SBGN Competition 2010
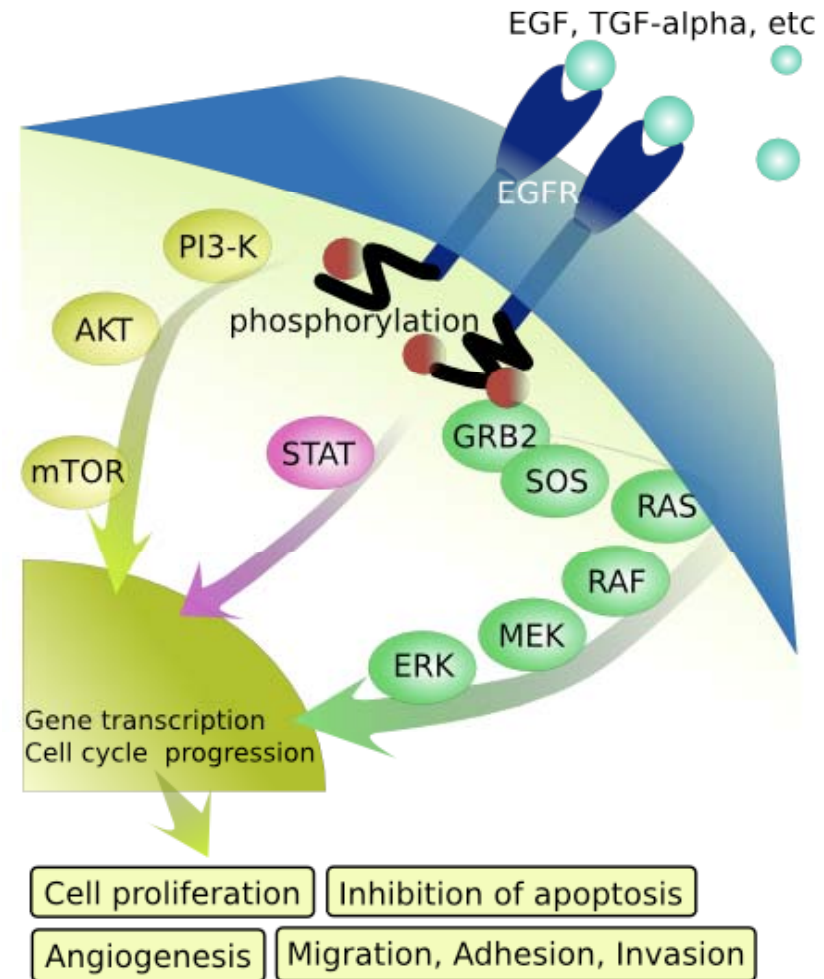# How to represent EGFR pathway?
A Case Study

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JST ERATO Kawaoka Infection-Induced Host Response Network Project

SBGN Process Description Diagram
EGFR Signaling Pathway

*What would be
the best representation of
**SBGN Process Description
Diagram notation**,
using **EGFR signaling pathway**
as an example?*

