12B0E24N: A glitch in the matrix: characterization of the potential of ketone bodies to improve muscular and functional adaptations to exercise training in young and older adults

A Data Management Plan created using DMPonline.be

Creator: Chiel Poffé

Affiliation: KU Leuven (KUL)

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

Template: FWO DMP (Flemish Standard DMP)

Grant number / URL: 12B0E24N

ID: 205364

Start date: 01-10-2023

End date: 30-09-2026

Project abstract:

We recently indicated that increasing blood ketone levels, by ketone ester ingestion (KE), promotes muscular angiogenesis and net muscle anabolism during exercise training performed under catabolic conditions. In addition, we provided proof of concept for a beneficial role of KE in remodeling of the extracellular matrix (ECM), and in promoting post-exercise sleep, which are both central players in the adaptive response to exercise. Therefore, we aim to elucidate whether KE, via these alterations, can beneficially impact the muscular and functional response to exercise training in well-trained individuals. Given the pivotal role of muscle catabolism, capillary rarefaction, sleep disturbances, and ECM remodeling in the age-related decline of muscular function and general health, we also aim to identify the effect of KE on the adaptive response to exercise training in older adults. In both work packages, we will provide an in-depth blueprint of the adaptations that occur in the skeletal muscle ECM as this is increasingly recognized to be a central regulator of muscular plasticity. As such, we aim to provide a detailed understanding of the effects of KE, exercise training, and aging on skeletal muscle ECM. This project will thus not only benefit athletes, but will also provide direct relevance for older adults, and will support the development of clinical trials in the context of dystrophic syndromes and other clinical models that are characterized by ECM dysregulations.

Last modified: 14-03-2024

12B0E24N: A glitch in the matrix: characterization of the potential of ketone bodies to improve muscular and functional adaptations to exercise training in young and older adults

DPIA

DPIA

Have you performed a DPIA for the personal data processing activities for this project?

- No

12B0E24N: A glitch in the matrix: characterization of the potential of ketone bodies to improve muscular and functional adaptations to exercise training in young and older adults

GDPR

GDPR

Have you registered personal data processing activities for this project?

- Yes

12B0E24N: A glitch in the matrix: characterization of the potential of ketone bodies to improve muscular and functional adaptations to exercise training in young and older adults

Application DMP

Questionnaire

Describe the datatypes (surveys, sequences, manuscripts, objects …) the research will collect and/or generate and /or (re)use. (use up to 700 characters)

Biological material: human blood samples, saliva samples, and muscle biopsies
Databases: spreadsheets and larger data files with numeric data from in-vivo measurements and biochemical analyses.
Surveys, questionnaires and food diaries
Personal data of volunteers
Statistical data
Manuscripts and publications
Notes (primarily in electronic lab notebook, otherwise traditional lab notebook)
Metadata generated using metadata standards for microscopy images (OME-XML standard), statistical analyses (metadata of database in SPSS), surveys (Data Documentation initiative standard), and proteomics data (MAGE-TAB). A general file will be generated to record the metadata of other data elements.

Specify in which way the following provisions are in place in order to preserve the data during and at least 5 years after the end of the research? Motivate your answer. (use up to 700 characters)

1. Designation of responsible person (If already designated, please fill in his/her name.)
2. Storage capacity/repository
    - during the research
    - after the research

Professor Katrien Koppo is designated as responsible person (support via our departmental data manager Evelien Nackaerts). During the project, all electronic data will be stored on a secured KU Leuven network drive (1TB, automatic backup) that is shared by the applicant and his supervisor. Upon completion of the project, all data will be added to a large volume storage (3.5 PB) that can only be accessed by the supervisor, the research data manager and the departmental ICT manager. Biological materials will be stored at appropriate temperature (blood at -20°C; muscle at -80°C; spare freezers available). All data and biological samples will be retained for a period of 10 years after the end of the project.

