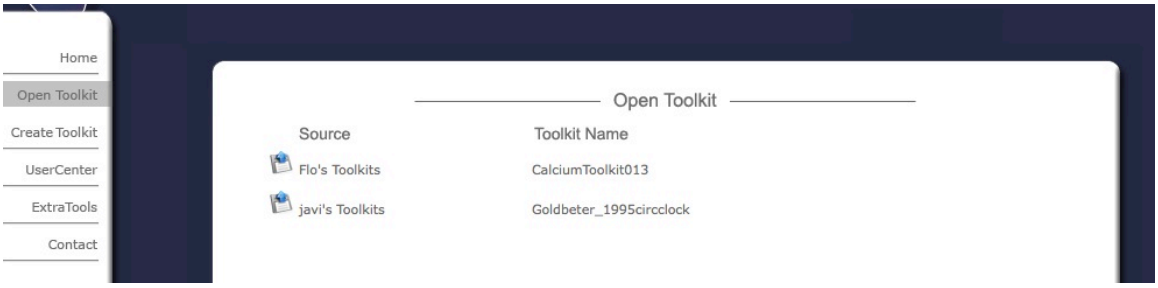
Proteus Guideline

In addition to the online help section, this guideline is supposed to help users to use a toolkit, to create mechanisms and to combine mechanisms to build toolkits.