From Wikipedia

Protocol

1. Take a model from Panther Pathways Database:
   http://www.pantherdb.org/pathway/

2. Import the model to CellDesigner Ver.4.1.
   http://celldesigner.org

3. Re-layout the model.

4. Convert it using SBGN Viewer function of CellDesigner.

5. Export the model image in .SVG or .PDF format.

6. Adjust the detail settings of the model using Illustrator.

Panther Pathways Database
Standard View

Get the original file from Pantherdb

Cytosol

Panther Pathways Database
Lite View
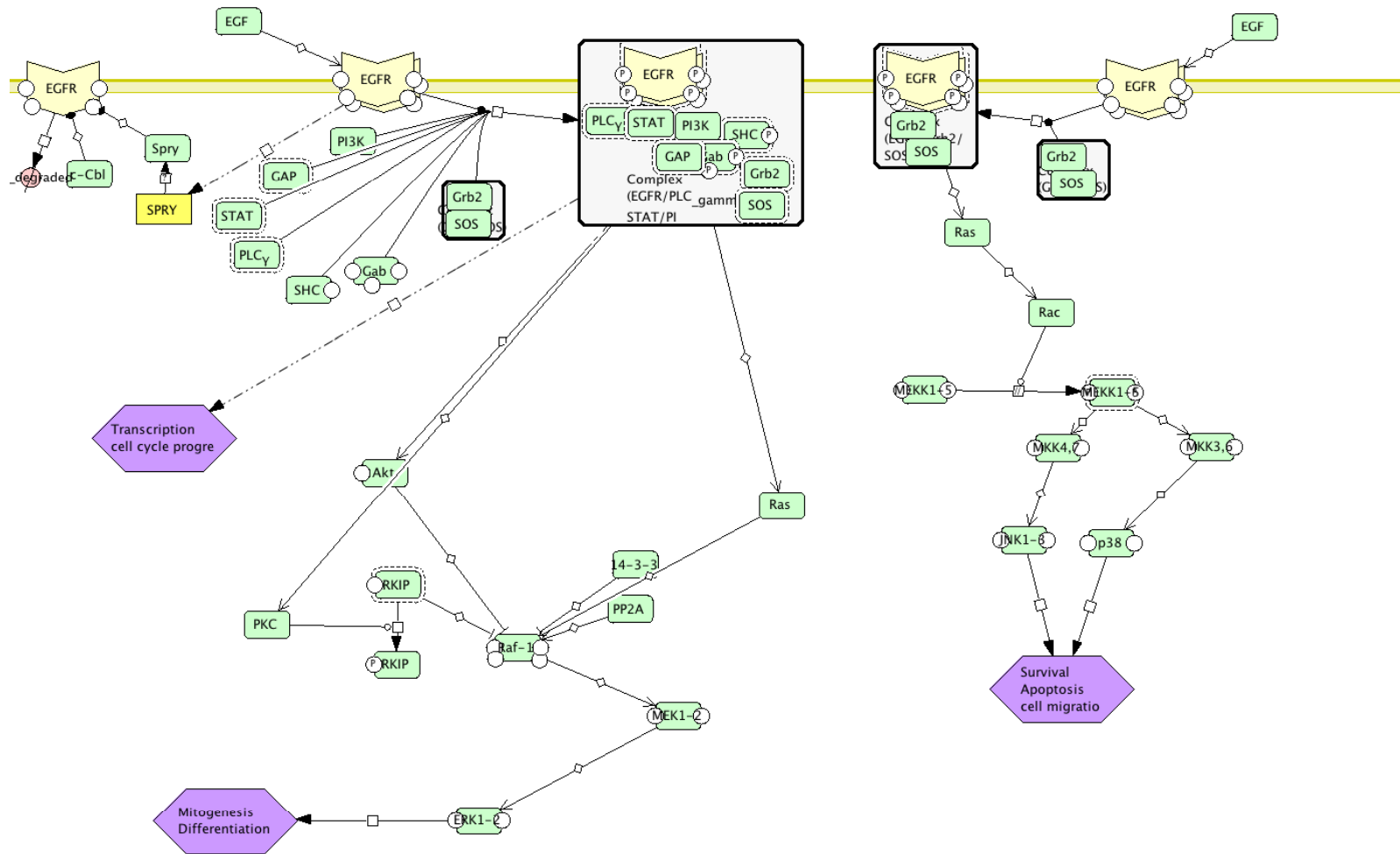
Panther Pathways Database
SBGN view
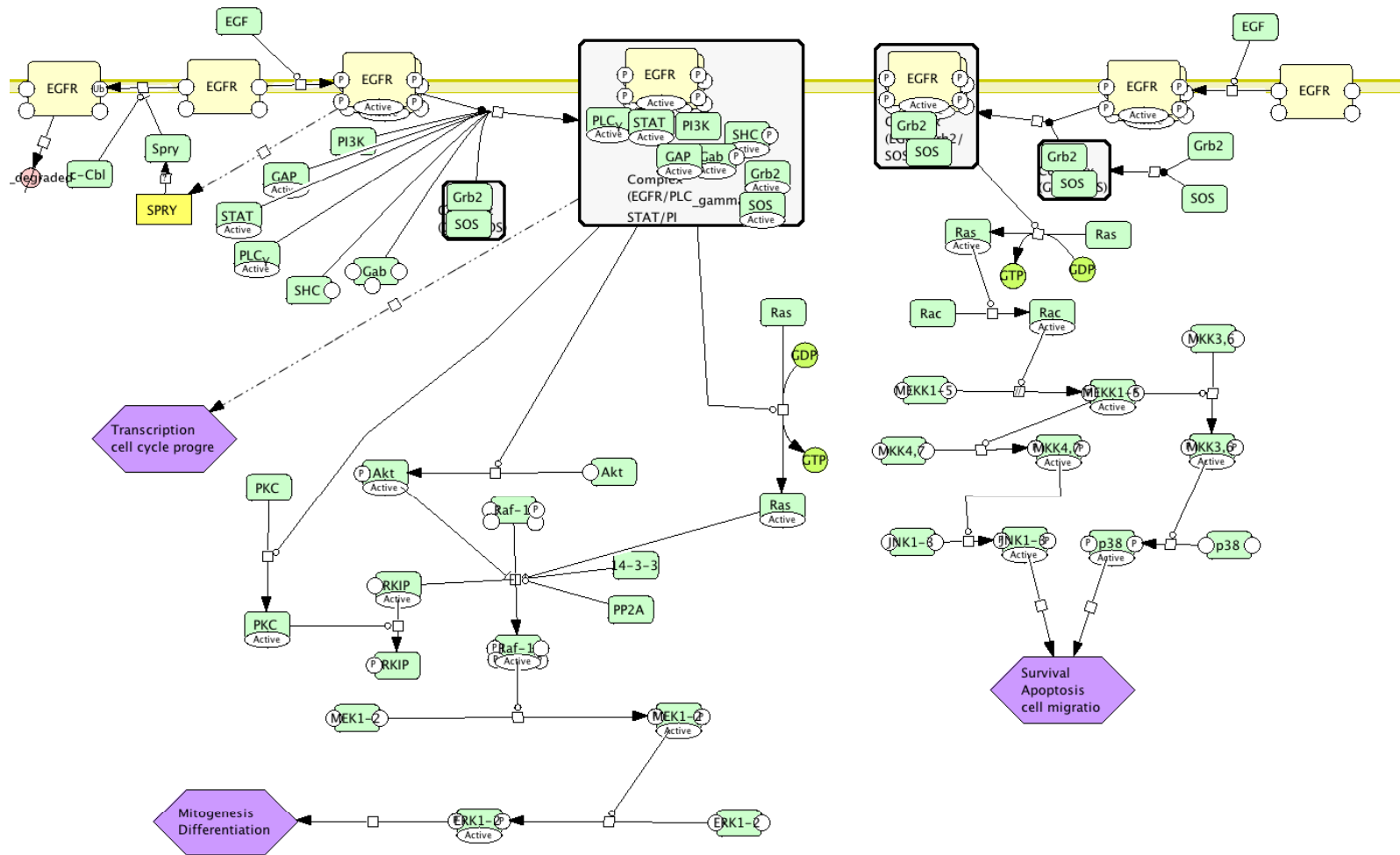
Layout a Signaling Pathway

