main

July 9, 2021

1 Functional enrichment analysis with g:Profiler

[1]:
```
library(tidyverse)
library(gprofiler2)
```

```
── Attaching packages ─────────────────────────────────────── tidyverse 1.3.1 ──

✔ ggplot2 3.3.5     ✔ purrr   0.3.4
✔ tibble  3.1.2     ✔ dplyr   1.0.7
✔ tidyr   1.1.3     ✔ stringr 1.4.0
✔ readr   1.4.0     ✔ forcats 0.5.1

── Conflicts ────────────────────────────────────────── tidyverse_conflicts() ──
✖ dplyr::filter() masks stats::filter()
✖ dplyr::lag()    masks stats::lag()
```

1.1 Load DEG results

[2]:
```
deg <- data.table::fread("../../_m/genes/diffExpr_maleVfemale_FDR05.txt") %>%
    select(gencodeID, ensemblID, Symbol, logFC, "adj.P.Val")
deg %>% head(2)
```

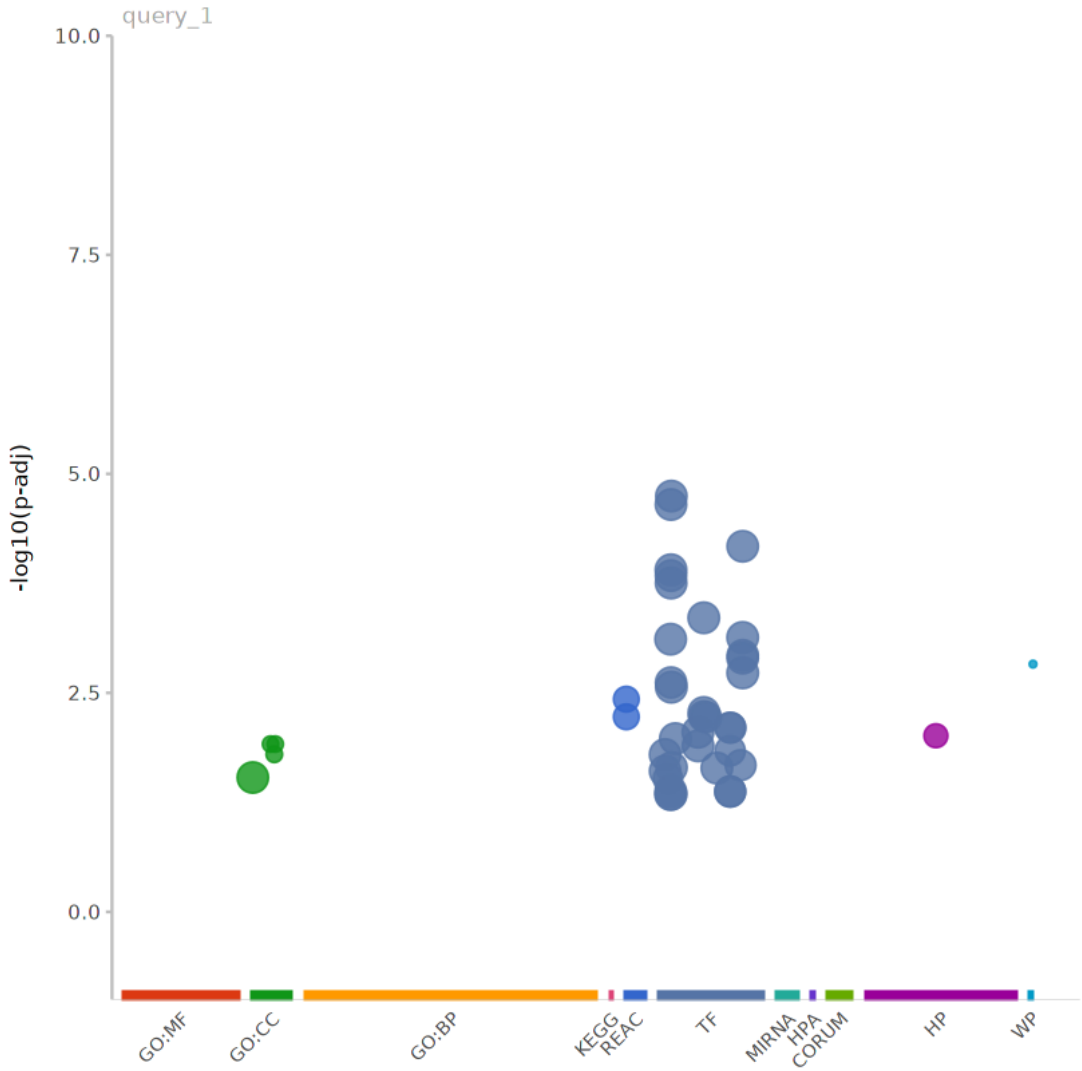
A data.table: 2 × 5

gencodeID <chr>	ensemblID <chr>	Symbol <chr>	logFC <dbl>	adj.P.Val <dbl>
ENSG00000226555.1	ENSG00000226555	AGKP1	7.270752	1.837492e-256
ENSG00000229236.1	ENSG00000229236	TTTY10	7.417472	3.642704e-249

1.2 Calculated enrichment and visual plot

[3]:
```
save_ggplots <- function(fn, p, w, h){
    for(ext in c('.pdf', '.png', '.svg')){
        ggsave(paste0(fn, ext), plot=p, width=w, height=h)
    }
}
```

[4]:
```
gostres <- gost(query=deg$ensemblID, organism="hsapiens")
gostres$result %>%
    data.table::fwrite(file = "allDEGs_functional_enrichment.txt", sep="\t")

p <- gostplot(gostres, capped = FALSE, interactive = FALSE)
print(p)
save_ggplots("allDEGs_manhattan", p, 9, 5)
```



