

LAB 6 :

# Visualization and analysis of functional gene networks using Cytoscape



# Data used in the network

## 1. Network : HumanNet v.1

a probabilistic functional gene network of 18,714 validated encoding genes of *Homo sapiens*. (Insuk *et al*, 2011)

We used subset of the network: 'breast cancer related genes'

## 2. Expression data: RNA-seq data

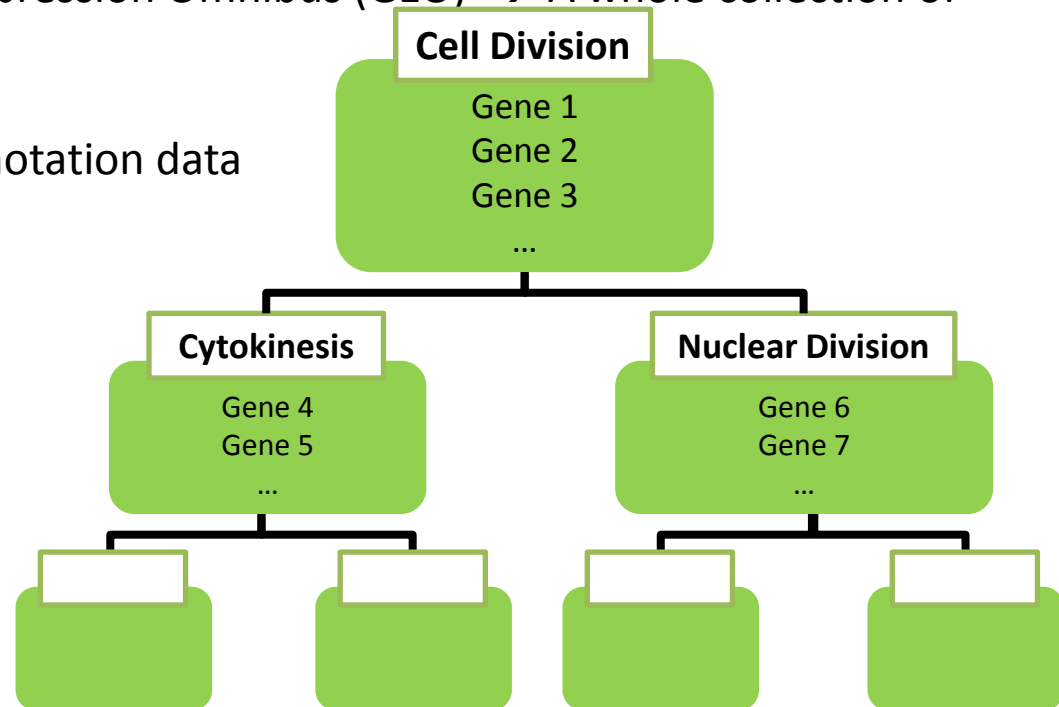
Samples are from 3 Breast cancer patients and 3 normal .

Breast cancer patients have specific type of cancer : Triple Negative Breast Cancer  
Data downloaded from : Gene Expression Omnibus (GEO) → A whole collection of various expression data

## 3. Gene Ontology : Gene-Function annotation data

Described in 3 domains

- Molecular Function
- Cellular Component
- **Biological Process**



# Report

Assignment : Draw given Network with Cytoscape on your own.

## Things to include

1. Date of the experiment and the day (Tue, Wed, Thur, Fri)
2. Results with “figures of your own” (**1 network file with gradient color, 1 with BINGO output**)
3. Discussion
4. References

## Discussion should include :

- What the network visualization tells you.  
(What information does the network give you? What can you tell from the expression data and function enrichment analysis using Bingo? → No correct answer for this. Just write what you think )
- Other type of visualization may give you additional points. If you have made modifications, describe what you have done in the report

Data to draw the network can be found in : [www.netbiolab.org](http://www.netbiolab.org) → teaching

Find Cytoscape at : [www.cytoscape.org](http://www.cytoscape.org)

