



VirtualBrainCloud

Personalized Recommendations for
Neurodegenerative Disease



www.VirtualBrainCloud-2020.eu

Public Deliverable Report

M24 deliverable D5.1:

“Text mining workflow to use ontologies and terminologies in OLS for information extraction of cause-and-effect” statements. The demonstration will be delivered as a ‘Webinar’”.

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1. Preface

The overarching goal of The VirtualBrainCloud is personalized prevention and treatment of dementia. To achieve generalizable results that help individual patients, the VirtualBrainCloud integrates the data of large cohorts of patients and healthy controls through multi-scale brain simulation using The Virtual Brain (or TVB) simulator. There is a need for infrastructures for sharing and processing health data at a large scale that comply with the EU general data protection regulations (or GDPR). The VirtualBrainCloud consortium closes this gap, making health data actionable. Elaborated data protection concepts minimize the risks for data subjects and allow scientists to use sensitive data for research. Another urgent need addressed by TVB-Cloud is to bridge the world of systems biology with the world of computational brain network modeling. We here report our work on text mining workflows and the use of ontologies and terminologies of the ontology lookup service (OLS) for information extraction of cause-and-effect” statements that can be directly integrated with brain network models (BNM).

2. Webinar

The demonstration of our development work on text mining workflows and the use of ontologies and terminologies of the OLS for information extraction of cause-and-effect” statements that can be directly integrated in BNM has been delivered as a public ‘Webinar’ on October 21st, 2020.

The Webinar had been announced publicly:

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Webinar: Computational modeling of candidate mechanisms of neurodegeneration




21 OCT 2020

DIGITAL EVENT

Upcoming Human Brain Project Webinar: Petra Ritter from Charité Berlin will speak about **Computational modeling of candidate mechanisms of neurodegeneration**.

Prof. Ritter will provide insight to the work of the → **Virtual Brain Cloud** EU Project, focusing on data integration and simulation for personalized recommendations for neurodegenerative disease.

To register for the event please email Prof. Ritter at [petra.ritter @ charite.de](mailto:petra.ritter@charite.de).

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We had ca. 30 attendees during the live presentation. Our particular target audience were scientists from the EU Flagship Human Brain Project (HBP) where the webinar was announced as part of an ongoing lecture series.

The 45 minutes lecture and demonstration was followed by ca. 20 minutes of discussion.

The 45-minutes webinar is publicly accessible on youtube:

<https://www.youtube.com/watch?v=pJsH7AoBvQ8&t=1s>



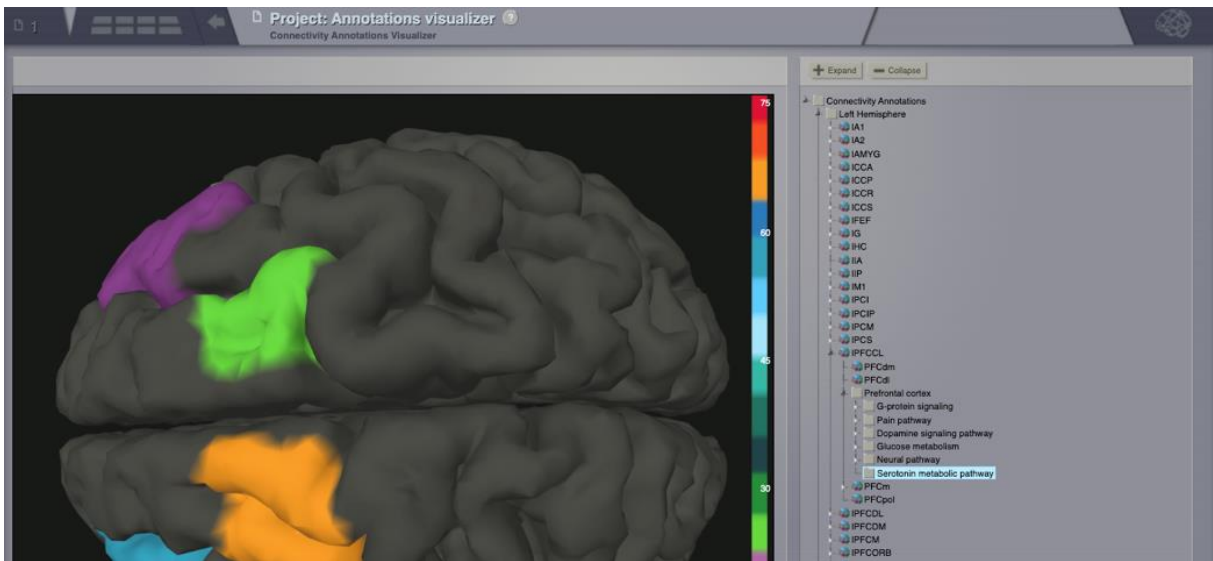
The Webinar will be posted shortly at the INCF Training space The Virtual Brain Simulation Platform Collection to reach even higher visibility and impact:

