Towards a functional cure strategy of HIV infection: Single virus imaging to study the impact of nuclear import and integration on transcription and latency

A Data Management Plan created using DMPonline.be

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Project abstract:

The human immunodeficiency virus type 1 (HIV-1) is the causative agent of the acquired immune deficiency syndrome (AIDS). Nowadays, HIV patients are treated with combination antiretroviral therapy which reduces the viral load but does not cure HIV infection. The persistence of integrated viral DNA in a transcriptionally silent mode is a major barrier to cure HIV infection. However, multiple strategies for an HIV cure are being developed. My host lab focuses on a block-and-lock functional cure strategy in which the cellular reservoir is rendered resistant to reactivation, thereby preventing viral rebound after treatment interruption. My host lab discovered the important role of lens epithelium-derived growth factor (LEDGF/p75) in HIV integration. LEDGF/p75 tethers HIV integrase to host chromatin, determining optimal integration sites. They developed small molecule inhibitors of this interaction (LEDGINs) that retarget the provirus to regions resistant to reactivation. In this project, I will study the role of three host factors in nuclear import (TRN-SR2, TNPO1, and CPSF6) and the impact of integration sites on HIV transcription and hence HIV persistence. Finally, I will determine the impact of known antivirals (reverse transcriptase inhibitors, capsid inhibitors, and integrase inhibitors) on nuclear import, integration site and HIV transcription. The project will result in a technology platform for the evaluation of antivirals and an improved functional cure strategy.

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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)

- Generate new data
- I will not work with personal data

Data types:

- Spreadsheets from experimental data (.xlsx, .csv)
- Images from experimental data (.png, TIFF, CBF, .jpeg)
- Text notes (.docx, .csv, .txt, .ape, .scf, lab book, OneNote)
- Presentations of experimental data (.ppt, .pdf)
- Nucleic acid sequences (.dna)
- Biochemical experimental readouts (western blotting)

Total volume of data:
1 TB

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. Joris Van Asselberghs, senior technician in our lab, guarantees the safeguarding of all data on a common storage drive with automatic back-up
2. All data is saved on a J drive with automatic back-up (capacity of 1 TB). Furthermore, for storage of my personal data, a OneDrive made available by KU Leuven with a capacity of 2 TB (can be expanded upon request) can be used. In addition, printouts of my research can be saved in the laboratory's archive, under responsibility of Brigitte Verheyden. Furthermore, all samples will be preserved in the appropriate freezers of -20°C and -80°C whereas cell lines are stored in liquid nitrogen. After my research, data will be stored on the OneDrive made available by KU Leuven.

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)

NA

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)

NA

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

NA

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DPIA

DPIA

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

- Not applicable

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GDPR

GDPR

Have you registered personal data processing activities for this project?

- Not applicable

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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
Spreadsheets from experimental data		Generate new data	Digital	Experimental	.xlsx, .csv	<1GB	
Images from experimental data (Confocal Microscopy)		Generate new data	Digital	Experimental	.png, TIFF, .jpeg	<1TB	
Text notes		Generate new data	Digital/Physical	Experimental	.docx, .csv, .txt	<1GB	
Presentations of experimental data		Generate new data	Digital	Experimental	.ppt, .pdf	<1GB	
Nucleic acid sequences		Generate new data	Digital	Experimental	.dna	<1GB	
Cell lines	Different knockdown cell lines	Generate new data	Physical				+- 15 cell lines
Integration site sequencing		Generate new data	Digital	Experimental		<100GB	
Biochemical experimental readouts		Generate new data	Digital	Experimental		<1GB	

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.

- Yes, human subject data

Human peripheral blood lymphocytes or CD4+ cells from human subjects will be used. Ethical approval is obtained. (Reference number: S58969-IRB00002047)

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.

- Yes

During this project, I will optimize an innovative imaging platform for HIV drug discovery. Despite the application on HIV in this project, the platform can be applied to other viruses. This platform can result in collaborations with industry and academia. Dr. Frauke Christ is the IOF manager in our lab and she will enable efficient valorization of this platform.

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).

In general, in-house collected data will be noted in the OneNote notebook unless otherwise described in the notebook. Data collected not in-house or digital data will be assigned to a specific folder in the FWO fellow's (Wout Hannes) KU Leuven OneDrive. This will be easy to find since there is a standard known by everyone working in the Laboratory for Molecular Virology and Gene Therapy.

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

No metadata standard will be used. However, data will be easy to find since a OneDrive notebook will be used in which all dates of experiments are mentioned with a description. In this way, it should be easy to find all data, which are divided into different work packages and subfolders.

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

Where will the data be stored?

Data will be stored at the FWO fellow's (Wout Hannes) OneDrive made available by KU Leuven with a capacity of 2TB (can be expanded upon my request). For back-up storage, the L drive (Large Volume Storage) of the Laboratory of Molecular Virology and Gene Therapy will be used.

How will the data be backed up?

The data on the fellow's lab PC is synchronized with the fellow's KU Leuven OneDrive. Data from the FWO fellow's (Wout Hannes) KU Leuven OneDrive will be backed up on the large volume storage of the Laboratory of Molecular Virology and Gene Therapy.

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

For storage of my personal data, a OneDrive made available by KU Leuven with a capacity of 2TB (can be expanded upon request) can be used. This is sufficient for the estimated volume specified in the data table.

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

Concerning the FWO fellow's lab PC: an antiviral system is installed, no connection will be made with unknown networks and no illegal programs/software will be downloaded.
Concerning the Laboratory of Molecular Virology and Gene Therapy: access is only provided for strictly assigned persons and protected by a password.

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

The expected costs for data storage during the project will be around 1000 euro. Costs will be partially covered both by the research budget provided alongside the FWO fellowship and the laboratory of Molecular Virology and Gene Therapy.

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 obtained data will be archived for 10 years according to KU Leuven RDM policy.

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

All obtained data will be archived on a L drive (Large Volume storage) of the laboratory of Molecular Virology and Gene Therapy at the KU Leuven.

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

The expected costs for data preservation will be around 1000 euro. Costs will be covered by the Laboratory of Molecular Virology and Gene Therapy and by the research budget provided by the FWO fellowship.

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, …)

Only data which were already published/mentioned in papers will be made available after the end of the project for public use. However, for a possible continuation of this research project, all unpublished data will be available in the laboratory of Molecular Virology and Gene Therapy. In this way, data can still be accessed on demand.
In addition, data will be shared between close collaborators when necessary.

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

Everyone will be able to request access to published data by e-mail. Nevertheless, prof. Zeger Debyser (PI) and Wout Hannes (FWO fellow) will, under consultation, evaluate if the request will be accepted. For example, ongoing collaborations will, by great change, be accepted whili competitive labs will be denied access.

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.

All obtained data will be archived at the L drive (Large Volume storage) of the laboratory of Molecular Virology and Gene Therapy at the KU Leuven. Everyone will be able to request access to published data by mail.

When will the data be made available?

Upon publication of the research results or upon request via mail.

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.

- Yes

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

The expected costs for data sharing will be largely based on the publication of papers. The price of publication is estimated at 3000 euro. This will be covered by the allocated project budget (FWO) and the Laboratory of Molecular Virology and Gene Therapy.

6. Responsibilities

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

Wout Hannes

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

Wout Hannes

Who will manage data preservation and sharing?

Zeger Debyser (PI) & Wout Hannes

Who will update and implement this DMP?

Wout Hannes