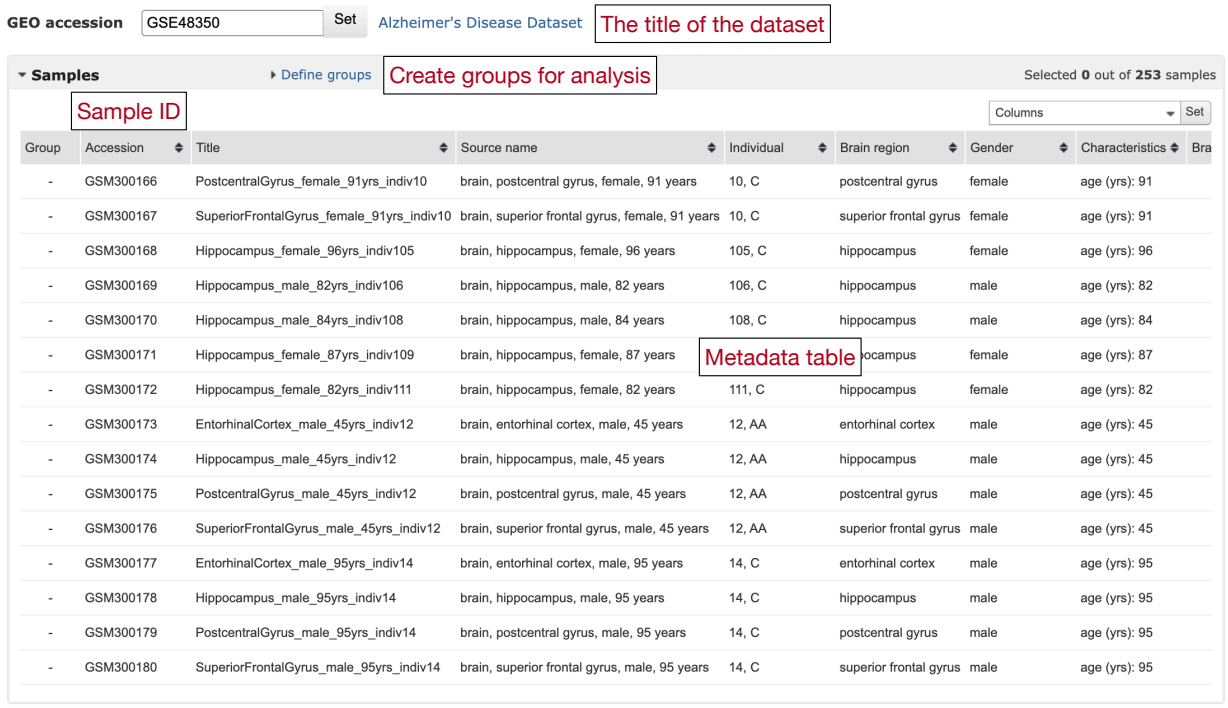
Research & Innovation – Nevada Bioinformatics Center

Tutorial: Differential expression analysis using GEO2R

Database URL: https://www.ncbi.nlm.nih.gov/geo
Example dataset: GSE48350 (https://www.ncbi.nlm.nih.gov/geo/query/acc.cgi?acc=GSE48350)

The URL for analysis will be: https://www.ncbi.nlm.nih.gov/geo/geo2r/?acc=GSE48350

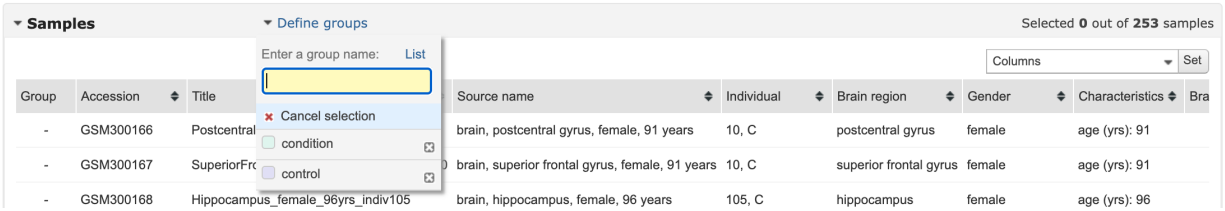
The interface:



