidyr 1.1.3
                         stringr 1.4.0
                         forcats 0.5.1
     readr 1.4.0
             0.3.4
     purrr
    R[write to console]:
                           Conflicts
    tidyverse_conflicts()
     dplyr::filter() masks stats::filter()
                     masks stats::lag()
     dplyr::lag()
[7]: %%R
     gg1 = plot_GO()
     print(gg1)
     save_plot(gg1, "hippocampus_GO_top10_stacked", 10, 6)
```

- TYROBP Causal Network-
- Synthesis of IP3 and IP4 in the cytosol
  - response to stimulus-
  - regulation of cytokine production-
    - Prion disease pathway-
    - primary miRNA binding-
- positive regulation of gene expression
  - plasma membrane-
  - p300-SMAD1-STAT3 complex-
- ary gland development pathway Involution (Stage 4 of 4)-
  - Longevity regulating pathway multiple species-
    - Longevity regulating pathway
      - leukocyte activation • Upreg
    - Inositol phosphate metabolism Down
      - immune system process
        - immune response
          - hsa-miR-362-3p-
          - hsa-miR-329-3p-
      - FoxO signaling pathway-
    - EGFR tyrosine kinase inhibitor resistance
      - cytokine production-
      - cell surface receptor signaling pathway
        - cell activation-
        - B cell receptor signaling pathway-

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Direction

# -Log10 (p adjus

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