A MULTI-MODAL AND LONGITUDINAL APPROACH TO STUDY THE NEUROBIOLOGICAL UNDERPINNINGS OF DISEASE ONSET AND PROGRESSION IN GENETIC ALS VARIANTS: FROM PRESYMPTOMATIC TO SYMPTOMATIC DISEASE STAGES.

A Data Management Plan created using DMPonline.be

Creators: Joke De Vocht, n.n. n.n., n.n. n.n.

Affiliation: KU Leuven (KUL)

Funder: Fonds voor Wetenschappelijk Onderzoek - Research Foundation Flanders (FWO)

Template: FWO DMP (Flemish Standard DMP)

Principal Investigator: n.n. n.n., Joke De Vocht

Data Manager: n.n. n.n., Joke De Vocht

Project Administrator: n.n. n.n., Joke De Vocht

Grant number / URL: 12AQF24N

ID: 206741

Start date: 01-11-2023

End date: 31-10-2026

Project abstract:

The main goal of this project is to better understand how neurodegeneration and neuroinflammation fit in a sequential model of disease progression in Amyotrophic Lateral Sclerosis (ALS). ALS is a complex neurodegenerative disorder with a myriad of disease presentations at the clinical, genetic and pathogenic level. Neuroinflammation and neurodegeneration play a key role in ALS pathophysiology, but there is no consensus on the regional and temporal relations between both disease mechanisms, nor their relation to disease onset and progression.

We will address this knowledge gap, by studying both disease mechanisms in presymptomatic and symptomatic carriers of ALS genetic variants. We will focus on the two most common ALS genetic variants in our regions: C9orf72RE and SOD1 gene mutations. This will help us identify predictors of disease onset and phenotype, as well as disease progression (rate) and survival at single subject level.

Unravelling the precise sequence of events at different stages of the disease process will be critical for: (i) reducing heterogeneity, (ii) defining the optimal timing for therapeutic interventions, (iii) monitoring treatment outcomes, and (iv) providing rich knowledge on the neurobiological underpinnings of disease onset and progression in ALS.

This will be realized, by combining advanced PET/MR imaging and biofluid markers to study both disease mechanisms, with detailed clinical and neuropsychological parameters in a longitudinal study design.

Last modified: 29-04-2024

A MULTI-MODAL AND LONGITUDINAL APPROACH TO STUDY THE NEUROBIOLOGICAL UNDERPINNINGS OF DISEASE ONSET AND PROGRESSION IN GENETIC ALS VARIANTS: FROM PRESYMPTOMATIC TO SYMPTOMATIC DISEASE STAGES.

FWO DMP (Flemish Standard DMP)

1. 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.

				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
		Please choose from the following options: • Generate new data • Reuse existing data	*Please choose from the following options:* • Digital • Physical	*Please choose from the following options:* • Observational • Experimental • Compiled/aggregated data • Simulation data • Software • Other • NA	*Please choose from the following options:* • .por, .xml, .tab, .csv,.pdf, .txt, .rtf, .dwg, .gml, … • NA	*Please choose from the following options:* • <100MB • <1GB • <100GB • <1TB • <5TB • <10TB • <50TB • >50TB • NA	
Human NeuroImaging Data	PET/MRI sequences	Reusing existing and generating new data	Digital	Experimental	.dcm, .nii, .json	<1TB	
Human NeuroImaging Data	PET/MRI sequence	Reusing existing and generating new data	Digital	Experimental	.dcm, .nii, .json	<1TB	
Human Biofluid Samples	blood & CSF samples	Reusing existing and generating new data	Physical				CSF: <15mL/study visit/subject Blood: <20mL/study visit/subject
Human Biofluid Samples	blood & CSF samples	Reusing existing and generating new data	Physical				CSF: 5-10 mL / study visit / subject Blood: <20mL / study visit / subject
Forms	survey results	Reusing existing and generating new data	Digital & Physical	Observational	.csv, .xlsx	<1GB	a binder per study subject 1-10 boxes

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:

We will reuse the following:

- existing clinical and 18F FDG PET data that was already collected and generated previously in the following projects: s50354, s58248, s59552, s66999 (https://doi.org/10.3390/cells12060933; 10.1001/jamaneurol.2020.1087).
- Biofluid samples previously collected in the context of s58248 (DOI: 10.1001/jamaneurol.2020.1087).
- Forms that were previously collected in the context of s58248, s59552 (DOI: 10.1136/jnnp-2021-327774; 10.1001/jamaneurol.2020.1087).

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? Describe these issues in the comment section. Please refer to specific datasets or data types when appropriate.

- Yes, human subject data

We will use human subject data (i.e. neuroimaging data, CSF and blood samples, paper forms), for which we received ethical approval by the University Hospitals Leuven ethical committee (s50354, s58248, s59552, s66999).

Will you process personal data? If so, briefly describe the kind of personal data you will use in the comment section. Please refer to specific datasets or data types when appropriate.

- Yes

Yes, we will collect and store personal data (e.g. name and surname, birth date, age, sex, home address, email address, personal or work phone number, identification number), in compliance with GDPR.
Ethical approval was granted by the CTC/EC Research UZ Leuven.

All personal data will be pseudonymized.

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.

- No

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 in the comment section to what data they relate and what restrictions are in place.

- No

n/a

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.

- No

n/a

2. 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).

We will document by means of:

- readme files with all necessary information concerning our data
- a codebook to log key dates and time, all relevant files, variables, associated descriptions, response options if applicable.
- In-file documentation will be used in all excel and csv files.
- Documentation will be stored in our online database progeny, methodology reports and protocols in a dedicated folder on KULeuven drives and the UZLeuven network drive.