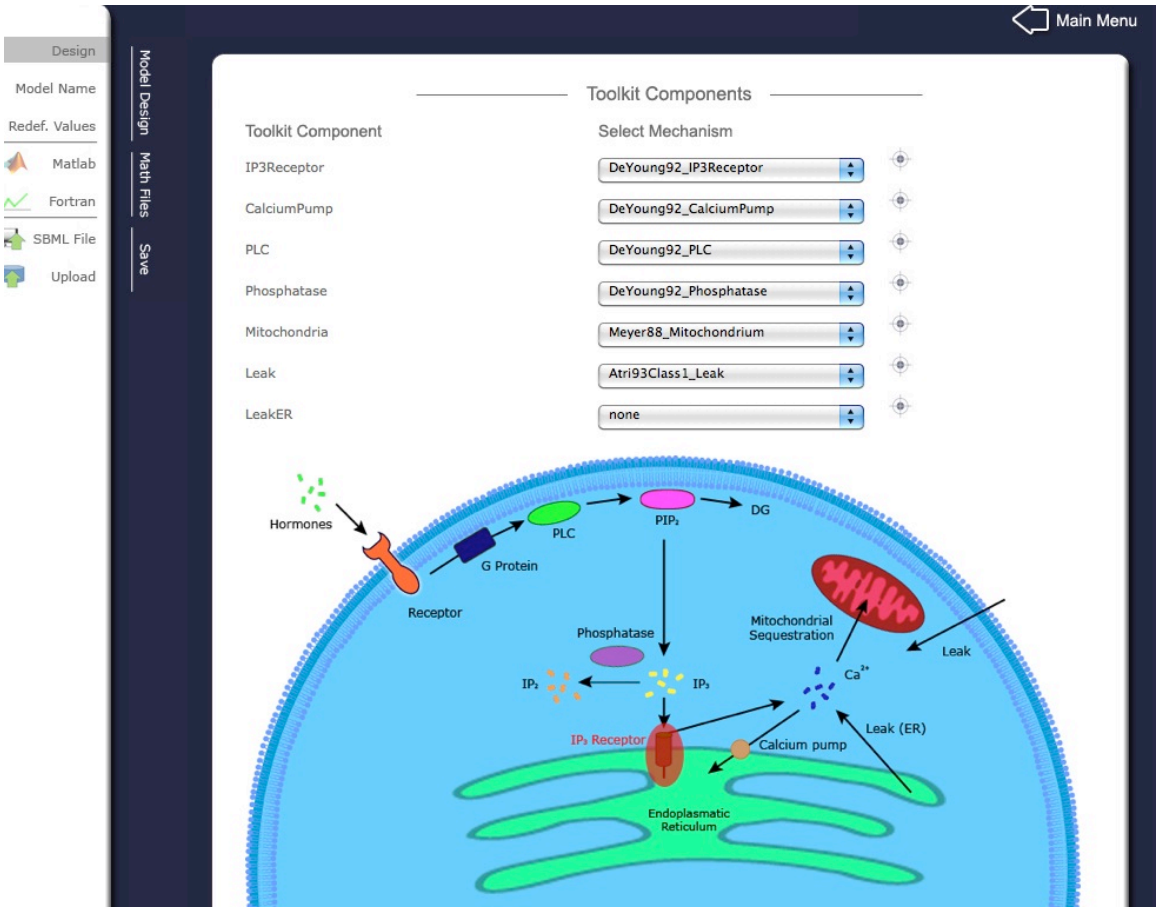
1. How to use a toolkit

A toolkit in Proteus is a collection of components. Each component provides a representation of a biological context. Users pick and choose components and, for each component, choose from different mechanisms. Each mechanism describes a different instantiation of the component's mechanism.

To open an existing toolkit, click on "Open Toolkit" in the main menu of Proteus. This yields the listing of all available toolkits as provided by the user community.
For this guideline, we select "CalciumToolkit013" which has been created by the user "Flo".

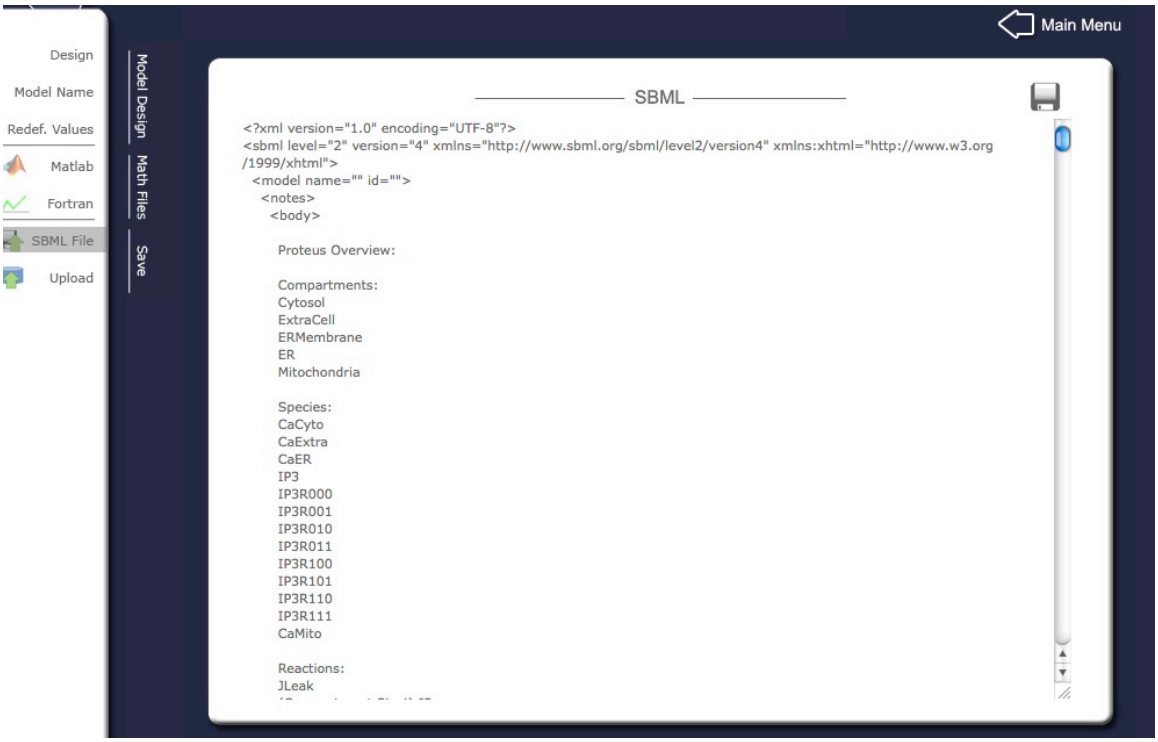


Initially the main design of the toolkit is shown. All toolkit components are listed along with dropdown lists and "target" buttons. For each component, you can select any assigned mechanism in the dropdown menu. If you intend to exclude certain components, you can set the assigned mechanism to be "none". In addition you can visualize each component via the corresponding "target" button. Picking and choosing mechanisms in the dropdown lists yields automatic creations of ODEs.