<https://training.incf.org/collection/virtual-brain-simulation-platform>

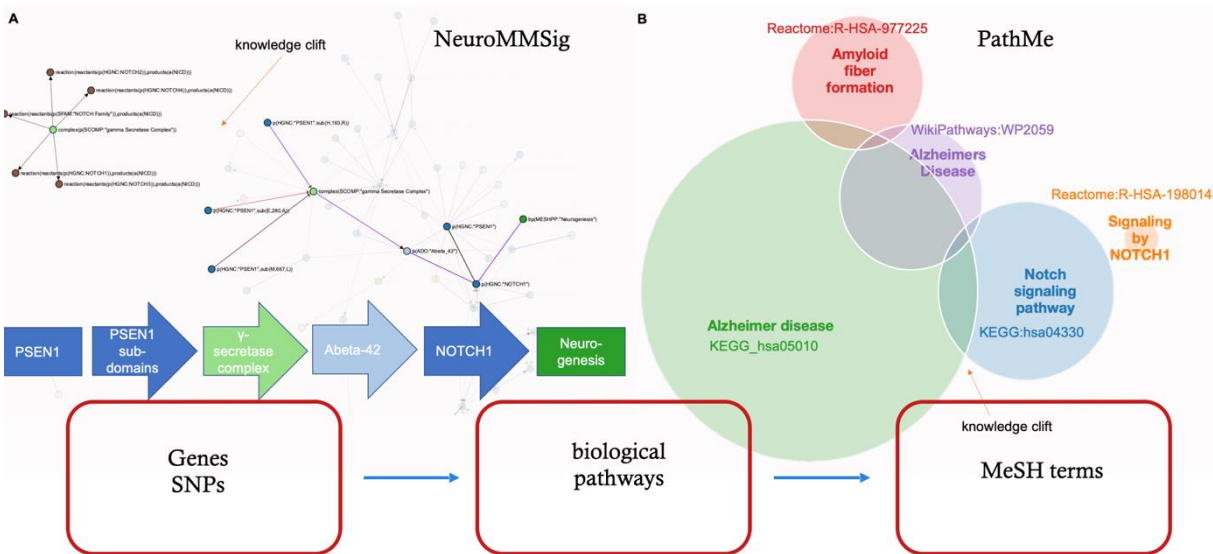
In summary, we present in the webinar how the following tools are being integrated in TVB-Cloud in order to infer candidate mechanisms of neurodegenerative disease:

- The Virtual Brain Simulator with the integrated Brain Region and Cell Type Ontology (BRCO) & Pathway Terminology System, accessible in the Cloud:

<https://thevirtualbrain.apps.hbp.eu/user/profile> & The Virtual Brain Ontology:



- Pathway Inventories NeuroMMSig <https://neurommsig.scai.fraunhofer.de/> & PathMe <https://pathme.scai.fraunhofer.de/>



- Knowledge Discovery and Semantic Search Tool SCAIView <https://www.scaiview.com/en/introduction.html>



3. Conclusions

We have provided a public demonstration of our first prototype of connecting The Virtual Brain (via TVB-Ontology) to Biological pathway inventories to simulate multi-scale effects of altered molecular pathways on the large-scale dynamics and function of the brain. The demonstration is available online.

4. Glossary

BNM - Brain Network Models

HBP - Human Brain Project

OLS – Ontology Lookup Service

Ontology – refers to a “knowledge graph”-type web which specify terms and the relationships between these terms

Terminology – refers to hierarchically listed terms as subtypes of other terms

TVB-Cloud – The Virtual Brain Cloud