

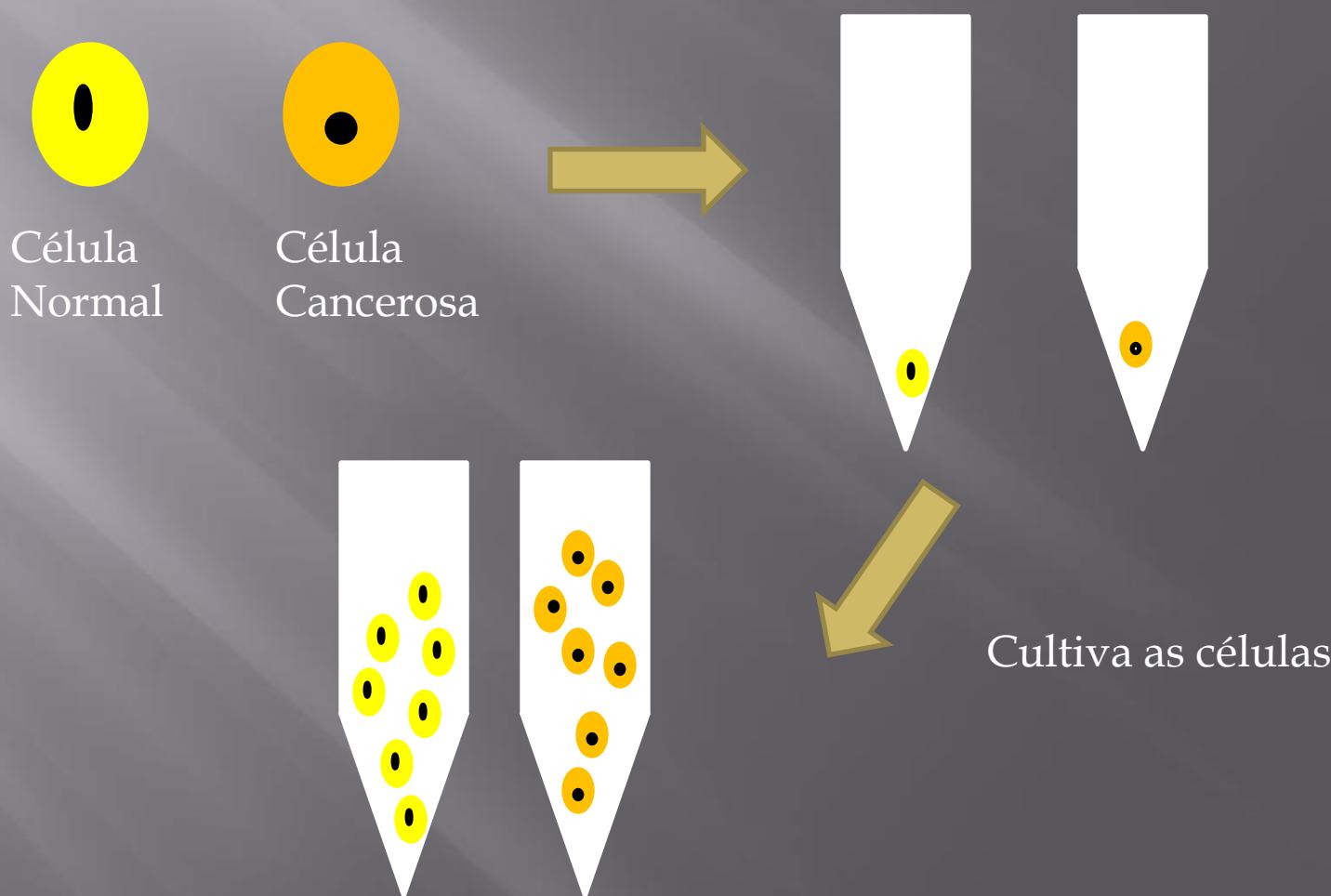
# ANÁLISE DE EXPRESSÃO GÊNICA DE GENOMA COMPLETO

José Luiz Rybarczyk Filho

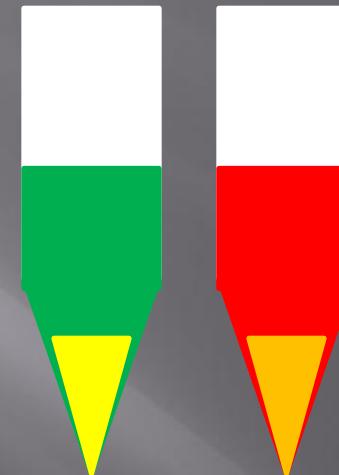
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- Expressão gênica
- Reorganização
- Cálculo de Modularidade
- Análise Funcional
- Transcriptograma

