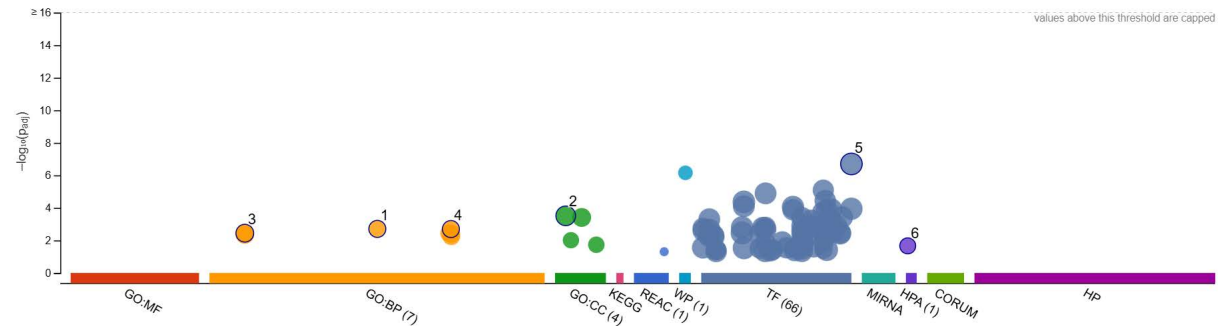


Pathway Analysis for Human Brain Reference (HBR) sample using webtools



ID	Source	Term ID	Term Name	Padj (query_1)
1	GO:BP	GO:0050804	modulation of chemical synaptic transmission	1.963×10^{-3}
2	GO:CC	GO:0030054	cell junction	3.086×10^{-4}
3	GO:BP	GO:0007268	chemical synaptic transmission	3.594×10^{-3}
4	GO:BP	GO:0099177	regulation of trans-synaptic signaling	2.003×10^{-3}
5	TF	TF:M12722_1	Factor: ZKDL; motif: GSGSCNNGGMRGCNCCGGG...	1.990×10^{-7}
6	HPA	HPA:0090991	cerebellum; molecular layer - neuropil[≥Low]	2.163×10^{-2}

version e112_eg59_p19_25aa4782
date 5/19/2025, 9:47:21 AM
organism hsapiens

g:Profiler

Results ?

Reference list upload_1
Uniquely Mapped IDs: 20580 out of 20580 79 out of 80
Unmapped IDs: 0 21
Multiple mapping information: 0 1

GO

Export [Table](#) [XML with user input ids](#) [JSON with user input ids](#)

Displaying only results for FDR P < 0.05, [click here to display all results](#)

	Homo sapiens (REF)	upload_1 (Hierarchy: NEW! ?)
GO biological process complete	#	# expected Fold Enrichment +/- raw P value FDR
modulation of chemical synaptic transmission	505	11 1.96 5.60 + 3.96E-06 5.87E-02
↳ regulation of trans-synaptic signaling	506	11 1.97 5.59 + 4.04E-06 2.99E-02

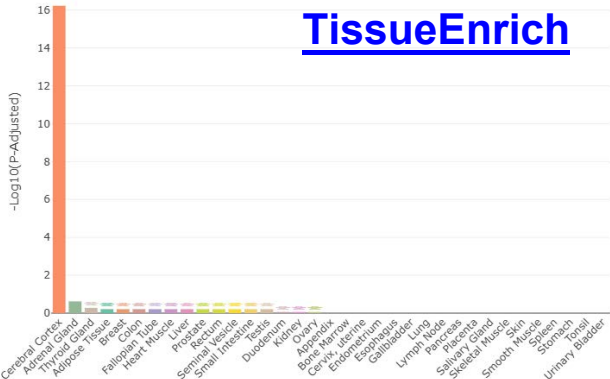
Results ?

Reference list upload_1
Uniquely Mapped IDs: 20580 out of 20580 79 out of 80
Unmapped IDs: 0 21
Multiple mapping information: 0 1

Export [Table](#) [XML with user input ids](#) [JSON with user input ids](#)

Displaying only results for FDR P < 0.05, [click here to display all results](#)

	Homo sapiens (REF)	upload_1 (Hierarchy: NEW! ?)
GO cellular component complete	#	# expected Fold Enrichment +/- raw P value FDR
postsynaptic density	350	8 1.36 5.88 + 6.45E-05 2.58E-02
↳ asymmetric synapse	366	9 1.42 6.33 + 1.23E-05 8.20E-03
↳ neuron to neuron synapse	401	9 1.56 5.77 + 2.53E-05 1.26E-02
↳ synapse	1681	22 6.53 3.37 + 2.69E-07 5.37E-04
↳ cell junction	2417	26 9.40 2.77 + 7.51E-07 7.50E-04
↳ postsynaptic specialization	386	8 1.50 5.33 + 1.27E-04 4.24E-02



