FWO DMP Template - Flemish Standard Data Management Plan

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	**Guy Boeckxstaens (0000-0001-8267-5797)**
Contributor name(s) (+ ORCID) & roles	**Nathalie Stakenborg (0000-0002-6229-0045) – Senior post-doc**
Project number[1] & title	Onderzoek naar de interactie tussen enterische neuronen en macrofagen
Funder(s) GrantID[2]	G079424N
Affiliation(s)	X KU Leuven ☐ Universiteit Antwerpen ☐ Universiteit Gent ☐ Universiteit Hasselt ☐ Vrije Universiteit Brussel ☐ Other: Provide ROR[3] identifier when possible:

[1] "Project number" refers to the institutional project number. This question is optional since not every institution has an internal project number different from the GrantID. 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.

[3] Research Organization Registry Community. https://ror.org/

Please provide a short project description	In the gut, tissue-resident macrophages are present throughout its different layers, where they carry out specialized functions according to their anatomical location. In mice, we recently identified a subpopulation of long-lived resident macrophages in the muscularis externa located in close proximity to the myenteric plexus, a vast collection of neurons that is responsible for the coordination of gastrointestinal motility. Depletion of these so-called neuron-associated muscularis macrophages (NA-MMϕ) in adulthood leads to loss of enteric neurons associated with impaired gastrointestinal transit and reduced secretion, indicating that these NA-MMϕ are indispensable for the maintenance and survival of enteric neurons. Moreover, evidence is accumulating that NAMMϕ may play a key role in intestinal neurodegeneration such as in diabetes and aging. Taken together, these data indicate that the presence of an intact NA-MMϕ population is indeed important for ENS health, and suggest that these immune cells must release neurotrophic mediators or maintain cell-cell contacts that are indispensable for neuronal survival. To study the human macrophage-enteric nervous system (ENS) crosstalk, we have developed a co-culture system of human induced pluripotent stem cell (iPSC)-derived enteric neurons and macrophages. In this model, human iPSCs are differentiated into macrophages and vagal-crest neuronal precursors and co-cultured up to 70 days. Of interest, neuronal precursors mature into enteric ganglia, interconnected by nerve fiber tracks and closely resembling the human ENS. On the other hand, iPSC-derived monocytes differentiate into at least two major subpopulations of macrophages after 1 week (depending on timing of seeding) in co-culture; one CD68+ subpopulation closely associated to enteric ganglia and another CD206+ subpopulation that aligns with the nerve fiber tracks. In the present project, we will therefore use this co-culture system to investigate the interaction between macrophages and neuronal precursors/enteric neurons during the maturation process of the ENS with the ultimate aim to identify the mediators/signaling pathways responsible for the maintenance and health of the human ENS.

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[4].

				ONLY FOR DIGITAL DATA	*ONLY FOR DIGITAL DATA*	*ONLY FOR DIGITAL DATA*	*ONLY FOR PHYSICAL DATA*
Dataset Name	Description	New or Reused	Digital or Physical	Digital Data Type	Digital Data Format	Digital Data Volume (MB, GB, TB)	Physical Volume
Sample metadata	Different iPSc clones	☒ Generate new data ☐ Reuse existing data	☒ Digital ☐ Physical	☐ Observational ☒ Experimental ☐ Compiled/ aggregated data ☐ Simulation data ☐ Software ☐ Other ☐ NA	☐ .por ☐ .xml ☐ .tab ☒ .csv ☐ .pdf ☒ .txt ☐ .rtf ☐ .dwg ☐ .tab ☐ .gml ☐ other: ☐ NA	☒ < 100 MB ☐ < 1 GB ☐ < 100 GB ☐ < 1 TB ☐ < 5 TB ☐ < 10 TB ☐ < 50 TB ☐ > 50 TB ☐ NA	NA
Laboratory procedure metadata	Data relating to samples processed in the laboratory, all necessary information relating to the laboratory	☒ Generate new data ☐ Reuse existing data	☒ Digital ☐ Physical	☐ Observational ☒ Experimental ☐ Compiled/ aggregated data ☐ Simulation data ☒ Software ☐ Other	☐ .por ☐ .xml ☐ .tab ☒ .csv ☒ .pdf ☒ .txt ☐ .rtf ☐ .dwg	☐ < 100 MB ☐ < 1 GB ☐ < 100 GB ☒ < 1 TB ☐ < 5 TB ☐ < 10 TB ☐ < 50 TB ☐ > 50 TB	NA

