
Unraveling the pathophysiology of Virus-Associated Pulmonary Aspergillosis (VAPA) using a zebrafish larvae model

A Data Management Plan created using DMPOnline.be

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Project abstract:

Virus-associated pulmonary aspergillosis (VAPA) is a severe and lethal co-infection with a fungus (*Aspergillus*) in the lungs of patients with severe influenza or COVID-19 admitted to the intensive care unit. The pathophysiology of VAPA is still an enigma, while this knowledge is vital to be able to identify new diagnostic and therapeutic strategies. Our project aims to elucidate why and how influenza and SARS-CoV-2 lead to invasive aspergillosis while other respiratory viruses do not, by establishing a collection of virus-*Aspergillus fumigatus* co-infection models using optically transparent zebrafish larvae. These zebrafish models will be used to characterize (co)infection dynamics and the interplay with the innate immune response, following a number of hypotheses. We will both investigate targeted hypotheses using fluorescence microscopy, as well as spawning new hypotheses using single-cell RNA sequencing.

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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
Microscopy images	Microscopy images of whole zebrafish larvae taken with Leica DMI8 microscope (LASX software) and spinning disk confocal microscope (Andor) (Imaris software)	N	D	I	.tif, .ems	<1GB	
Flow cytometry plots	Flow cytometry plots of zebrafish cells acquired with BD LSRFortessa X20 (FACS Diva software)	N	D	SO	.fcs	<1GB	
qPCR data	Quantstudio Machine + associated software	N	D	N	.xls	<1GB	
scRNA-seq	Expression of RNA of zebrafish specific cells	N	D	SO	.fastq	<100GB	

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:

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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)

All experimental work is approved by relevant ethical committees: P070/2021 by ECD for working with zebrafish larvae as an animal model.

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).

All experiments with their details are described in an online lab notebook using EndNote which is backed up continuously by KU Leuven servers. For microscopy images, all associated documentation and metadata is stored together with the images on a computer and once opened in corresponding LAS X or Imaris softwares, details are shown including dimensions, bit-depth, microscopy settings etc. The same applies for other used techniques including flow cytometry and qPCR; all details on the required parameters are written down in a lab book but are visible as well once files are opened in their corresponding software programs and the files needed for this are stored on a KUL controlled and backed up server to ensure access at all times.

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

For microscopy images; the Leica LASX and Imaris softwares generate a metadata file for every picture taken and which is stored together with the picture.

Data Storage & Back-up during the Research Project

Where will the data be stored?

- Shared network drive (J-drive)
- Large Volume Storage

All data will be stored on KUL organized and backed up drives with specific directions for the type of data. Smaller data will be stored in a specific folder on the J drive of our team. Larger data files such as microscopy data will be stored on the L drive of our team. Finally, data of finished projects will be stored on a storage K drive which can be accessed at all times. All drives are regulated and backed up by the KU Leuven and if needed, capacity can be increased at any time. All raw and (pre-)processed scRNA-seq data will be routinely stored on the Vlaamse Super Computer (VSC). Sequencing data will be uploaded to the GEO database after publication.

How will the data be backed up?

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

The data will be stored on the university's central servers (J/K/L drives) with automatic daily backup procedures.

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?

All data is stored on a KU Leuven backed up server wherefore access is granted to only team members and this access is controlled and overlooked by a designated person of our research group (Head of the research group: Joana Rocha-Pereira).

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

The costs of a KUL server backend storage are; 415.2 euros/year for the J drive (800GB), 1138.4 euros/year for the L drive (10TB), 22.8 euros/year for the K drive (200GB). The costs for data storage and backups are concerning the whole research group and are not specific for this research project and thus the costs will be divided over all funding available by our group including the bench fee available through this project.

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)?

- Other (specify below)

The data and all associated information including meta data and electronic lab books will be stored on the university's K drive (with automatic back-up procedures) for at least 10 years,

conform the KU Leuven RDM policy.

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

Since all data will be stored on the long-term storage K-drive, costs are estimated at 11.4 euros/100 GB which is paid annually (the exact cost will depend on the storage size at the specific moment in time which can always be increased/decreased on demand). The costs for data storage are concerning the whole research group and are not specific for this research project and thus the costs will be divided over all funding available by our group.

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 open data

At the end of the research project and after respective papers have been published, data will be deposited on the KUL research data repository.

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

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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)
- Other (specify below)

At the end of the research project and after respective papers have been published, data will be deposited on the KUL research data repository. Upon request, data can be shared with other parties after data has been published in peer-reviewed open access journals.

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.

- CC-BY 4.0 (data)

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.

- No

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

Every researcher can store 50 GB per year for free on the KUL research data repository. If the dataset exceeds this limit, the researcher should contact the RDR helpdesk. The storage quota applies to the first author of the dataset.

Responsibilities

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

Anaïs Hubart, PhD student of this project. Moreover, a second PhD student will be recruited for the project with who this responsibility will be shared.

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

Anaïs Hubart, PhD student of this project. Moreover, a second PhD student will be recruited for the project with who this responsibility will be shared.

Who will manage data preservation and sharing?

Anaïs Hubart, PhD student of this project and the second PhD student who will be recruited for the project, supported by Prof. Joana Rocha-Pereira (professor of the research group and supervisor) and Prof. Joost Wauters (co-promotor).

Who will update and implement this DMP?

The PI bears the end responsibility of updating & implementing this DMP.