All metadata (coding) used during the project will be saved on KULeuven drives, the internal University Hospitals Leuven server (which is backed-up daily) and RDR where applicable.

Will a metadata standard be used to make it easier to find and reuse the data? If so, please specify (where appropriate per dataset or data type) which metadata standard will be used. If not, please specify (where appropriate per dataset or data type) which metadata will be created to make the data easier to find and reuse.

- Yes

We plan to deposit and share research data via KU Leuven RDR and will use DataCite as a metadata standard.

3. Data storage & back-up during the research project

Where will the data be stored?

Clinical and neuroimaging data will be stored on the internal University Hospitals Leuven server (which is backed-up daily), CSF and serum samples will be stored in the neurobiobank, and neuropsychological data will be stored in an e-registry (Progeny / REDCAP).
All clinical [18F]FDG-PET and biofluid measurements are saved in the electronic patient file, and all other relevant clinical data in an e-registry (Progeny)

How will the data be backed up?

The internal University Hospitals Leuven server is backed-up daily.

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

Yes, a dedicated folder on the University Hospitals Leuven server has been allocated with ample storage and backup capacity to meet the project's requirements.
We will also use a dedicated KULeuven personal network drive.

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

Dedicated project folders are only accessible to individuals directly involved in the project through secure authentication measures (e.g. user permissions).

Access control mechanisms will be implemented to ensure that only authorized personnel can view, modify, or interact with the data. Additionally, regular audits and monitoring protocols will be established to detect and prevent unauthorized access attempts.

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

A dedicated KULeuven personal network drive will cost 503,66 € / TB / year.

4. 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 prospective datasets will be pseudonymized and preserved for at least 20 years.
Primary data:
1. PET and PET/MR neuroimaging sequences: [18F]FDG PET, [18F]DPA714 PET, T1-weighted MRI, Fluid-Attenuated Inversion Recovery (FLAIR), Multi-shell diffusion-weighted MRI, Resting-state functional MRI;
2. CSF and Serum samples;
3. patient reported questionnaires to investigate functional decline (ALS functional rating scale revised);
4. neuropsychological and neuropsychiatric assessments of executive functioning, language, social

cognition, verbal fluency, memory, visuospatial functioning, behavioral changes;
5. neurological and clinical assessments of neurological symptoms/signs (by an experienced neurologist).

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

A dedicated folder on the University Hospitals Leuven server and by means of Large Volume Storage at the KULeuven.

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

The expected cost: € 104,42 / TB / year.
Costs will be covered by the lab of Neurobiology.

5. Data sharing and reuse

Will the data (or part of the data) be made available for reuse after/during the project? In the comment section please explain per dataset or data type which data will be made available.

- Yes, in a restricted access repository (after approval, institutional access only, …)

1. *PET and PET/MR neuroimaging sequences: [18F]FDG PET, [18F]DPA714 PET, T1-weighted MRI, Fluid-Attenuated Inversion Recovery (FLAIR), Multi-shell diffusion-weighted MRI, Resting-state functional MRI;*

   Will be made stored in a restricted access repository, and will be made available for other researchers associated with the Lab of Neurobiology, or through DTA with external research groups.

2. *CSF and Serum samples*;

   Will be stored in the neurobiobank and leftovers will be made available to other researchers associated with the Lab of Neurobiology, or through DTA with external research groups.

3. *patient reported questionnaires to investigate functional decline (ALS functional rating scale revised), neuropsychological and neuropsychiatric assessments of executive functioning, language, social cognition, verbal fluency, memory, visuospatial functioning, behavioral changes, and neurological and clinical assessments of neurological symptoms/signs (by an experienced neurologist).*

   Will be pseudonymized and stored in a restricted access repository, and will be made available for other researchers associated with the Lab of Neurobiology, or through DTA with external research groups.

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

Access to the data will be restricted to individuals directly affiliated with the Lab of Neurobiology or actively engaged in the project. These individuals will be granted access under strict conditions, including authentication through user credentials, and their access will be limited to the specific data necessary for their role in the project.

In the event of exchanging data with external groups, all transfers will be conducted through Data Transfer Agreements (DTAs). These agreements will outline the terms and conditions governing the transfer, including data usage, confidentiality, and security protocols. By utilizing DTAs, we ensure that data exchange is conducted in a secure and legally compliant manner, safeguarding the confidentiality and integrity of the shared information.

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 in the comment section per dataset or data type where appropriate.

- Yes, Privacy aspects
- Yes, Ethical aspects

Data sharing will be restricted, to restrict sharing of sensitive patient (research) data (e.g. genetic information, identifiers).

To address these restrictions, we will pseudonymize data to remove personally identifiable information and restrict access to individuals affiliated with the project. This ensures compliance with ethical and legal standards while allowing for necessary collaboration and data sharing within the project team.

Where will the data be made available? If already known, please provide a repository per dataset or data type.

We plan to use KU Leuven RDR, as we work with sensitive data.
CSF and blood samples will be stored in the neurobiobank.

When will the data be made available?

Upon publication of research results

Which data usage licenses are you going to provide? If none, please explain why.

CC-BY-NC-SA-4.0 as the research outcomes are not intended to be commercialized.

Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, you have the option to provide it in the comment section.

- Yes

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

n/a

6. Responsibilities

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

Joke De Vocht; Nikita Lamaire; Fouke Ombelet; Philip Van Damme

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

Joke De Vocht; Nikita Lamaire; Fouke Ombelet; Philip Van Damme

Who will manage data preservation and sharing?

Philip Van Damme; Joke De Vocht

Who will update and implement this DMP?

Joke De Vocht