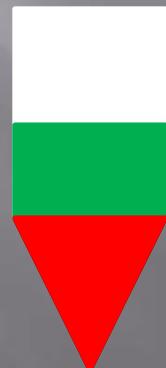
# Expressão Gênica



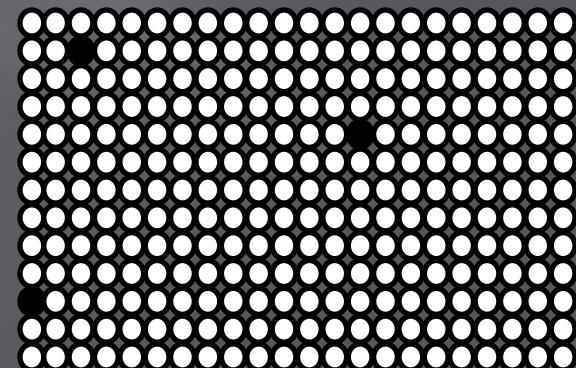
# Expressão Gênica



aplica-se um marcador, verde para normal e vermelho para câncer

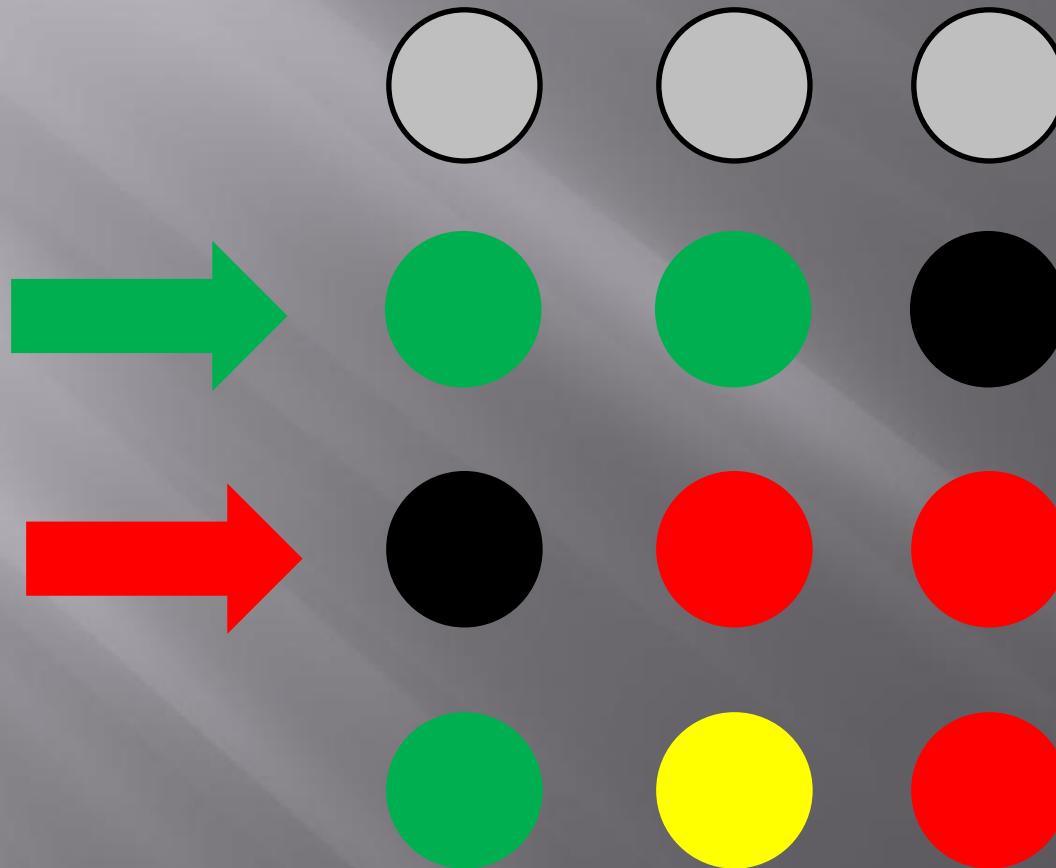


Mistura os dois,  
Aplique a mistura  
No microarranjo

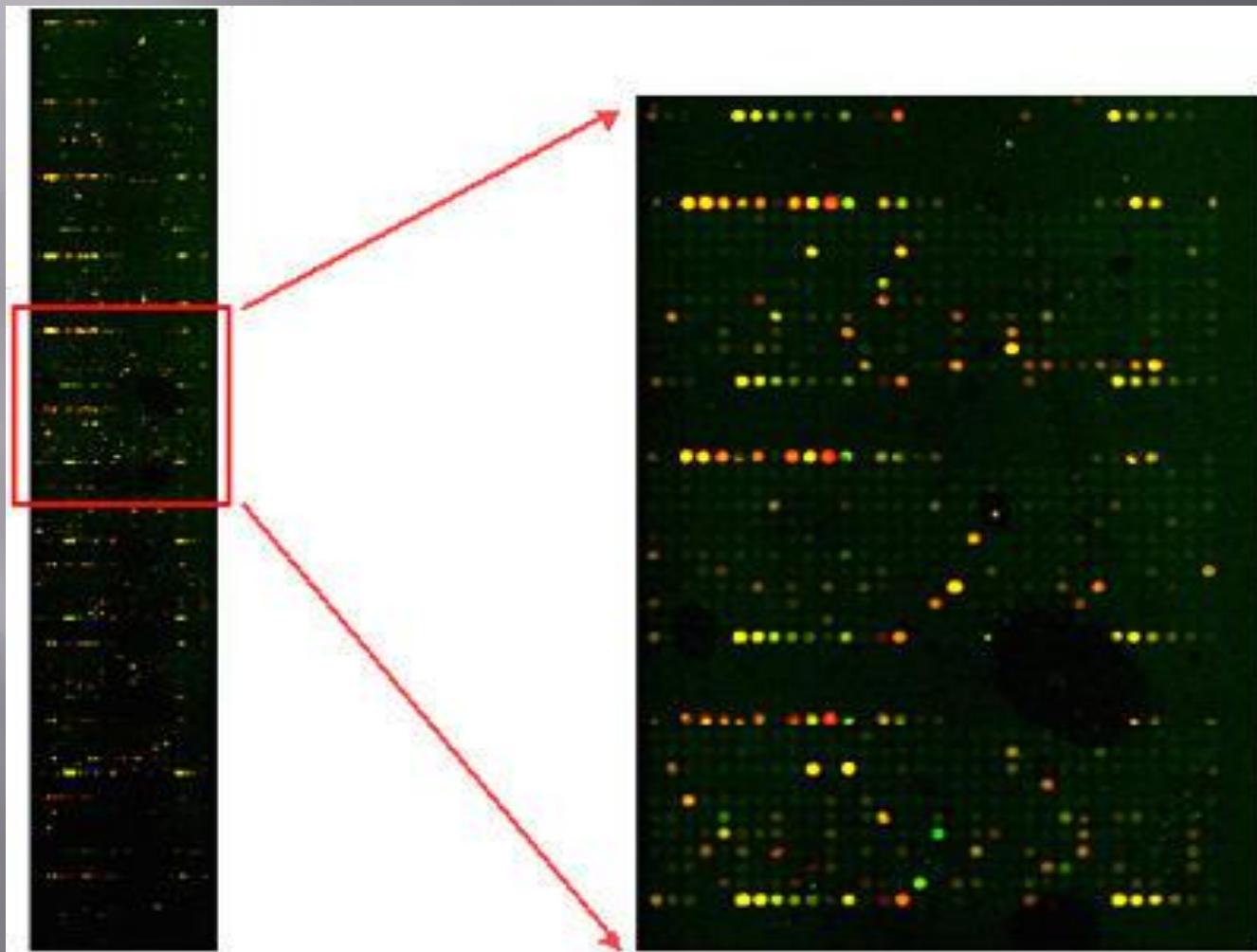


Microarranjo

# Expressão Gênica



# Expressão Gênica



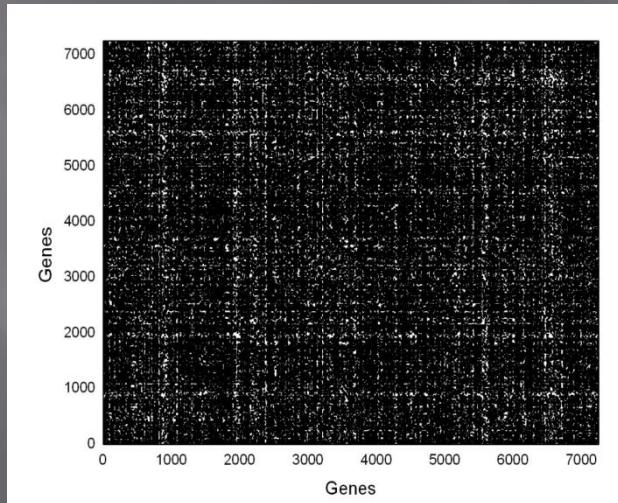
Transcriptoma

# Matriz de adjacência

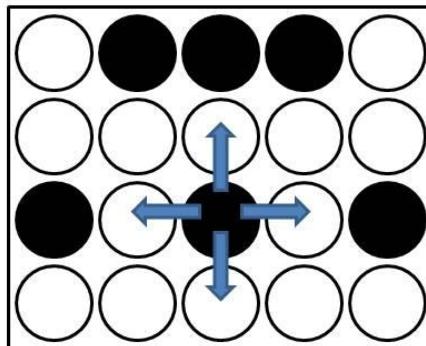
- Enumeram-se as proteínas
- Constrói-se a matriz de interações  $A_{ij}$  de tal maneira que

