Integrated Gene Set Analysis for microRNA Studies

Comparison of methods for Gene Set Analysis

2015-10-22

Methods

A GSA extension of Godard's approach have been computed straight forward using logistic regression models and our Bioconductor library. This strategy will certainly retain Godard's methodology good characteristics while incorporating the benefits of the GSA approach over the ORA one.

We did find that the functional results at miRNA level (Godard's generalization) and the ones at gene level (after transference as originally proposed) have a significantly positive correlation. This indicates that overall both methodologies should provide similar findings. The correlation is not very strong though as the methodologies are explicitly different.

Detailed results and scripts are available in https://github.com/dmontaner-papers/gsa4mirna (folders: supplementary_files_godard and scripts_godard).

Results

For each cancer type, there are several plots displaying the correlation between the GSA analysis carried out at miRNA level (Godard's paradigm) and at gene level after "transference". Each dot represents a GO term. X and Y values are derived from p-values and signs of the log odds ratios resulting from the mdgsa analysis (similar to equation 1 of the paper but at GO level instead of at miRNA level).

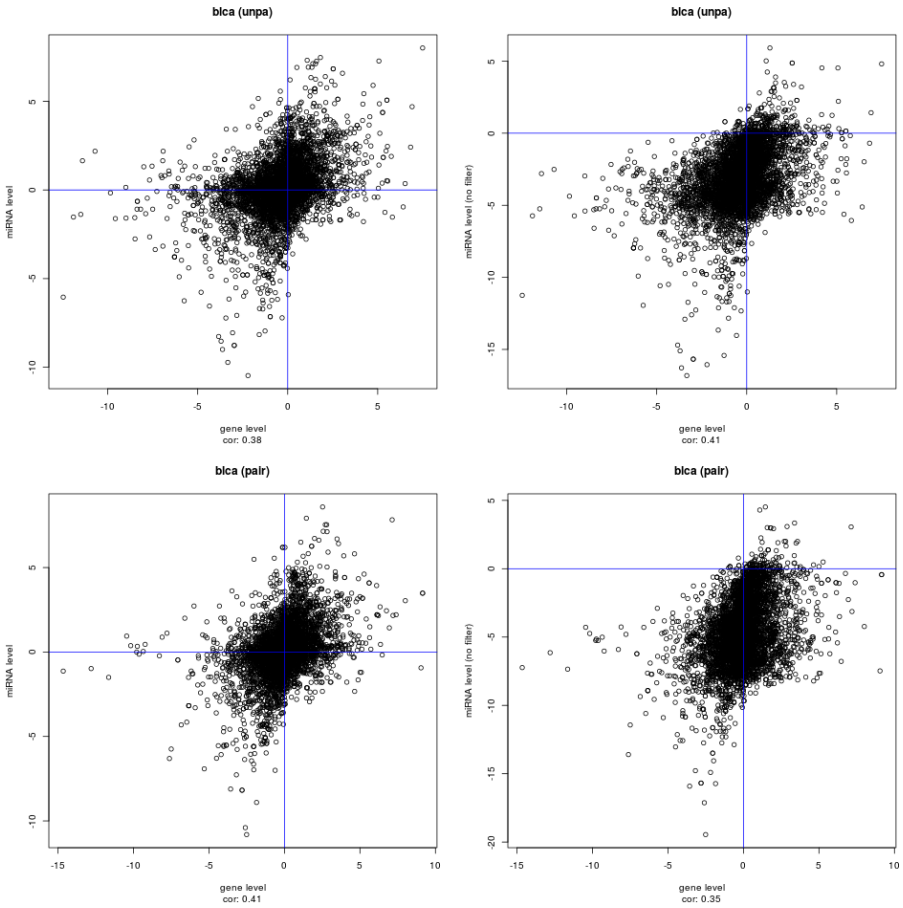


Figure 1: BLCA

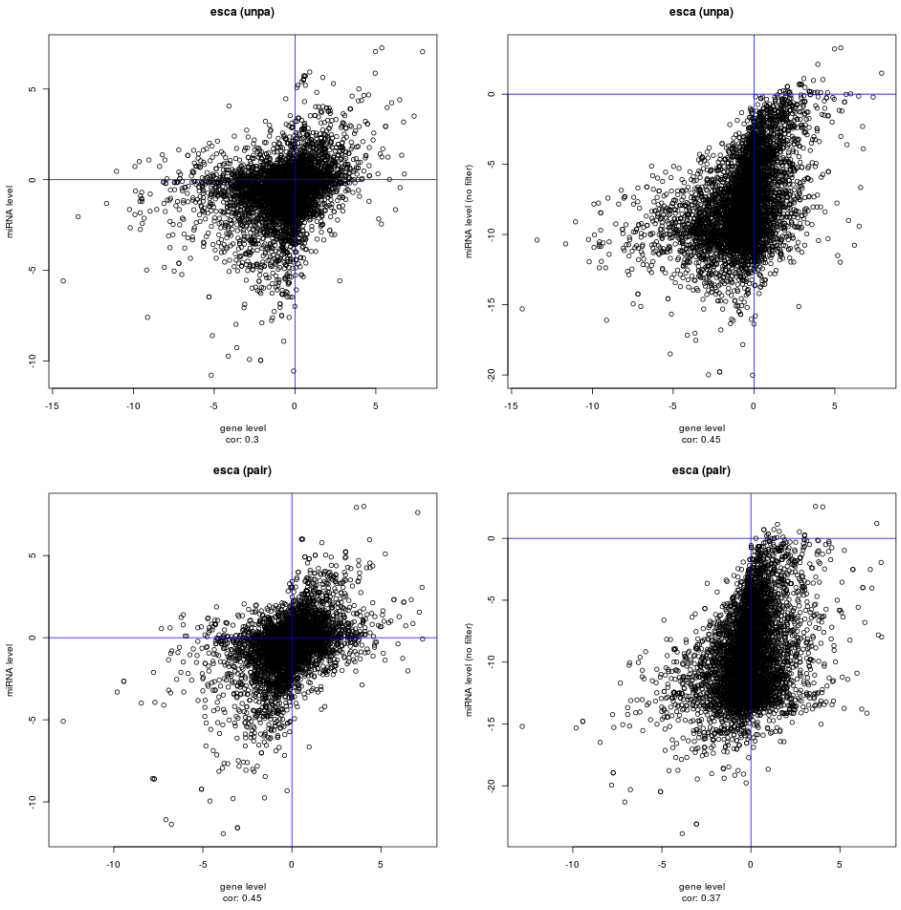


Figure 2: ESCA

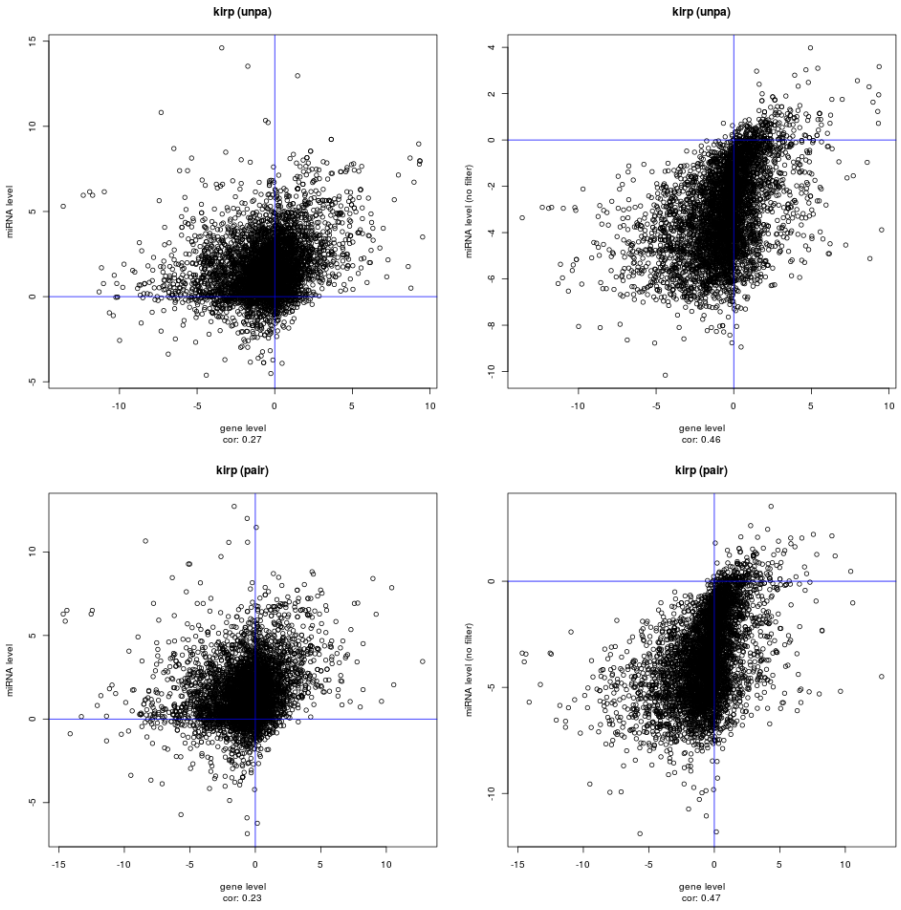


Figure 3: KIRP

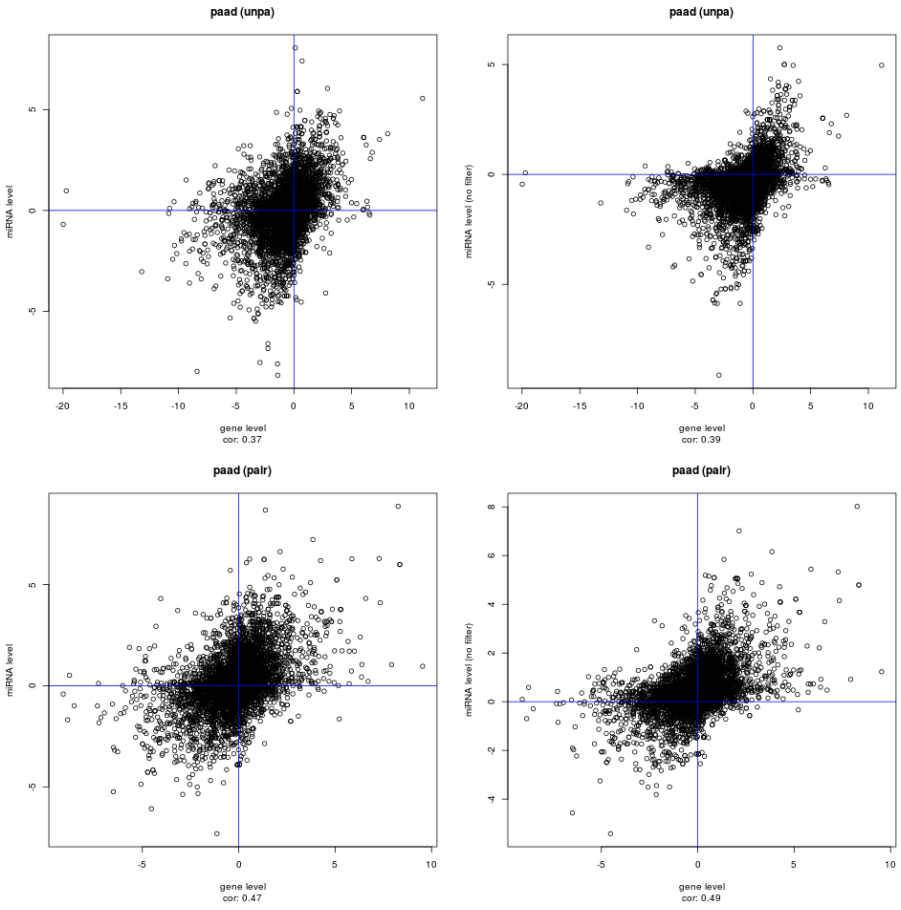


Figure 4: PAAD

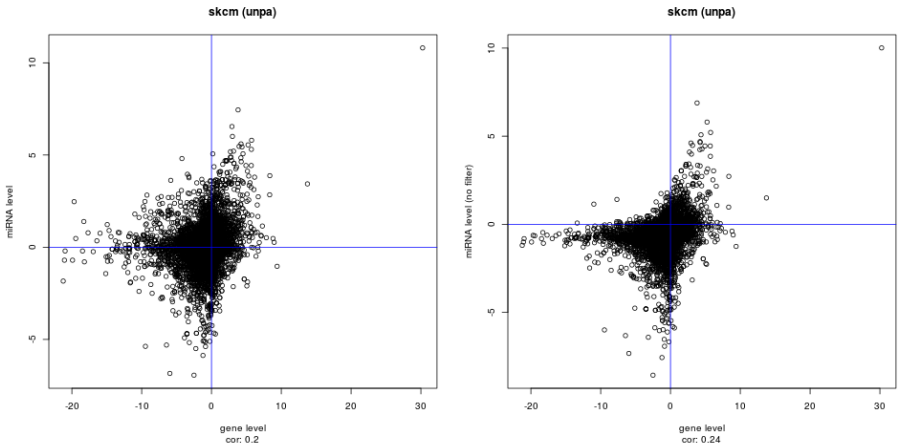


Figure 5: SKCM

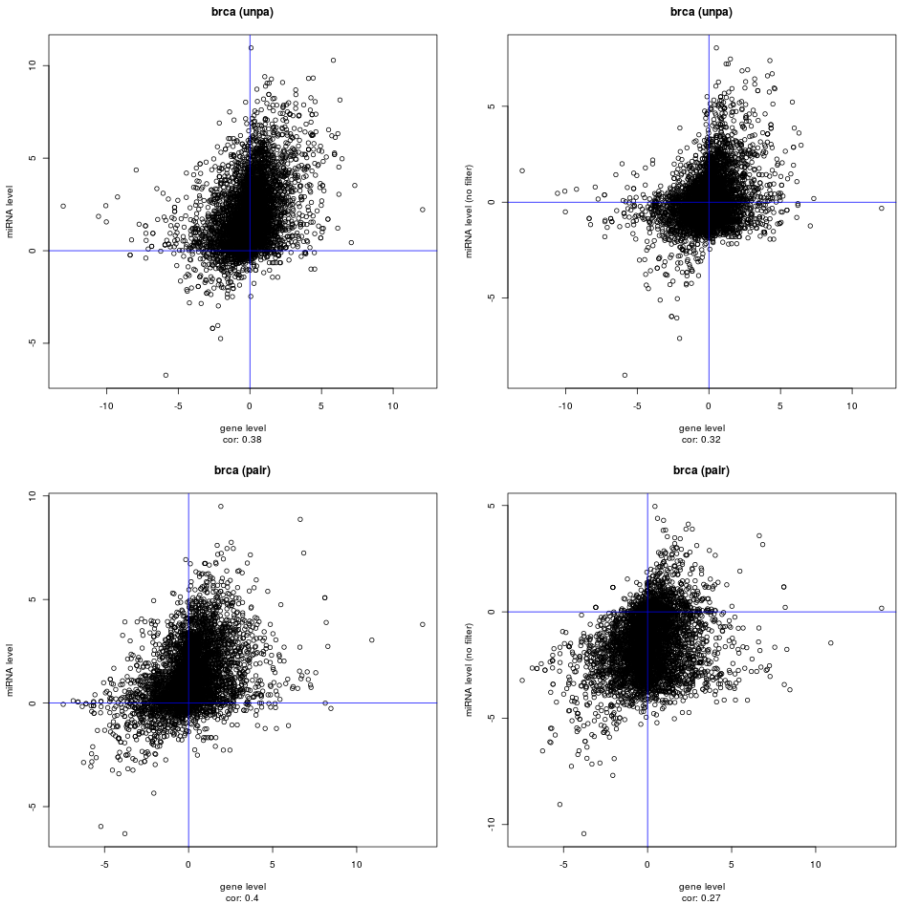


Figure 6: BRCA

