## GO Guide:

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, W3C

В

가

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Consortium, SGD(Saccharomyces Genome Database),
                                                            MGD(Mouse Genome Informatics)
가
                                                                                                                Gene
       가
                                                            Ontology Consortium
                 Gene Ontology
                                                                                        (gene product)
                                                            RNA
                        GO Guide
                                                                                       (term)
                Gene Ontology
                                                                 [3].
                                                  가
                                 OWL[4](Web Ontology
                      SeRQL[5]
                                                                                                     Gene Ontology
Language)
                                                                                           function,
                                                                                                         Biological
                                                            Consortium
                                                                             Molecular
                                      2
                                                  OWL
                                                                                                                Gene
                                                            Process,
                                                                        Cellular component
Gene Ontology
                                                   Gene
                                                            Ontology
Ontology
             3
                                                                       Gene Ontology Consortium
                                                                                       Gene Ontology
   5
                                                                                             Gene Ontology
                                                                                                                term
     6
                                                                  gene product
                                                                     Gene Ontology
2.
                                                            OWL
2.1
                 OWL
                                                            <owl:Class rdf:ID="G0_0016209">
                                                             <go:name>antioxidant activity</go:name>
                                                             <rdfs:comment>Inhibition of the reactions brought about by
                                                            dioxygen (02) or peroxides. Usually the antioxidant is
                                                            effective because it can itself be more easily oxidized than
                                                            the substance protected. The term is often applied to
                                                            components that can trap free radicals, thereby breaking the
                                       가
                                                            chain reaction that normally leads to extensive biological
                                         [6].
                                                            damage.
  W3C(World Wide Web Consortium)
                                                            </rdfs:comment>
                                                             <rdfs:subClassOf rdf:resource="#G0_0003674" />
  가
                                 Subject, Predicate,
                                                              <go:dbxref>
Object
            가
                                              [7]
                                                               <owl : Restriction>
                                      RDF[7](Resource
                                                                <go:database_symbol>SP_KW</go:database_symbol>
Description Framework)
                                       . RDF
                                                                <go:reference>Antioxidant/go:reference>
                                                               </owl:Restriction>
                                                              </go:dbxref>
    가
                     W3C
                             RDF
                                                             <go:association>
                                                  RDF
                        OWL
                                         . OWL
                                                               <owl : Restriction>
                                                                <go:evidence>
                                                                 <owl : Restriction>
                                                                  <go:evidence_code>ISS</go:evidence_code>
                                                                  <go:dbxref>
        가
                                                                   <owl:Restriction>
                                                                    <go:database_symbol>MGI</go:database_symbol>
                                                                    <go:reference>MGI:2429377</go:reference>
                                         XML
                                                                   </owl:Restriction>
                                                                  </go:dbxref>
                                                                 </owl:Restriction>
가
                                                                </go:evidence>
                                                            <go:gene_product>
                                                                <owl:Restriction>
2.2 Gene Ontology
                                                                 <go:name>4930414C22Rik</go:name>
Gene
       Ontology
                    Consortium
                                     1998
                                               FlyBase
                                                                 <go:dbxref>
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<owl:Restriction>
                                                                                            . GoGet
                                                                                                       Gene
      <go:database_symbol>mgi</po:database_symbol>
                                                        Ontology
                                                                                     tool
                                                                                                     term
      <go:reference>MGI:2444701</go:reference>
                                                           gene product가
     </owl:Restriction>
    </go:dbxref>
   </owl:Restriction>
                                                                             GoGet
                                                                                      'common ancestor',
  </go:gene_product>
                                                        'part Of'
                                                                       term
 </owl:Restriction>
                                                                                    gene product가
                                                                          term
</go:association>
</owl:Class>
                 1. Gene Ontology
                                                                              가
                                                               GO Guide
                                                               가
                                      . <owl:Class
rdf:ID="G0 0016209">
                                     Gene Ontology
     ID가 GO 0016209
                                          <go:name>
                                                        3.
   GO
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                                                                             OWL
