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Disease: Bipolar Disorder

Biological Question: Studying the effects of bipolar disorder on the microenvironment of different areas in the brain.

How RNA-seq data can help:

We will analyze bulk RNA-seq expression data to run a differential expression analysis to compare samples of BD (Bipolar Disorder) patients, SZ (Schizophrenia) patients and healthy patients.

In addition, we will use the differentially expressed genes to identify enriched gene sets and pathways in different parts of the brain. We could then compare the results to the control group's pathways in order to find significance.

Furthermore, we will try and classify the BD patients according to their expression profile using an unsupervised clustering algorithm.

At last, we could find if the BD patient's brain tissue composition is different than the normal tissue found in the healthy control group using xCell.

Datasets:

Accession ID	Location	Count matrix?	Groups	Citation
E-GEOD-78936	https://www.ebi.ac.uk/gxa/experiments/E-GEOD-78936	YES	82 samples in total: Bipolar: <ul style="list-style-type: none">16 samples from BA 11.7 samples from BA 24.7 samples from BA 9. Schizophrenia: <ul style="list-style-type: none">16 samples from BA 11.6 samples from BA 24.6 samples from BA 9. Healthy control: <ul style="list-style-type: none">12 samples from BA 11.6 samples from BA 24.6 samples from BA 9. *BA means Brodmann area.	(Hu et al., 2016)
E-GEOD-53239	https://www.ebi.ac.uk/gxa/experiments/E-GEOD-53239	YES	22 samples in total: Bipolar: <ul style="list-style-type: none">11 samples from BA 46. Healthy control: <ul style="list-style-type: none">11 samples from BA 46. *BA means Brodmann area.	(Akula et al., 2014)

E-GEOD-5388	https://www.ebi.ac.uk/gxa/experiments/E-GEOD-5388	YES	61 samples in total: Bipolar: <ul style="list-style-type: none"> • 30 samples from BA 9. Healthy control: <ul style="list-style-type: none"> • 31 samples from BA 9. *BA means Brodmann area.	(Ryan et al., 2006)
E-GEOD-5389	https://www.ebi.ac.uk/gxa/experiments/E-GEOD-5389	YES	21 samples in total: Bipolar: <ul style="list-style-type: none"> • 10 samples from BA 11. Healthy control: <ul style="list-style-type: none"> • 11 samples from BA 11. *BA means Brodmann area.	(Ryan et al., 2006)

Total:

186 samples in total:

Brodman Area	Bipolar Disorder (Number of samples)	Schizophrenia (Number of samples)	Healthy control (Number of samples)
9	37	6	37
11	26	16	23
24	7	6	6
46	11	0	11