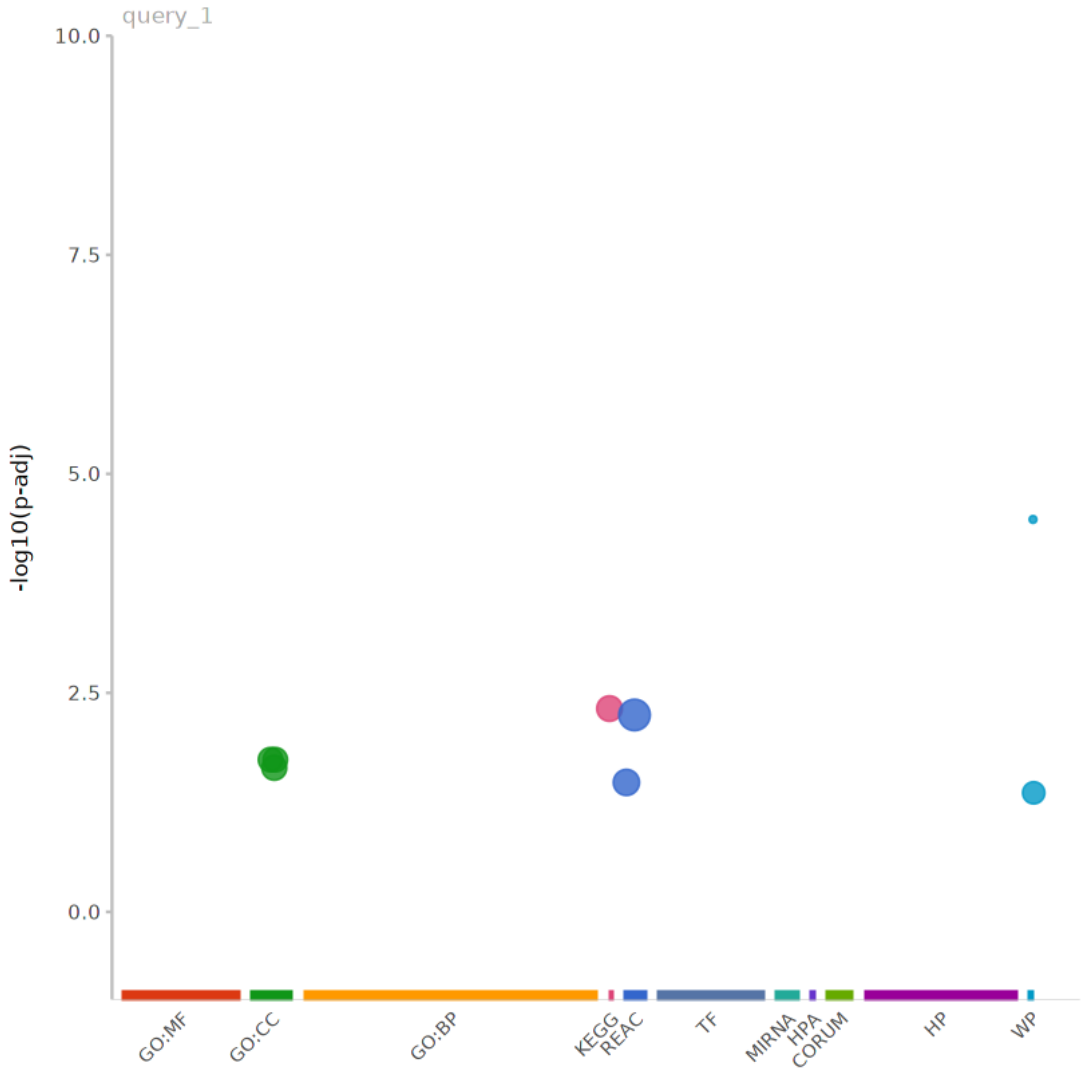
[5]:
```
gostres$result
```

A data.frame: 42 × 14

query <chr>	significant <lgl>	p_value <dbl>	term_size <int>	query_size <int>	intersection_size <int>	precis <dbl>
query_1	TRUE	1.214280e-02	19	406	5	0.012
query_1	TRUE	1.214280e-02	19	406	5	0.012
query_1	TRUE	1.590694e-02	20	406	5	0.012
query_1	TRUE	2.925763e-02	14808	406	347	0.854
query_1	TRUE	9.759154e-03	257	107	19	0.177
query_1	TRUE	3.731337e-03	582	230	30	0.130
query_1	TRUE	5.933327e-03	596	230	30	0.130
query_1	TRUE	1.791050e-05	14041	441	363	0.823
query_1	TRUE	2.243112e-05	14592	441	373	0.845
query_1	TRUE	6.715571e-05	15001	441	379	0.859
query_1	TRUE	1.244292e-04	16407	441	403	0.913
query_1	TRUE	1.452208e-04	13379	441	347	0.786
query_1	TRUE	1.767489e-04	15130	441	380	0.861
query_1	TRUE	4.394609e-04	16380	441	401	0.909
query_1	TRUE	7.367747e-04	16245	441	398	0.902
query_1	TRUE	7.713981e-04	15410	441	383	0.868
query_1	TRUE	1.175625e-03	12512	441	326	0.739
query_1	TRUE	1.270177e-03	14230	441	360	0.816
query_1	TRUE	1.870952e-03	16373	441	399	0.904
