UNRAVELLING THE NEUROPEPTIDERGIC CIRCUITRY UNDERLYING AROUSAL AND SENSITIZATION

A Data Management Plan created using DMPonline.be

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Project abstract:

Survival of every organism depends on its ability to modulate behavior in response to external stimuli. As a consequence, animals can switch between alternative behavioral states, one of which is arousal. A fundamental aspect of arousal is cross-modal sensitization, which primes specific brain circuits for increased vigilance following an arousing, often aversive stimulus. Although observed in most animals, from worms to humans, the molecular factors underlying sensitization and their mode
of action in arousal circuits remain elusive. In this project, I aim to deliver a deeper understanding of the genetic and neural networks governing environmentally triggered arousal by dissecting the peptidergic circuitry involved. Neuropeptides, which are protein-like signaling molecules, play key roles in modulating such behaviors in humans and across animal species. Using the well-characterized C. elegans nervous system I will investigate neuropeptide genes and their roles in arousal circuits at the molecular and cellular level. I will use state-of-the-art molecular and imaging tools to dissect this peptidergic circuit and assess neural activity in response to external stimuli. This work will broaden our understanding of the basic principles underlying arousal and sensitization and lay a foundation for future studies in vertebrate brains.

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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
Publication manuscripts	Publication manuscripts	Generate new data	Digital	Compiled/aggregated data	.docx, .pdf	<100GB	
Images	Confocal fluorescence microscopy of transgenes	Generate new data	Digital	Experimental	.jpg, .tiff, .oib	<1TB	
Videos	Semi-automated behavioral assays, Calcium imaging	Generate new data	Digital	Experimental	.avi, .stk	<10TB (Permanent storage)	
Processed data file	Quantitative experimental data (behavioral assay data, calcium imaging data, receptor deorphanisation and doseresponse data)	Generate new data	Digital	Experimental	.csv, .exe, .xlsx, .mat, .RData, .rda, .pzfx	<100GB	
Data representations	Visual representation of quantitative and qualitative data	Generate new data	Digital	Experimental	.ai, .svg, .jpg, .png, .pdf	<100GB	
Notebooks	Experimental logbook	Generate new data	Physical	/	/	/	6-7 books
Frozen stock collections	Our experimental work will generate a diverse set of samples that will be archived and stored in our frozen stock collections (DNA and RNA samples, frozen at -20 or -80 degrees; C. elegans strains and plasmid-transformed bacteria frozen at -80 degrees and in liquid nitrogen)	Generate new data	Physical	/	/	/	/

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)? Describe these issues in the comment section. Please refer to specific datasets or data types when appropriate.

- No

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 digital data (raw and analyzed data files) will be stored on Desktop File Storage and Large Volume Storage. Digital files will be organized in folders per research objective and experiment, including a .txt file with a clear description of what the data represent and how they were generated.
Experimental procedures will be fully documented as word files and in hardcover notebooks. Details on samples, including plasmid maps and strain genotypes, will be archived in excel files with an overview of their location in frozen stock collections.

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

Biological imaging data will be stored following the OME (Open Microscopy Environment) standard to encode metadata on light microscopy experiments in image files. Metadata about strain and plasmid collections will be created manually, following the community guidelines as published in the Nomenclature section of the community resource Wormbase (www.wormbase.org).

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

Where will the data be stored?

During the research, all digital data will be stored on Desktop File Storage. The ICT team of the Biology Department will facilitate the technical

infrastructure and
authentication to access stored files through KU Leuven's Active Directory (Luna). Hardcover notebooks will be kept personally by all researchers involved during the project, and by the PI after the end of the project. Samples will be stored in the central stock collections of the lab.

How will the data be backed up?

Network storages (fee-based) for digital data are hosted in the KU Leuven ICTS data center, with incremental backups on at least a daily basis. All data is mirrored to a second ICTS data center.

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

Network storage for digital data hosted by the KU Leuven ICTS data center can provide sufficient storage and backup capacity (fee-based).

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

We will not be working with personal, confidential, or sensitive data but will ensure data security by storing data at secured KU Leuven Network storages and buildings.

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

Expected costs for data storage and back-up during the project are estimated 3500 EUR, which will be covered by the allocated FWO project bench fee or research project funds.

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, including digital files and samples, will be stored for at least 5 years after the end of the project.

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

After the research, digital data will be archived for at least 5 years on Large Volume Storage hosted in the KU Leuven ICTS data center with automatic back-up procedures. Samples will be kept for long-term storage in frozen stock collections (-80 freezer or liquid nitrogen).

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

Expected costs for data storage and back-up after the project are estimated at 3500 EUR, which will be covered by research grant budgets.

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 an Open Access repository

Digital data and samples resulting from this project will be made available after publication of results.

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

NA

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.

Publications resulting from this project will be archived in the KU Leuven Lirias 2.0 repository. All data and samples can be requested from the main researcher or the principal investigator by mail.

When will the data be made available?

Upon publication of the research results

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

Data will be shared under CC-BY license.

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?

Expected costs for data sharing encompass publication fees (estimated 3000 EUR),
which will be covered by the research project funds.

6. Responsibilities

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

The main researcher will manage data documentation and metadata management during the project.

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

The main researcher will manage data storage and back-ups on KU Leuven servers during the project.

Who will manage data preservation and sharing?

The principal investigator will manage data preservation and sharing.

Who will update and implement this DMP?

The main researcher and PI will update & implement this DMP.