Group	Accession	Title	Source name	Individual	Brain region	Gender	Characteristics	Bra
-	GSM300166	PostcentralGyrus_female_91yrs_indiv10	brain, postcentral gyrus, female, 91 years	10, C	postcentral gyrus	female	age (yrs): 91	
-	GSM300167	SuperiorFrontalGyrus_female_91yrs_indiv10	brain, superior frontal gyrus, female, 91 years	10, C	superior frontal gyrus	female	age (yrs): 91	
-	GSM300168	Hippocampus_female_96yrs_indiv105	brain, hippocampus, female, 96 years	105, C	hippocampus	female	age (yrs): 96	
-	GSM300169	Hippocampus_male_82yrs_indiv106	brain, hippocampus, male, 82 years	106, C	hippocampus	male	age (yrs): 82	
-	GSM300170	Hippocampus_male_84yrs_indiv108	brain, hippocampus, male, 84 years	108, C	hippocampus	male	age (yrs): 84	
-	GSM300171	Hippocampus_female_87yrs_indiv109	brain, hippocampus, female, 87 years		ocampus	female	age (yrs): 87	
-	GSM300172	Hippocampus_female_82yrs_indiv111	brain, hippocampus, female, 82 years	111, C	hippocampus	female	age (yrs): 82	
-	GSM300173	EntorhinalCortex_male_45yrs_indiv12	brain, entorhinal cortex, male, 45 years	12, AA	entorhinal cortex	male	age (yrs): 45	
-	GSM300174	Hippocampus_male_45yrs_indiv12	brain, hippocampus, male, 45 years	12, AA	hippocampus	male	age (yrs): 45	
-	GSM300175	PostcentralGyrus_male_45yrs_indiv12	brain, postcentral gyrus, male, 45 years	12, AA	postcentral gyrus	male	age (yrs): 45	
-	GSM300176	SuperiorFrontalGyrus_male_45yrs_indiv12	brain, superior frontal gyrus, male, 45 years	12, AA	superior frontal gyrus	male	age (yrs): 45	
-	GSM300177	EntorhinalCortex_male_95yrs_indiv14	brain, entorhinal cortex, male, 95 years	14, C	entorhinal cortex	male	age (yrs): 95	
-	GSM300178	Hippocampus_male_95yrs_indiv14	brain, hippocampus, male, 95 years	14, C	hippocampus	male	age (yrs): 95	
-	GSM300179	PostcentralGyrus_male_95yrs_indiv14	brain, postcentral gyrus, male, 95 years	14, C	postcentral gyrus	male	age (yrs): 95	
-	GSM300180	SuperiorFrontalGyrus_male_95yrs_indiv14	brain, superior frontal gyrus, male, 95 years	14, C	superior frontal gyrus	male	age (yrs): 95	

Step 1: Create groups for the analysis

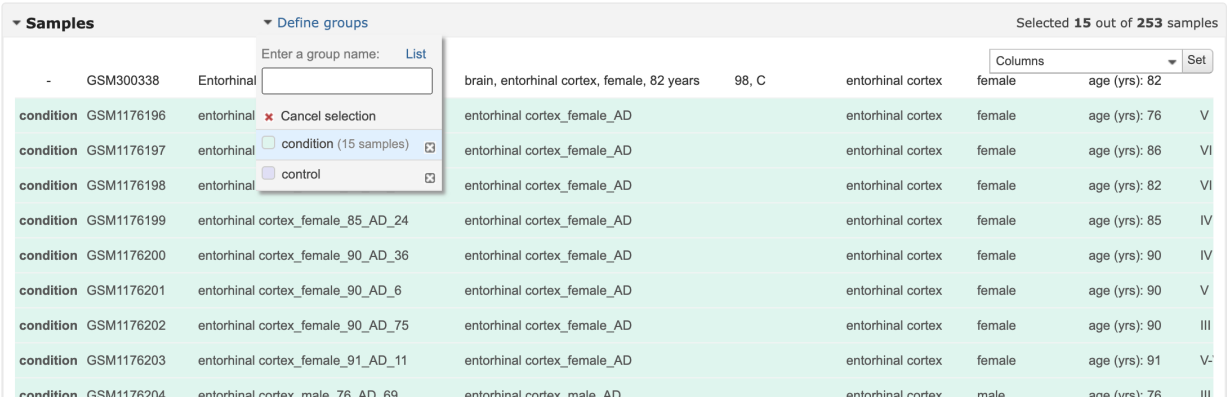
Let's create two groups: "condition" and "control"