What’s the reason why you wish to deviate from the principle of preservation of data and of the minimum preservation term of 5 years? (max. 700 characters)

No deviation.

Are there issues concerning research data indicated in the ethics questionnaire of this application form? Which specific security measures do those data require? (use up to 700 characters)

Personal data will be acquired and registered in the KU Leuven’s PRET platform. All study data will be pseudonymized and the coding (the link between a subject and his/her data) will be stored for 15 years by the supervisor. Therefore, the supervisor is the only person who can relate the data to a specific person. None of the acquired data will contain elements that may result in identifying a particular subject.

Which other issues related to the data management are relevant to mention? (use up to 700 characters)

Not applicable.

12B0E24N: A glitch in the matrix: characterization of the potential of ketone bodies to improve muscular and functional adaptations to exercise training in young and older adults

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 blood, saliva and muscle biopsy samples	Biological material collected during the study interventions	Generate new data	Physical	Experimental	NA	NA	144 biopsies, 144 venous blood samples, 144 saliva samples
Spreadsheet with numeric data from all in-vivo measurements, biochemical analyses and personal data	Spreadsheet with all numeric data that is collected	Generate new data	Digital	Experimental	.csv	<100GB	NA
Western blot images	Digital images of western blot analyses on skeletal muscle samples	Generate new data	Digital	Experimental	.tiff	<1GB	NA
Microscope images	Digital microscope images of immunohistochemical analyses on skeletal muscle samples	Generate new data	Digital	Experimental	.tiff	<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:

No data will be reused.

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

Human subject data will be collected. Ethical guidelines will be followed and all studies will be registered using the PRET tool of the KU Leuven.

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

Personal data of competent, healthy adult volunteers.
Categories of data:
- Ordinary personal data: name, age, gender, weight, height, telephone number and email address
- Special personal data: health data → performance parameters (muscle strength and cycling performance); metabolites and hormones in the blood and metabolites in muscle samples

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).

Metadata will be generated using metadata standards for microscopy images (OME-XML standard), statistical analyses (metadata of database in SPSS), surveys (Data Documentation initiative standard), and proteomics data (MAGE-TAB). A general file will be generated to record the metadata of other data elements as such allowing to reproduce all experimental analyses.

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

Metadata will be generated using metadata standards for microscopy images (OME-XML standard), statistical analyses (metadata of database in SPSS), surveys (Data Documentation initiative standard), and proteomics data (MAGE-TAB).

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

Where will the data be stored?

During the project, all electronic data will be stored on a secured KU Leuven network drive (1TB, automatic backup) that is shared by the applicant and his supervisor. Biological materials will be stored at appropriate temperature (blood at -20°C; muscle at -80°C; spare freezers available).

How will the data be backed up?

The KU Leuven network drive is automatically backed up on a daily basis by the departmental ICT manager.

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

- Currently 1 TB is available on the secured KU Leuven network drive.
- Spare freezers are available for the biological materials.

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

The network drive is secured by the KU Leuven and is only accessible for myself, my supervisor, our research data manager and departmental ICT manager.

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

No expected costs.

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 and biological samples will be retained for a period of 10 years after the end of the project.

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

During the project, all electronic data will be stored on a secured KU Leuven network
drive (1TB, automatic backup) that is shared by the applicant and his supervisor. Upon completion of the project, all data will be added to a large volume storage (3.5 PB) that can only be accessed by the supervisor, the research data manager and the departmental ICT manager. Biological materials will be stored at appropriate temperature (blood at -20°C; muscle at -80°C; spare freezers available).

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

No expected costs.

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.

- No (closed access)

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

Prof. Katrien Koppo has integral access to all data (promotor).

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.

Data will not be made publicly available.

When will the data be made available?

Not applicable.

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

Not applicable.

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?

Not applicable.

6. Responsibilities

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

Chiel Poffé

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

Chiel Poffé

Who will manage data preservation and sharing?

Katrien Koppo

Who will update and implement this DMP?

Chiel Poffé