$A_{ij}=1$  se i e j interagem

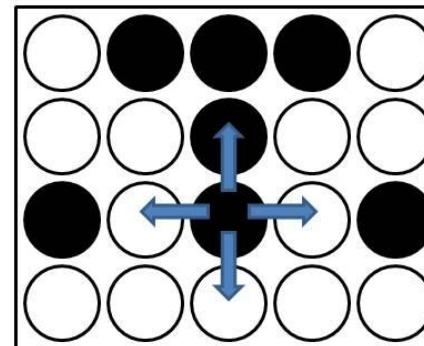
$A_{ij}=0$  se i e j não interagem



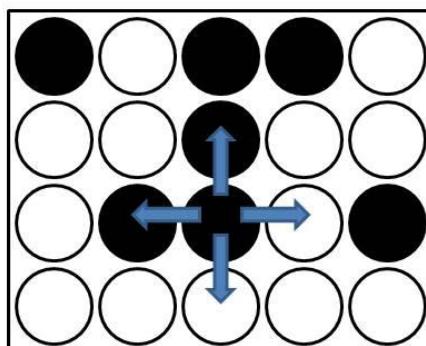
# Reorganização



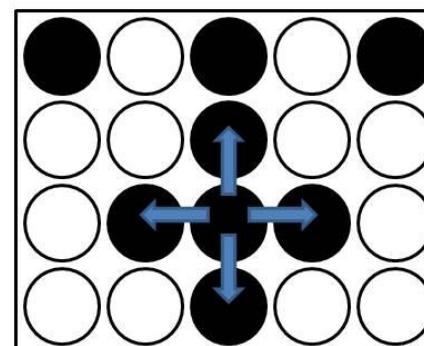
**Configuração n° 1**  
**E<sub>1</sub>**