**Lab Address: Science Research Center (과학원) S323 Questions:**

**Email to [vxterran@gmail.com](mailto:vxterran@gmail.com)**

**Due date : Experiment date -> Due date**

**3/30 -> 4/13**

**4/3 -> 4/17**

**3/31 -> 4/14**

**4/4 -> 4/18**

# Installing JAVA

Download java from <http://java.sun.com/javase/downloads/index.jsp>

## Java SE Downloads



Java Platform (JDK) 8



JDK 8 & NetBeans 8.0

### Java Platform, Standard Edition

#### Java SE 8

This new major release contains several new features and enhancements that increase the performance of existing applications, make it easier to develop applications for modern platforms, and increase maintainability of code.

[Learn more](#) ▶

- [Installation Instructions](#)
- [Release Notes](#)
- [Oracle License](#)
- [Java SE Products](#)
- [Third Party Licenses](#)
- [Certified System Configurations](#)
- [Readme Files](#)
  - [JDK ReadMe](#)
  - [JRE ReadMe](#)

#### JDK 8

[DOWNLOAD](#) ↓

#### Server JRE 8

[DOWNLOAD](#) ↓

#### JRE 8

[DOWNLOAD](#) ↓

Download JRE by clicking red arrow



# Installing JAVA














Click file that suits your operating system

**Java SE Runtime Environment 8**

You must accept the [Oracle Binary Code License Agreement for Java SE](#) to download this software.