- **Align:** to illustrate Flow of Information
  - Cascade
  - Input / Output (Top-to-Bottom or Left-to-Right)
- **Merge :** Duplicate Species or Merge them?
- **Connect:** Lines Straight or Orthogonal bend?
- **Modifications:** Catalyse or Inhibit?
- **Complex:** Position of the Components?
- **Dimer :** Dimer? Two Components in parallel?
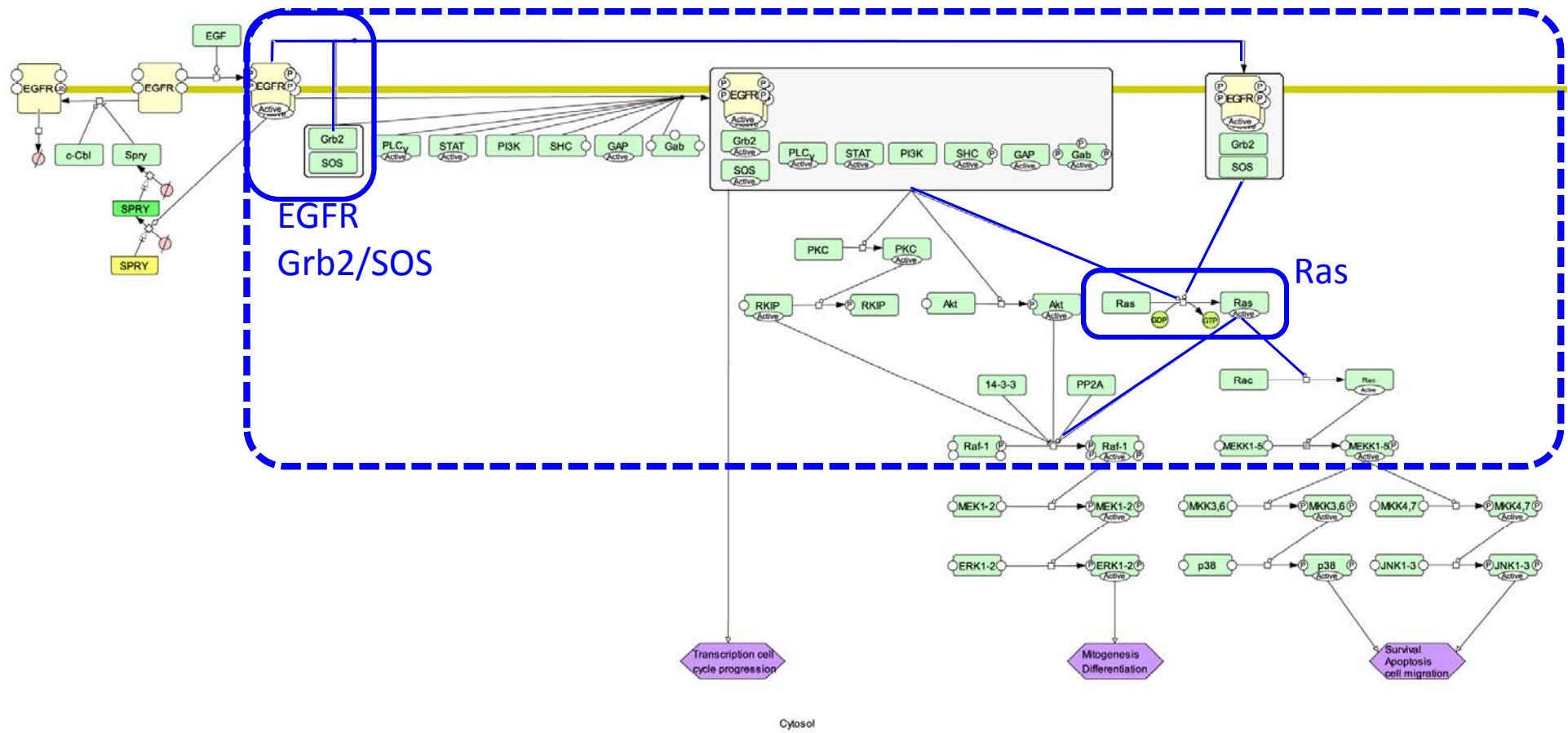
MAP-1: Align
Align Components Vertically and Horizontally