Once a set of mechanisms has been selected, you can download the resulting Matlab files in the “Matlab” section:

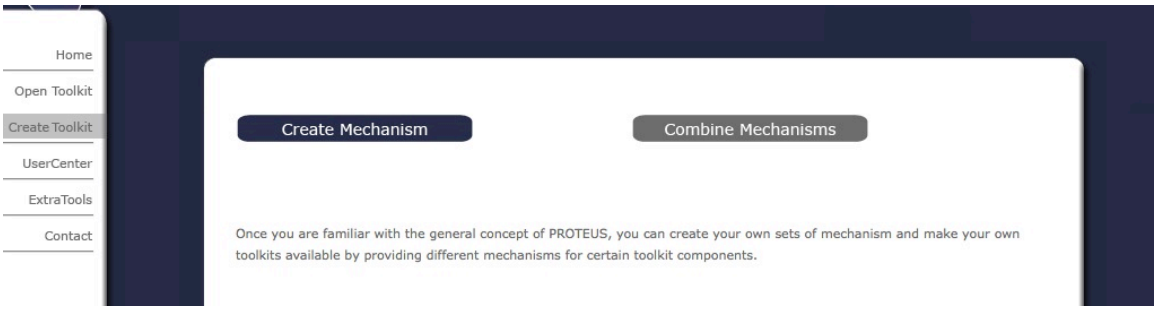
Alternatively you can download the resulting Fortran files, upload the model to the Proteus server (as an registered user) or save the model as SBML file:



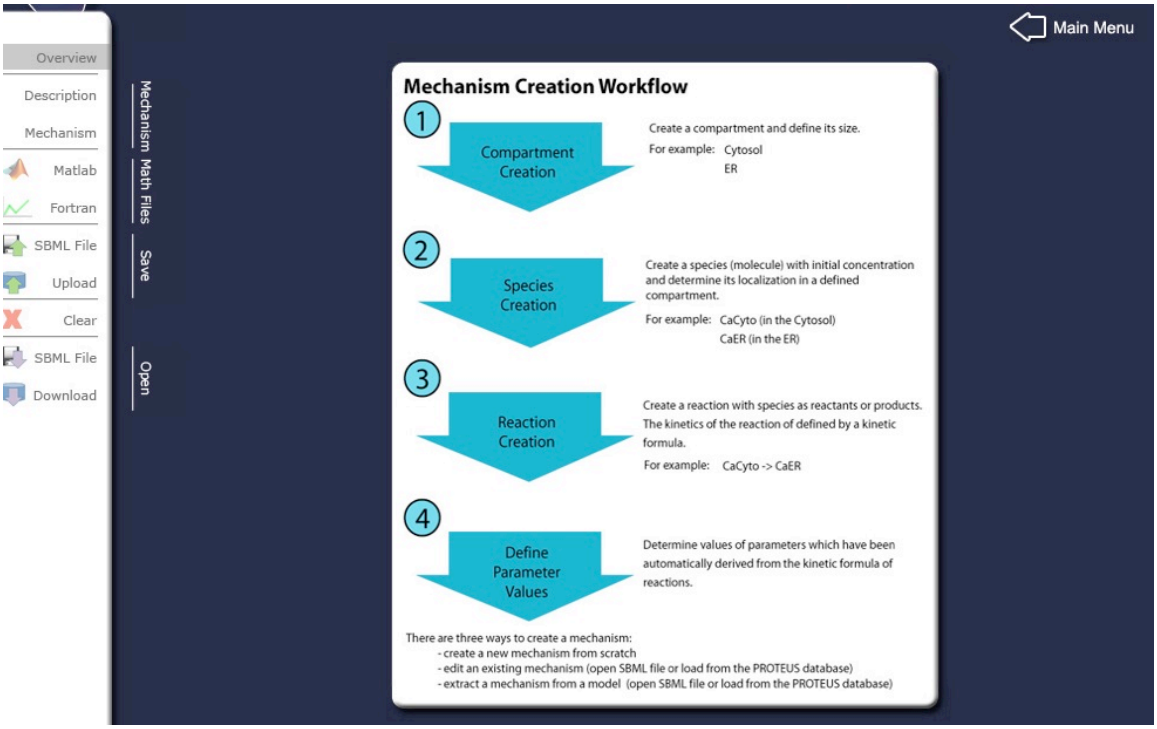
In summary, picking and choosing components and associated mechanisms is all you have to do, to create a model.