**Configuração n° 2**  
**E<sub>2</sub>**

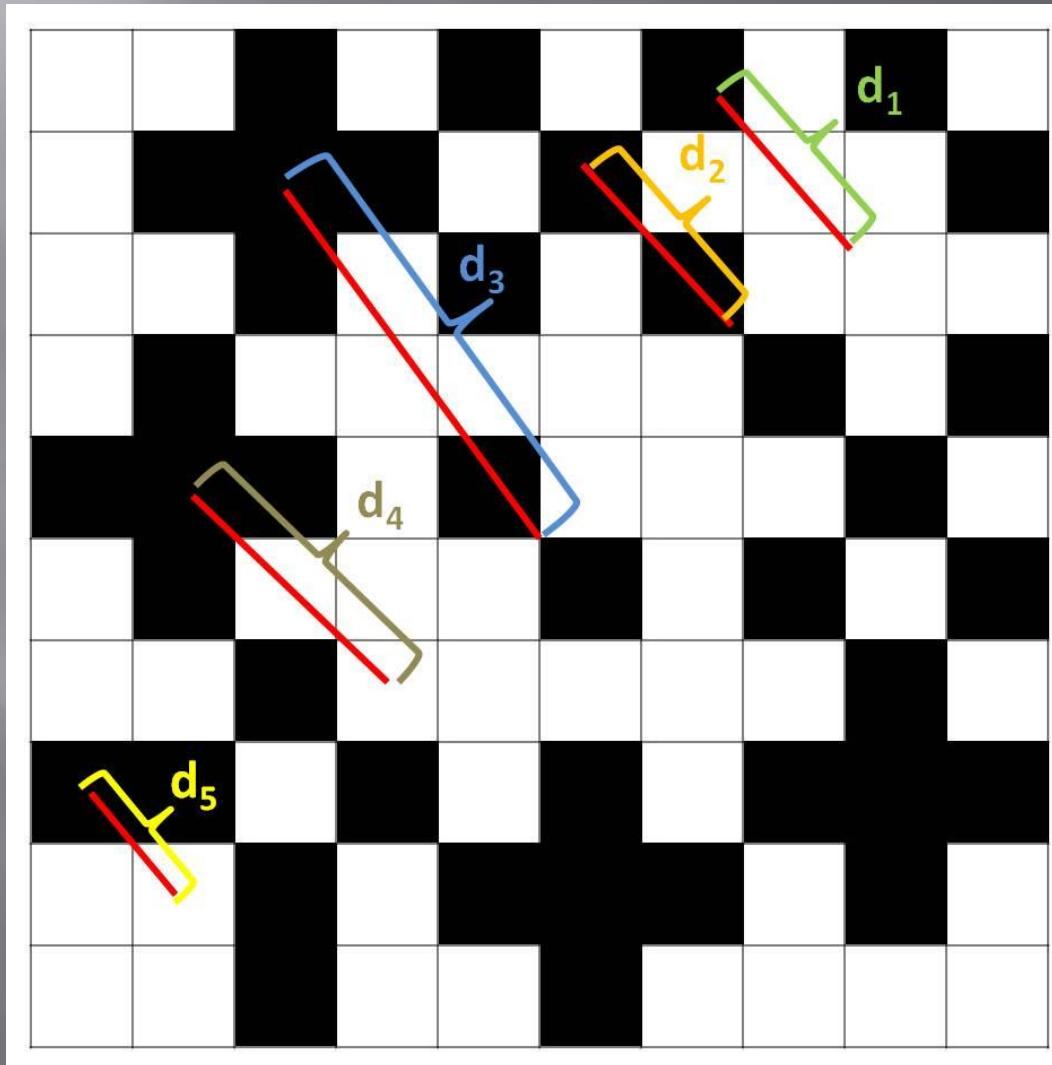


**Configuração n° 3**  
**E<sub>3</sub>**



**Configuração n° 4**  
**E<sub>4</sub>**

# Reorganização



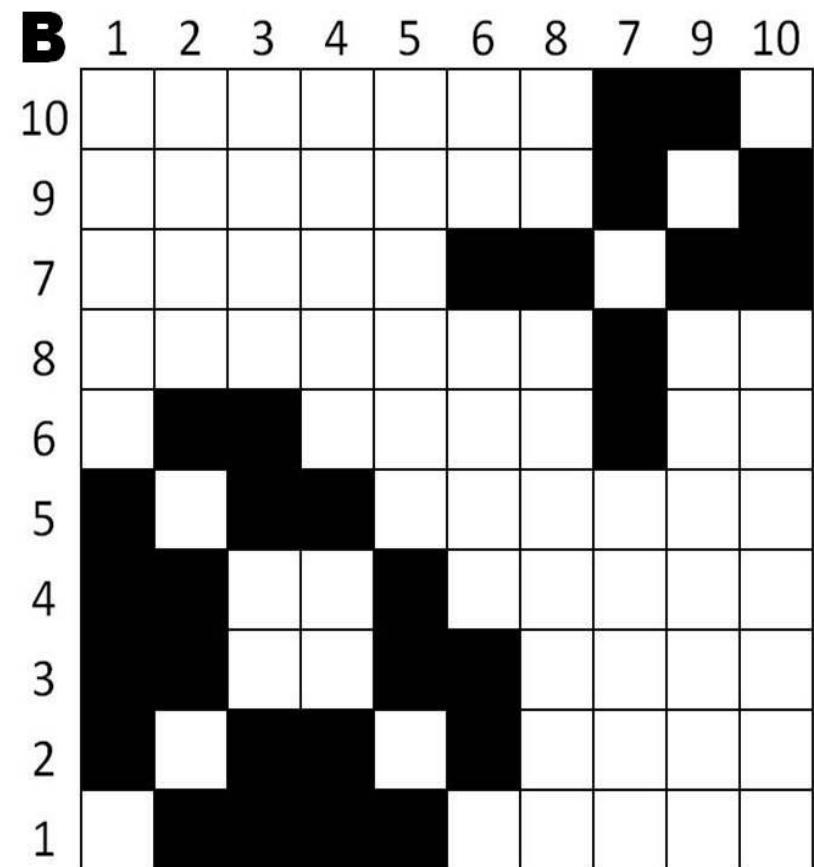
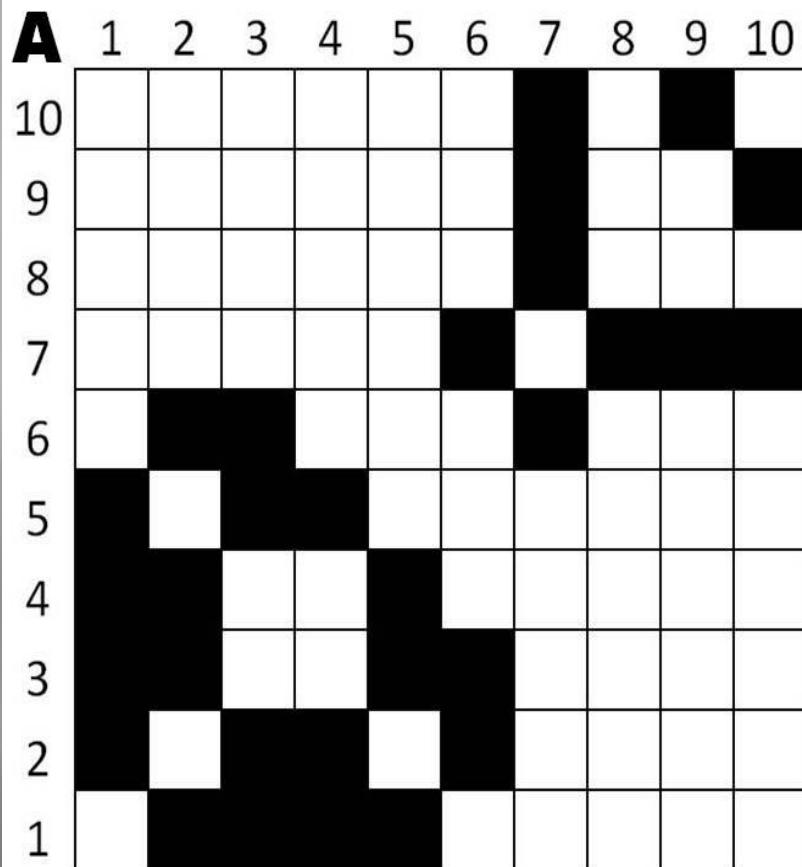
# Reorganização

- Associamos uma energia a cada configuração da matriz:

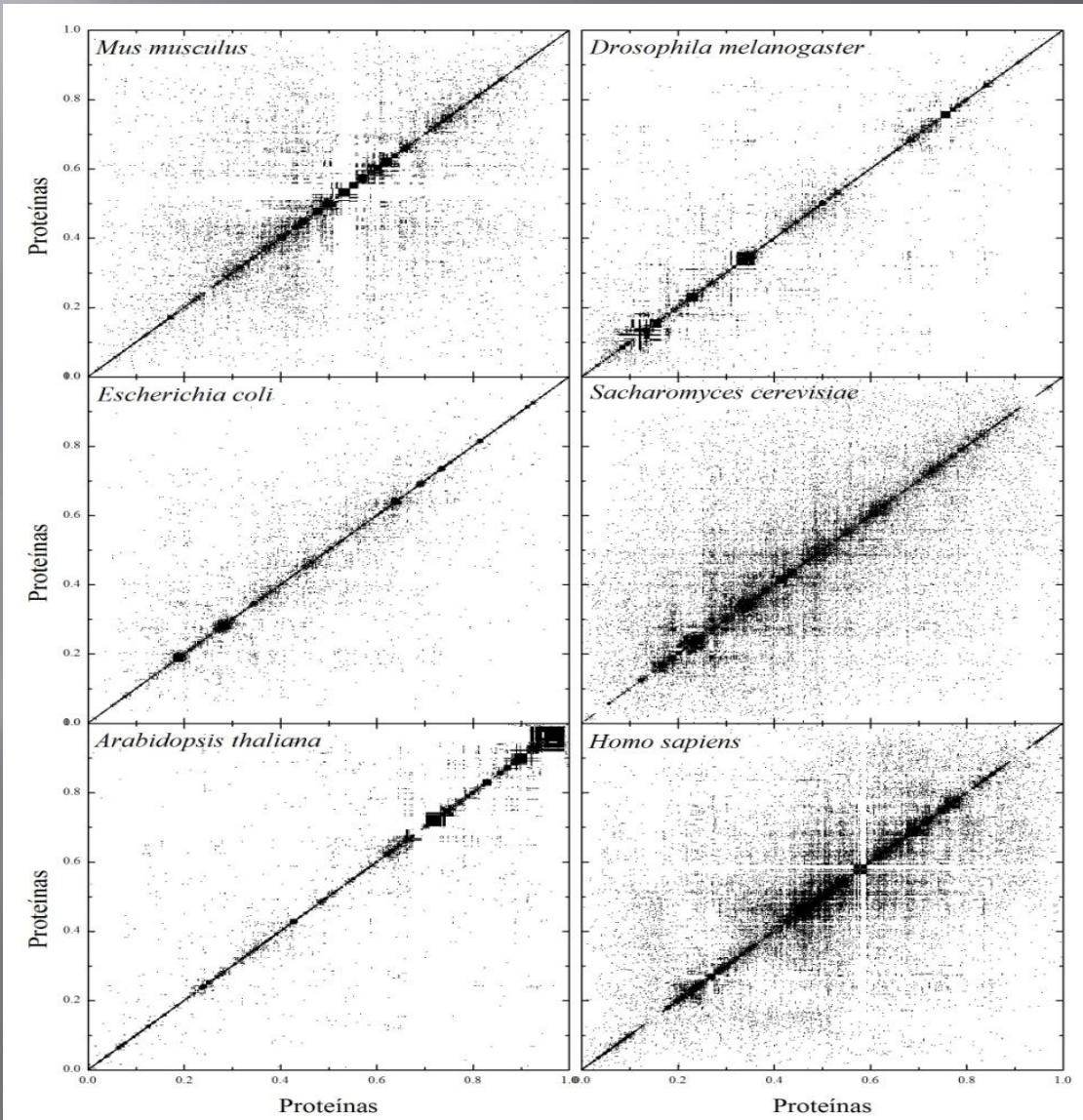
$$\mathcal{E} = \sum_{i=1}^N \sum_{j=1}^N (i^2 - j^2)^{\frac{1}{2}} [|A_{i,j} - A_{i+1,j}| + |A_{i,j} - A_{i-1,j}| + |A_{i,j} - A_{i,j+1}| + |A_{i,j} - A_{i,j-1}|]$$

- Escolhemos dois rótulos ao acaso, trocamos as proteínas de lugar, reobtemos a matriz e sua energia.
- Se a nova energia é menor a troca é aceita
- Caso contrário, volta-se à configuração inicial
- Repete-se o procedimento