     <rdfs:comment>
                                                                                       Sesame[10] API
<rdfs:subClassOf rdf:resource="#GO_0003674" />
                                                                                           GO Guide
                GO 0003674
                              subClassOf
                                      <go:dbxref>
                                                                Browser
                                                                                       Keyword Helper
                                                                     Query Composer
       <go:association>
                                                             Guide
                                                                     Graph Generator
                                                                Query Translator
                           가
                                                                        Translator
                                                                                       Query Optimizer
                                                                             Sesame Access APIs
                                                                               RDB(MySQL)
                                                                Storage
2.3
                                                                        2. GO Guide
 Gene Ontology
       , term
                 term
                                                                                     MySQL
                                                                                              RDB
       term
                                                        Sesame
                                                                                                       Gene
                                                        Ontology
          AmiG0[8]
                      GoView[9]
                                        GoGet[9]
                                                             OBO format[11], XML, MySql dump
            Am i GO
                     Gene Ontology consortium
                                                                             . XML
                                                                                                   OWL
BDGP(Berkeley Drosophila Genome Project)
                                                                                          OWL
     Gene Ontology
                            . AmiGO
                                                               OWL
                                                                                         Sesame API
                                                           MySQL
                                                                                       Gene Ontology
   term
                                                                                            term
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                                                                                        가
         가
                                                 가
                                                        OWL
                                                                                               RDB
           Gene Ontology database
                                       exploration
project(Macalester college,
                                 Data
                                       exploration
                                                                                                   Sesame
                                           GoView
laboratory)
                                                           European IST project On-To-Knowledge
GoGet
            . GoView
                        Gene Ontology
                                                            research prototype
                                                                                                . RDF
                           visualization tool
                                                        OWL
                                                                          RDFS
                              highlight
                       term
                                                        inference
                                                                                      RDQL[12], RQL[13]
                                                                  query language
                                                                                               RQL
                     term
                                                           SeRQL
       highlight
                            term
                                                                 memory-based
                                                                                          RDBMS
```

HTTP, RMI, SOAP access interface . GO Guide 1.1 Gene Ontology GO Guide (Query OOPSLA UI for Browsing and Querying Gene Ontology Translator) Search Result (1) Tree generator, Graph generator keyword helper Query Composer가 3. GO Guide OWL SeRQL Translator SeRQL 2 GO Guide , Query Optimizer GO Guide 가 (1) SeRQL (2) (3) (4) 가 . 'biosynthesis' term (2) 'bio' Help 'bio' 4. GO Gduide 4.1 'biosynthesis' 2 (1) Search 가 'biosynthesis' term Name Association . GO guide term 가 'Show term in detail' 가 'biosynthesis' term 가 (1) biosynthesis GO Guide 4. term

가

'Show term in tree'	5	Gene Ontolog	ıy 4	1가 Pred	icate
'biosynthesis'				•	
tree가 (1)	tree	(-)			
term 가	•	. (3)	(4)		71
71		Add triple	(4)		가
가 .	Graphical New	. (3)			
⊞ 00.0003673 Gera, Ortalogy					
⊞ @ GO 0008150: biological process  @ @ GO 0007982: physiological process  @ GO 00007982: physiological process		(4)		'a' te	erm 'b'
EX GOODSON ASSESSMENT IN A detail		term	'с'	term	term
Parlieto Dabiect Parlieto Object				,	
5. tree		(4)	sen , (1)	d query 가	
5 (Onambi	1 . 1	GO Guide	, (1)	-1	
5 'Graphio 6	cal View'		가 .		
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		가		-	
(		71			
) 3			. ,	, ,	
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			(term or gen	e product)	
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and the bosonium contractions.	7.1	term			term
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■ Zonn ■ Haliak ■ Handrick : "Hartichit kolon and histoprovid for more dations."  1			GO Guide		
6.					
(4)			Gene Ontology	<i>'</i>	
(1) 가 ,			•		
,					
'Put into Subject', 'Put into Obj	ect'				
가 . 'Put into Subject'	term				
Subject, 'Put into Object' Ob	ject				
, (3)		4.2			
, ,		404050			
(3)	•	4.2.1 SeRQL		Conomo	
(5) 가		GO Guide		Sesame 가	
가		. Sesame	RDF	<b>71</b>	
, RDF		. Codamo		R	DQL, RQL,
Subject, Object, Predicate		SeRQL	GO Guide	SeRQL	
, Pr	edicate		Sesame	SeR	

가 , RQL SELECT 7x PROM (x) rdfs-subClassOf (y) [14]. SeRQL owl:onProperty ("Part-of"); owl:someValuesFrom O USING NAMESPACE rdfs=(http://www.w3.org/rdfs#>, owl=<a href="http://www.w3.org/owl#">http://www.w3.org/owl#</a> Оыц SELECT Obj1, Obj2 PROM (Subj) ns:pre1 (obj1): ns:pre2 (Obj2) prel 9. part-of Subi WHERE Sobj like "\*john"
USING NAMESPACE na = Chttp://www.foo? gene\_product 10 term Ohi2 term gene\_product 7. SeRQL "4030414C22Rik" 10 gene\_product 가 term SeRQL 가 Subject "John" G0:0016209 BLECT 2v pre2 Subject Predicate PROM (s) go association () pre1 grégeus\_product ("4830414C2288h") USBNG NAMBEPACE association 가 Object Obj1, Obj2 gu= <http://www.geneuntology.org/go#> **SELECT** 가 가 가 **FROM** evidence sepe\_product WHERE 가 **FROM** namespace가 datahas reference symbel 가 가 expression MGI MGI reference lothurse. 4030414C22f88 MGE244701 4.2.2 GO **SeRQL** gene\_product 10. term GO:000367 name subclassO4 4.2.3 GO Guide Molecular function GO Guide Gene Ontology SELECT 9x G0:0016299 UI FROM (x) serql:directSabClassOf (GO:0003674): **SeRQL** UI go:name ("Molecular function")
USING NAMESPACE go=Chttp://geneontology.org> 가 OWL-QL **SeRQL** must-binding 8. is-a 가 Gene Ontology 3가 . SeRQL 11 . term term , part-of is-a gene\_product term User Interface ther input open SeRQL is-a 2 molecular function term 가 term Is-of Transitive) Part-of 8 GO:0016209가 Sergl:directSubClassOf Predicate rdfs:subClassOf Predicate Path expression Path eignession **OWL** Predicate Part-of Integrated path 가 Restriction term 11. part-of GO:0003674 term part-of 11 (UI) term Predicate SeRQL onPropery part-of part-of SeRQL 가 SeRQL SeRQL

SeRQL

must-binding

## SeRQL

12

SeRQL FROM