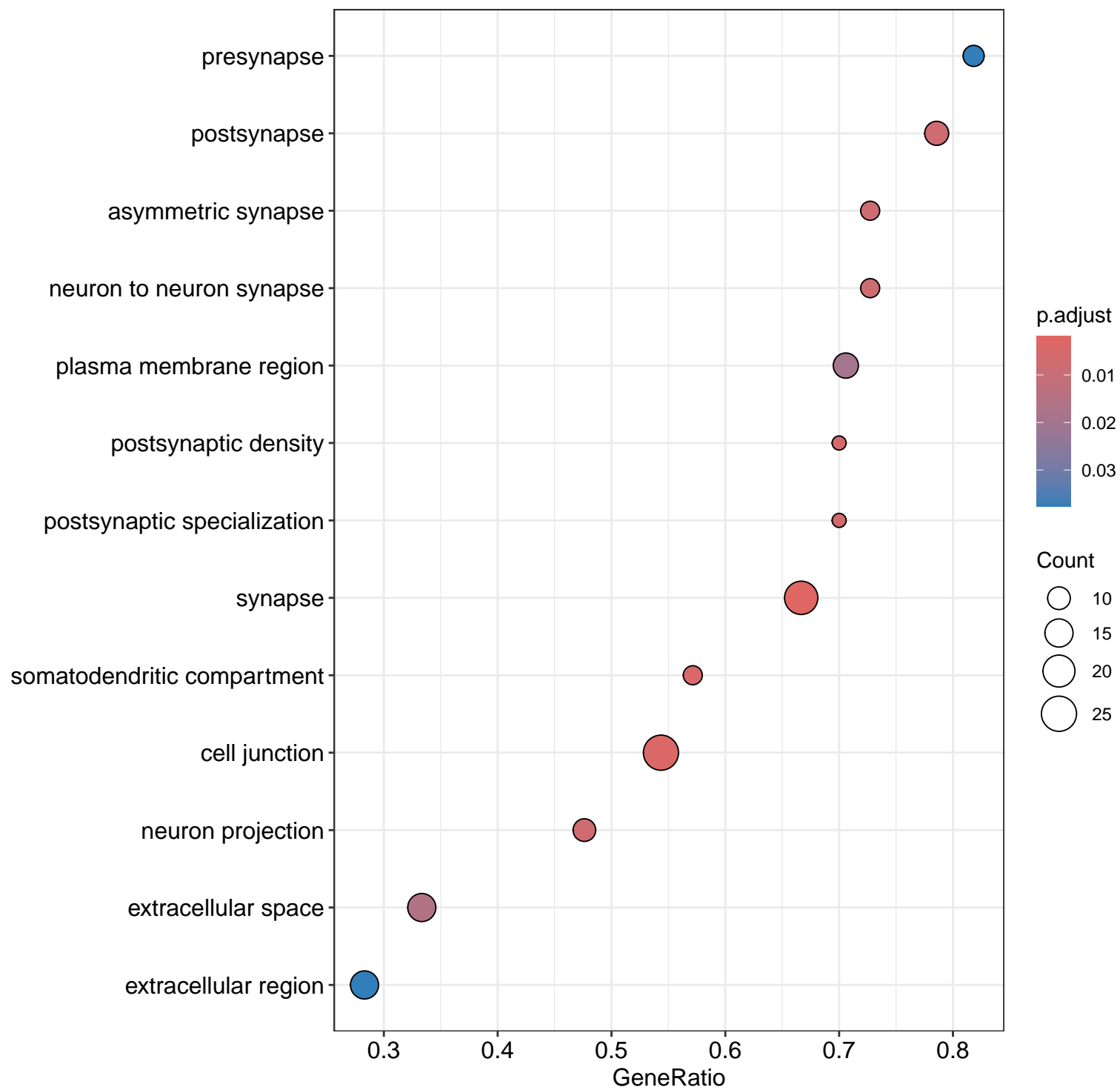
Pathway Analysis for Human Brain Reference (HBR) and Universal Human Reference (UHR) samples using R

$$\log_2 \text{FoldChange} = \log_2 \left(\frac{\text{expression in UHR}}{\text{expression in HBR}} \right) = \log_2(\text{UHR}) - \log_2(\text{HBR})$$

