FWO DMP Template - Flemish Standard Data Management Plan

Version KU Leuven

Project supervisors (from application round 2018 onwards) and fellows (from application round 2020 onwards) will, upon being awarded their project or fellowship, be invited to develop their answers to the data management related questions into a DMP. The FWO expects a **completed DMP no later than 6 months after the official start date** of the project or fellowship. The DMP should not be submitted to FWO but to the research co-ordination office of the host institute; FWO may request the DMP in a random check.

At the end of the project, the **final version of the DMP** has to be added to the final report of the project; this should be submitted to FWO by the supervisor-spokesperson through FWO's e-portal. This DMP may of course have been updated since its first version. The DMP is an element in the final evaluation of the project by the relevant expert panel. Both the DMP submitted within the first 6 months after the start date and the final DMP may use this template.

The DMP template used by the Research Foundation Flanders (FWO) corresponds with the Flemish Standard Data Management Plan. This Flemish Standard DMP was developed by the Flemish Research Data Network (FRDN) Task Force DMP which comprises representatives of all Flemish funders and research institutions. This is a standardized DMP template based on the previous FWO template that contains the core requirements for data management planning. To increase understanding and facilitate completion of the DMP, a standardized **glossary** of definitions and abbreviations is available via the following link.

	1. General Project Information
Name Grant Holder & ORCID	Pieter-Jan Serneels; 0000-0001-6788-6297
Contributor name(s) (+ ORCID) & roles	Promotor: Prof. Dr. Lieve Moons; 0000-0003-0186-1411 Co-Promotor: Prof. Dr. Lies De Groef; 0000-0002-3329-3474
Project number ¹ & title	1114525N; Exploring age-related glial alterations and their impact on myelin integrity and remyelination in the killifish CNS.
Funder(s) GrantID ²	/
Affiliation(s)	X KU Leuven
	☐ Universiteit Antwerpen
	☐ Universiteit Gent
	☐ Universiteit Hasselt
	□ Vrije Universiteit Brussel
	□ Other:
	ROR identifier KU Leuven: 05f950310

¹ "Project number" refers to the institutional project number. This question is optional. Applicants can only provide one project number.

² Funder(s) GrantID refers to the number of the DMP at the funder(s), here one can specify multiple GrantIDs if multiple funding sources were used.

Please provide a short project description

A decline in myelin integrity and remyelination potential is suggested to contribute to age-related functional deficits and neuropathies. Recent studies show that phenotypic changes in oligodendroglia, as well as in astrocytes and microglia, underlie this myelin pathology. The exact mechanisms remain elusive, largely because current research mainly involves young animal models. The host lab previously revealed that fast-aging killifish, regeneration-competent fish that display human aging traits, undergo glial aging and a decrease in their ability to repair damage in the aged central nervous system (CNS), thereby shifting towards more mammalian-like regenerative characteristics upon aging. Altered glial responses were shown to contribute to this decline. Using single-nuclei multiomic techniques, I aim to decode age-related alterations in inter- and intracellular signaling. Besides, I will histologically and molecularly study the impact of aging on glial dynamics and myelin reformation during injury-induced de- and remyelination. Finally, I will delve into the gene expression profile of glial populations within injured young and aged killifish optic nerves at single nuclei level. With subsequent bioinformatic analyses and validation studies, we seek to provide crucial insights into glial aging and its impact on glia-glia crosstalk and remyelination. These findings pave the way for future research aimed at enhancing functional circuit repair in the senescent mammalian CNS.

2. 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 ³.