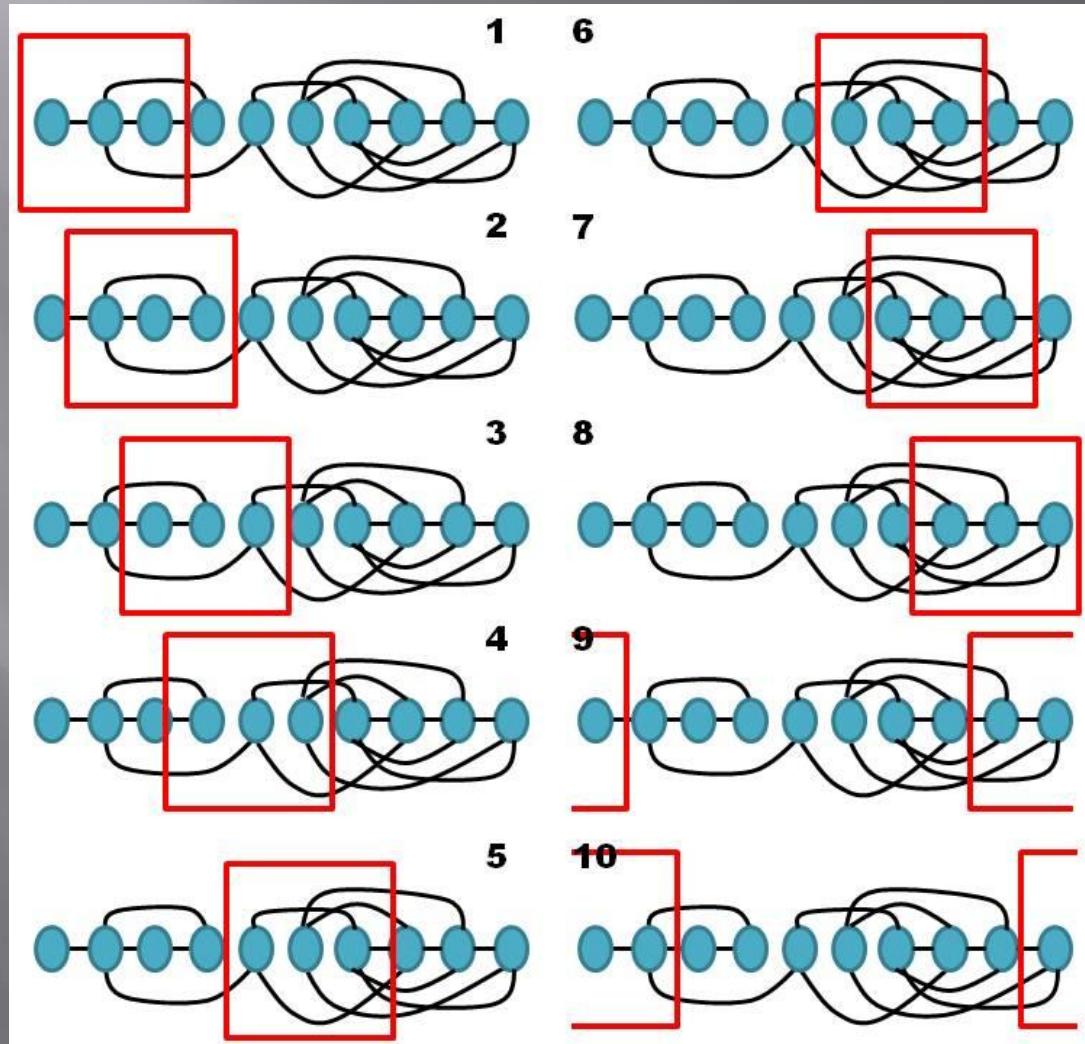
# Reorganização



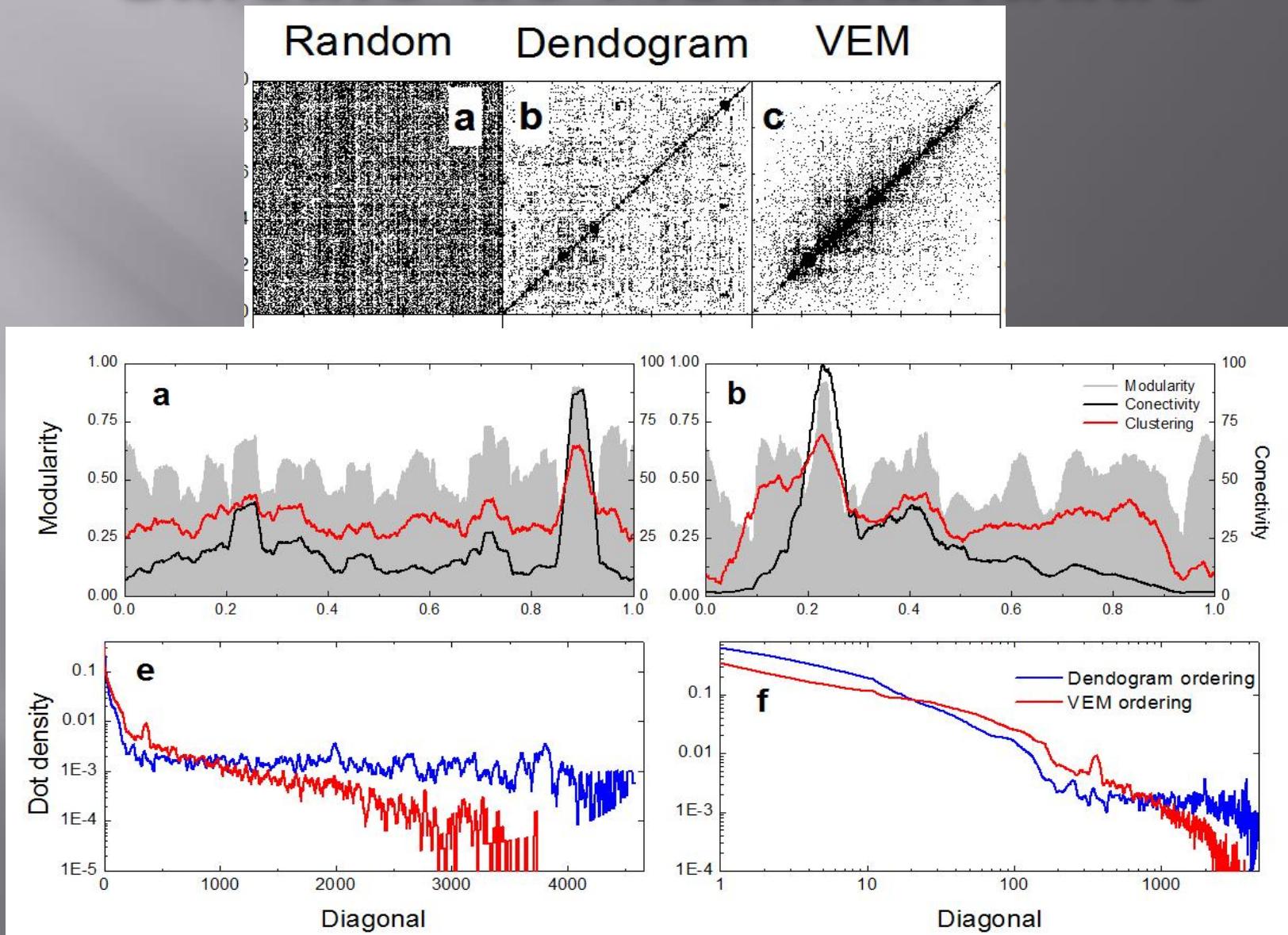
# Reorganização



# Cálculo de Modularidade



# Cálculo de Modularidade

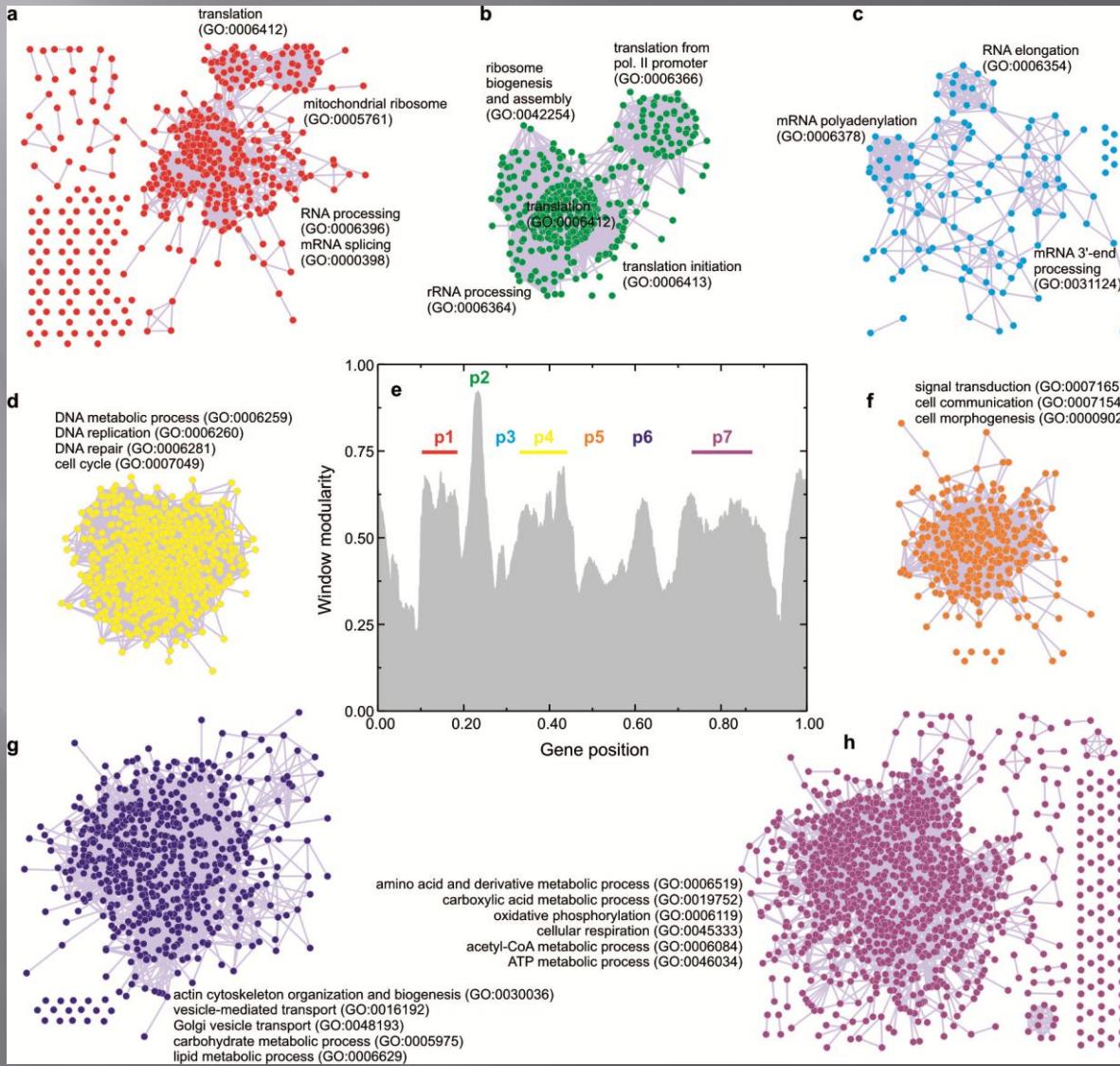