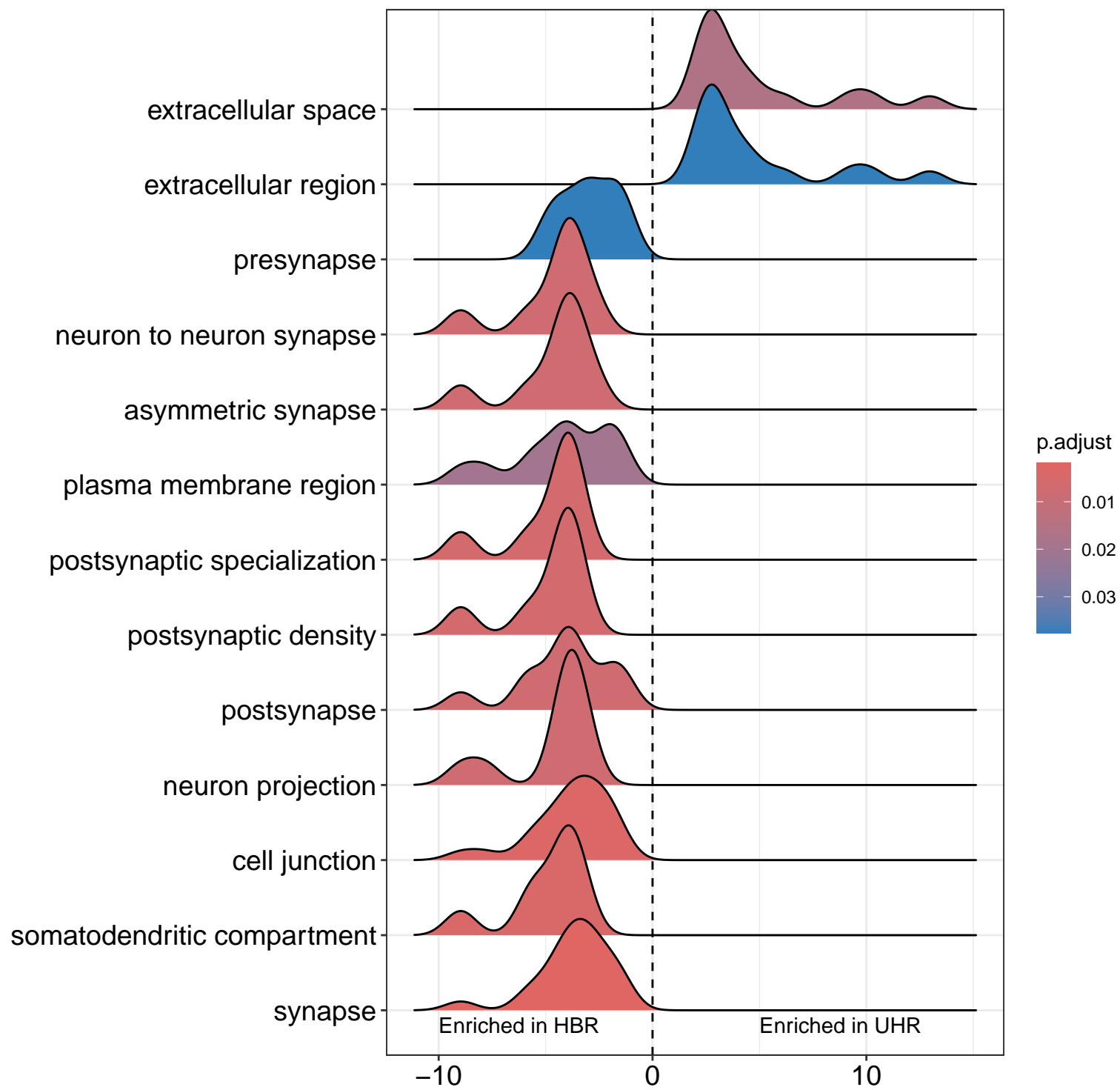
Interpretation:

- A positive $\log_2\text{FC}$ → gene is upregulated in UHR relative to HBR.
- A negative $\log_2\text{FC}$ → gene is downregulated in UHR (i.e., upregulated in HBR).

GSEA Dotplot – Top GO Terms



GSEA ridge plot – Top GO Terms



MAPK8IP2 (JIP2 or IB2) is a **brain-enriched scaffold protein for JNK and p38 signaling in neurons**. KEGG and GSEA analyses show it is part of the MAPK signaling pathway (hsa04010).