MAPK Cascades

From CST, Inc.
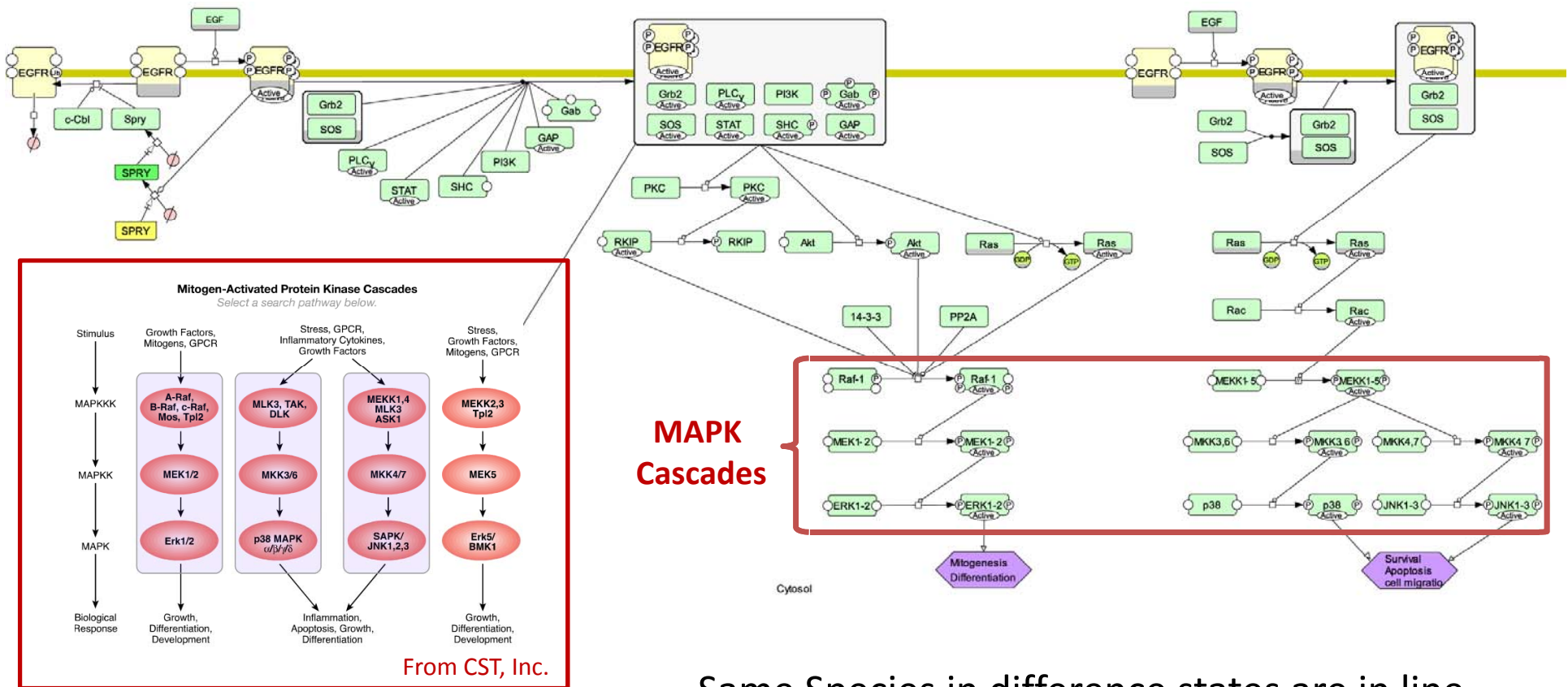
Same Species in difference states are in line
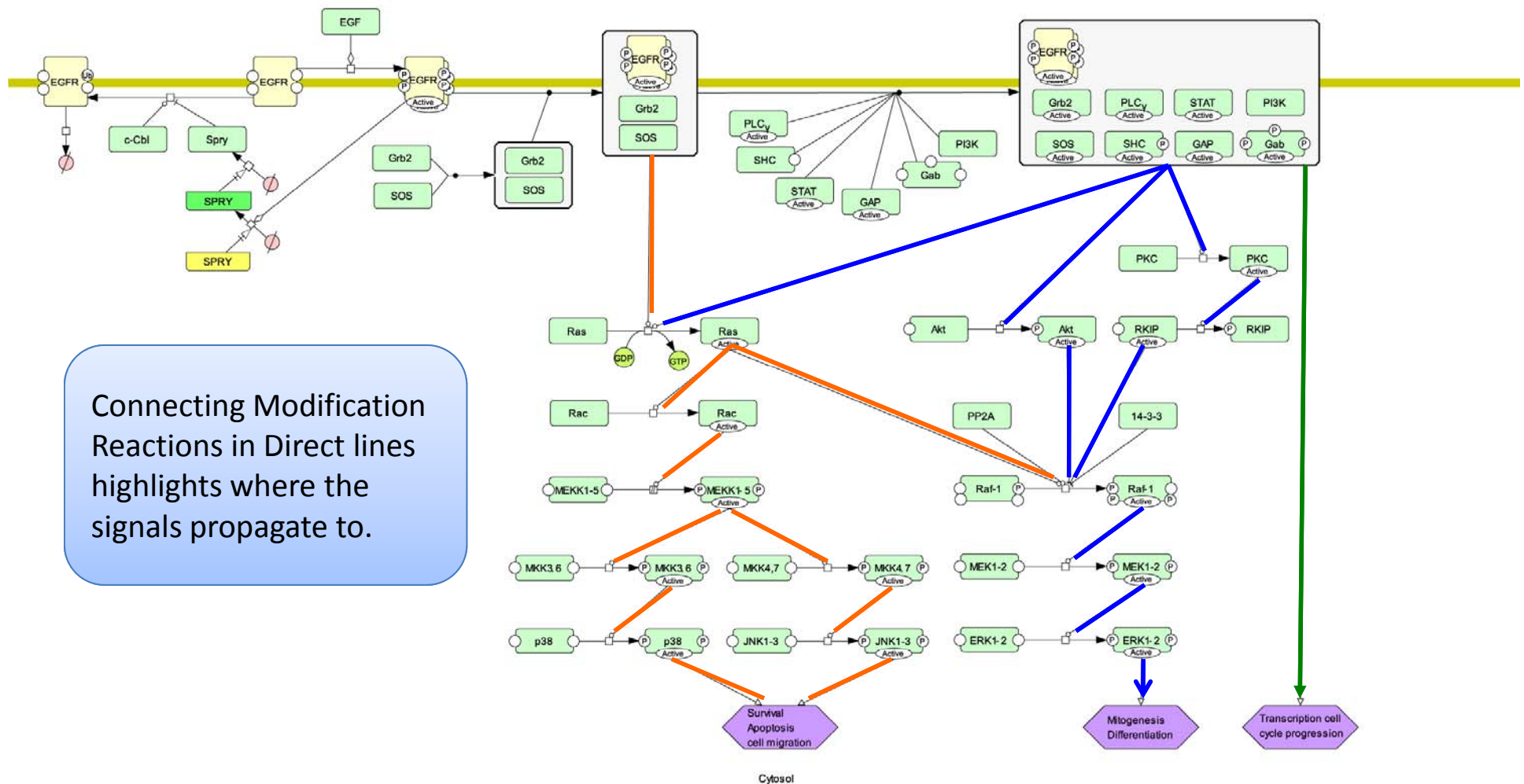Highlight **Cascade** pattern