# Análise Funcional

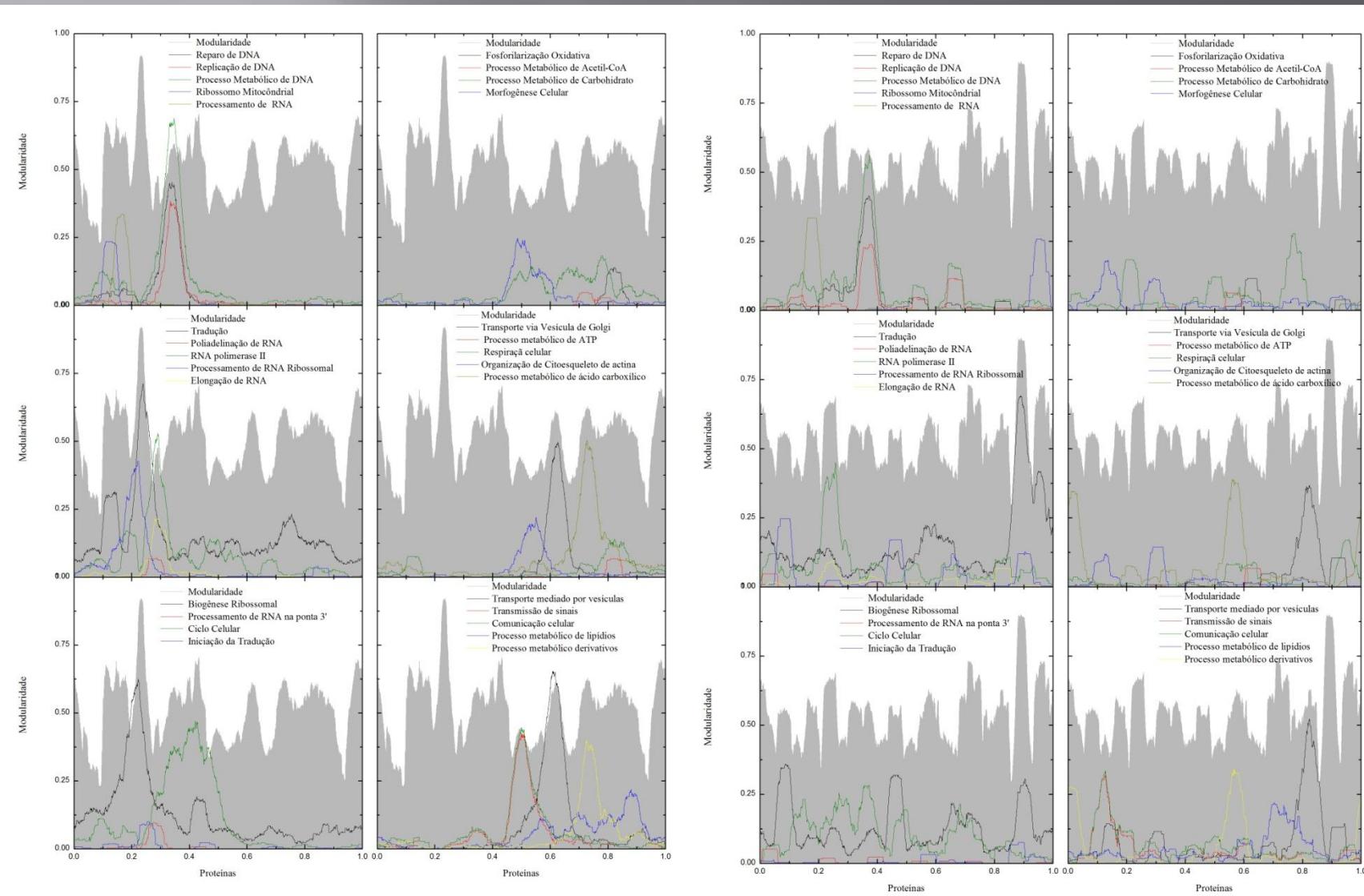
- ❑ Classificação dos genes por ontologias:
  - Processos Biológicos
  - Funções Moleculares
  - Componentes Celulares
- ❑ Hierárquico: GO's Mães, filhas, netas, etc...

