STUDYING THE IMPACT OF MODULATED INFLAMMATION IN CARDIAC ISCHEMIA REPERFUSION INJURY.

A Data Management Plan created using DMPonline.be

Creators: Michiel Algoet, First Name Surname

Affiliation: KU Leuven (KUL)

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

Template: FWO DMP (Flemish Standard DMP)

Principal Investigator: First Name Surname

Grant number / **URL:** 11A2423N

ID: 196715

Start date: 01-11-2022

End date: 31-10-2026

Project abstract:

Ischemic heart disease is a leading cause of death. The metabolic, functional and structural changes
after acute myocardial injury, also termed cardiac remodelling, determine residual cardiac function,
development of heart failure and survival. Inflammation andreperfusion not only contribute to infarct
healing but paradoxically can also cause aggravation of the injury (metaflammation). Ischemic postconditioning has shown its beneficial role in infarct size reduction and cardiac remodelling in rodent models. In rodent models with comorbidities (= pro-inflammatory state) it seemed a higher
threshold was present before activating thess endogenous cardioprotective pathway. To study the
relationship between inflammation and remodeling, we will use preclinical rodent models with a genetic deletion (CLEC4E), metabolic syndrome and aged models, pharmacological intervention (colchicine) and surgical intervention (ischemic postconditioning). To establish the acute myocardial
ischemia and perform postconditioning during imaging a technical surgical procedure will be developed. Using advanced state-of-the art imaging infrastructure (PET-MRI), we will be able to perform longitudinal monitoring of cardiac function, metabolism and inflammation to describe the process of cardiac remodeling after an acute ischemic injury and different interventions in individual
models. It is our goal to identify the role of inflammation in cardiac remodelling and explore its therapeutic options.

Last modified: 31-01-2023

STUDYING THE IMPACT OF MODULATED INFLAMMATION IN CARDIAC ISCHEMIA REPERFUSION INJURY.

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.

Type of Data	Format	Volume	How created
(A) Positron emission tomography (PET)	.NIfTI, DICOM; paper/pdf	50 GB	PET imaging of murine hearts Descriptive data on paper form: subject- and tracer-specific document with information regarding the injected tracer (e.g., required activity, specific activity, radiochemical purity, lot-number of precursor) – will be achieved as pdf
(B) Magnetic resonance imaging (MRI)	.NIfTI, DICOM, .SPAR, .SDAT	180 GB	MRI imaging of the participants' brains, more specifically · anatomical scans (T1) · Late Gadolinium enhancement scans (LGE) · diffusion weighted imaging (DWI) · functional magnetic resonance imaging (fMRI) collected at baseline, at 4-week follow-up and at 10-week follow-up
(C) Histology	Tissue and .CZI files	180 GB 500+ samples	Cardiac tissue will be collected at the end of the experiment and used for analysis. Histological stainings will be performed (MPO, sirius red) and electronic scans will be made.
(D) Analysis scripts and code for medical imaging (MRI and PET), and statistical analysis	.m(at), .py(w), .r, .sgsx, .jmp, .dll	6 GB	Already existing in-house script that is adapted; self-written code and statistics datasets
(E) Processed data	.xlsx, .txt	2 GB	Processed data of all raw data sources described above will be stored in .xlsx or .txt format, depending on the type of data
(F) Metadata	.txt/.docx	100 MB	

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

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, animal data

Ethical approval @ KU Leuven is obtained: P146-2021

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.

- 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/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

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).

All information regarding this study will be kept on central secured KU Leuven server and will be updated by a member of the research team every time a new subject is enrolled and/or measurements take place.
The study protocol describes the goal, purpose and objectives of the study and how the study will be performed practically.
Letters in brackets below refer to the table above (question 2b).
(A) and (B): An additional .txt or docx. file explaining the scanning protocol, image reconstruction, data storage, primary data processing and generic descriptions of the applied data analysis processes will be stored for each imaging type.
(C): Physical storage in cardiac surgery lab, electronical storage on central secured KU Leuven server. An additional .txt or docx. file explaining the scanning protocol, and physical histology will be stored.
(D), (E), (F): Electronical storage on central secured KU Leuven server

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.

- No

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

Where will the data be stored?

Data will be stored using backup protocols and server space of the KU Leuven.
- Data on animal models, surgical protocols and immunohistochemistry are backed up and archived

on the servers of the research groups (Cardiology/ Cardiac Surgery, Nuclear Medicine, Biomedical MRI) totaling 20Tb
- Storage capacity for the imaging modalities is available at Molecular Small Animal Imaging Center (MoSAIC) (server partition PET/MRI: 50Tb; server partition MRI: 20Tb). This storage space is available during and after the project, also reflected in the data storage policy of MoSAIC.

How will the data be backed up?

KU Leuven servers are backed up

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

Data will be stored using backup protocols and server space of the KU Leuven.
- Data on animal models, surgical protocols and immunohistochemistry are backed up and archived on the servers of the research groups (Cardiology/ Cardiac Surgery, Nuclear Medicine, Biomedical MRI) totaling 20Tb
- Storage capacity for the imaging modalities is available at Molecular Small Animal Imaging Center (MoSAIC) (server partition PET/MRI: 50Tb; server partition MRI: 20Tb). This storage space is available during and after the project, also reflected in the data storage policy of MoSAIC.

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

Data is only accessible for people with have been granted access by the director of the cardiovascular department and/or biomedical imaging department.
Access is granted through the personal employee login, which is unique.

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

Large volume storage KUL: € 100,86 / TB / year.
Covered by the department.

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 data mentioned in table 1, question 1.

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

Large volume storage KU Leuven

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

Large volume storage KUL: € 100,86 / TB / year.
Covered by the department.

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, …)

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

After request, access will be permitted after consulting the PhD student and supervisor.

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.

- No

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

NA

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.

NA

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.

- No

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

Deposition of smaller datasets in data repositories is usually covered by the repository and for sharing physical data the cost are typically paid by the researcher requesting the materials. For larger datasets repositories may charge a fee.

6. Responsibilities

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

Michiel Algoet

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

Michiel Algoet

Who will manage data preservation and sharing?

Michiel Algoet

Who will update and implement this DMP?

Michiel Algoet