MAP-2 : Merge

Merge the common components
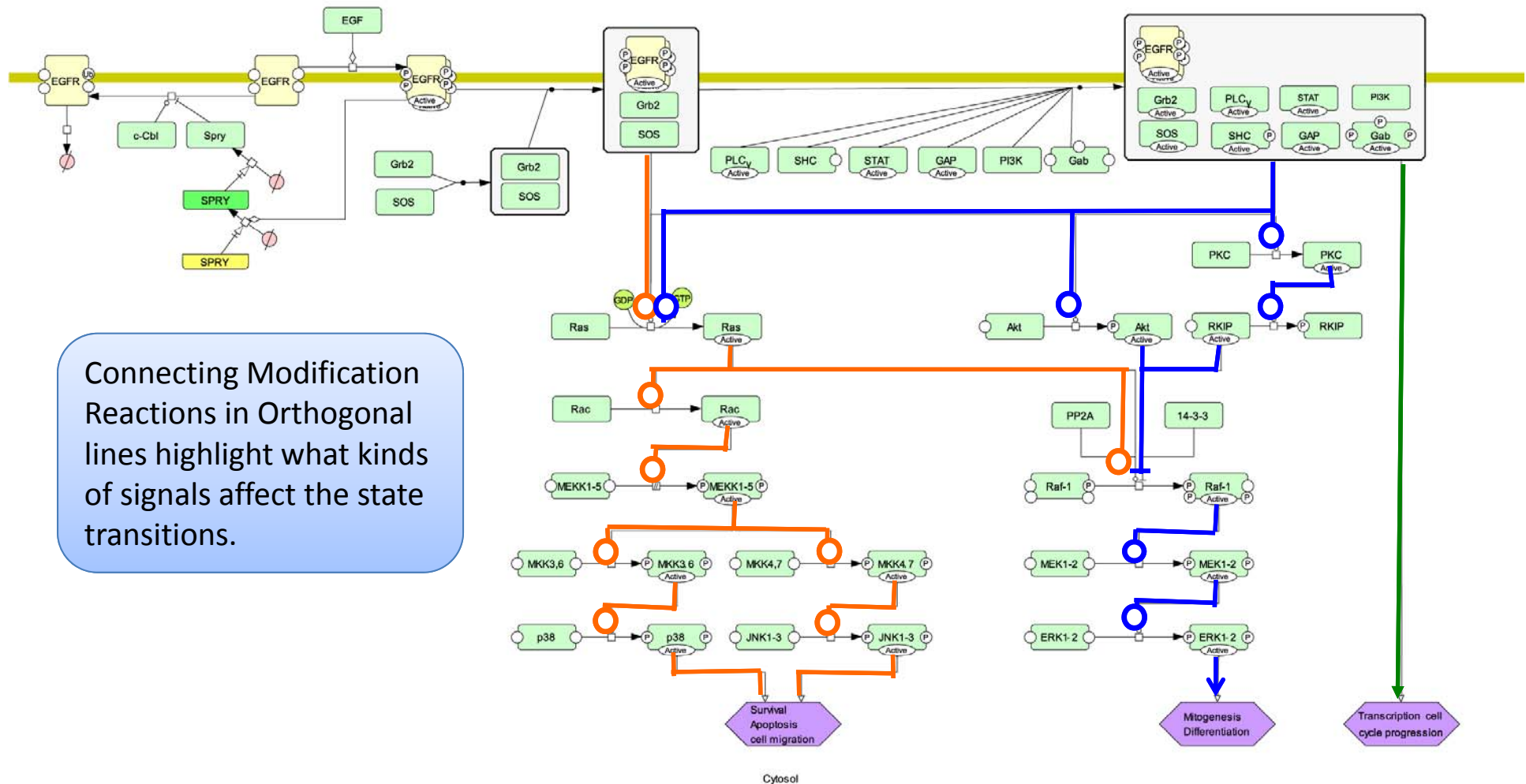
MAP-3-1: Connect - Straight

