

CSE 4754 Bioinformatics

Differential Gene Expression Analysis

TCGA-UCEC

Uterine Corpus Endometrial Carcinoma



Team Members

Tasnimul Hasnat
190041113

Nur Nasrum
1900411106

Khaja Abdus Sami
190041136

Introduction

Objective

**Unveil gene expression
disparities between normal
uterine endometrial
tissue and UCEC samples.**

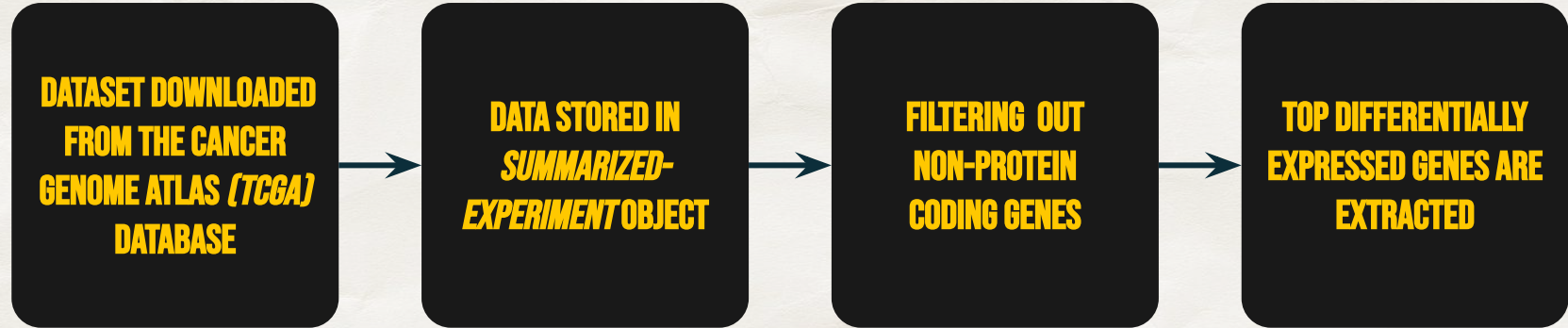


Differential Gene Expression Analysis

**Aims to identify differentially
expressed biological condition
e.g. disease vs. control or
treatment vs. control.**

Uses **DESeq2 Package in R**

Data Preprocessing

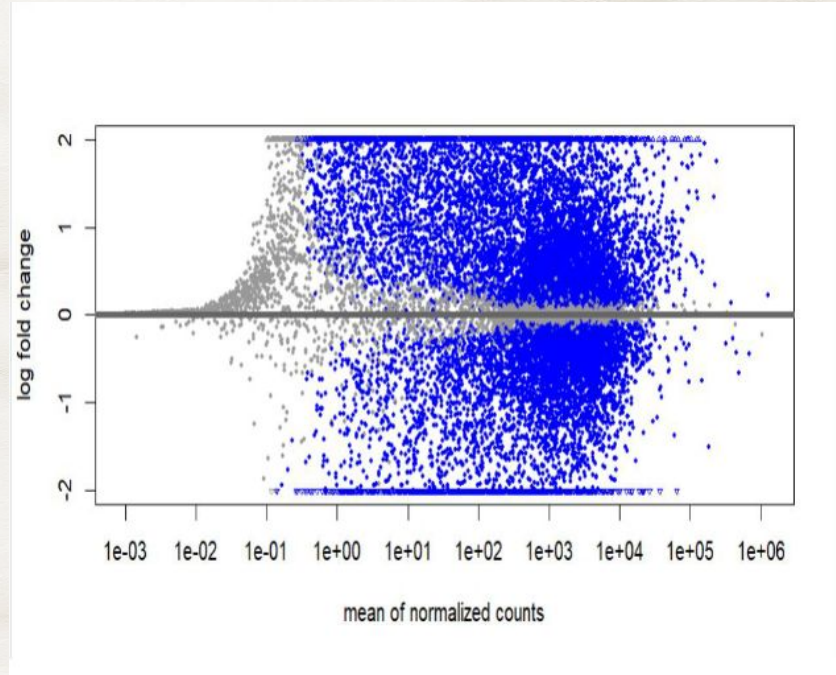


DESeq2

- A bioconductor package for DGE Analysis
- Identifies differentially expressed genes across experimental conditions.
- *DESeq2()* function performs:
 - Normalization
 - Dispersion Estimation
 - Negative Binomial GLM fitting
 - Hypothesis Testing

Visualization Using MA PLOT

MA Plot shows the **LOG2** fold changes attributable to a given variable over the mean of normalized counts for all the samples in the **DESeq** dataset.



Up-Regulated & Down-Regulated Genes

Up-Regulated Genes

Genes that exhibit the highest increase in expression levels when comparing one condition to another. They are the genes with the largest positive fold changes or log2 fold changes.

Down-Regulated Genes

Genes that show the most significant decrease in expression levels when comparing one condition to another. They have the largest negative fold changes or log2 fold changes.

Top 250 Up-Regulated Genes

	baseMean	log2FoldChange	lfcSE	stat	pvalue	padj
ENSG00000160181.9	447.4508281	9.602536488	0.7516700319	12.77493592	2.26E-37	3.65E-36
ENSG00000197172.10	320.5604158	9.199529698	0.7677550359	11.98237624	4.40E-33	5.68E-32
ENSG00000221867.9	402.4446124	9.1686433	0.7110222449	12.89501611	4.80E-38	7.95E-37
ENSG00000139515.6	55.76192969	8.803639762	0.6160965299	14.28938378	2.55E-46	6.43E-45
ENSG00000213401.10	208.3365929	8.717473961	0.7025815262	12.40777566	2.37E-35	3.46E-34

Top 250 Down-Regulated Genes

	baseMean	log2FoldChange	lfcSE	stat	pvalue	padj
ENSG00000179914.5	214.0916777	-4.767393835	0.3155582927	-15.10780716	1.44E-51	4.62E-50
ENSG00000168484.12	164598.1208	-4.71523333	0.3741829718	-12.60141077	2.07E-36	3.18E-35
ENSG00000108342.13	438.095222	-4.661507984	0.3163273821	-14.73634041	3.77E-49	1.09E-47
ENSG00000158764.7	174.3377403	-4.637760118	0.3656017999	-12.68527704	7.14E-37	1.13E-35
ENSG00000178084.2	19.05648193	-4.55444425	0.3643207619	-12.50119325	7.35E-36	1.10E-34



Thank You!