**LESSON PLAN: Gene Expression**

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**Logistics:**

Software needed: R or R studio, Ms.Excel

What needs to be done in advance?

* Install R, R studio, and Excel on the computers (they should know how to do that so they don’t need to do it again)
* Have pre-made scripts and datasets

**Lesson plan, Day 1**

**Intro:** 25 min

* Intro to: Central dogma, general overview of RNA sequencing

Finding data source and downloading data: 50 min

* How to find the data set from paper?
* Downloading RAW FASTA file from GEO
* Downloading reference transcriptome from GENECODE

R basic and installation 20 min

* R basics (installation of DESeq2, pheatmap etc

**Lesson plan, Day 2**

**Differentially gene expression analysis: 60 min**

* Preparing the data set for DEGs identification in R
* Using DESeq2 for DEGs identification

**Basic visualization and Ensembl ID conversion: 60 min**

* Heatmap of the few selected genes
* Using bitools for Ensembl ID to gene ID conversion
* Use excel for identification of significant DEGs

**Gene ontology**

* Use identified DEGs for GO term analysis
* Predict the effect of PTEN KO

**Presentations (if time):**

* Let them show everyone what they did