[4] Add rows for each dataset you want to describe.

	procedures performed			☐ NA	☐ .tab ☐ .gml ☒ other: .czi, .fcs, .wps, .pzfx ☐ NA	☐ NA	
Sequencing reads	Sequencing reads output from Illumina deep sequencing	☒ Generate new data ☐ Reuse existing data	☒ Digital ☐ Physical	☐ Observational ☒ Experimental ☐ Compiled/ aggregated data ☐ Simulation data ☐ Software ☐ Other ☐ NA	☐ .por ☐ .xml ☐ .tab ☐ .csv ☐ .pdf ☐ .txt ☐ .rtf ☐ .dwg ☐ .tab ☐ .gml ☒ other: FASTQ ☐ NA	☐ < 100 MB ☐ < 1 GB ☐ < 100 GB ☐ < 1 TB ☒ < 5 TB ☐ < 10 TB ☐ < 50 TB ☐ > 50 TB ☐ NA	NA
Sequencing data analysis and results	Sequencing data analysis and result output	☒ Generate new data ☐ Reuse existing data	☒ Digital ☐ Physical	☐ Observational ☒ Experimental ☐ Compiled/ aggregated data ☐ Simulation data ☐ Software ☐ Other ☐ NA	☐ .por ☐ .xml ☐ .tab ☒ .csv ☒ .pdf ☒ .txt ☐ .rtf ☐ .dwg ☐ .tab ☐ .gml	☐ < 100 MB ☐ < 1 GB ☐ < 100 GB ☐ < 1 TB ☒ < 5 TB ☐ < 10 TB ☐ < 50 TB ☐ > 50 TB ☐ NA	

					☐ other: .loom, .rds ☐ NA		
Custom made algorithms	Portfolio of custom-made scripts for the processing and analysis of the metadata and results generated as part of the project	☒ Generate new data ☐ Reuse existing data	☒ Digital ☐ Physical	☐ Observational ☒ Experimental ☐ Compiled/ aggregated data ☐ Simulation data ☒ Software ☐ Other ☐ NA	☐ .por ☐ .xml ☐ .tab ☐ .csv ☐ .pdf ☒ .txt ☐ .rtf ☐ .dwg ☐ .tab ☐ .gml ☒ other: .sh ☐ NA	☐ < 100 MB ☒ < 1 GB ☐ < 100 GB ☐ < 1 TB ☐ < 5 TB ☐ < 10 TB ☐ < 50 TB ☐ > 50 TB ☐ NA	

GUIDANCE: *DATA CAN BE DIGITAL OR PHYSICAL (FOR EXAMPLE BIOBANK, BIOLOGICAL SAMPLES, …). DATA TYPE: DATA ARE OFTEN GROUPED BY TYPE (OBSERVATIONAL, EXPERIMENTAL ETC.), FORMAT AND/OR COLLECTION/GENERATION METHOD.* *EXAMPLES OF DATA TYPES: OBSERVATIONAL (E.G. SURVEY RESULTS, SENSOR READINGS, SENSORY OBSERVATIONS); EXPERIMENTAL (E.G. MICROSCOPY, SPECTROSCOPY, CHROMATOGRAMS, GENE SEQUENCES); COMPILED/AGGREGATED DATA[5] (E.G. TEXT & DATA MINING, DERIVED VARIABLES, 3D MODELLING); SIMULATION DATA (E.G. CLIMATE MODELS); SOFTWARE, ETC.* *EXAMPLES OF DATA FORMATS: TABULAR DATA (.POR,. SPSS, STRUCTURED TEXT OR MARK-UP FILE XML, .TAB, .CSV), TEXTUAL DATA (.RTF, .XML, .TXT), GEOSPATIAL DATA (.DWG,. GML, ..), IMAGE DATA, AUDIO DATA, VIDEO DATA, DOCUMENTATION & COMPUTATIONAL SCRIPT.* *DIGITAL DATA VOLUME: PLEASE ESTIMATE THE UPPER LIMIT OF THE VOLUME OF THE DATA PER DATASET OR DATA TYPE.* *PHYSICAL VOLUME: PLEASE ESTIMATE THE PHYSICAL VOLUME OF THE RESEARCH MATERIALS (FOR EXAMPLE THE NUMBER OF RELEVANT BIOLOGICAL SAMPLES THAT NEED TO BE STORED AND PRESERVED DURING THE PROJECT AND/OR AFTER).*	
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.	NA
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, please describe these issues further and refer to specific datasets or data types when appropriate.	☒ Yes, human subject data: EC number=S68688 (approval in progress 20/3/2024) ☐ Yes, animal data ☐ Yes, dual use ☐ No If yes, please describe: iPSc cell lines will be used. The personal data that is available of the used clones is gender and age. PRET application was filled in and project G-2024-7642 was approved

