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## Behind the barrier: how to extend the half-life of biologicals in the brain?

*A Data Management Plan created using DMPonline.be*

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**Template:** KU Leuven BOF-IOF

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### Project abstract:

Central nervous system (CNS) disorders are some of the most prevalent yet poorly treated illnesses, causing a significant impact on quality of life and an economic burden on healthcare systems. However, CNS drug discovery has not been very successful compared to other therapeutic areas. A major challenge for CNS drug discovery, is the presence of the blood-brain barrier (BBB), which restricts therapeutics from entering the CNS. Numerous pharmaceutical companies and academic labs are exploring how to facilitate transport of biological drugs over the BBB and significant progress is being made in increasing the transport efficiency in the recent years, also by our laboratory. Very recently, our laboratory has validated an additional approach to extend the concentration of biologicals in the brain. With this project, we want to further validate this approach and generate additional data to strengthen KU Leuven's IP position.

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### Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

Dataset name / ID	Description	New or reuse	Digital or Physical data	Data Type	File format	Data volume	Physical volume
		Indicate: N(ew data) or E(xisting data)	Indicate: D(igital) or P(hysical)	Indicate: Audiovisual Images Sound Numerical Textual Model Software Other (specify)		Indicate: <1 GB <100GB <1TB <5TB >5TB NA	
plasmid DNA	plasmid DNA encoding for variants generated for this project	N	P	DNA	NA	NA	up to 40 vials stored at - 20°C
purified proteins		N	P	Protein	NA	NA	up to 40 vials stored at - 20°C
In vitro experiments		N	D	T	.pdf	< 1 GB	
In vivo experiments		N	D	T	.pdf	< 1GB	
mouse tissue		N	P	Processed tissue	/	/	up to 200 vials stored at - 80°C

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

No data will be re-used

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? If so, refer to specific datasets or data types when appropriate and provide the relevant ethical approval number.

- Yes, animal data (Provide ECD reference number below)

ECD 091/2022

Will you process personal data? If so, please refer to specific datasets or data types when appropriate and provide the KU Leuven or UZ Leuven privacy register number (G or S number).

- No

Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, ...)? If so,

please comment per dataset or data type where appropriate.

- Yes

Patent application will be re-submitted during the course of this C3 grant.

**Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material or Data transfer agreements, Research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.**

- Yes

Nanobodies were isolated from immune libraries obtained from VIB. General agreement between VIB and KU Leuven in place for those libraries and nanobodies discovered from them.

**Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.**

- Yes

IP will be filed for the final nanobody sequences.

#### Documentation and Metadata

**Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g. in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, codebook.tsv etc. where this information is recorded).**

Detailed experimental protocols, the research progress and clear descriptions of obtained data, what they represent and how they were generated, will be collected in an electronic lab notebook (eLabJournal, eLabNext, Eppendorf Group). Here, folders are provided for all subtasks of the project (folder structure: Project group > Project > Study > Experiment). In each folder, a new file will be made for each experiment, named with the data and subject, and including information on the responsible person (i.e. the person who created the file) as well as version tracking. Each experimental file will contain a section on the subject, objective and experimental design, used protocols, used and generated samples, results (a description of results and observation rather than all raw and analysed data) and conclusion. Raw data files, as well as e.g. ppt files with graphical summaries, are stored on a J drive that mirrors the ELN structure.

SOPs that are used in the lab are also version controlled and stored in eLab Next

No paper notebooks are used.

**Will a metadata standard be used to make it easier to find and reuse the data?**

**If so, please specify which metadata standard will be used.**

**If not, please specify which metadata will be created to make the data easier to find and reuse.**

- No

All metadata is described in the ELN.

#### Data Storage & Back-up during the Research Project

**Where will the data be stored?**

- Shared network drive (J-drive)
- Other (specify below)

All data is stored on the J drive and in our electronic labnotebooks.