Connecting Modification Reactions in Direct lines

Connecting Modification Reactions in Direct lines highlights where the signals propagate to.
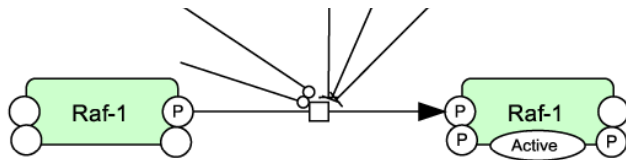
MAP-3-2: Connect - Orthogonal

Connecting Modification in Orthogonal

Connecting Modification Reactions in Orthogonal lines highlight what kinds of signals affect the state transitions.

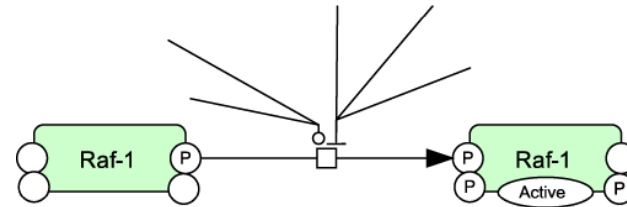# Pattern: Modifications at Process Node

A

Easy to identify the number of modifications but the connections are overlapped around the process node.
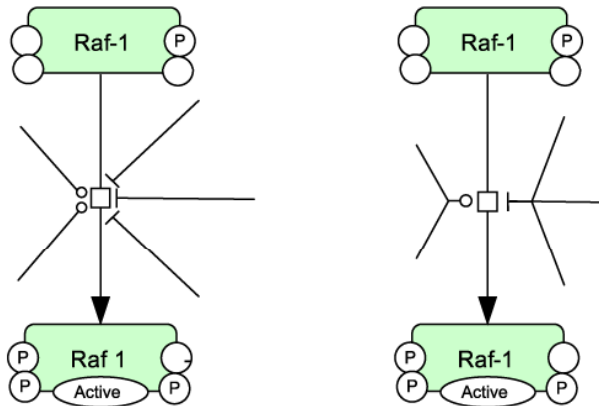

B

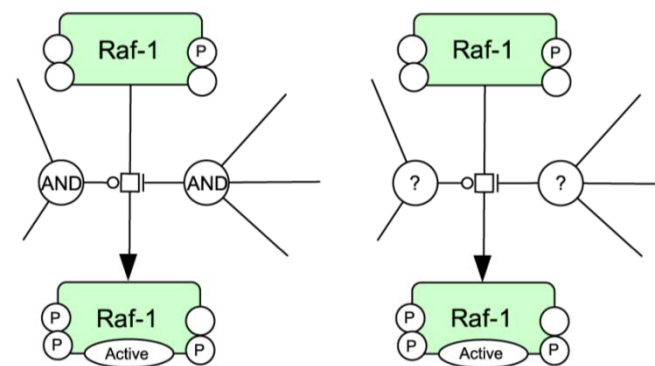Easy to identify the number of modifications and connection types can easily detect.