☒ Accept License Agreement ☐ Decline License Agreement

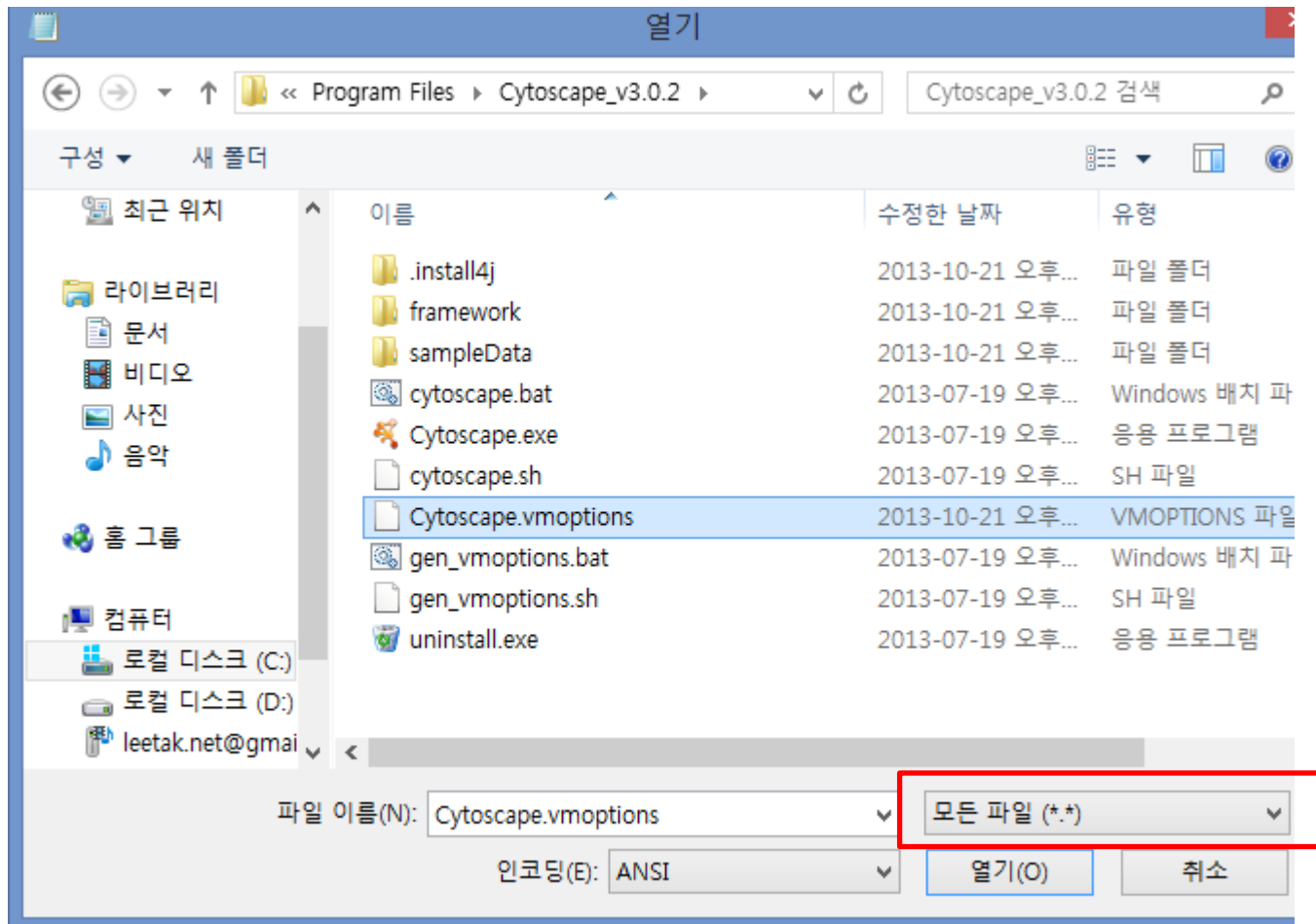
Must click here to download

Product / File Description	File Size	Download
Linux x86	40.24 MB	 <a href="#">jre-8-linux-i586.rpm</a>
Linux x86	55.44 MB	 <a href="#">jre-8-linux-i586.tar.gz</a>
Linux x64	40.37 MB	 <a href="#">jre-8-linux-x64.rpm</a>
Linux x64	54.38 MB	 <a href="#">jre-8-linux-x64.tar.gz</a>
Mac OS X x64	56.59 MB	 <a href="#">jre-8-macosx-x64.dmg</a>
Mac OS X x64	52.59 MB	 <a href="#">jre-8-macosx-x64.tar.gz</a>
Solaris SPARC 64-bit	50.32 MB	 <a href="#">jre-8-solaris-sparcv9.tar.gz</a>
Solaris x64	47.96 MB	 <a href="#">jre-8-solaris-x64.tar.gz</a>
Windows x86 Online	1.53 MB	 <a href="#">jre-8-windows-i586-iftw.exe</a>
Windows x86 Offline	29.67 MB	 <a href="#">jre-8-windows-i586.exe</a>
Windows x86	45.84 MB	 <a href="#">jre-8-windows-i586.tar.gz</a>
Windows x64	32.54 MB	 <a href="#">jre-8-windows-x64.exe</a>
Windows x64	48.83 MB	 <a href="#">jre-8-windows-x64.tar.gz</a>

자바 충돌 문제 해결

메모장을 “관리자 권한”으로 실행

파일 → 열기 → cytoscape 파일 → Cytoscape\_vmoptions 파일을 열기



모든 파일 선택

자바 충돌 문제 해결

메모장을 “관리자 권한”으로 실행

파일 → 열기 → cytoscape 파일 → Cytoscape\_vmoptions 파일을 열기

-Xmx1250m 을 -Xmx512m으로 수정하여 저장

## 내용 보강

### Usage for BiNGO application

Using the file to install BINGO and running it.

1. Apps → App manager → install from file (lower left) → Select “BiNGO jar”

#### 2. Running BiNGO

1) Select all genes in the network (Ctrl + A)

2) Apps → BiNGO

3) BiNGO settings

Type cluster name : any names

Select ontology file : → custom : “ file gene\_ontology\_ext.obo”

Select namespace → ---

Select organism/annotation → custom “ file : GOBP.BiNGO.txt”

3. start BiNGO. It will take some time.