

New SABIO-RK restful Web Services Documentation

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1 The new web services

1.1 Introduction and Resources

Table 1 describes the root resources which are open for use in the new web services. Sub-resources available for the Suggestion resource are listed in table 2. These web services may be accessed programmatically using any language capable of sending and receiving http requests.

Resource	Methods	Description
Kinetic Law	GET	This resource contains an sbml model for a single kinetic law entry in the SABIORK database. <i>Media types:</i> application/xml+sbml
SearchKineticLaw	GET	This resource allows for a search of the SABIORK database based on a vocabulary of keywords provided (see section 2 for the listing. Search parameters are entered as a request parameter of type String consisting of a list of comma separated Keyword-Value pairs. Eg: searchTerms=PATHWAY=Urea cycle, TISSUE=liver. Note that currently only values which appear in the SABIORK database are valid. Searches for valid entries can be performed using the Suggestions resource.
Suggestion	GET	This resource has a number of sub-resources which may be used to obtain results for correct values for parameters which may be used in search.

Table 1: Description of the resources for SabioRK web services.

1.2 URIs

In table 3 we describe the resources available at each URI. Each URI is prefixed by <http://www.sabiork.h-its.org/sabioRestWebServices>.

Sub-resource	Methods	Description
Enzyme	GET	Contains data about the name an EC class ID number for enzyme stored in the SABIORK database which may be useful for searching for kinetic law entries. <i>Media types:</i> application/xml
Tissue	GET	Contains the ID number and a description of a tissue stored in the SABIORK database. <i>Media types:</i> application/xml
Organism	GET	Contains the ID number and name of organism stored in the SABIORK database. <i>Media types:</i> application/xml
Compound	GET	Contains the name of a compound stored in the SABIORK database, which may appear as a reactant or product in kinetic reactions. <i>Media types:</i> application/xml
Pathway	GET	Contains the name of a pathway stored in the SABIORK database. <i>Media types:</i> application/xml
CellLocation	GET	Contains a description and the ID number of a cellular location in which reactions take place stored in the SABIORK database. <i>Media types:</i> application/xml
Modification	GET	Contains a description and ID number about a modification type which is stored in the SABIORK database. <i>Media types:</i> application/xml
Event	GET	Contains a description and the ID number of an event which is stored in the SABIORK database. <i>Media types:</i> application/xml
Protein	GET	Contains the UniProtID for a protein which is stored in the SABIORK database. <i>Media types:</i> application/xml
Publication	GET	Contains the title, author, and PubMed ID number of a publication entry stored in the the SABIORK database. <i>Media types:</i> application/xml

Table 2: Sub resources for the suggestion resource web service.

Table 3: URIs

Resource	URI	Description
Kinetic Law	/kineticLaws	Use this URI to obtain an SBML model containing several kinetic law entries. Kinetic Law id numbers are specified in a request parameter <code>kinlawids</code> containing a string of comma separated kinetic law ids.
Kinetic Law	/kineticLaws/{kinlawid}	Use this URI to retrieve the SBML representation of the kinetic law entry corresponding to <code>kinlawid</code> .

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Table 3 – Continued

Resource	URI	Description
Search Kinetic Law	/searchKineticLaws/sbml	Use this URI to retrieve the SBML representation of all kinetic law entries corresponding to the search criteria specified. Dictionary for the search keyword terms is described in section 2.
Search Kinetic Law	/searchKineticLaws/kinlaws	Use this URI to retrieve a list IDs of all kinetic law entries that fulfil the search criteria. Dictionary for the search keyword terms is described in section 2.
Suggestion	/suggestions	
Enzyme	/suggestions/enzymes	Returns an xml document containing a list of the EC class ID and names of all enzymes in the database matching the string supplied in requestion parameter searchEnzymes .
Tissue	/suggestions/tissues	Returns an xml document containing a list of the ID and descriptions of all tissues in the database matching the string supplied in requestion parameter searchTissues .
Organism	/suggestions/organisms	Returns an xml document containing a list of the ID and descriptions of all organisms in the database matching the string supplied in requestion parameter searchOrganisms .
Compound	/suggestions/compounds	Returns an xml document containing a list of names of all compounds in the database matching the string supplied in requestion parameter searchCompounds .
Pathway	/suggestions/pathways	Returns an xml document containing a list of names of all pathways in the database matching the string supplied in requestion parameter searchPathways
Cell Location	/suggestions/cellLocations	Returns an xml document containing a list of the ID and descriptions of all cell locations in the database matching the string supplied in requestion parameter searchCellLocations .
Modification	/suggestions/modifications	Returns an xml document containing a list of the ID and descriptions of all modifications in the database matching the string supplied in requestion parameter searchModifications

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Table 3 – Continued

Resource	URI	Description
Event	/suggestions/events	Returns an xml document containing a list of the ID and descriptions of all events in the database matching the string supplied in requestion parameter searchEvents
Protein	/suggestions/proteins	Returns an xml document containing a list of the UniProt IDs of all proteins in the database matching the string supplied in requestion parameter searchProteins
Publication	/suggestions/publications	Returns an xml document containing a list of the author, title, year and PubMed IDs of all publications in the database matching the string supplied in requestion parameter searchPublications