```
Algorithm: Integrated path
Require: Input: triple statement (Subject, Property, Object)
While (Input)
  /* find pattern
if (property is " is-a" ) predicate = is-a pattern
     else if (property is "part-of") predicate = part-of
      else if (property is "annotated") predicate = annotated
pattern
/* build path expression
if (input is first) path_expression = predicate
  else
         { /* find common matching string
           matching_string = find (path_expression, predicate)
            /* integrate path expression
               if (path_expression starts matching_string)
               path expression = path expression +";"
               + predicate's unmatching string
               if (path_expression ends matching_string)
               path_expression = path_expression
               + predicate's unmatching string
               else path_expression =
               path_expression +" ," +predicate
                    12.
```

GO Guide

**SeRQL** SeRQL 가

Sesame

SeRQL

13

gene\_product

가

**SeRQL** 

is-a part-of annotated(term

gene\_product) 13 . is-a

part-of

가 annotated

가 must-binding

13 "GO:0009987" ID 가 "part-Of" term "GO:0043012" term

User Query가 SeRQL

가 3

Constitution and User Query 90 HHID MECHANIS (d) procession () proces, probat (1)

13. GO Guide

5.

**OWL** 

Gene Ontology

GoView GoGet AmiGO **RDB** , RDB Gene Ontology

GO Guide Gene Ontology Sesame

**RDB** 

가

, GO Guide

가

가 가

Gene Ontology

Go Guide	AmiGO	GoView & GoGet
OWL format	RDB format	RDB format
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SeRQL		
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1.		

Gene Ontology

Guide

GO

6.

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OWL SeRQL . 가

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Gene Ontology

Gene Ontology

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