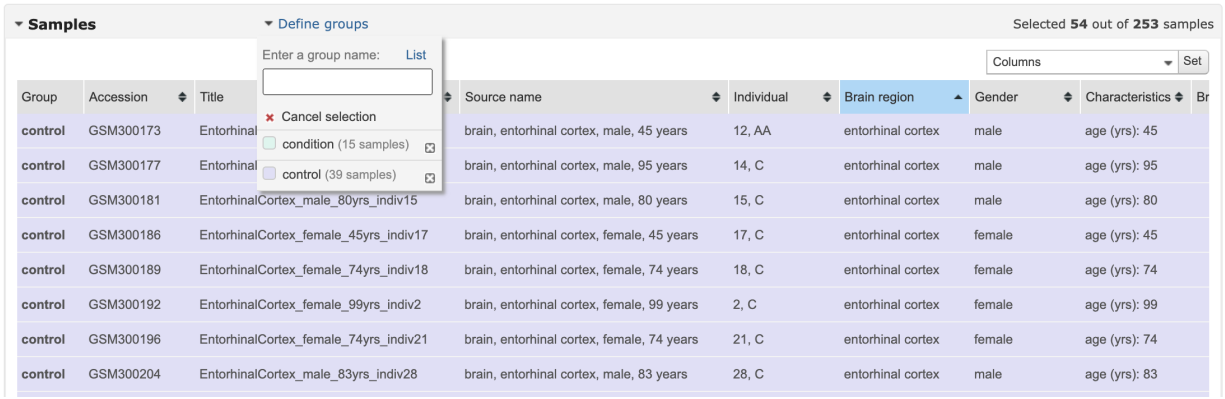
Step 2: Select samples for each group

In this tutorial, let's only consider samples from the Entorhinal Cortex region.

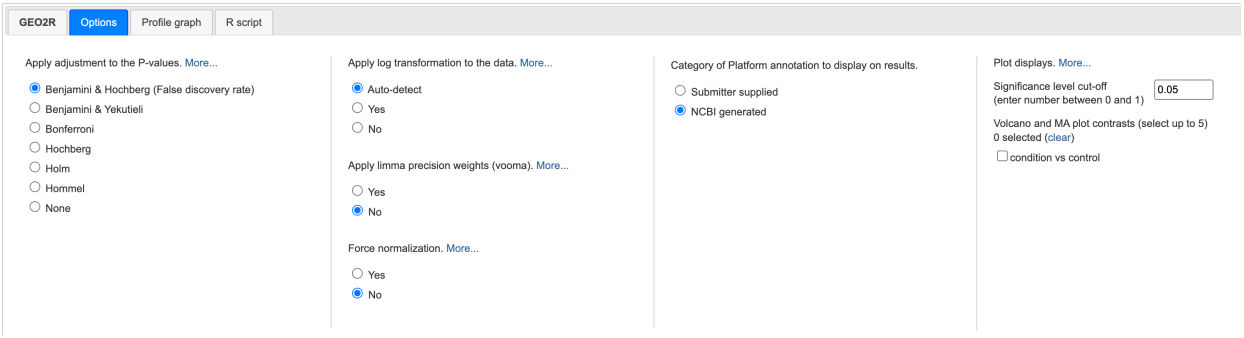
Find the sample with the suffix "AD" and add them to the "condition" group. To select multiple samples next to each other, select the first sample, hold the shift button, and select the last sample. After the samples are selected, click on the group "condition" to add all selected samples to this group.



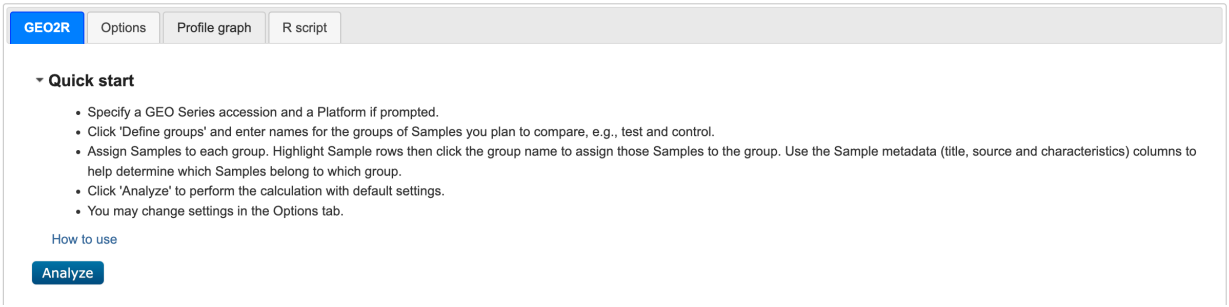
Next, select the remaining samples of this brain region for the "control" group.