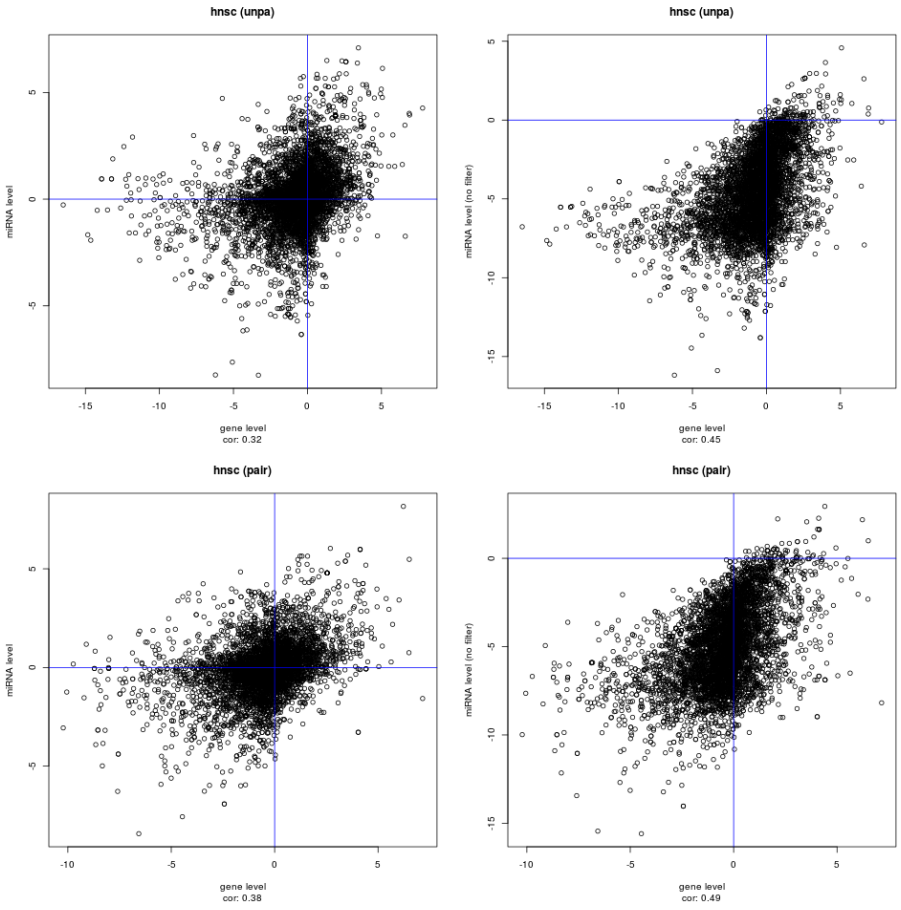


Figure 7: HNSC

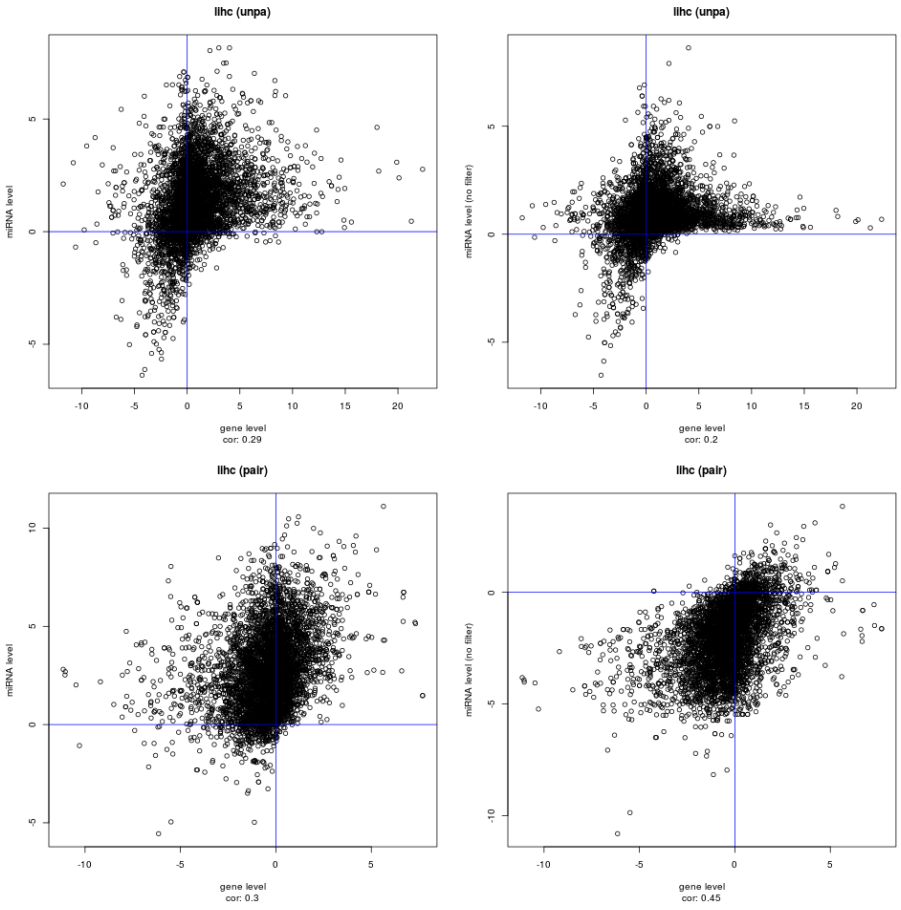


Figure 8: LIHC

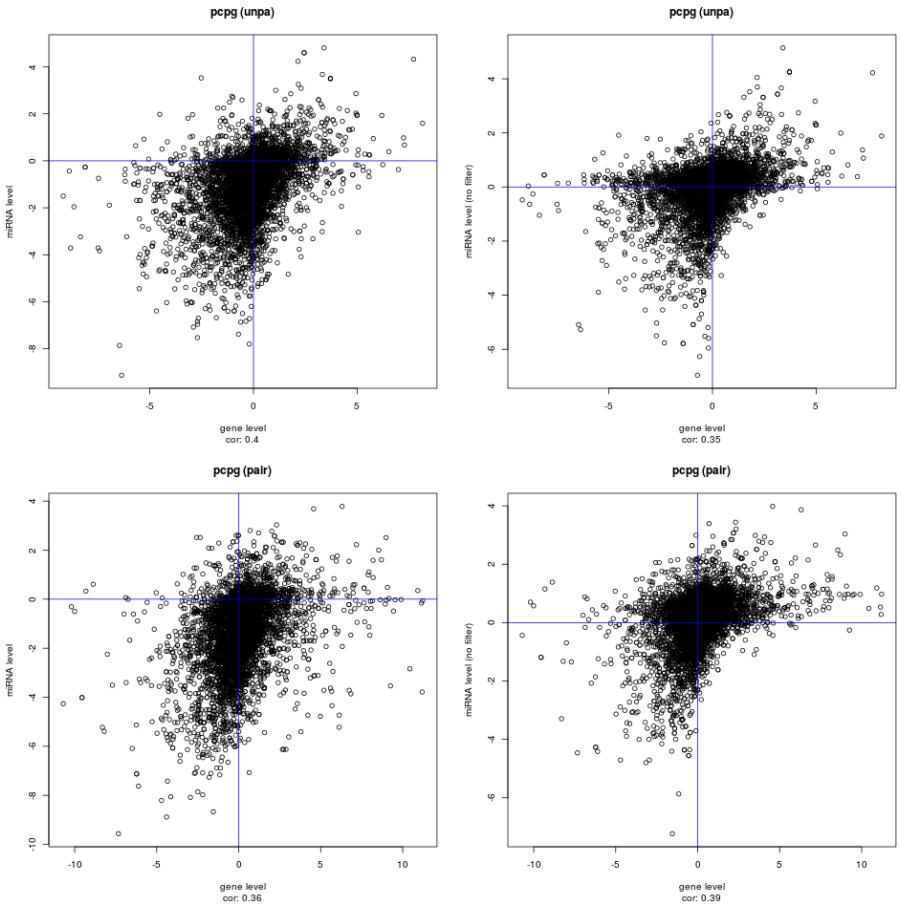


Figure 9: PCPG

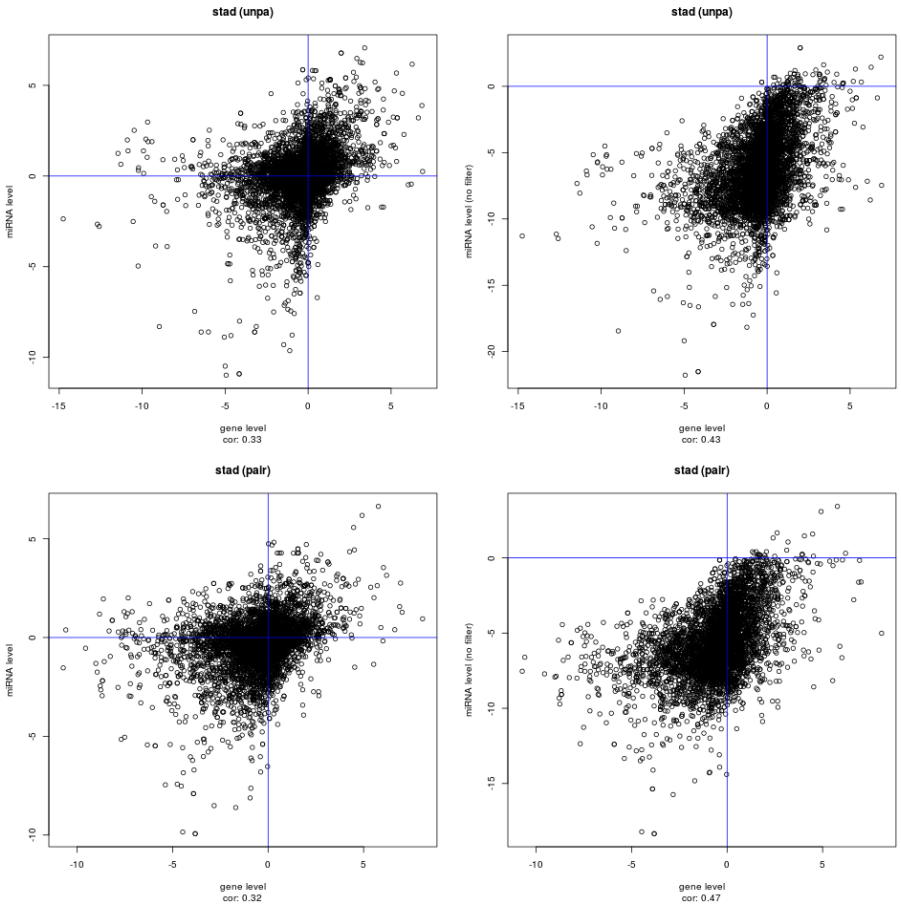


Figure 10: STAD

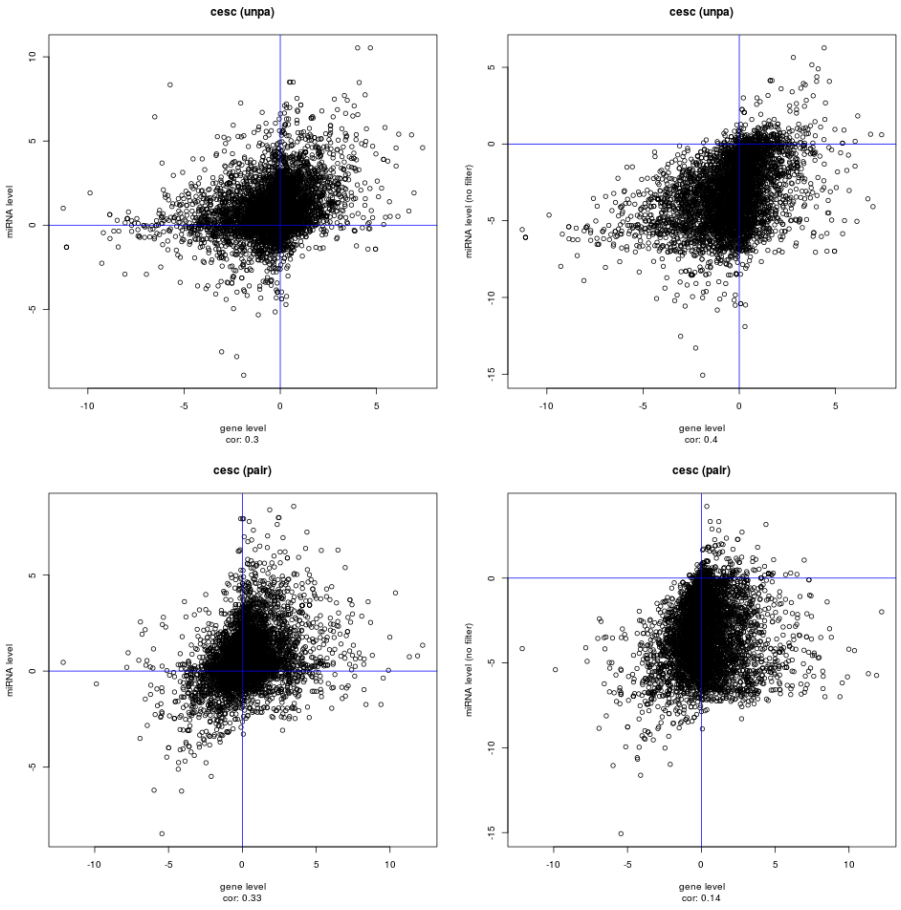


Figure 11: CESC

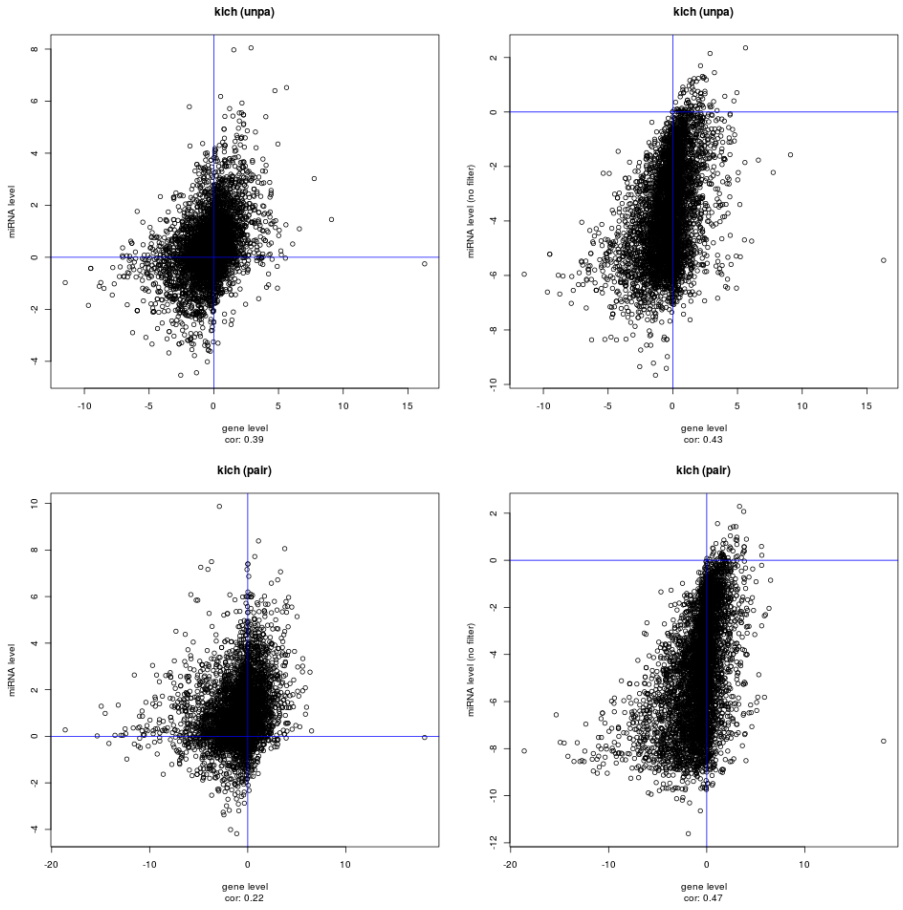


