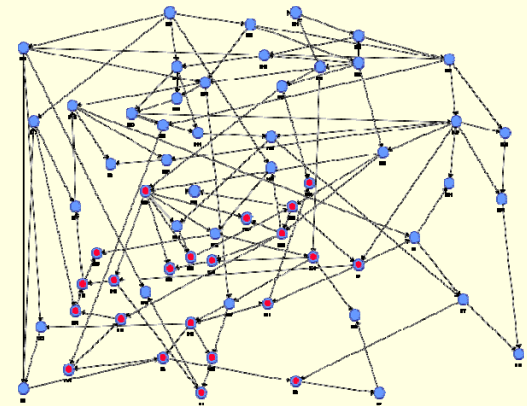


Inferring Three-way Gene Interactions from Microarray Data Sets

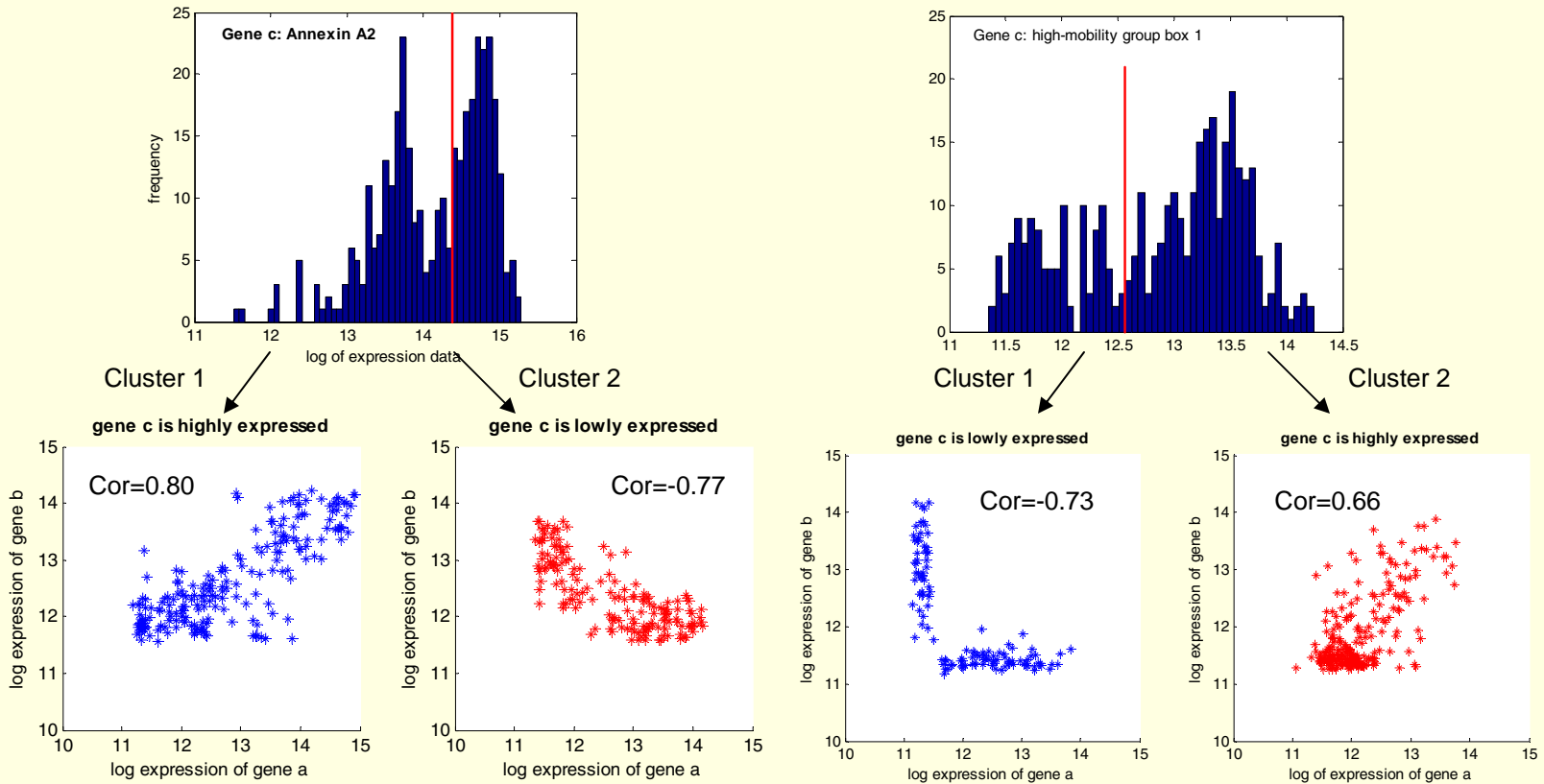
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Method

- Goal: to identify gene triplets in which the differential correlation of two genes is regulated by the third one.
- 545 Affy U133A experiments; randomly split into training and testing
- Model-based clustering to select control genes with bi-model expression profile.
- For each triplet gene a, b and c, calculate correlation between gene a and b under two conditions which are defined by the clustering result of gene c.
- Test whether the difference between those two correlations are statistically significant.

Example of Three-way Interaction

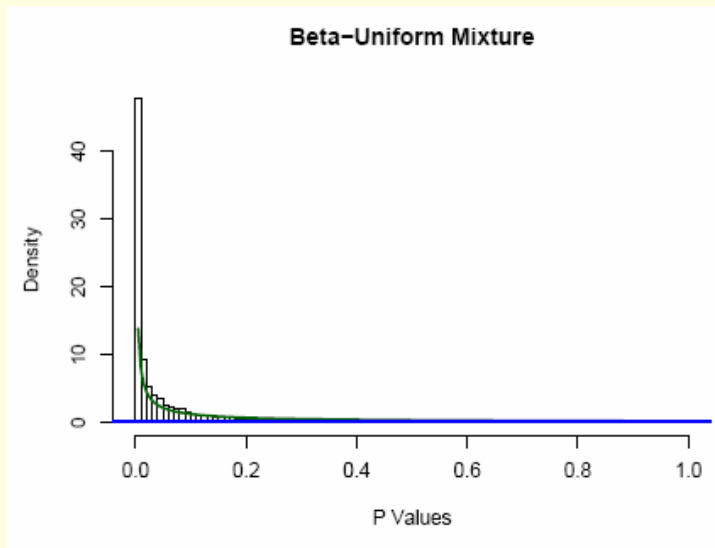


Gene c: annexin A2
 Gene a: cysteine-rich, angiogenic inducer
 Gene b: zinc finger protein 36, C3H type

Gene c: high-mobility group box 1
 Gene a: RAP2A, member of RAS oncogene family
 Gene b: kinesin family member 5C

Result

- Among top 10k most significant triplets in training, 70.25% have p-values < 0.05 in testing dataset.



- FDR=0.05
- p-value cutoff=0.187
- # of triplets that are verified in testing set = 8471