				ONLY FOR DIGITAL DATA	ONLY FOR DIGITAL DATA	ONLY FOR DIGITAL DATA	ONLY FOR PHYSICAL DATA
Dataset	Description	New or Reused	Digital or	Digital Data Type	Digital Data	Digital Data	Physical Volume
Name			Physical		Format	Volume (MB, GB,	
						TB)	
Single nuclei	Data from the	⊠ Generate new	□ Digital	☐ Audiovisual	.xls, .csv, .R, .py,	□ < 1 GB	
multiome	single nuclei	data	☐ Physical	☐ Images	BCL/FASTQ	□ < 100 GB	
RNA and	RNA and ATAC	☐ Reuse existing		☐ Sound		□ < 1 TB	
ATAC	sequencing of	data				⊠ < 5 TB	
sequencing	the young and			☐ Textual		□ > 5 TB	
data Work	old optic nerves.			☐ Model		□NA	
package 1				☐ Software			
				☐ Other:			
Biomolecular	Data from qPCR,	□ Generate new	□ Digital	☐ Audiovisual	.tif, .tiff, .oib, .czi,	□ < 1 GB	/
/histological	Western blot	data	☐ Physical		.txt, .csv, .xlsx,	□ < 100 GB	
validation	and/or ELISA,	☐ Reuse existing		☐ Sound	.pzfx	⊠ < 1 TB	
sequencing	and HCR and/or	data				□ < 5 TB	
data Work	IHC from the			☐ Textual		□ > 5 TB	
package 1	optic nerve.			☐ Model		□NA	
				☐ Software			
				☐ Other:			
Histological	Data from HCR	⊠ Generate new	□ Digital	☐ Audiovisual	.tif, .tiff, .oib, .czi,	□ < 1 GB	/
data Work	and IHC of	data	☐ Physical		.txt, .csv, .xlsx	□ < 100 GB	
package 2	young and aged	☐ Reuse existing		☐ Sound		⊠ < 1 TB	
	(un)injured fish.	data				□ < 5 TB	

³ Add rows for each dataset you want to describe.

				☐ Textual		□ > 5 TB	
				☐ Model		\square NA	
				☐ Software			
				☐ Other:			
Myelin	Data from	□ Generate new	□ Digital	☐ Audiovisual	.tif, .tiff, .oib, .czi,	□ < 1 GB	/
integrity data	Fluoromyelin,	data	☐ Physical		.txt, .csv, .xlsx,	□ < 100 GB	
Work	TEM and VEPs	☐ Reuse existing		☐ Sound	.pzfx	⊠ < 1 TB	
package 2	of young and	data		⋈ Numerical		□ < 5 TB	
	aged (un)injured			☐ Textual		□ > 5 TB	
	killifish.			☐ Model		□NA	
				☐ Software			
				☐ Other:			
Single nuclei	Data from single	□ Generate new	□ Digital	☐ Audiovisual	.xls, .csv, .R, .py,	□ < 1 GB	
RNA	nuclei RNA	data	☐ Physical	☐ Images	BCL/FASTQ	□ < 100 GB	
sequencing	sequencing	☐ Reuse existing		☐ Sound		⊠ < 1 TB	
data Work	from the young	data				□ < 5 TB	
package 2	and old injured			☐ Textual		□ > 5 TB	
	optic nerves.			☐ Model		\square NA	
				☐ Software			
				☐ Other:			
Biomolecular	Data from	□ Generate new	□ Digital	☐ Audiovisual	.tif, .tiff, .oib, .czi,	□ < 1 GB	
/histological	HCR/IHC,	data	☐ Physical		.txt, .csv, .xlsx,	□ < 100 GB	
data Work	fluoromyelin,	☐ Reuse existing		☐ Sound	.pzfx	⊠ < 1 TB	
package 3	TEM and VEPs	data				□ < 5 TB	
	of young/aged			☐ Textual		□ > 5 TB	
	injured fish			☐ Model		\square NA	
	exposed to			☐ Software			
	pharmaceutical			☐ Other:			
	compounds.						