The physical samples will be stored in the freezers of the lab of the PI. A digital overview of all stored samples will be available (in the sample inventory system of the electronic lab notebook).

#### **How will the data be backed up?**

- Standard back-up provided by KU Leuven ICTS for my storage solution
- Other (specify below)

The digital data (saved on KU Leuven J-drive) will be stored on the university's central servers with automatic hourly back-up procedures.

The data stored in the electronic lab notebook (eLabJournal, eLabNext, Eppendorf group) is replicated to 3 different data centers in real-time.

Additionally, a full back-up of all data files is made every 24 hours. Data back-ups are stored as fully encrypted files to an external vault in case of an emergency and the necessity of a full recovery.

#### **Is there currently sufficient storage & backup capacity during the project?**

If no or insufficient storage or backup capacities are available, explain how this will be taken care of.

- Yes

#### **How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?**

Only lab members actively working on the project will have access to the KU Leuven J-drive (access is granted by the PI).

In the electronic lab notebook (eLabJournal, eLabNext, Eppendorf group), only the people actively working on the project will be granted access to the experimental data of the project (settings by administrators for each individual lab member). Furthermore, after completion, experiments will be signed and locked into a read-only mode, which prevents further data modification, and a digital signature including time stamp is added to the experiment.

#### **What are the expected costs for data storage and backup during the research project? How will these costs be covered?**

Data storage on the KU Leuven J-drive with backup will cost 519€ per Tb per year. Each eLabJournal Cloud license seat costs approximately 150€ per year. Costs will be covered by the laboratory or project consumables budget.

#### **Data Preservation after the end of the Research Project**

Which data will be retained for 10 years (or longer, in agreement with other retention policies that are applicable) after the end of the project?

In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).

- All data will be preserved for 10 years according to KU Leuven RDM policy

#### **Where will these data be archived (stored and curated for the long-term)?**

- Shared network drive (J-drive)
- Other (specify below)

Data will be stored in ELabNext.

**What are the expected costs for data preservation during the expected retention period? How will these costs be covered?**

Costs are minimal and will be covered by internal lab funds.

#### **Data Sharing and Reuse**

**Will the data (or part of the data) be made available for reuse after/during the project?**

**Please explain per dataset or data type which data will be made available.**

- Other (specify below)

All data will be available after patenting. Prior to that, data can be shared under MTA/CDA.

**If access is restricted, please specify who will be able to access the data and under what conditions.**

Employees of the laboratory will have access to the data. In addition, data can be shared under MTA/CDA.

**Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)?**

**Please explain per dataset or data type where appropriate.**

- Yes, intellectual property rights

No data that is subject to patenting is shared.

**Where will the data be made available?**

**If already known, please provide a repository per dataset or data type.**

- KU Leuven RDR (Research Data Repository)

**When will the data be made available?**

- Upon publication of research results

Upon obtaining IP, the data will be made available to the public in the form of posters/presentation/papers.

**Which data usage licenses are you going to provide?**

If none, please explain why.

- CC-BY 4.0 (data)

Do you intend to add a persistent identifier (PID) to your dataset(s), e.g. a DOI or accession number? If already available, please provide it here.

- No

What are the expected costs for data sharing? How will these costs be covered?

Costs are expected to be negligible.

#### Responsibilities

Who will manage data documentation and metadata during the research project?

The promoter of the grant will manage data documentation:  
prof. dr. Maarten Dewilde

Individual lab members are aware of their expected contribution to proper RDM.

Who will manage data storage and backup during the research project?

The promoter of the grant will manage data documentation:  
prof. dr. Maarten Dewilde

Individual lab members are aware of their expected contribution to proper RDM.

Who will manage data preservation and sharing?

The promoter of the grant will manage data preservation and sharing in consultation with LRD:  
prof. dr. Maarten Dewilde

Who will update and implement this DMP?

The promoter of the grant will update and implement this DMP:  
prof. dr. Maarten Dewilde