[5] These data are generated by combining multiple existing datasets.

Will you process personal data[6]? If so, briefly describe the kind of personal data you will use. Please refer to specific datasets or data types when appropriate. If available, add the reference to your file in your host institution's privacy register.	☒ Yes ☐ No If yes: - Short description of the kind of personal data that will be used: Gender and age - Privacy Registry Reference: EC number=S68688; PRET application completed and project approved
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 ☐ No If yes, please comment: Sequencing data analysis and results - Custom made algorithms - can gain interest from companies that develop treatments for intestinal neurodegenerative diseases. If our 'custom made algorithms' has high efficacy to pinpoint molecular determinants of gut neurodegeneration this can promote the development of novel treatment strategies towards gut neurodegeneration.
Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material/Data transfer agreements, research collaboration agreements)? If so, please explain to what data they relate and what restrictions are in place.	☐ Yes ☒ No If yes, please explain:
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 to what data they relate and which restrictions will be asserted.	☐ Yes ☒ No If yes, please explain:

[6] 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).	Sample metadata will be available in a .txt and .xlsx file allowing a fast and efficient information interrogation. All laboratory procedures, bioinformatics analysis and testing and any other relating data will be heavily documented; an electronic lab book system will be created and implemented for tracking all processes conducted. All scripts generated will be commented/documented and will include README files. Log files will be generated during data analysis with detailed information on the analysis process performed on each run and sample analysed.
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.*	☒ Yes ☐ No If yes, please specify (where appropriate per dataset or data type) which metadata standard will be used: Metadata standards will be made for sequencing data and results to be able to upload them to repositories described below Templates are available to have metadata standards for qPCR, flow cytometry and immunofluorescent datasets If no, please specify (where appropriate per dataset or data type) which metadata will be created:

4. Data Storage & Back-up during the Research Project	
Where will the data be stored?	Shared network drive (J-drive) Large Volume Storage KUL hosted MySQL Server - HPC Tier-2 data -archive
How will the data be backed up? *WHAT STORAGE AND BACKUP PROCEDURES WILL BE IN PLACE TO PREVENT DATA LOSS? DESCRIBE THE LOCATIONS, STORAGE MEDIA AND PROCEDURES THAT WILL BE USED FOR STORING AND BACKING UP DIGITAL AND NON-DIGITAL DATA DURING RESEARCH.*[7] *REFER TO INSTITUTION-SPECIFIC POLICIES REGARDING BACKUP PROCEDURES WHEN APPROPRIATE.*	Standard back-up provided by KU Leuven ICTS for my storage solution.
Is there currently sufficient storage & backup capacity during the project? If yes, specify concisely. If no or insufficient storage or backup capacities are available, then explain how this will be taken care of.	☒ Yes ☐ No If yes, please specify concisely: We have requested and obtained enough storage capacity on Shared network drive (J-drive) Large Volume Storage KUL hosted MySQL Server - HPC Tier-2 data -archive to be able to storage all data obtained from the current project If no, please specify:

[7] Source: Ghent University Generic DMP Evaluation Rubric: https://osf.io/2z5g3/

