Wrap up:　Development of the database ontology system for insect brain databases

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Prombrem: IVB-PF problem

Now Many(more than 10) database (CosmoDB) have its own terminology.

(https://invbrain.neuroinf.jp/modules/htmldocs/IVBPF/Database/ivbpf.html)

We are planning integrate those to one database(Xoonips).

How integrate those ontology?

- Our answer
- Link keyword to the outside mediawiki
- Construct relations between these word in wik
- Using semantic mediawiki(+)

Keywords in DB A
Morphology/
Dendrites in the tip of the mushroom body
Beta lobe and axon terminals in the lateral protocerebrum
Dendrites in the lateral and posterior protocerebrum and axon terminals in the mushroom body calyces

Keywords in DB B
部位/
脳
キノコ体
キノコ体/傘部
前大脳側葉

Keywords in DB C
arborization area/
AL
AL/G
AL/G/AV
AL/G/AD
AL/G/A
AL/G/PD
AL/G/P
AL/G/V
AL/MGC
AL/MGC/Cumulus
AL/MGC/Horseshoe
AL/MGC/Toroid
CC
LAL
MB

Each database use its own keyword and note integrated

キノコ体 = Mushroom body = MB

Previous work: Most of data descricption and keyword information were copied into media-wiki

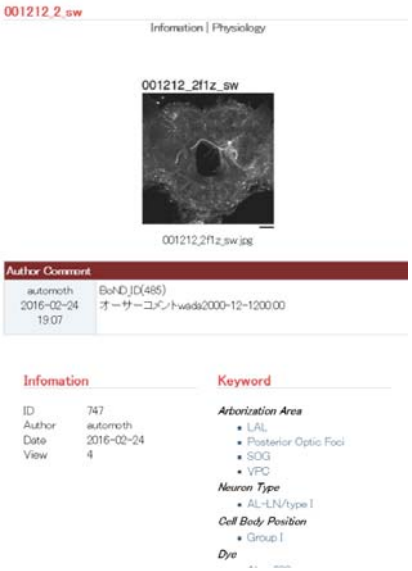
Objective: metadata integration of individual databases in IVB-PF

Method: use (semantic)mediawiki and existing ontology

Work

- We made individual datapages/ keyword page in wiki using python and cosmoapi and mediwiki API(mwclient).

Refs
Codes: git@github.com:TKazawa/jh2016a.git
Constructing media wiki:
https://invbrain.neuroinf.jp/jscpb_test/wiki/



Existing databases in IVB-PF

Make link and keyword pages in mediawiki
Making categories

Wiki for metadata integration

a review of the literature: insect onthology

- Drosophila Anatomy Ontology (DAO)in mainteined as Drosophila anatomy and development ontologies
- https://github.com/FlyBase/drosophila-anatomy-developmental-ontology/wiki

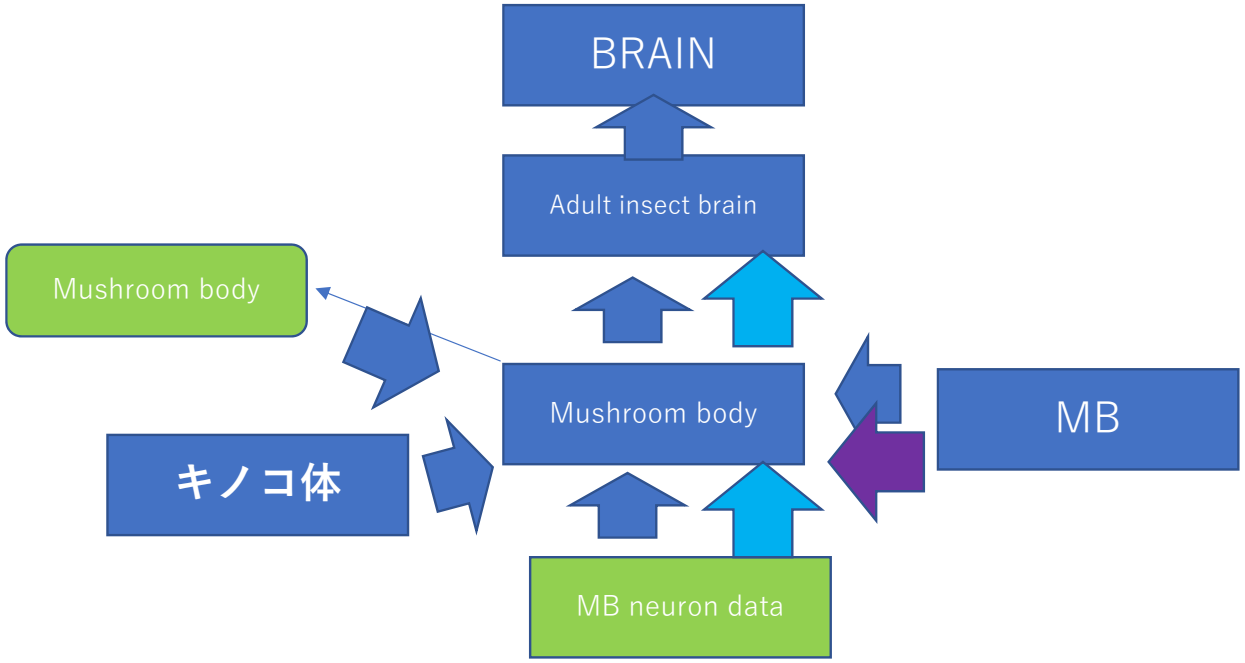
- More generalized insect brain terminology is described in “A Systematic Nomenclature for the Insect” (2014 Key Ito et.al) Brain http://dx.doi.org/10.1016/j.neuron.2013.12.017