Visual system/ optic nerve samples work package 1-3	Collected visual system/optic nerve samples from killifish either for histology, TEM or molecular	☑ Generate new data☐ Reuse existing data	□ Digital ⊠ Physical	☐ Audiovisual ☐ Images ☐ Sound ☐ Numerical ☐ Textual ☐ Model ☐ Software ☑ Other: Tissue		□ < 1 GB □ < 100 GB □ < 1 TB □ < 5 TB □ > 5 TB ⊠ NA	1x -80 freezer shelf 1x -20 freezer shelf 1x 4-8°C fridge shelf (depending on the type of material)
Manuscripts/ reports	assays Manuscripts and reports concerning the project	☑ Generate new data☐ Reuse existing data	⊠ Digital □ Physical	☐ Audiovisual ☐ Images ☐ Sound ☐ Numerical ☑ Textual ☐ Model ☐ Software ☐ Other:	.docx	□ < 1 GB ⊠ < 100 GB □ < 1 TB □ < 5 TB □ > 5 TB □ NA	
GUIDANCE: The data description forms the basis of your entire DMP, so make sure it is detailed and complete. It includes digital and physical data and encompasses the whole spectrum ranging from raw data to processed and analysed data including analysis scripts and code. Physical data are all materials that need proper management because they are valuable, difficult to replace and/or ethical issues are associated. Materials that are not considered data in an RDM context include your own manuscripts, theses and presentations; documentation is an integral part of your datasets and should described under documentation/metadata. RDM Guidance on data							
source, preferab	ting data, please sp ly by using a persis OI, Handle, URL etc ype.	tent					

Are there any ethical issues concerning the	☐ Yes, human subject data; provide SMEC or EC approval number:
creation and/or use of the data	☑ Yes, animal data; provide ECD reference number: 175/2023
(e.g. experiments on humans or animals, dual	☐ Yes, dual use; provide approval number:
use)? If so, refer to specific datasets or data	□ No
types when appropriate and provide the	Additional information:
relevant ethical approval number.	We will conduct animal experiments, more specifically on killifish, in accordance with the standard
	laboratory safety rules. All necessary safety measures for both laboratory and animal experiments will be
	strictly observed. Our methods follow the guidelines and rules set by the HSE Department (Health, Safety
	and Environment) and the Animal Ethics Committee at KU Leuven.
Will you process personal data ⁴ ? If so, please	☐ Yes (provide PRET G-number or EC S-number below)
refer to specific datasets or data types when	
appropriate and provide the KU Leuven or UZ	Additional information:
Leuven privacy register number (G or S number).	
Does your work have potential for commercial	☐ Yes
valorization (e.g. tech transfer, for example spin-	⊠ No
offs, commercial exploitation,)?	If yes, please comment:
If so, please comment per dataset or data type	
where appropriate.	
Do existing 3rd party agreements restrict	☐ Yes
exploitation or dissemination of the data you	⊠ No
(re)use (e.g. Material/Data transfer agreements,	If yes, please explain:
research collaboration agreements)?	
If so, please explain to what data they relate and	
what restrictions are in place.	
Are there any other legal issues, such as	□ Yes
intellectual property rights and ownership, to be	⊠ No
managed related to the data you (re)use?	If yes, please explain:
If so, please explain to what data they relate and	
which restrictions will be asserted.	

⁴ See Glossary Flemish Standard Data Management Plan

3. 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).

RDM guidance on documentation and metadata.

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.

REPOSITORIES COULD ASK TO DELIVER METADATA IN A CERTAIN FORMAT, WITH SPECIFIED ONTOLOGIES AND VOCABULARIES, I.E. STANDARD LISTS WITH UNIQUE IDENTIFIERS.

We will keep records for each work package for 10 years (where applicable):

Digital data:

- Experimental design and protocol (.docx file)
- List of abbreviations used (.docx file)
- Data structure documentation (.docx file)
- Data analysis steps and relevant scripts (MATLAB, Python, ImageJ and Imaris scripts)
- Raw data (specific file format according to data type)
- Analyzed data (.xlsx and .prism)
- Index file/readme file (.txt file) for each work package, detailing the names, locations (folder and subfolder structure), and descriptions of the aforementioned files.