C

Drawing the same type of modifications lines from the same direction.
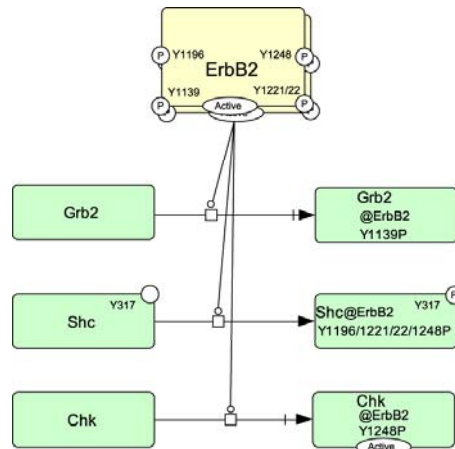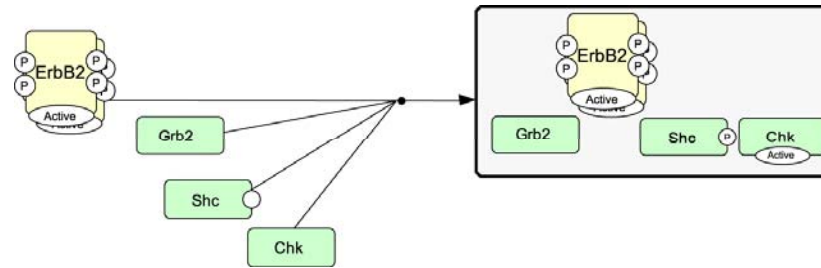

D

Use a Boolean logic gates

Pattern: Receptors 1
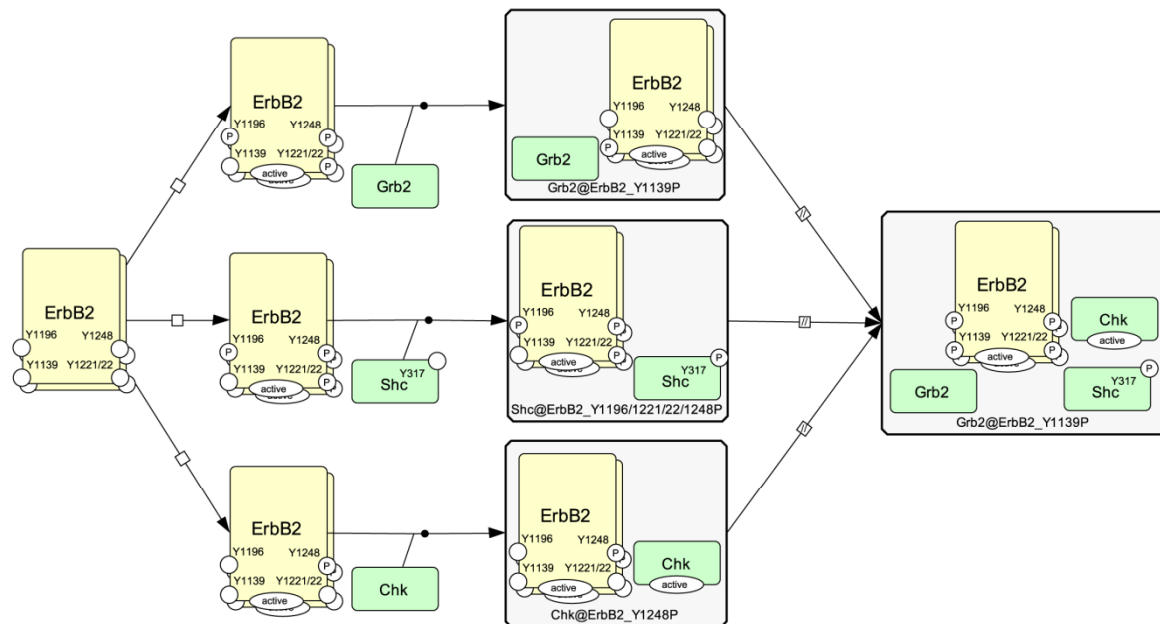

A Show details of modifications

Oda et al. 2005

B Show flow of state transition (simplified)