query_1	TRUE	2.405302e-03	12431	441	323	0.732
query_1	TRUE	2.723755e-03	16345	441	398	0.902
query_1	TRUE	5.282912e-03	14202	441	357	0.809
query_1	TRUE	5.835991e-03	9328	441	255	0.578
query_1	TRUE	5.976091e-03	10336	441	277	0.628
query_1	TRUE	7.851625e-03	8550	441	237	0.537
query_1	TRUE	7.920242e-03	8285	441	231	0.523
query_1	TRUE	8.870824e-03	17131	441	410	0.929
query_1	TRUE	1.051851e-02	15413	441	379	0.859
query_1	TRUE	1.273977e-02	16079	441	391	0.886
query_1	TRUE	1.451081e-02	6864	441	197	0.446
query_1	TRUE	1.598000e-02	14305	441	357	0.809
query_1	TRUE	2.116220e-02	9820	441	263	0.596
query_1	TRUE	2.242482e-02	11168	441	292	0.662
query_1	TRUE	2.282815e-02	15642	441	382	0.866
query_1	TRUE	2.468539e-02	14245	441	355	0.804
query_1	TRUE	3.011406e-02	3956	441	125	0.283
query_1	TRUE	4.206280e-02	14705	441	363	0.823
query_1	TRUE	4.221979e-02	10721	441	281	0.637
query_1	TRUE	4.245630e-02	10490	441	276	0.625
query_1	TRUE	4.531494e-02	17025	441	406	0.920
query_1	TRUE	4.586962e-02	14560	441	360	0.816
query_1	TRUE	1.485234e-03	7	180	4	0.022