2. How to create a mechanism

To create a toolkit, you have to create a set of mechanisms via the "Create Mechanism" section (under "Create Toolkit") first.

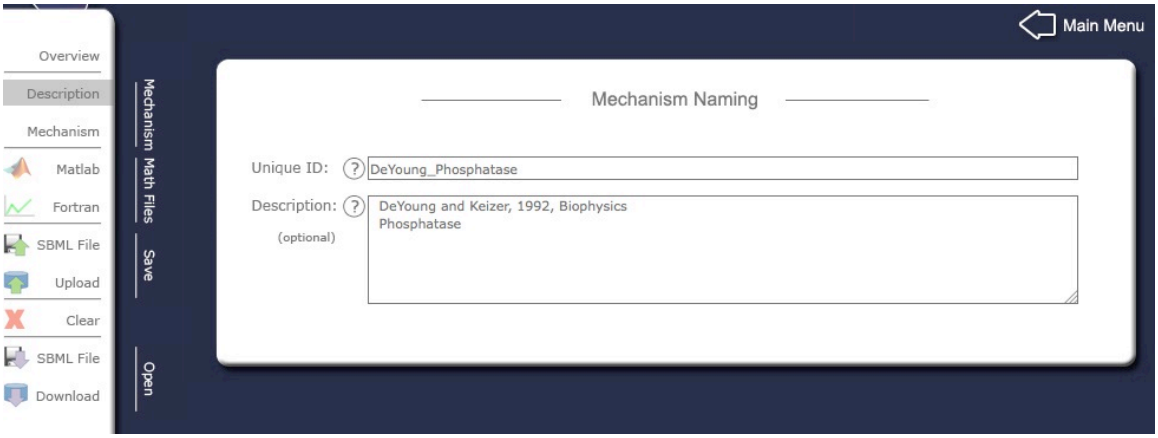


The initial section of the Mechanism Creation section illustrates an overview:

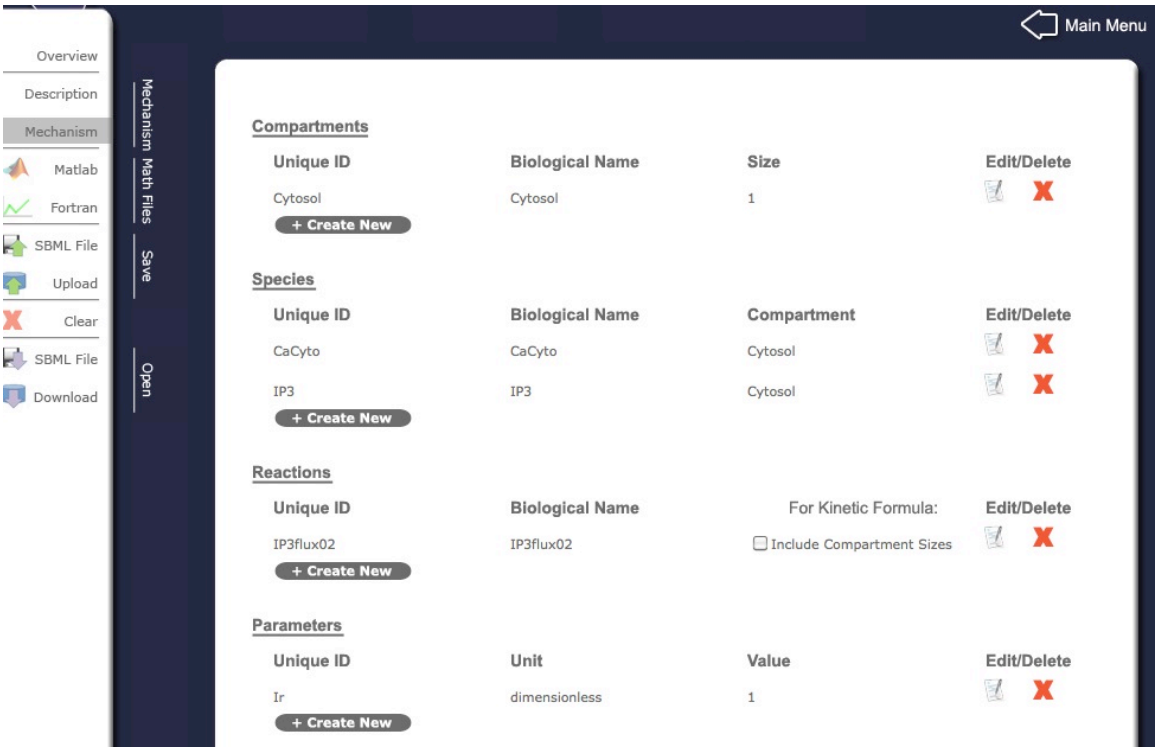


You can create a mechanism from scratch or open an existing mechanism by downloading it from the Proteus server or loading a SBML formatted model.

A unique identifier has to be assigned to each mechanism and the provision of an optional description is highly recommended.



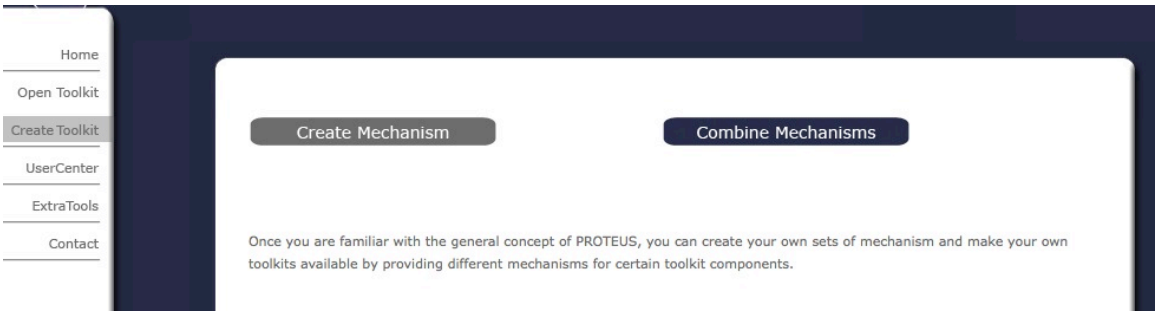
The “Mechanism” section allows the creation of compartments, species, reactions, and parameters. The main page lists already created instances. Corresponding buttons enables the user to edit or create new instances.



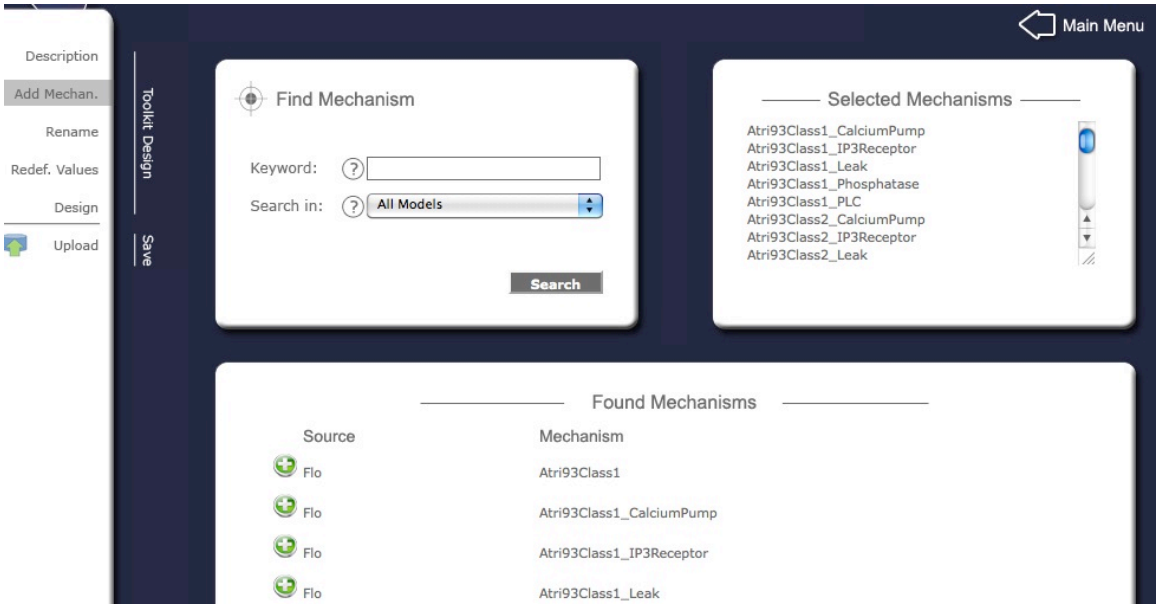
Once a mechanism has been created, the user can save the mechanism in SBML, Fortan, or Matlab format. In addition, registered users can upload the mechanism to the Proteus server, which is required to create a toolkit.