- ❑ all : all [251827 gene products]
  - ❑ I GO:0005575 : cellular\_component [171409 gene products]
    - + I GO:0005623 : cell [107250 gene products]
    - + I GO:0044464 : cell part [107213 gene products]
    - I GO:0031975 : envelope [3942 gene products]
      - + I GO:0030313 : cell envelope [667 gene products]
      - + I GO:0031967 : organelle envelope [3275 gene products]
    - I GO:0005576 : extracellular region [3935 gene products]
      - ❑ I GO:0048046 : apoplast [264 gene products]
      - ❑ P GO:0044421 : extracellular region part [2002 gene products]
        - + I GO:0048180 : activin complex [3 gene products]
        - + I GO:0032311 : angiogenin-PRI complex [22 gene products]
        - + I GO:0031395 : bursicon neuropeptide hormone complex [2 gene products]
        - + I GO:0005601 : classical-complement-pathway C3/C5 convertase complex [0 gene products]

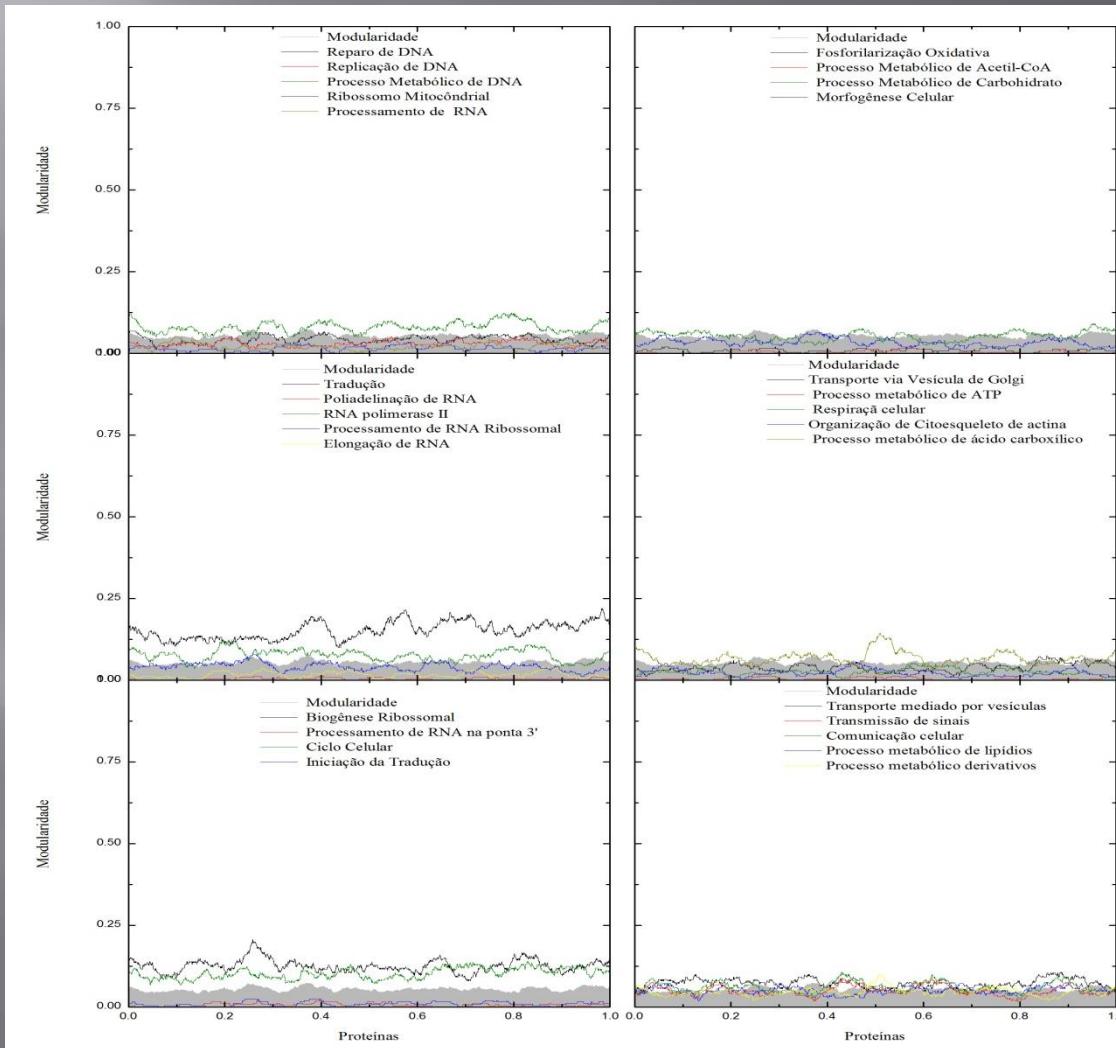
# Análise Funcional



# Análise Funcional



# Análise Funcional



# GEO

 NCBI       Gene Expression Omnibus

HOME | SEARCH | SITE MAP | Handout | NAR 2006 Paper | NAR 2002 Paper | FAQ | MIAME | Email GEO | Not logged in | Login ?

NCBI > GEO ?

**Gene Expression Omnibus:** a gene expression/molecular abundance repository supporting MIAME compliant data submissions, and a curated, online resource for gene expression data browsing, query and retrieval.