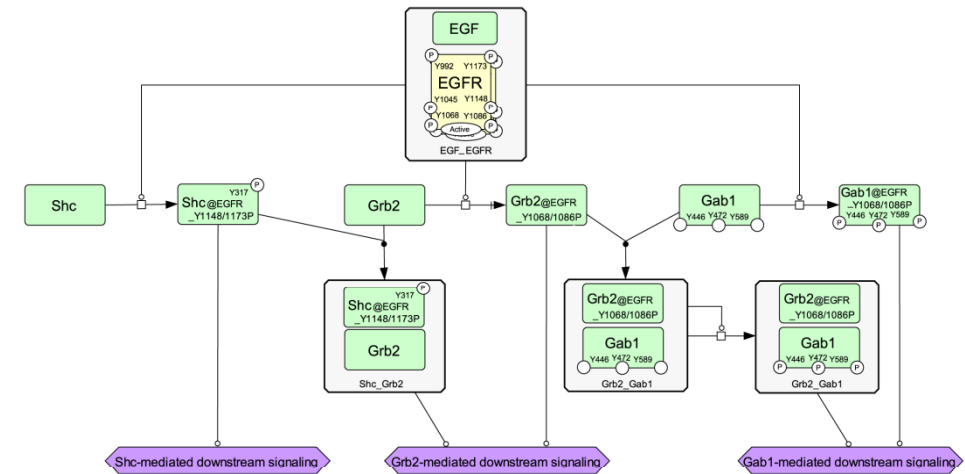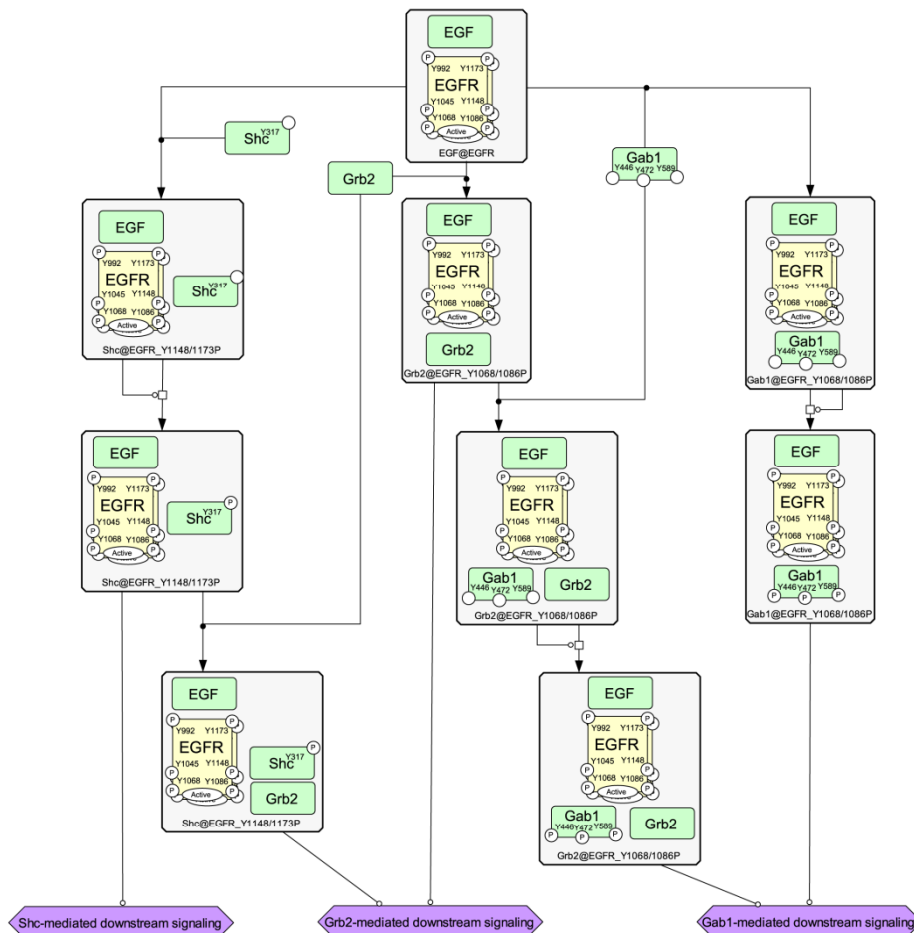**C** Show state transition and the details of modifications
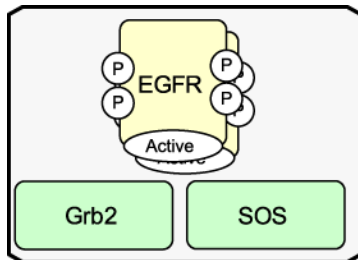
Pattern: Receptors 2 Oda et al. 2005

A Show everything (details of modifications of all the component in the complexes.)
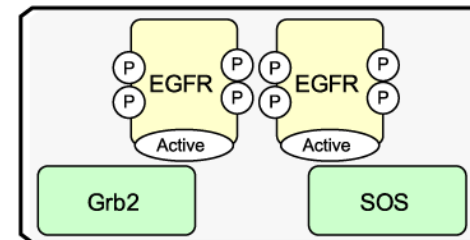
B Highlight modifications only

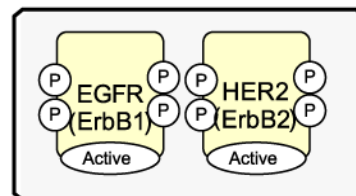# Pattern: Dimerization

A Receptor as a Dimer

B Two receptors in a complex

C Different receptors form a complex

Supplementary files

- Files:
  - EGF_receptor_signaling_pathway(.xml/.png)*Original Panther Pathways Models
  - MAP1_Align(.xml /.ai /.png)
  - MAP2_Merge(.xml /.ai /.png)
  - MAP3-1_Connect-Straight(.xml /.ai /.png)
  - MAP3-2_Connect-Orthogonal(.xml /.ai /.png)
  - Modifications (.xml /.ai /.png)
  - Receptors1_ErbB2 (.xml)
  - Receptors1 (.ai /.png)
  - Receptors2_Oda-etal2005_A (.xml /.ai /.png)
  - Receptors2_Oda-etal2005_B (.xml /.ai /.png)
  - Dimerization (.ai /.png)