Physical data:

Samples collected during experiments will be documented and preserved for the duration of the project. Depending on the sample type, they will be stored in fixatives or freezers. Immunohistologically stained slides will be stored in appropriate containers in a dry place or freezer. Due to the nature of these samples, they cannot be kept for 10 years and they will be discarded when analyses have been concluded.

⊠ Yes □ No

If yes, please specify (where appropriate per dataset or data type) which metadata standard will be used: The experiments are unique, but the data will be standardized according to data-type across experiments to make it easier to interpret the structure. Metadata standards will be used for transcriptomics (https://faircookbook.elixir-europe.org/content/recipes/interoperability/transcriptomics-metadata.html). For all other data, metadata will be created using the Dublin core (http://www.dcc.ac.uk/resources/metadata-standards/dublin-core).

	4. Data Storage & Back-up during the Research Project
Where will the data be stored?	☐ Shared network drive (J-drive)
Consult the internative WIII comes at a second social to	☐ Personal network drive (I-drive)
Consult the <u>interactive KU Leuven storage guide</u> to find the most suitable storage solution for your data.	☐ OneDrive (KU Leuven)
Jina the most suitable storage solution for your data.	☐ Sharepoint online
	☐ Sharepoint on-premis
	☐ Large Volume Storage ☐ Digital Vault
	☐ Digital valut ☐ ☑ Other: ManGo (KU Leuven)
	Other. Marido (Ko Leuverr)
How will the data be backed up?	☑ Standard back-up provided by KU Leuven ICTS for my storage solution
•	☐ Personal back-ups I make (specify)
WHAT STORAGE AND BACKUP PROCEDURES WILL BE IN PLACE TO PREVENT DATA LOSS?	☐ Other (specify)
Is there currently sufficient storage & backup	⊠ Yes
capacity during the project? If yes, specify	□ No
concisely. If no or insufficient storage or backup	The research group currently has 15 TB of storage on KU Leuven servers, and this can be expanded at hoc.
capacities are available, then explain how this	If no, please specify:
will be taken care of.	
How will you ensure that the data are securely	The network storage is located in the KU Leuven ICTS data center, with a duplicate in the second ICTS center. This setup ensures disaster recovery and additional backup capacity, ensuring data availability in
stored and not accessed or modified by	the long term. Access to the data is restricted by KU Leuven security groups, and all data will be password
unauthorized persons?	protected.
CLEARLY DESCRIBE THE MEASURES (IN TERMS OF PHYSICAL SECURITY,	
NETWORK SECURITY, AND SECURITY OF COMPUTER SYSTEMS AND	
FILES) THAT WILL BE TAKEN TO ENSURE THAT STORED AND	
TRANSFERRED DATA ARE SAFE. Guidance on security for research data	

What are the expected costs for data storage and backup during the research project? How will these costs be covered?	Back-up cost per Tb (KU Leuven ICTS): 295€/year Large Volume Storage: 95,14€/Tb/year Expected amount of data (5 Tb)The costs will be covered by complementary funding (pending FWO project, lab resources).
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	5. Data Preservation after the end of the Research Project
Which data will be retained for at least five 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). Guidance on data preservation	 ✓ All data will be preserved for 10 years according to KU Leuven RDM policy ☐ All data will be preserved for 25 years according to CTC recommendations for clinical trials with medicinal products for human use and for clinical experiments on humans ☐ Certain data cannot be kept for 10 years (explain)
Where will these data be archived (stored and curated for the long-term)? Dedicated data repositories are often the best place to preserve your data. Data not suitable for preservation in a repository can be stored using a KU Leuven storage solution, consult the interactive KU Leuven storage guide.	 □ KU Leuven RDR ☑ Large Volume Storage (longterm for large volumes) □ Shared network drive (J-drive) ☑ Other (specifiy): Notebooks will be kept in the lab for at least 5 years, conform the KU Leuven RDM

