

SBML Layout Extension Update

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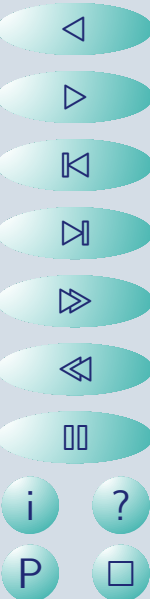


What is it?

- a way to store layout information on the reaction network in SBML files

Why do we need it?

- SBML only stores a mathematical description of a model
- all layout information created in a visual modeling tool is lost on SBML export



Layout Extension News

Ralph Gauges, Ursula Rost, Sven Sahle, and Katja Wegner

A model diagram layout extension for SBML

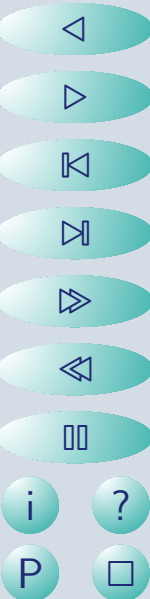
Bioinformatics, 1 August 2006; 22: 1879 - 1885.

- libSBML Version 3
- XSLT stylesheet updates
- render extension

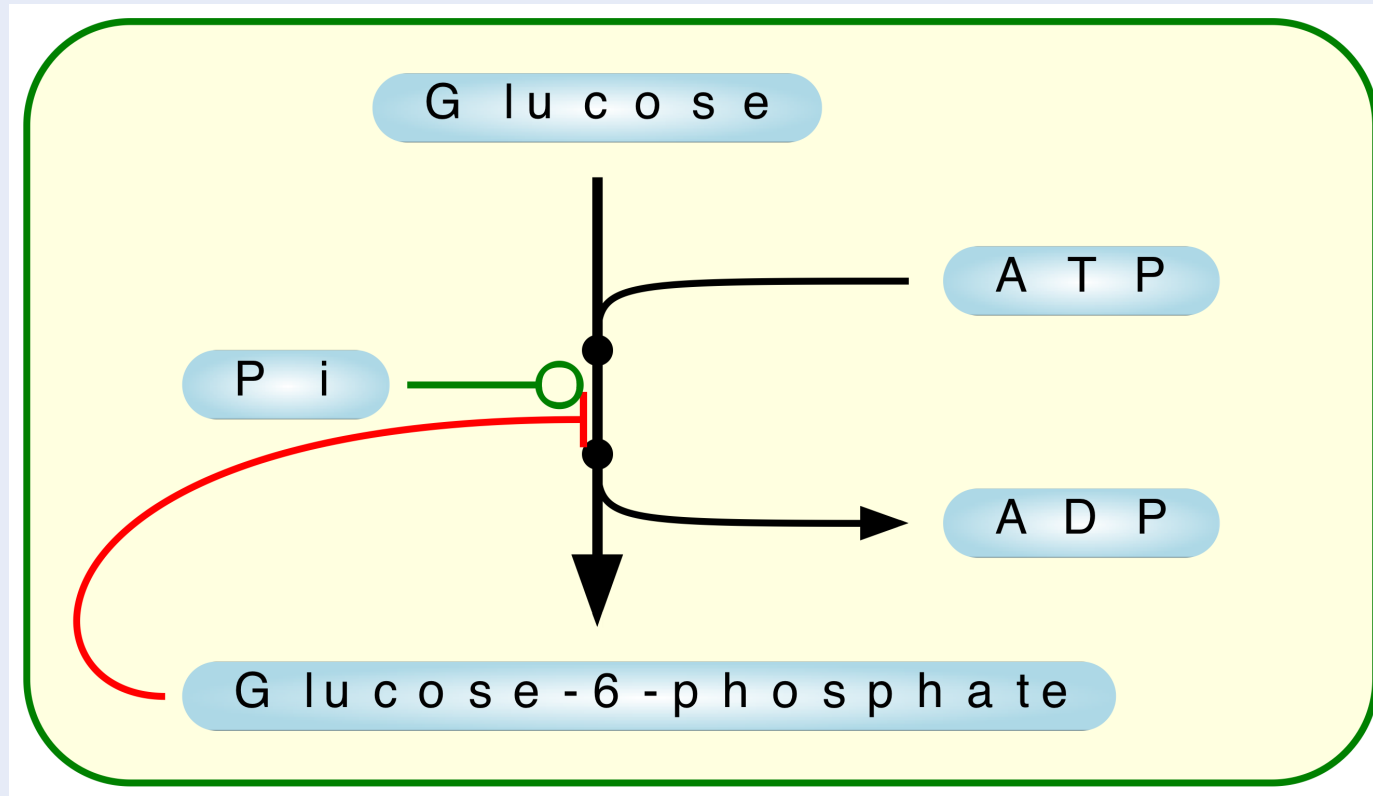


New Features of the XSLT Stylesheet

- stylesheet itself is valid XML Schema code
- output from stylesheet is now valid SVG Version 1.0
- modifier roles are now symbolized via different line endings
- added some more parameters to the stylesheet to change the look of the rendering at runtime
- put the stylesheet under the LGPL