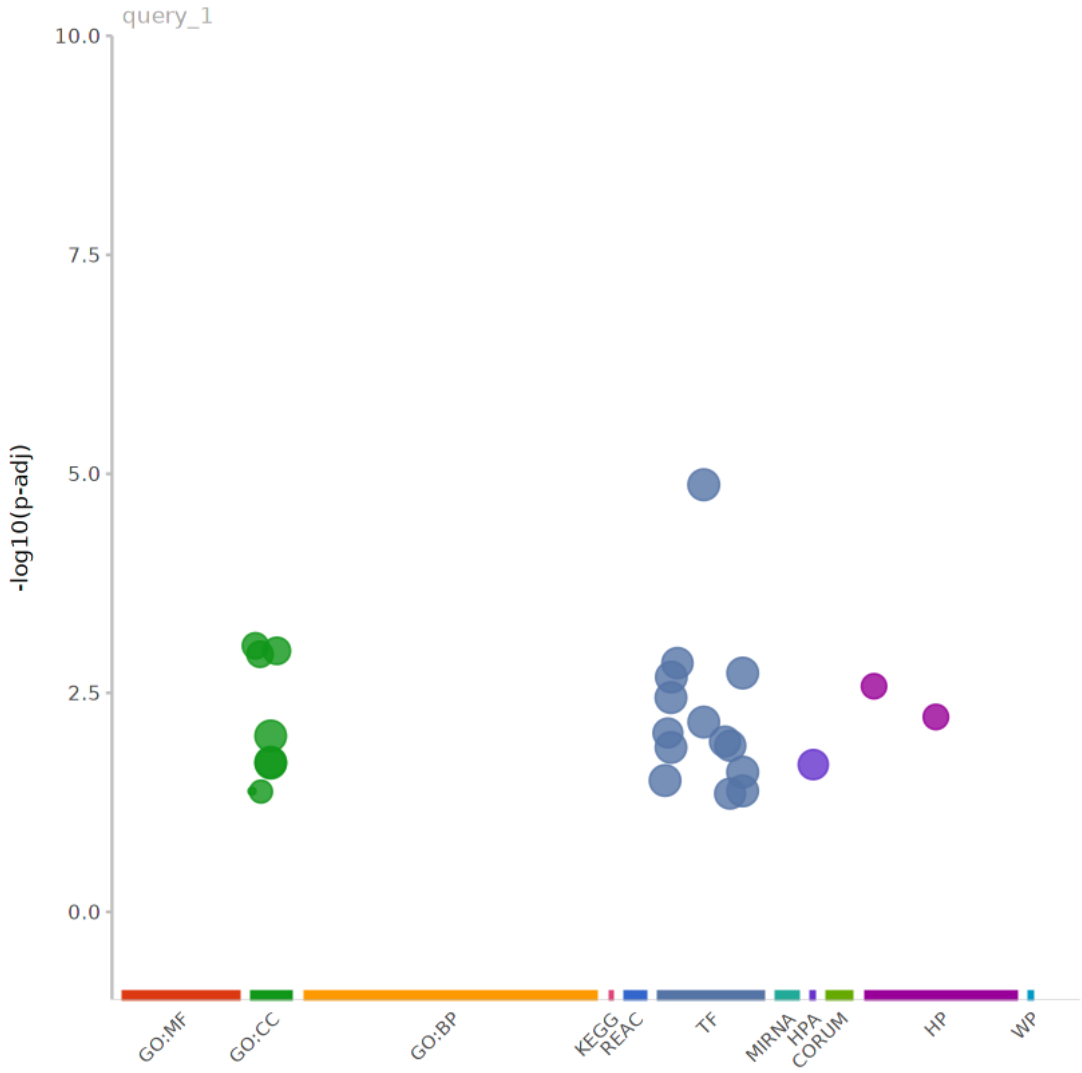
[6]:
```
deg_male = deg %>% filter(logFC > 0)
gostres <- gost(query=deg_male$ensemblID, organism="hsapiens")
```

```
gostres$result %>%
    data.table::fwrite(file = "male_bias_DEGs_functional_enrichment.txt",␣
 ↪sep="\t")

p <- gostplot(gostres, capped = FALSE, interactive = FALSE)
print(p)
save_ggplots("male_bias_DEGs_manhattan", p, 9, 5)
```



[7]:
```
deg_female = deg %>% filter(logFC < 0)
gostres <- gost(query=deg_female$ensemblID, organism="hsapiens")
gostres$result %>%
```

```
    data.table::fwrite(file = "female_bias_DEGs_functional_enrichment.txt",␣
 ↪sep="\t")

p <- gostplot(gostres, capped = FALSE, interactive = FALSE)
print(p)
save_ggplots("female_bias_DEGs_manhattan", p, 9, 5)
```



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