Figure 12: KICH

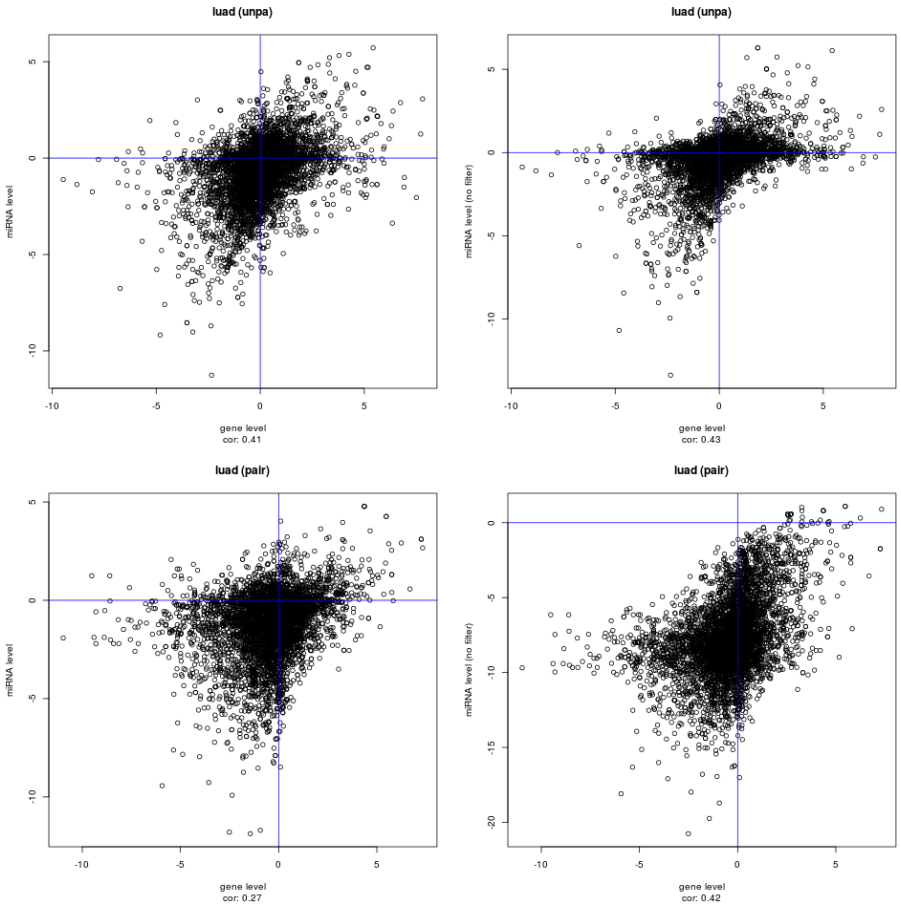


Figure 13: LUAD

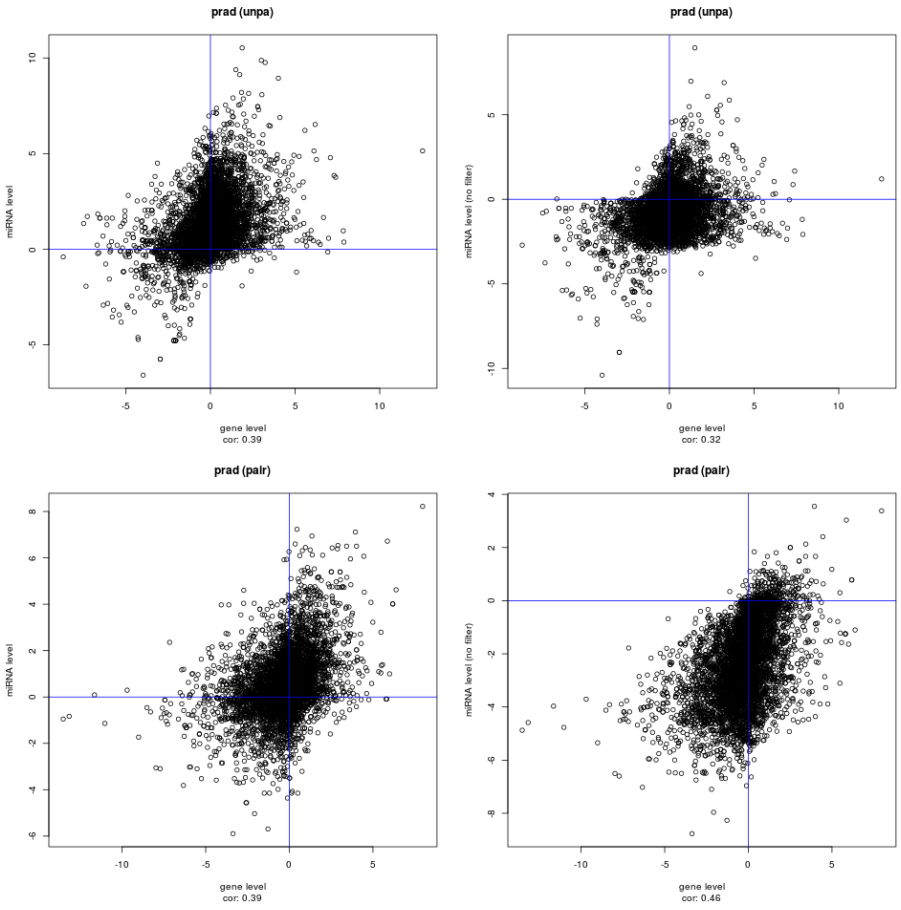


Figure 14: PRAD

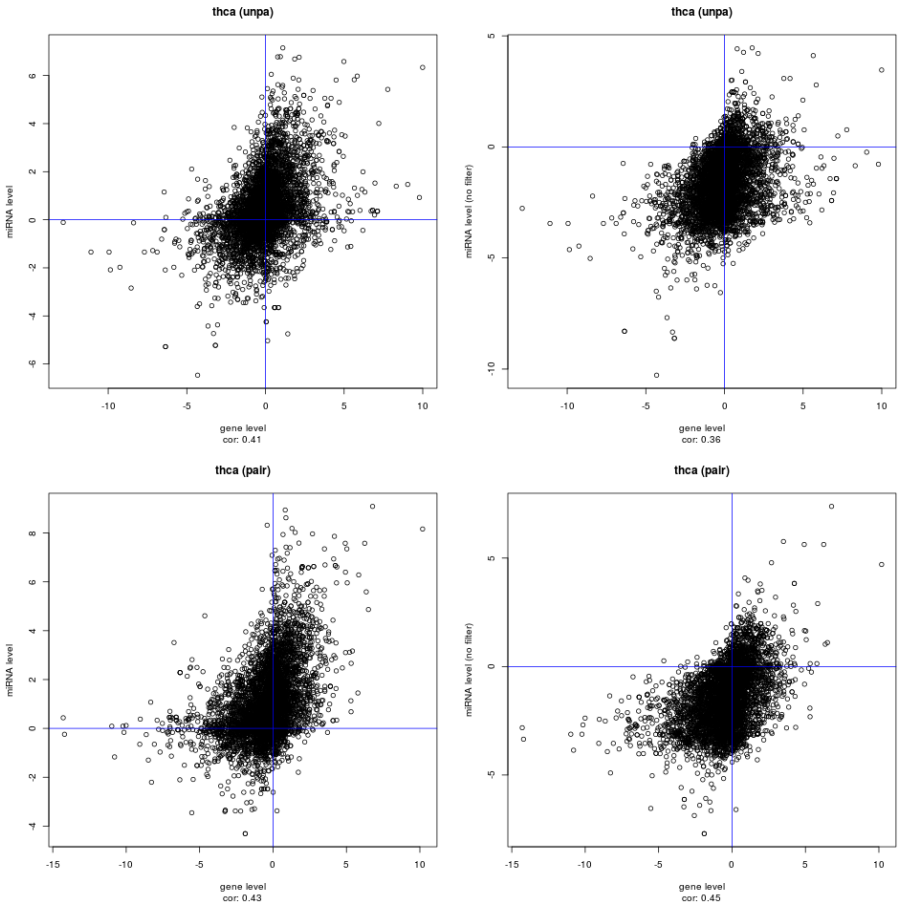


Figure 15: THCA

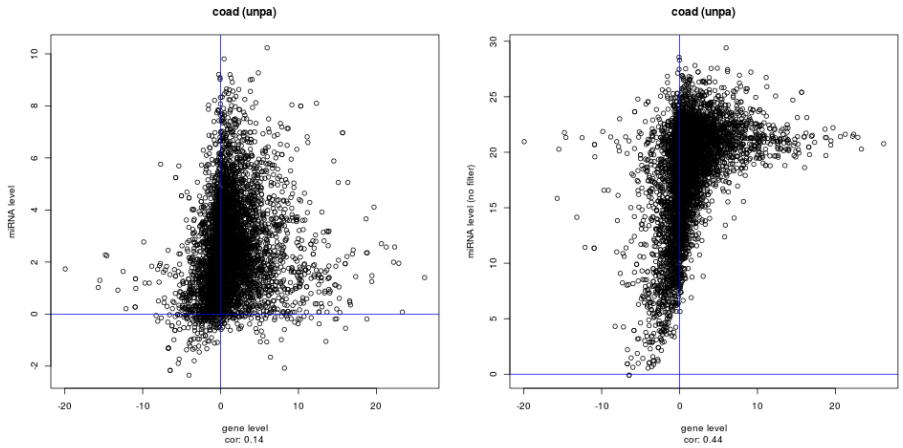


Figure 16: COAD

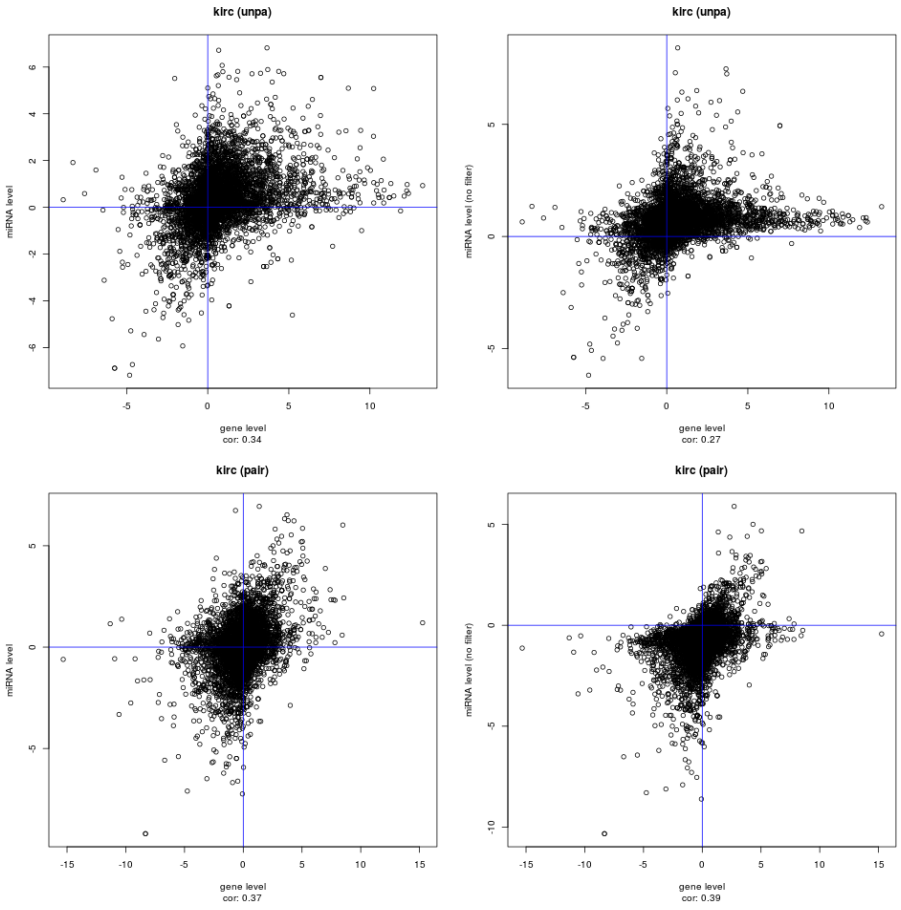


Figure 17: KIRC

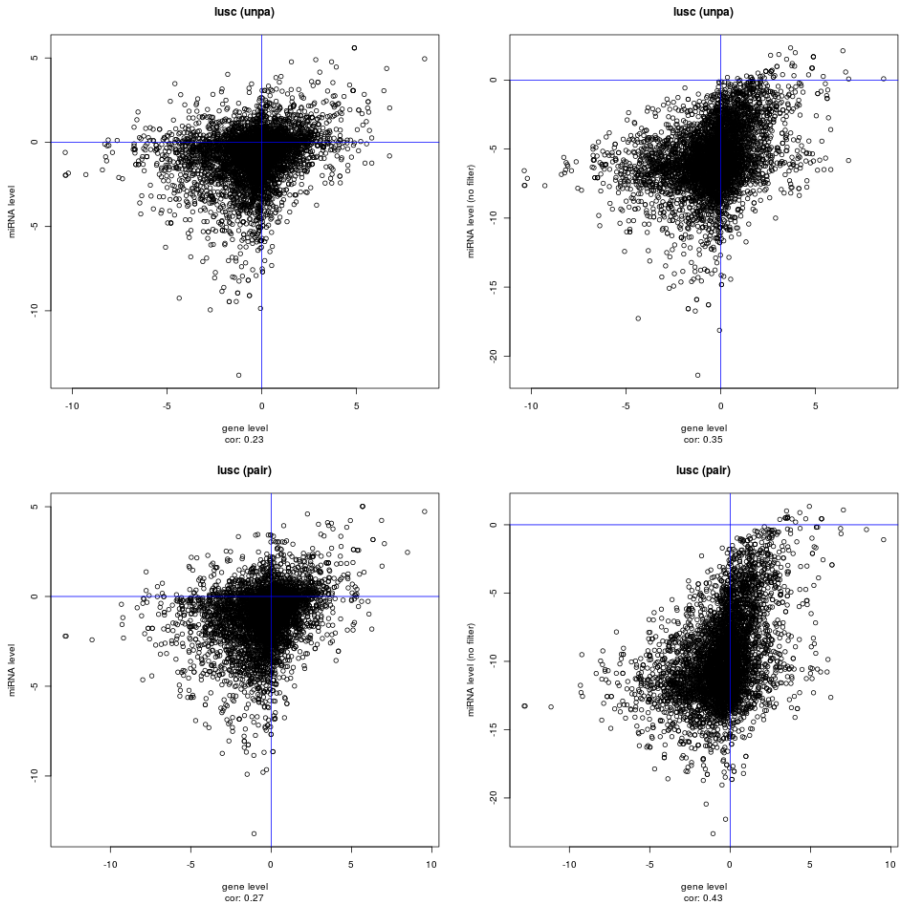