3. How to combine mechanisms to create a toolkit

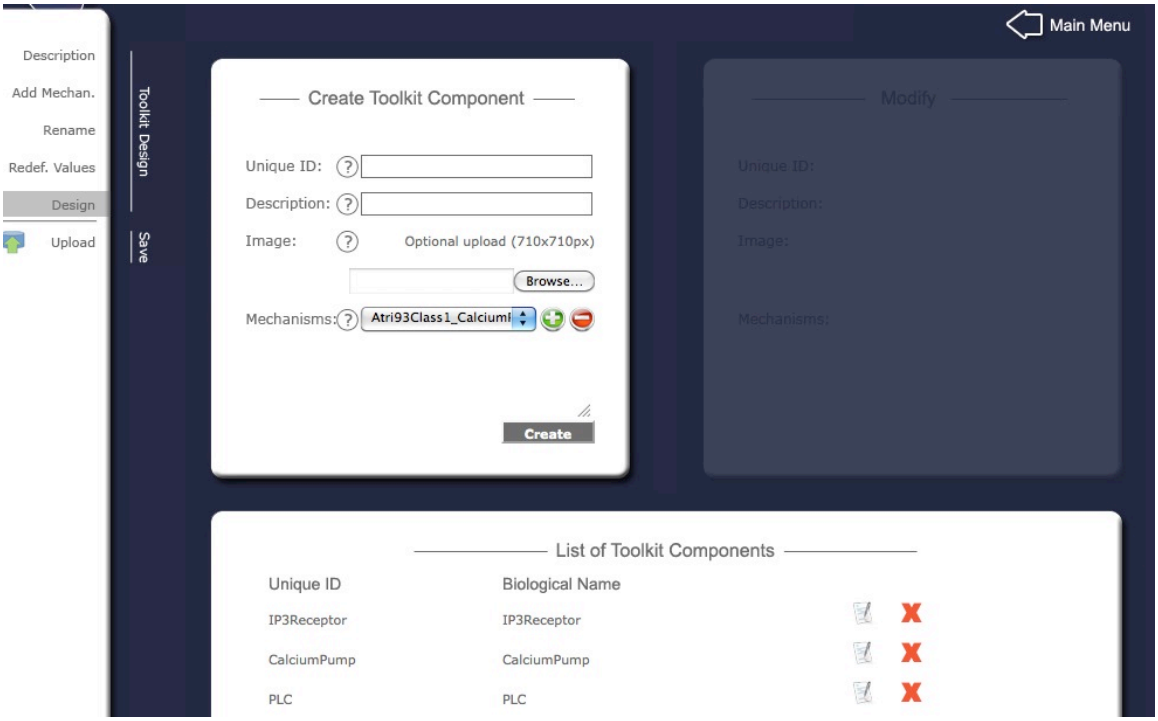
To create a toolkit, you have to combine already created mechanisms (see chapter 2) and assign them to toolkit components. In the "Combine Mechanisms" section, a subsection of the "Create Toolkit" section, you can create toolkits from scratch or modify an existing one. This is the only section that requires to be a registered user, so that created toolkits can be uploaded to the server.



The first step is to upload a set of mechanisms in the "Add mechanisms" section. You can search mechanisms and add them to your "cart".



Once you have selected a number of relevant mechanisms, you can create toolkit components. For each toolkit component, you can upload an associated image that illustrates the given component and assign the corresponding mechanisms that you have uploaded to your cart.



That’s actually all you have to do to create a toolkit: Upload a number of mechanisms, create toolkit components and assign the corresponding mechanisms to each component.
The “Rename” and “Redefine Values” sections allow to rename compartment, species, and parameter terms, and to change species concentrations, compartment sizes or parameter values, if required.

Finally you can upload the toolkit to the server.