Gene expression analysis

Expression change

- Single gene
  - self contained
    - multivariate tests
- Gene-set
  - competitive test
    - univariate tests
  - topological structure of the gene set is given

Correlation change

- Single gene
- Gene pair
- Gene-set
  - between two gene-sets

Statistical hypothesis to test

H0: mean expression of a gene is unchanged
H0: the equality of mean vector (2) H0: equality of multivariate distribution
H0: weighted scores are unchanged
H0: scores are unchanged
H0: rank order of the genes of a data set is random in a pathway
H0: equality of the multivariate distribution of correlation of an individual gene
H0: correlation between a gene pair is unchanged
H0: correlation structure of a gene-set is unchanged
H0: correlation structure between two modules is unchanged

Test statistic/methods

t test, ANOVA
Hotelling T, N-statistic
weighted aggregation of the test score, SPIA
aggregation of the test score, GSEA, GSA, GAGE etc
covariance distance of a gene to other genes in the data
corscor, differential coexpression analysis
graph edit distance, gene set coexpression analysis
DiffCoEx, dCoxS