a

Gene sets

{g1, g3, g4, g5}   exp. set:

{g2,g4,g8}   up or down

{g1, g7}   pathways:

{g2, g5, g6}   up and down

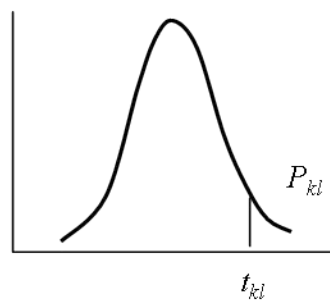**Microarray data (log based)**

samples: A_{1-K} B_{1-L}

conditions:

genes: g1
g2
g3
g4
g5
g6
g7
g8

b

1-on-1 comparison

A_k B_l

folds   statistics

g2

g4

g8

$-$ $=$
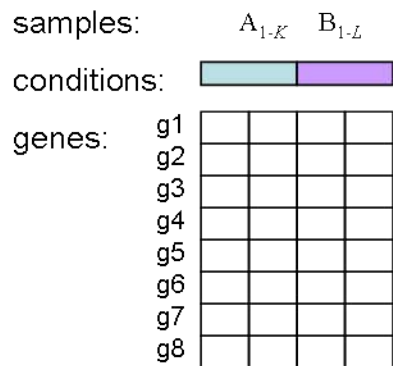
m M
s S
n N
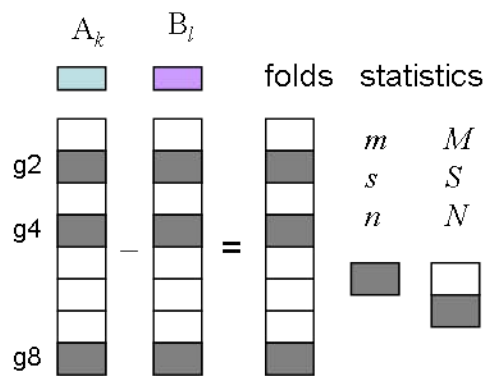
Two-sample t-test

$$t_{kl} = (m-M)\big/\sqrt{s^2/n + S^2/n}$$

P_{kl}

t_{kl}

c

Summarization and meta-test

$$x = -\frac{1}{L}\sum_{kl}\log P_{kl} \qquad P(X > x) \sim Gamma(K,1)$$