

# Garuda OpenTox

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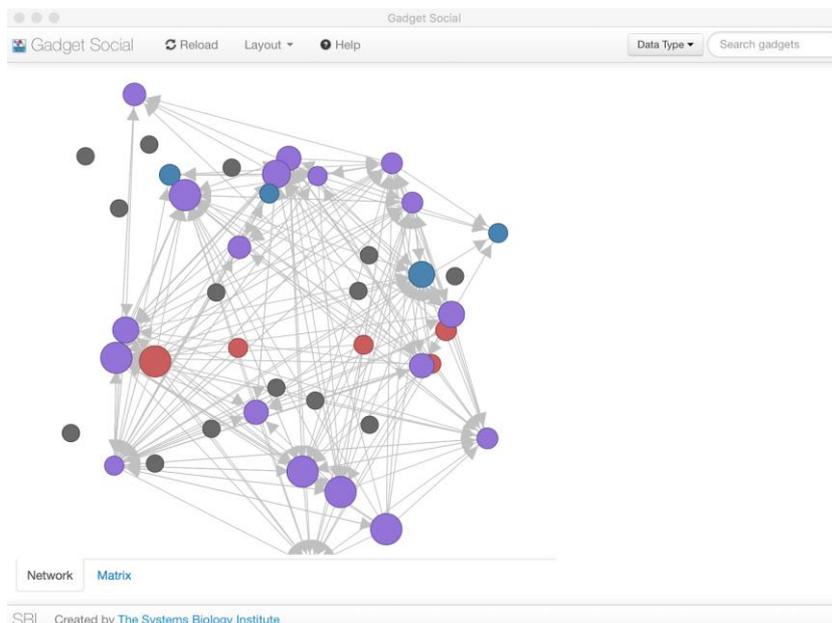
## Introduction

In this work we are developing OpenTox Garuda Gadgets to provide access to multiple sources of toxicology data socialised to systems biology and bioinformatics applications.

*Garuda* is a systems biology platform developed by the Systems Biology Institute (SBI) in Tokyo, Japan. It hosts an array of gadgets with diverse GUIs and functionalities on a connective platform. Garuda aims to be “the way biology connects”. Garuda has both a community edition and commercial version, and is being used both in academia and industry.



Inside Garuda, gadgets can communicate with each other by sending data through the platform. The following image visualises gadget connectivity.



## Current Work

Douglas Connect is working together with SBI as a strategic partner to add OpenTox gadgets to Garuda. This will allow data from OpenTox APIs to be accessed and analysed through a diverse set of Garuda gadgets.

The **Open TG-GATEs sample finder** gadget allows the user to search for samples in Open TG-GATEs using the OpenTox API for this database.

Input Files	Output Files
<b>Configuration</b>	
Organism	Rat Human
Tissue	Liver Kidney
Cell Type	in vivo in vitro
RepeatType	Single Repeat
Time Point	3 6 9
Dose Level	Low Middle High
Compound	1% cholesterol + 0.25%... 2,4-dinitrophenol 2-nitrofluorene 3-methylcholanthrene acarbose acetamide acetamidofluorene acetaminophen

The **Open TG-GATEs Data Fetcher** allows the user to fetch data from the Open TG-GATEs API and either export it, or pass it to other gadgets. Genes may be filtered by *p*-value for relevance.

Input Files	Output Files	Discover			File	
data.csv		myTable				
data.csv		Probe	Gene	acetamide/Middle/192.0	003017921008(p)	acetamide/Middle/192.0
		1394361_a_at	Wnt2	null	null	null
		1387354_at	Stat1	0.5673444732252657	0.038571629776510886	0.9459491035048841
		1386807_at	Wnt2	-0.14160195823494867	0.992732656620708	0.16248700362523366
		1372757_at	Stat1	0.12853887594274	0.39698748459124533	0.532684773778988
		1372523_at	Gclc	-0.011222543602173299	0.9605742632051829	0.006848349144960535
		1370688_at	Gclc	0.13535475002910374	0.530276846895265	0.2016106903188918
		1370365_at	Gss	-0.15581636264635387	0.45102840671665323	-0.10455229940790002
		1368835_at	Stat1	0.5087288532794352	0.044568788707451054	0.7222840339726277

The genes can immediately be used in other gadgets on Garuda through the platform's connectivity, by sending a gene set. In this way, we can discover significant pathways, analyse the same genes in other databases (such as Percellome) and so on.

The two gadgets mentioned above have been published on the *Garuda gateway* and may be downloaded for free by anyone with a Garuda installation.

Douglas Connect is working continuously with SBI to make more OpenTox data and APIs available on the Garuda platform.

We describe our recent seminar and hackathon in Tokyo and Seoul on this work in the following blog post:

<http://www.douglasconnect.com/blog/2016-meetings-tokyo-and-seoul>

For more information about Garuda, please see the official web site

<http://www.garuda-alliance.org> .