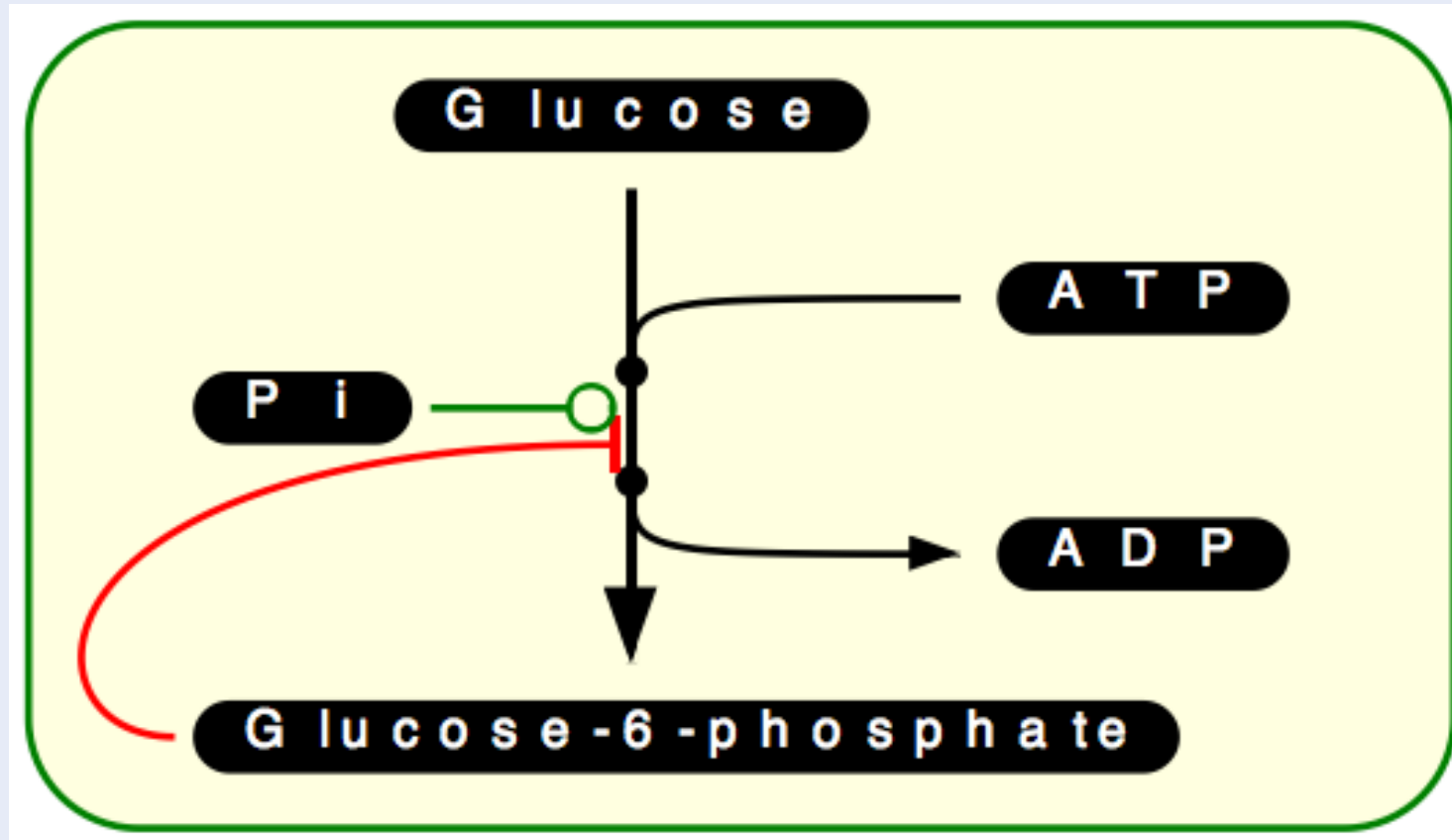


Example Rendering from New Stylesheet



```
xsltproc -param "ZOOM" 1.0 sbml_layout.xsl TestModel3.xml > TestModel3.svg
```

Commandline Parameters



```
xsltproc -param "ZOOM" 1.0
```

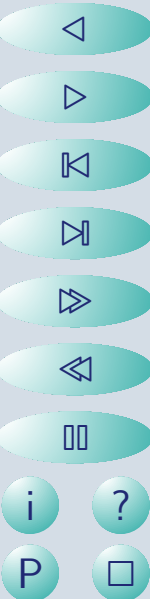
```
-stringparam "SPECIES_GLYPH_FILL" "black"
```

```
-stringparam "TEXT_GLYPH_FILL" "white" sbml_layout.xsl TestModel3.xml >
```

```
TestModel3-black.svg
```

Render Extension Features

- concept similar to stylesheets
- each layout can have several stylesheets
- each stylesheet defines a set of styles that specifies how the individual elements of the layout are to be rendered
- styles can reference other styles (inheritance)
- style assignment via id, role or type



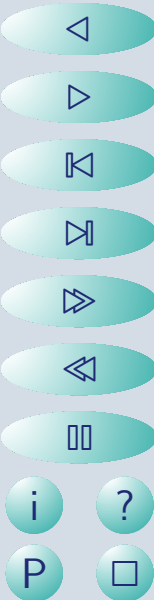
Elements of a Render Information Set

listOfColorDefinitions: contains color definitions to be used in styles

listOfGradientDefinitions: defines some color gradients to be used in styles

listOfLineEndings: defines a set of arrow heads to be used on curve objects

listOfStyles: contains the individual styles that make up the render information



Styles

- consists of a group element that contains other groups or graphical primitives
- graphical primitives are:
 - rectangle
 - ellipse
 - polygon
 - general path object (line segments and cubic bezier curves)
 - text element



Style Example

.....

```
<colorDefinition id="lightBlue" value="#CECECE"/>
```

```
<colorDefinition id="white" value="#FFFFFF"/>
```

.....

```
<radialGradient id="speciesGlyphGradient">
```

```
  <stop offset="0%" stop-color="white" />
```

```
  <stop offset="100%" stop-color="lightBlue" />
```

```
</radialGradient>
```

.....

```
<style id="speciesGlyphStyle" typeList="SPECIESGLYPH">
```

```
  <g stroke="black" stroke-width="1.0">
```

```
    <rectangle x="0%" y="0%" width="100%" height="100%"  
              rx="5%" fill="speciesGlyphGradient" />
```