**GEO navigation**

```
graph LR
    QUERY[QUERY] --> DataSet[DataSets]
    QUERY --> GeneProfile[Gene profiles]
    QUERY --> Acc[GEO accession]
    QUERY --> BLAST[GEO BLAST]
    BROWSE[BROWSE] --> DataSetB[DataSets]
    BROWSE --> AccB[GEO accessions]
    AccB --> Platform[Platforms]
    AccB --> Sample[Samples]
    AccB --> Series[Series]
    SUBMIT[SUBMIT] --> DirectDeposit[Direct deposit / update]
    SUBMIT --> WebDeposit[Web deposit / update]
    DirectDeposit --> CreateAccount[Create new account]
```

**Public data**

GPL Platforms	6135
GSM Samples	326908
GSE Series	12952
Total	345995

**Site contents**

**Documentation**

- Overview
- FAQ
- Find Submission guide
- Linking & citing
- Journal citations
- Programmatic access
- DataSet clusters
- GEO announce list
- Data disclaimer
- GEO staff

**Query & Browse** ?

- Repository browser
- Submitter contacts
- SAGEmap
- FTP site
- GEO Profiles
- GEO DataSets

**Deposit & Update** ?

- Direct deposit
- Web deposit
- New account

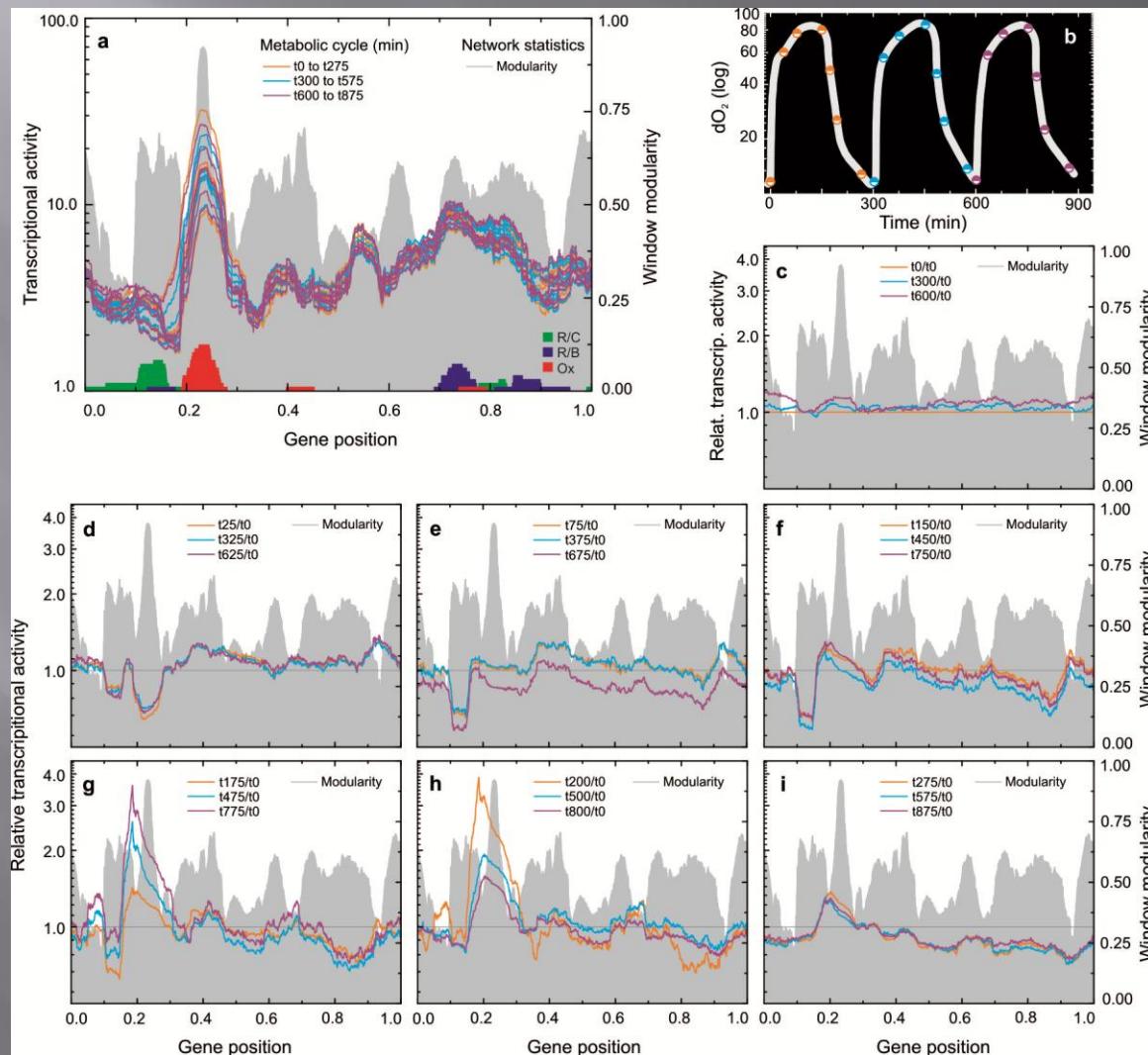
GEO navigation help window. Mouse over flow chart for information.

Get GEO accession  Scope:  Format:  Amount:

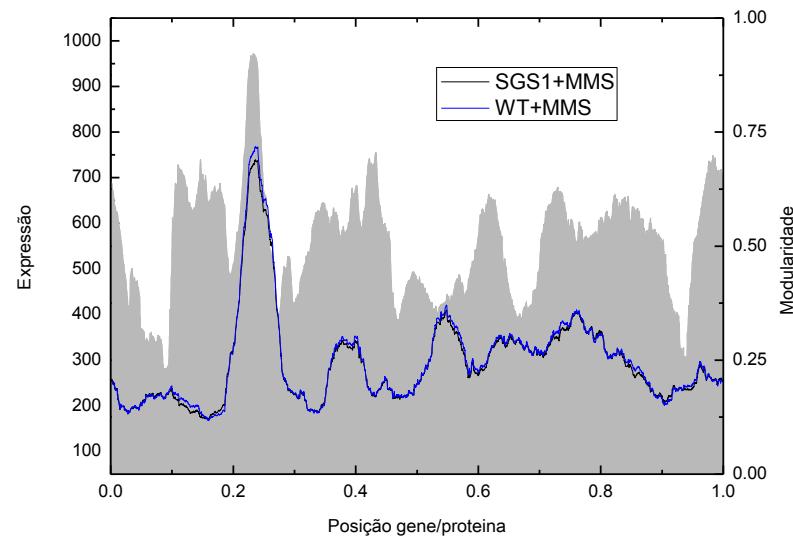
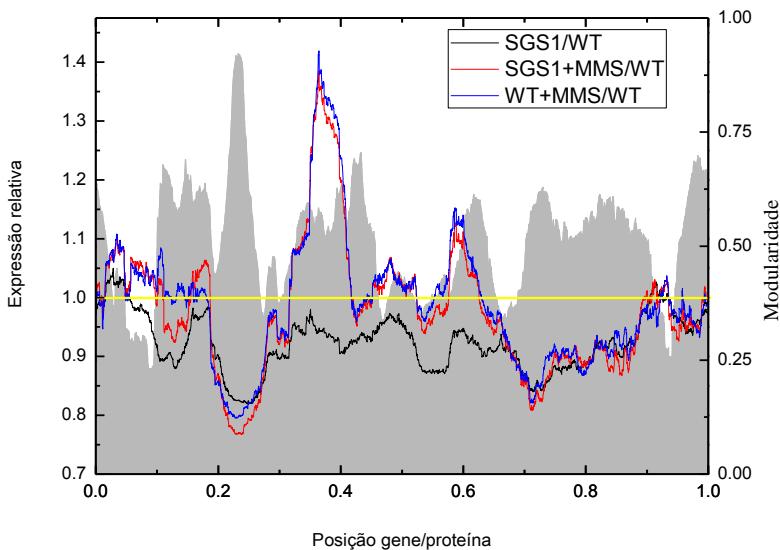
Depositors only User:  Password:   Recover a password

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# Transcriptograma



# Transcriptograma



Muito Obrigado pela Atenção!!