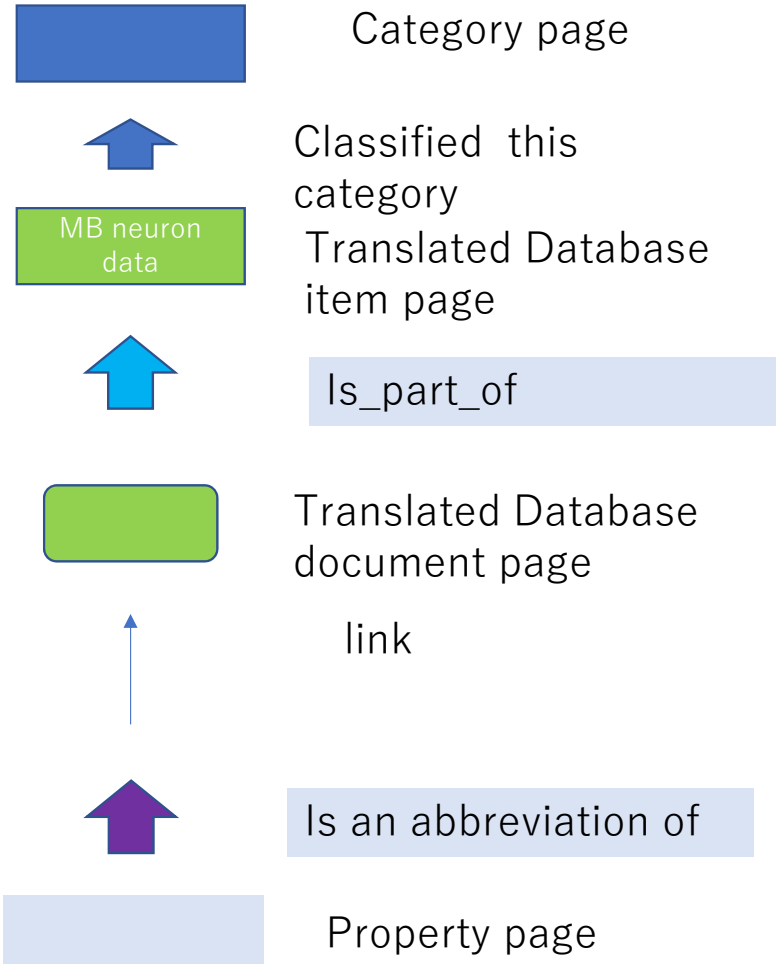
- Some relationship is useful

- **Parts of Table S1, Neuropil supercategories (level 1) were used**

- **OL optic lobe**
- **MB mushroom body**
- **CX central complex**
- **LX lateral complex**
- **VLNP ventrolateral neuropils**
- **LH lateral horn**
- **SNP superior neuropils**
- **INP inferior neuropils**
- **AL antennal lobe**
- **VMNP ventromedial neuropils**
- **PENP periesophageal neuropils**
- **GNG gnathal ganglia**

Constructed ontology structure in the wiki





“category” means in RDF that rdfs:subClassOf or "is an instance of a class”

https://www.semantic-mediawiki.org/wiki/Help:RDF_export

Summary

Main result

The first step of the integration between JSCPB wiki and IVB=PF were achieved

Test place :
https://invbrain.neuroinf.jp/jscpb_test/wiki
Compare between
https://cns.neuroinf.jp/jscpb/wiki/%E6%B0%B4%E6%B3%A2%E8%AA%A0
and
https://invbrain.neuroinf.jp/jscpb_test/wiki/%E6%B0%B4%E6%B3%A2%E8%AA%A0

- NEXT STEP
  - Multilanguage
    - Next version of SMW (17.3) may implement multi-language
  - Relation from neuron data
    - Virtual fly brain (http://www.virtualflybrain.org/site/vfb_site/home.htm) uses
      - overlaps
      - connected_to
      - Innervating
      - Etc
  - Synonyms:
  - α/β lobe and horizontal /vertical lobe.
  - Extend ontology
    - species
    - Experimental method
  - Try a semantic inference .