Development of conditionally active enzymes based on recombinant binders.

A Data Management Plan created using DMPonline.be

Creator: Vincent Van Deuren

Affiliation: KU Leuven (KUL)

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

Template: FWO DMP (Flemish Standard DMP)

Data Manager: Vincent Van Deuren

Project Administrator: Vincent Van Deuren

Grant number / URL: 12B2Y24N

ID: 206265

Start date: 01-10-2023

End date: 30-09-2026

Project abstract:

A key question in synthetic biology and other disciplines is how enzymes can be engineered so that their activity is controlled by the presence or absence of (near-) arbitrary stimuli. Conformational changes are a key regulatory mechanisms in proteins, but it is currently very difficult to generate protein domains that show pronounced conformational changes in response to a stimulus of choice.
This project aims to overcome this limitation by creating conditional enzymes called 'NanoBlocks', in which highly generic affinity binders are combined with split enzymes in such a way that binding of the target results in a conformational change and activation of the split enzyme. In particular, I propose to develop a framework that will allow conditional enzymes to be created against, in theory, any target for which a nanobody is available. To achieve this, I will set up a screening system based on yeast surface display and fluorescence-assisted cell sorting that can simultaneously monitor binding and the molecular response. The resulting methodology will be used to develop two such enzymes, a tool for conditional interactome mapping, as well as a tool to engineer new signaling pathways via conditional protease activity.

Last modified: 26-04-2024

Development of conditionally active enzymes based on recombinant binders.
DPIA

DPIA

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

- No

Development of conditionally active enzymes based on recombinant binders.
GDPR

GDPR

Have you registered personal data processing activities for this project?

- No

Development of conditionally active enzymes based on recombinant binders.
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)

Multiple types of data will be generated. First of all, plasmid sequences of the developed constructs (FASTA, FASTQ), FACS data of the cell sorting (FCS). On the other hand, the developed tools will allow us to generate fluorescence microscope images (TIFF), mass spectra and proteomic data (mzXML). I expect total amount of data to be around low Tb order

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 : Prof. Peter Dedecker (PI of the hostlab)
2. Storage capacity/repository
    - during the research: personal harddrives
    - after the research: All harddrives are handed over to the PI. When published, the data of our lab is commonly preserved on zenodo.

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)

not applicable

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)

no, all data acquired is free from ethical issues as it concerns protein engineering and demonstration of the tools in model and commercial cell lines.

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

none

Development of conditionally active enzymes based on recombinant binders.
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
proteomics	mass spectra	new data	digital	experimental	mzXLS	<10TB	
Microscope images	image	new data	digital	experimental	TIFF	<50TB	
Plasmids	sequences	new data	digital	experimental	FASTA	<1GB	
FACS data	cell sorting data (fluorescence)	new data	digital	experimental	FCS	<1TB	

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 is 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.

- 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).

The file naming system will contain the most important parameters (eg. name, data, stimulus frame, exposure, laser power, ...). All of the data is linked in an en electronic lab book (One note) with additional notes and observations

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

The date in the filename will be directly linked to the electronic labboon, where alle the relevant information is kept

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

Where will the data be stored?

The data will be stored on several external harddrives. Backups are regularly made.

How will the data be backed up?

on other, standalone backup drives.

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

The lab has a large stock of harddrives available.

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

The harddrives are kept in a locked drawer in the office (which is also locked when no one is around)

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

Estimate up to 10 hard drives (4 TB each). Bench fee or general lab funds are used for the buying of hard drives

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 of the relevant data will be handed over to the PI. The data that eventually ends up in in papers is always uploaded to zenodo

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

The lab routinely stores published data on zenodo

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

Zenodo is free of charge, and the hard drives are already acquired

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

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

no restrictions applied

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.

zenodo.org as it is the host lab preferred platform
Addgene for the plasmids

When will the data be made available?

After publication of the relevant article

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

none, as all data will be factual

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

none available at the moment

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

none

6. Responsibilities

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

Vincent Van Deuren

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

Vincent Van Deuren

Who will manage data preservation and sharing?

prof. Peter Dedecker

Who will update and implement this DMP?

Vincent Van Deuren