What are the expected costs for data preservation during the expected retention period? How will these costs be covered?	Back-up cost per Tb (KU Leuven ICTS): 295€/year Large Volume Storage: 95,14€/Tb/year Expected amount of data (5 Tb)The costs will be covered by complementary funding (pending FWO project and lab resources).
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	6. 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. Note that 'Available' does not necessarily mean that the data set becomes openly available, conditions for access and use may apply. Availability in this question thus entails	 Yes, as open data Yes, as embargoed data (temporary restriction) Yes, as restricted data (upon approval, or institutional access only) No (closed access) Other, please specify: Written progress reports will be stored internally. Relevant findings will be disseminated through publication in high profile, peer-reviewed international journals. In addition, data will be presented at
BOTH OPEN & RESTRICTED ACCESS. FOR MORE INFORMATION: HTTPS://WIKI.SURFNET.NL/DISPLAY/STANDARDS/INFO-EU-REPO/#INF OEUREPO-AccessRights	(inter)national scientific meetings specific to the field, such as GLIA meetings, etc. Transcriptomics data will be made openly available via data repositories. Requests for non-deposited data will be evaluated on a case-by-case basis and may be provided upon request.
If access is restricted, please specify who will be	/
able to access the data and under what	
conditions.	

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, privacy aspects Yes, intellectual property rights Yes, ethical aspects Yes, aspects of dual use Yes, other No If yes, please specify:
Where will the data be made available? If already known, please provide a repository	 ☐ KU Leuven RDR ☑ Other data repository (specify): Open Access repository
per dataset or data type.	□ Other (specify): request by mail
When will the data be made available?	 ☑ Upon publication of research results ☐ Specific date (specify) ☐ Other (specify)
Which data usage licenses are you going to	
provide? If none, please explain why.	☑ Data Transfer Agreement (restricted data)
	☐ MIT licence (code)
A DATA USAGE LICENSE INDICATES WHETHER THE DATA CAN BE	☐ GNU GPL-3.0 (code)
REUSED OR NOT AND UNDER WHAT CONDITIONS. IF NO LICENCE IS GRANTED, THE DATA ARE IN A GREY ZONE AND CANNOT BE LEGALLY	☐ Other (specify)
REUSED. DO NOTE THAT YOU MAY ONLY RELEASE DATA UNDER A	
LICENCE CHOSEN BY YOURSELF IF IT DOES NOT ALREADY FALL UNDER ANOTHER LICENCE THAT MIGHT PROHIBIT THAT.	
Check the <u>RDR quidance on licences</u> for data and	
software sources code or consult the <u>License selector</u>	
<u>tool</u> to help you choose.	
I	

Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, please provide it here.	
INDICATE WHETHER YOU INTEND TO ADD A PERSISTENT AND UNIQUE IDENTIFIER IN ORDER TO IDENTIFY AND RETRIEVE THE DATA.	
What are the expected costs for data sharing? How will these costs be covered?	We will opt for free repositories. The expected cost for ad hoc data sharing will be low, since the use of OneDrive is free for KU Leuven members up to 250GB and ManGo is free for KU Leuven members up to 1TB. In addition, Belnet will be used to share data up to 6TB. We do not expect to exceed this.

7. Responsibilities	
Who will manage data documentation and metadata during the research project?	Responsibility for ensuring data preservation and sharing, as well as the end responsibility for updating and implementing the DMP is with the supervisors (Lieve Moons and Lies De Groef).
Who will manage data storage and backup during the research project?	Data documentation, data storage & back up during the project is the responsibility of all researchers working on this project, including Pieter-Jan Serneels.
Who will manage data preservation and sharing?	Lieve Moons and Lies De Groef
Who will update and implement this DMP?	Pieter-Jan Serneels, Lieve Moons and Lies De Groef