2 Search Keyword Vocabulary

- **ECNUMBER** An enzyme may included in the search parameters by EC Class number (eg. ECCNUMBER=1.1.1.2)
- **ENZYMENAME** An enzyme may included in the search parameters by name. Exact names must be used. Eg (ENZYME=Acetoin dehydrogenase)
- **TISSUE** The name of the tissue (eg. TISSUE=liver)
- **ORGANISM** The name of the organism (eg. ORGANISM=)
- **PATHWAY** The name of the reaction pathway (eg, PATHWAY=Urea Cycle)
- **LOCATION** Location within the cell that a kinetic reaction takes place (eg. LOCATION=leucoplast)
- **PUBMED** Publication within which the kinetic law data is published, by PubMed number (eg PUBMED=13538975)
- **AUTHOR** Publication within which the kinetic law data is published, by author (eg AUTHOR=Shelton E)
- **TITLE** Publication within which the kinetic law data is published, by title, full title string is required (eg “TITLE=Roles of His291-alpha and His146-beta” in the reductive acylation reaction catalyzed by human branched-chain alpha-ketoacid dehydrogenase: refined phosphorylation loop structure in the active site)
- **YEAR** Year of publication (eg YEAR=2007)

- **UNIPROTID** Protein as listed in UniProtID (eg UNIPROTID=A1VCV2)
- **PARAMETERTYPE** Experimental parameter specified in the kinetic law entry (eg PARAMETERTYPE=Vmax)
- **EVENTNAME** Signalling event name (eg EVENTNAME=Transcription)
- **EVENTTYPE** Signalling event type (eg EVENTTYPE=translation)
- **REACTANT** General search for reactant involved in the reaction eg (REACTANT=O2)
- **ORGANISMTAX** Organism taxonomy (eg ORGANISMTAX=Laccaria)
- **REACTANTPUBCHEMID** PUBCHEM ID number of a compound
- **REACTANTKEGGID** KEGG ID of a compound (eg REACTANTKEGGID=C00003)
- **REACTANTCHEBIID** CHEBI ID of a compound (eg REACTANTCHEBI=44215)
- **REACTANTCASID** CAS-ID of a compound (eg REACTANTCASID=53-84-9)
- **REACTANTPRODUCT** Reactant as a product of the reaction
- **REACTANTSUBSTRATE** Reactant as substrate in the reaction
- **REACTANTINHIBITOR** Reactant in an inhibitor role in the reaction
- **REACTANTCATALYST** Reactant acting as a catalyst in a reaction
- **REACTANTCOFACTOR** Reactant acting as a cofactor in a reaction
- **REACTANTACTIVATOR** Reactant acting as an activator in a reaction
- **REACTANTMODIFIER** Reactant acting as a modifier in a reaction
- **MUTANT** Mutant enzyme variant (eg MUTANT=K8R)
- **WILDTYPE** Wildtype enzyme variant (eg WILDTYPE=W1)
- **RSABIO** SABIO reaction ID number (eg RSABIO=15)
- **RKEGG** KEGG reaction ID (eg RKEGG=R00737)

3 XML schema for the Suggestions subresources

```
<?xml version="1.0"?>
<!--
Document      : suggestionsschema.xsd
Created on   : February 16, 2011, 11:52 AM
Author       : jungle
Description:
    Purpose of the document follows.
```

```

-->
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://www.sabiork.h-its.org"
  xmlns:tns="http://www.sabiork.h-its.org">

  <xs:complexType name="Enzyme">
    <xs:sequence>
      <xs:element name="ECClassID" type="xs:string"/>
      <xs:element name="Name" type="xs:string"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="Organism">
    <xs:sequence>
      <xs:element name="Id" type="xs:string"/>
      <xs:element name="Name" type="xs:string"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="Event">
    <xs:sequence>
      <xs:element name="Id" type="xs:string"/>
      <xs:element name="Description" type="xs:string"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="Tissue">
    <xs:sequence>
      <xs:element name="Id" type="xs:string"/>
      <xs:element name="Description" type="xs:string"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="Modification">
    <xs:sequence>
      <xs:element name="ID" type="xs:string"/>
      <xs:element name="Description" type="xs:string"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="CellLocation">
    <xs:sequence>
      <xs:element name="ID" type="xs:string"/>
      <xs:element name="Description" type="xs:string"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="Compound">
    <xs:sequence>
      <xs:element name="Name" type="xs:string"/>

```

```

    </xs:sequence>
</xs:complexType>

<xs:complexType name="Protein">
  <xs:sequence>
    <xs:element name="UniProtID" type="xs:string"/>
  </xs:sequence>
</xs:complexType>

<xs:complexType name="Pathway">
  <xs:sequence>
    <xs:element name="Name" type="xs:string"/>
  </xs:sequence>
</xs:complexType>

<xs:complexType name="Publication" >
  <xs:sequence>
    <xs:element name="PubMedID" type="xs:string"/>
    <xs:element name="Author" type="xs:string"/>
    <xs:element name="Title" type="xs:string"/>
  </xs:sequence>
</xs:complexType>

<xs:element name="SuggestionList" type="tns:SuggestionList"/>

<xs:complexType name="SuggestionList">
  <xs:sequence>
    <xs:element name="Publication" type="tns:Publication" minOccurs="0" maxOccurs="unbou
    <xs:element name="Protein" type="tns:Protein" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="Pathway" type="tns:Pathway" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="Compound" type="tns:Compound" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="CellLocation" type="tns:CellLocation" minOccurs="0" maxOccurs="unb
    <xs:element name="Modification" type="tns:Modification" minOccurs="0" maxOccurs="unb
    <xs:element name="Enzyme" type="tns:Enzyme" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="Event" type="tns:Event" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="Tissue" type="tns:Tissue" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="Organism" type="tns:Organism" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>

</xs:schema>

```