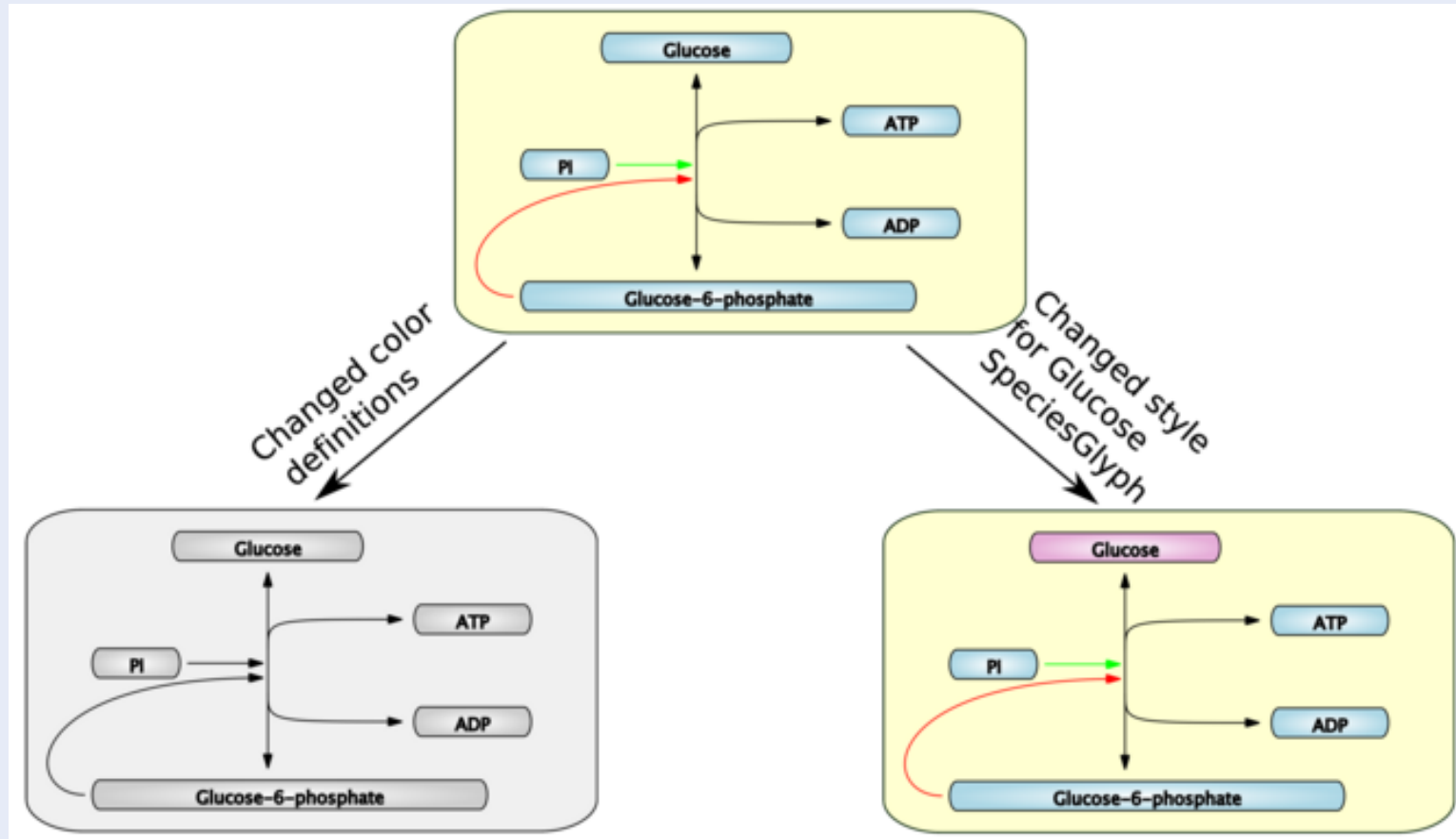
```
  </g>
```

```
</style>
```

.....