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons? *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.* [7]	All data is stored on locations where only authorized persons can access. No unauthorized persons can access the data. All data and files generated as part of this project will be stored on KU Leuven servers using the network drives. Additionally, all researchers actively working on the project follow a clean desk policy.
What are the expected costs for data storage and backup during the research project? How will these costs be covered?	J-drive: €503,66 / TB / year; 1TB is needed for storage of immunofluorescence images, flow cytometry data, etc for 4 year storage, so we need €2014,64 for 4 year storage of 1TB Large volume storage drive: €104,42 /TB / year; for the remaining 6 years, we will archive the data in the L-drive, so we €626,52 for 6 year storage of 1TB KUL hosted MySQL Server : HPC tier-2 data archive: €70/TB/year; 1.5 TB needed for 10 year storage, so €1050 is needed for 10 year storage Total: € 3.691,16 for 10 year storage of all data types These costs have been anticipated and will be covered by PI funding that is already available.

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...).	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)?	L drive
What are the expected costs for data preservation during the expected retention period? How will these costs be covered?	As discussed above: J-drive: €503,66 / TB / year; 1TB is needed for storage of immunofluorescence images, flow cytometry data, etc for 4 year storage, so we need €2014,64 for 4 year storage of 1TB Large volume storage drive: €104,42 / TB / year; for the remaining 6 years, we will archive the data in the L-drive, so we €626,52 for 6 year storage of 1TB KUL hosted MySQL Server : HPC tier-2 data archive: €70/TB/year; 1.5 TB needed for 10 year storage, so €1050 is needed for 10 year stoarge Total: € 3.691,16 for 10 year storage of all data types These costs have been anticipated and will be covered by available funding of PI

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 BOTH OPEN & RESTRICTED ACCESS. FOR MORE INFORMATION: HTTPS://WIKI.SURFNET.NL/DISPLAY/STANDARDS/INFO-EU-REPO/#INFOEUREPO-ACCESSRIGHTS*	☐ Yes, in an Open Access repository ☒ Yes, in a restricted access repository (after approval, institutional access only, …) ☐ No (closed access) ☐ Other, please specify: Sample metadata: closed access Laboratory procedure metadata: restricted access Sequencing reads: restricted access Sequencing data analysis and results: open data Custom made scripts: open data
If access is restricted, please specify who will be able to access the data and under what conditions.	Laboratory procedure metadata: institutional access Sequencing reads: as read data contain human reads.
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 per dataset or data type.	Sequencing data analysis and results: NCBI Custom made scripts: Github
When will the data be made available? *This could be a specific date (dd/mm/yyyy) or an indication such as 'upon publication of research results'.*	Upon publication of research results
Which data usage licenses are you going to provide? If none, please explain why. *A data usage license indicates whether the data can be reused or not and under what conditions. If no licence is granted, the data are in a grey zone and cannot be legally 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.* *Example Answer: E.g. "Data from the project that can be shared will be made available under a Creative Commons Attribution license (CC-BY 4.0), so that users have to give credit to the original data creators."* [8]	Data from the project that can be shared will be made available under a creative commons attribution licences (CC-BY 4.0), so that users have to give credit to the original data creators.
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.*	☒ Yes ☐ No If yes: a PID will be added upon deposit in a data repository

[8] Source: Ghent University Generic DMP Evaluation Rubric: https://osf.io/2z5g3/

What are the expected costs for data sharing? How will these costs be covered?	No costs are expected for data sharing on locations where the data and scripts will be made publicly available (NCBI, Github). Any publications costs associated will be covered by project funding already available.

7. Responsibilities	
Who will manage data documentation and metadata during the research project?	**Marte Vandeput, Elisabetta de Marco, Nathalie Stakenborg, Guy Boeckxstaens**
Who will manage data storage and backup during the research project?	**Marte Vandeput, Elisabetta de Marco, Nathalie Stakenborg, Guy Boeckxstaens**
Who will manage data preservation and sharing?	**Marte Vandeput, Nathalie Stakenborg, Guy Boeckxstaens**
Who will update and implement this DMP?	**Marte Vandeput, Nathalie Stakenborg, Guy Boeckxstaens**