Plan Overview

A Data Management Plan created using DMPonline.be

Title: Decipher the contribution of the extracellular matrix to neuromuscular junction homeostasis and loss in Amyotrophic Lateral Sclerosis (ALS).

Creator: Graciana de Azambuja

Data Manager: Graciana de Azambuja

Project Administrator: Graciana de Azambuja

Affiliation: KU Leuven (KUL)

Template: KU Leuven BOF-IOF

Data Manager: Graciana de Azambuja

Project abstract:

The extracellular matrix (ECM) is understudied in amyotrophic lateral sclerosis (ALS). I propose to investigate the role of ECM proteins in neuromuscular junction (NMJ) homeostasis and ALS pathogenesis. To identify new NMJ targets and elucidate what causes early NMJ loss in ALS, we applied spatial transcriptomics to the lower motor circuitry of three ALS rodent models which recapitulate ALS-like features. This innovative work combined with further in vivo protein validation identified two ECM proteins as novel NMJ components which are dysregulated in a mutant-dependent manner. Furthermore, ECM dysregulation is emerging as a potential feature in ALS patients. With this solid premise, I hypothesize that dysfunctional communication between muscles and motor neurons (MNs) is driven, at least in part, by impaired ECM proteins. Thus, I will 1) characterize the spatial and temporal dysregulation of both ECMs in mice, 2) identify the most susceptible cells to defective ECMs by modulating their levels in cultured MNs, muscle and both, and 3) provide pre-clinical in vivo test as to whether targeting newly identified ECMs represents an attractive therapeutic strategy to restore function. Ultimately, validation in human patient material will ascertain the relevance of these novel targets. Altogether, I will combine in vivo models and in vitro innovative cellular systems together with omics approaches and functional assays. If successful my work is likely to broadly impact all ALS forms.

ID: 212042

Start date: 15-10-2024

End date: 30-09-2025

Last modified: 08-01-2025

Decipher the contribution of the extracellular matrix to neuromuscular junction homeostasis and loss in Amyotrophic Lateral Sclerosis (ALS).

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: **A**udiovisual **I**mages **S**ound **N**umerical **T**extual **M**odel **SO**ftware Other (specify)		Indicate: <1GB <100GB <1TB <5TB >5TB NA	
Immunofluorescence	Immunofluorescence quantifications from mouse tissue (muscle, spinal cord, sciatic nerve and brain) and motor neurons and myotubes cell cultures	N	D	I and T	TIFF and ODS/CSV.	<100GB	NA
Protein quantifications	Protein quantifications from mouse tissue (muscle, spinal cord, sciatic nerve and brain) and motor neurons and myotubes cell cultures protein extracts	N	D	I and T	ODS/CSV	<1GB	NA
RNA/transcript quantifications	RNA/transcripts quantifications from mouse tissue (muscle, spinal cord, sciatic nerve and brain) and motor neurons and myotubes cell cultures RNA extracts	N	D	I and T	ODS/CSV	<1GB	NA
Formol preserved samples	Mouse tissue samples (muscle, spinal cord, sciatic nerves and brain) and cell culture samples, fixed preserved with formol and stored in 4 degrees celsius for tissue processing	N	P	O (physical sample)	NA	NA	2 mL/sample
Histology slides	Histology slides from mouse tissue or cell culture samples	N	P	O (physical sample)	NA	NA	100 cm2/100 samples
Protein lysates	Protein lysates from mouse tissue or cell culture	N	P	O (physical sample)	NA	NA	2 mL/sample
RNA lysates/cDNA	RNA lysates from mouse tissue or cell culture transformed in cDNA	N	P	O (physical sample)	NA	NA	2 mL/sample
Fluorescence images	Microscope images taken from fluorescent labeled histology samples	N	D	I	TIFF	<100GB	NA
Western blot images	Biochemical luminescent developed images from protein expressing membranes western blots generated from protein lysates	N	D	I	TIFF	<1GB	NA
Single nuclei RNA sequencing	RNA transcriptomics dataset form single nuclei RNA sequencing	O	D	SO	html	<100GB	NA

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:

Single nuclei RNA seq dataset:
https://scope.aertslab.org/#/CBD__SADC__Diana_Piol__snMuscle/CBD__SADC__Diana_Piol__snMuscle%2F20240719_All_Combined.loom/compare

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 reference number:

- 170/2024
- 000/(GS3)Breeding-Da_Cruz /2020 "Breeding harmful phenotypes"
- 000/(GS1/GS2)Breeding Da Cruz kweek "General breeding no harm"
- 024/2022

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.

- No

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.

- No

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

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).

To keep data understandable and usable Electronic Lab Notebooks will be used to record methodological procedures and store all related data obtained in the project, from raw data to final figures, including data presented in congress, meetings, scientific events etc, manuscripts drafts and final versions.

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.

- Yes

To make data findable and citable, descriptive or citation metadata such as authors, title, abstract, and keywords are essential. These metadata elements are typically aligned with established schemes like DataCite. Structural metadata will include details such as the units of analysis, sample types, instruments used, settings of data collection, and methodologies employed. Such metadata adheres to best practices and community standards to provide clarity and enable reproducibility.
Metadata will be automatically generated by instruments during data collection, enriched using Research Data Management (RDM) tools, and will be supplemented upon deposit in a repository. Data will be deposited and shared via the KU Leuven Research Data Repository, the DataCite metadata standard will be applied to ensure the datasets are easily discoverable, properly documented, and readily citable.

Data Storage & Back-up during the Research Project

Where will the data be stored?

- ManGO
- Large Volume Storage

How will the data be backed up?

- Standard back-up provided by KU Leuven ICTS for my storage solution

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?

To ensure data are securely stored and protected from unauthorized access or modification, robust measures will be implemented, including role-based access controls, strong authentication methods such as multi-factor authentication (MFA) provided by KU Leuven. I will use secure storage solutions, such as institutional repositories or compliant cloud platforms, that will be accessed only in institutional network (in locus network or via VPN). Additionally, secure data-sharing platforms with permissions-based access will facilitate collaboration, and all practices will comply with relevant legal and institutional regulations. Training and clear policies will further reinforce data security.

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

No extra costs are expected. Costs are covered by the institution.

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)?

- Large Volume Storage (longterm for large volumes)
- KU Leuven RDR

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

No extra costs are expected. Costs are covered by the institution.

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.

- Yes, as restricted data (upon approval, or institutional access only)

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

Graciana de Azambuja (post doctoral fellow)
Sandrine Da Cruz (PI)
Laboratory memebers upon request.
External researchers upon request.

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.

- No

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

Which data usage licenses are you going to provide?

If none, please explain why.

- Other (specify below)

Public Domain Mark (PD)

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.

- Yes, a PID will be added upon deposit in a data repository

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

No extra costs are expected. Costs are covered by the institution.

Responsibilities

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

Graciana de Azambuja (post doctoral fellow)
Sandrine Da Cruz (PI)

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

Graciana de Azambuja (post doctoral fellow)
Sandrine Da Cruz (PI)

Who will manage data preservation and sharing?

Graciana de Azambuja (post doctoral fellow)
Sandrine Da Cruz (PI)

Who will update and implement this DMP?

Graciana de Azambuja (post doctoral fellow)
Sandrine Da Cruz (PI)