Style Inheritance



Kohn Map Rendering

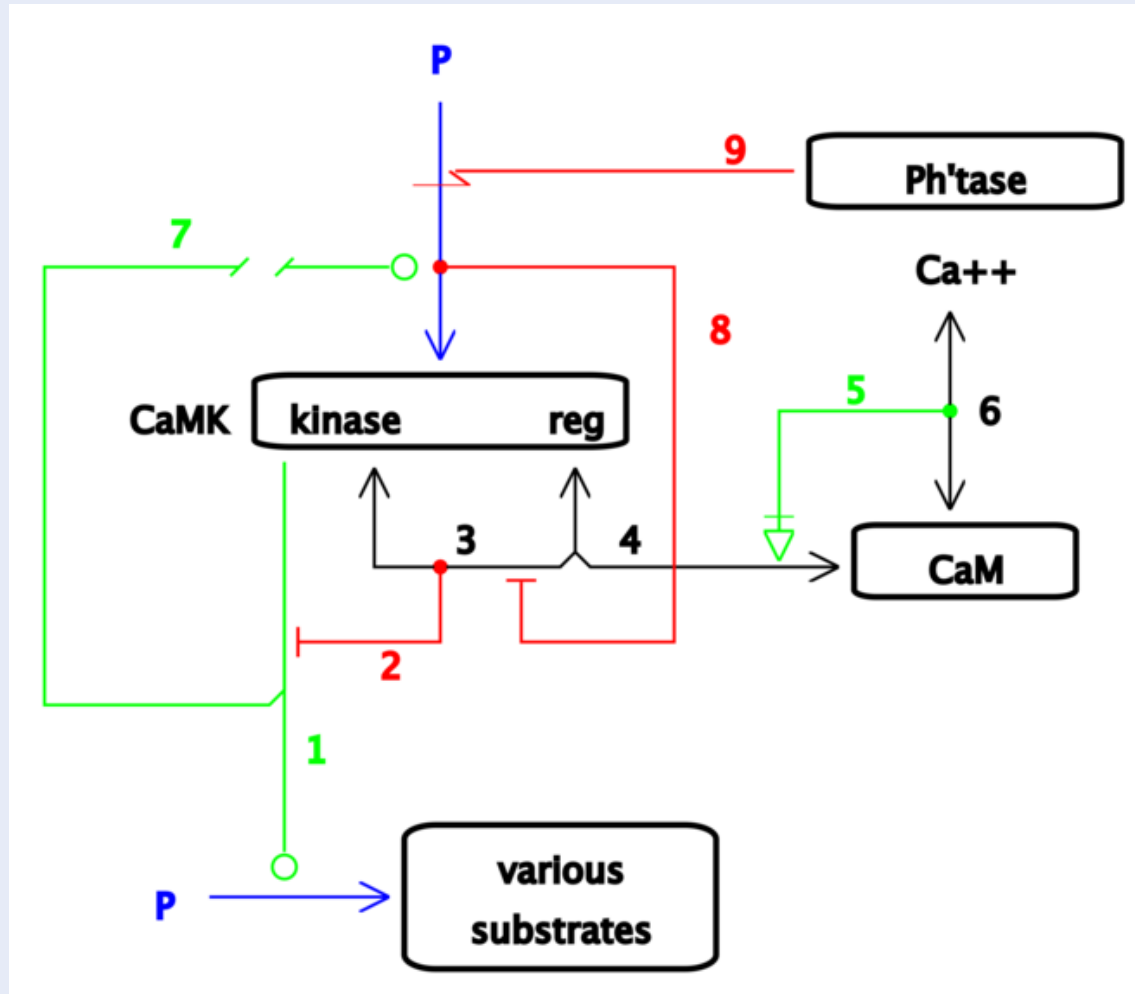
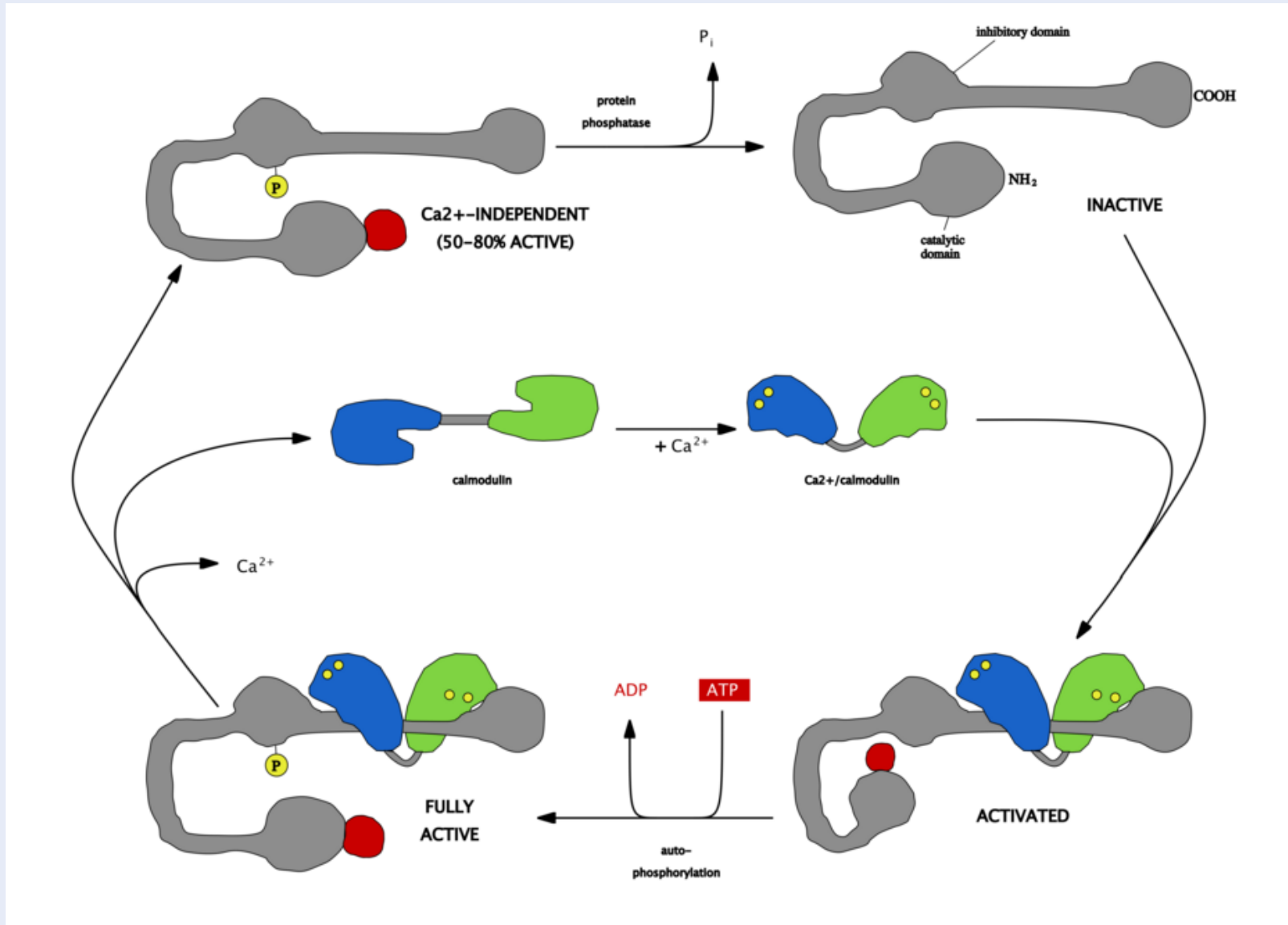
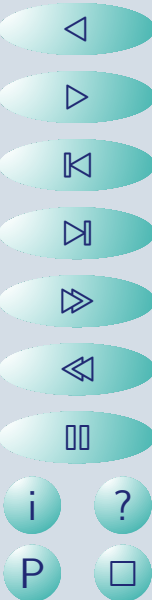


Figure from Alberts



Webpage

<http://projects.eml.org/bcb/sbml/>



Outlook

- polish the specification
- polish stylesheet and integrate functionality from old stylesheet
- implement code to display and manipulate layout and render information
- write some scripts to transform SVG code snippets into style information and vice versa



Acknowledgements

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- Ursula Rost
- Sven Sahle
- Katja Wegner

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