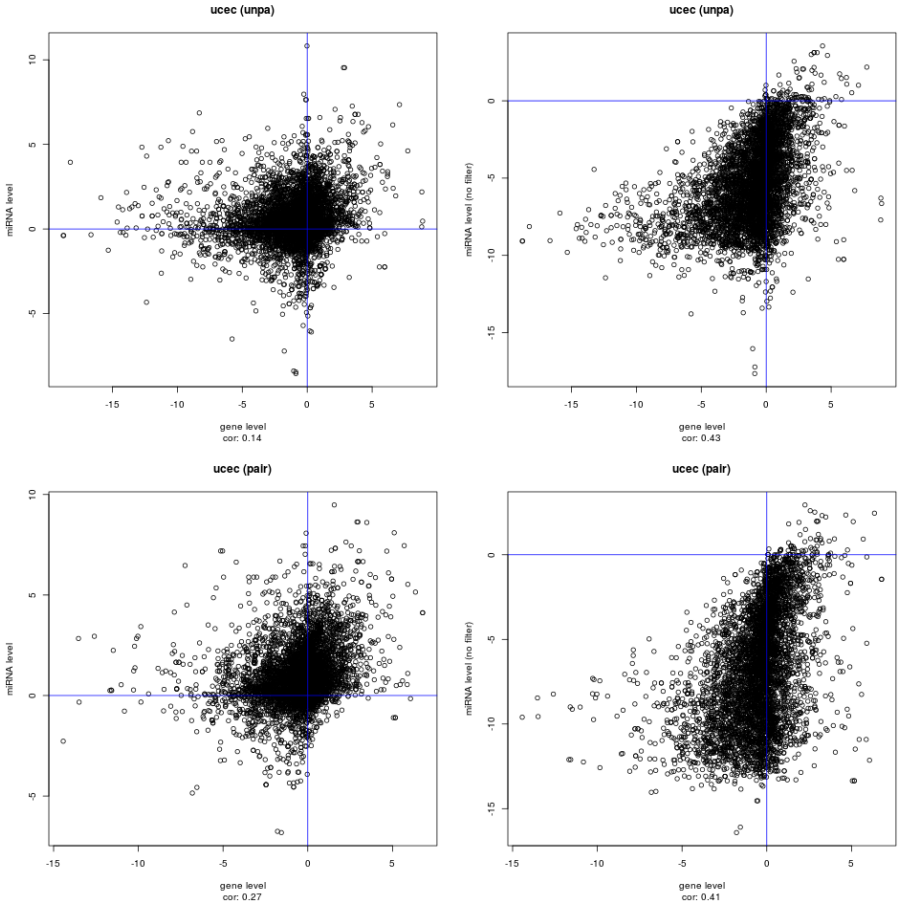


Figure 18: LUSC


ucec (unpa)
miRNA level
gene level
cor: 0.14
ucec (unpa)
miRNA level (no filter)
gene level
cor: 0.43
ucec (pair)
miRNA level
gene level
cor: 0.27
ucec (pair)
miRNA level (no filter)
gene level
cor: 0.41

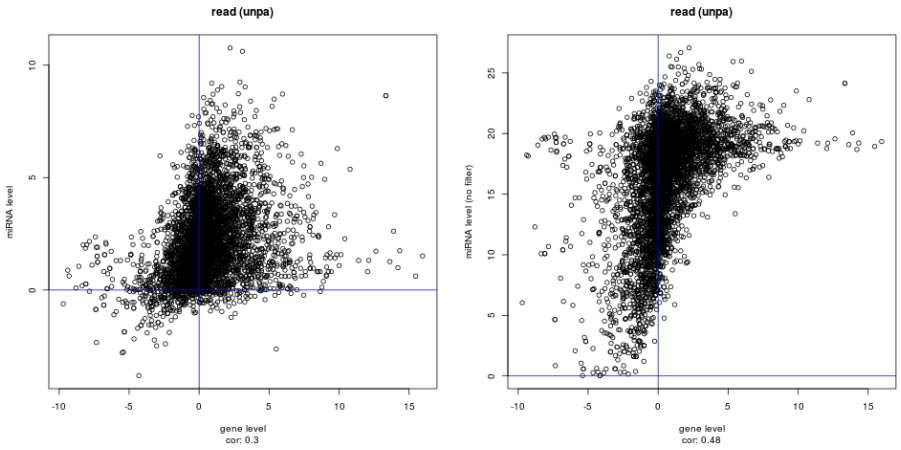


Figure 19: READ