Step 3: Select options:

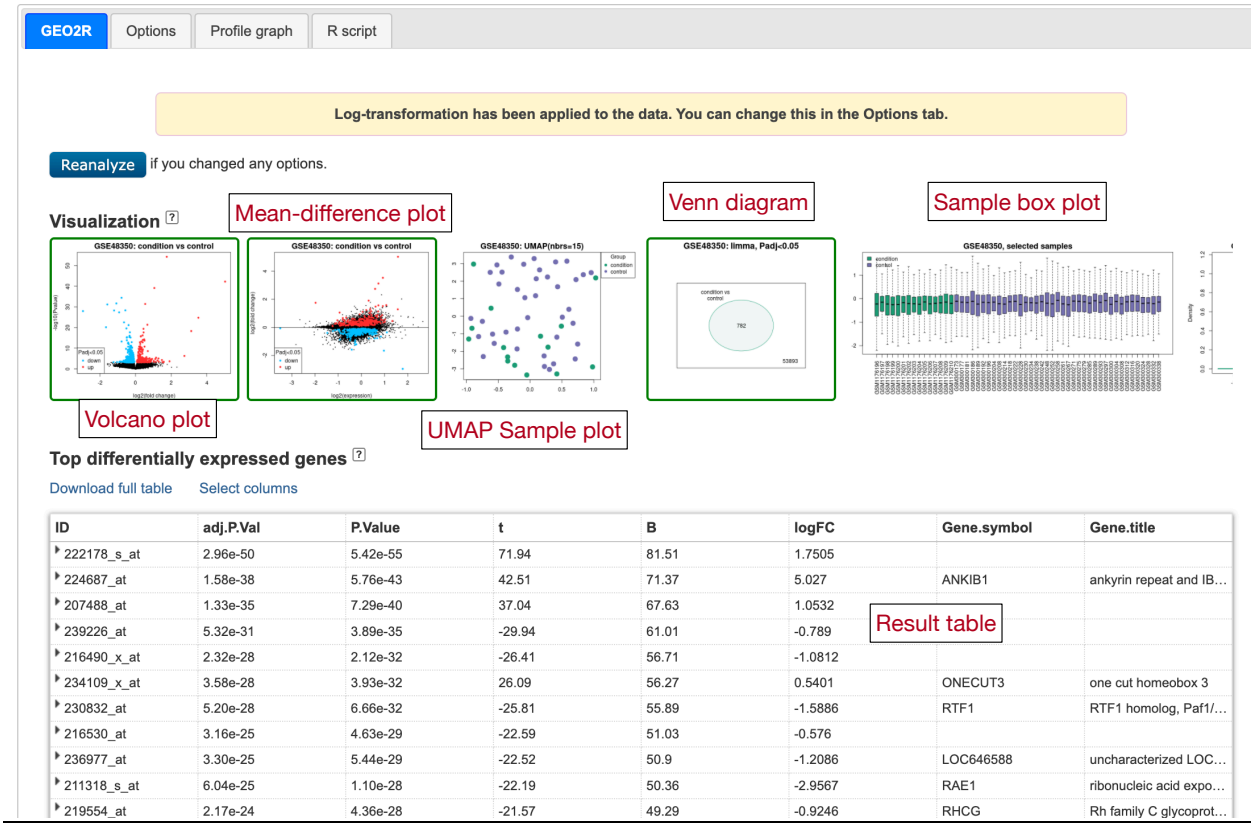


Step 4: Start the analysis:



Click the analyze button. This process can take from 3-10 minutes depending on how many samples are selected.

Step 4: Download the results



ID	adj.P.Val	P.Value	t	B	logFC	Gene.symbol	Gene.title
222178_s_at	2.96e-50	5.42e-55	71.94	81.51	1.7505		
224687_at	1.58e-38	5.76e-43	42.51	71.37	5.027	ANKIB1	ankyrin repeat and IB…
207488_at	1.33e-35	7.29e-40	37.04	67.63	1.0532		
239226_at	5.32e-31	3.89e-35	-29.94	61.01	-0.789		
216490_x_at	2.32e-28	2.12e-32	-26.41	56.71	-1.0812		
234109_x_at	3.58e-28	3.93e-32	26.09	56.27	0.5401	ONECUT3	one cut homeobox 3
230832_at	5.20e-28	6.66e-32	-25.81	55.89	-1.5886	RTF1	RTF1 homolog, Paf1/…
216530_at	3.16e-25	4.63e-29	-22.59	51.03	-0.576		
236977_at	3.30e-25	5.44e-29	-22.52	50.9	-1.2086	LOC646588	uncharacterized LOC…
211318_s_at	6.04e-25	1.10e-28	-22.19	50.36	-2.9567	RAE1	ribonucleic acid expo…
219554_at	2.17e-24	4.36e-28	-21.57	49.29	-0.9246	RHCG	Rh family C glycoprot…