DMP Luna Dillemans

Project Name CXC chemokine ligand 10 in inflammatory arthropathies: biological function, quantification and potential as therapeutic target - DMP Luna Dillemans

Project Identifier 11L3122N

Grant Title CXC chemokine ligand 10 in inflammatory arthropathies: biological function, quantification and potential as therapeutic target

Principal Investigator / **Researcher** Luna Dillemans

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Description Chemokines are proteins that orchestrate directional leukocyte trafficking. CXC chemokine ligand 10 (CXCL10) is an interferoninducible inflammatory chemokine that coordinates chemo-attraction of activated T cells and NK cells through interaction with its G protein-coupled receptor, CXC chemokine receptor 3 (CXCR3). As a result of posttranslational modifications, CXCL10 exhibits a high degree of natural structural and functional heterogeneity with CD26- processed amino-terminally truncated CXCL10 acting as a chemotaxis antagonist. The biological effect of natural processing of CXCL10 at the C-terminus is largely unknown, but will be uncovered in this project. CXCL10 is abundantly present in the circulation and inflamed joints in various inflammatory arthropathies and is generally acknowledged to contribute to selective leukocyte recruitment towards the inflamed joints. However, whether CXCL10 is biologically active, inactive due to processing or even acts as a CXCR3 antagonist in these diseases is uncharted territory, since no methods exist to discriminate CXCL10 proteoforms in biological samples. This project aims to develop such method and to quantify endogenous CXCL10 proteoforms in synovial fluids and plasma of patients suffering from inflammatory arthropathies. As such, this research will unravel the role of CXCL10 in these destructive arthropathies and pave the way towards the identification of a novel therapeutic target.

Institution KU Leuven

1. General Information

Name applicant

Luna Dillemans

FWO Project Number & Title

11L3122N: CXC chemokine ligand 10 in inflammatory arthropathies: biological function, quantification and potential as therapeutic target

Affiliation

- KU Leuven

Laboratory of Molecular Immunology, Rega Institute for Medical Research

2. Data description

Will you generate/collect new data and/or make use of existing data?

- Generate new data
- Reuse existing data

Describe in detail the origin, type and format of the data (per dataset) and its (estimated) volume. This may be easiest in a table (see example) or as a data flow and per WP or objective of the project. If you reuse existing data, specify the source of these data. Distinguish data types (the kind of content) from data formats (the technical format).

Several types of data will be collected during my research project, including patient characteristics (i.e., age, sex, type of arthropathy, disease status, treatment), raw research data which is mainly instrument and processed data files and images. A detailed overview of these categories of data collection is provided in the table below. An estimated 500 GB of data per year will be collected. Hence, we expect that 2 TB will be obtained after 4 years. The raw data, analysed data and protocols will be evidently stored as digital files but also catalogued in my own personal laboratory notebooks and general laboratory notebooks. Besides the collection of new data, also data of patient samples previously collected at the laboratory (by Dr. Mieke Metzemaekers) will be used for this research project. The purposes of my PhD project are also incorporated in the ethical committee project submission of Dr. Mieke Metzemaekers and therefore, we are allowed to re-use these data for the current research project.

Type of data	Format stored	Volume of data	How/ from which source was the data obtained
Patient characteristics	.docx	10 MB/year	Collected from patient files kept by the treating clinicians: Prof. dr. Lien De Somer, Prof. Dr. Ellen De Langhe, Prof. Dr. Barbara Neerinckx, Prof. Dr. Patrick Verschueren, Dr. Alla Ishchenko and Prof. dr. Carine Wouters As researcher, we only receive patient' code and important features for our analysis (pseudonymization is done) (already obtained approval from the Ethics Committee Research UZ Leuven/KU Leuven cfr. S6508)
Observational numeric data (instrument data files)	.docx .xlsx .fcs .emf .pzfx	500 GB/year	In- and output data of solid-phase peptide synthesis (WP 1.1) ELISA and enzymatic activity data (WP 3.3) Nano-LC tandem MS files (WP 2) Flow cytometric analysis of leukocytes (WP 3.2) Data from functional assays for testing of neutrophils (WP 1.2 and WP 3.2) Data inserted into Graphpad Prism for analysis (WP 1-3)
Images and movies	.tif or .png .mp4	500 GB/year	Immunostainings of leukocytes (WP 3.2) Live-cell imaging in Incucyte (WP 3.2) Western Blot data (WP 3.3)

3. Legal and ethical issues

Will you use personal data? If so, shortly describe the kind of personal data you will use. Add the reference to your file in KU Leuven's Register of Data Processing for Research and Public Service Purposes (PRET application). Be aware that registering the fact that you process personal data is a legal obligation.

- Yes

Privacy Registry Reference: not yet available

Short description of the kind of personal data that will be used:

We will use personal data of patients and healthy controls included in the study (S65508: Role of posttranslational modifications of chemoattractants in leukocyte recruitment in the context of auto-inflammation and chronic arthritis). Patient data consist of general characteristics (*i.e.* age, sex) as well as disease-specific information (e.g. type of arthropathy, plasma levels of inflammatory markers, type of treatment, etc.) and the results of functional assays and immunophenotyping of leukocytes. Healthy control data consist of general characteristics and the results of functional assays and immunophenotyping of leukocytes. All patient data will be collected by Prof. Dr. Lien De Somer and the other collaborating clinicians (vide supra). When the researchers receive the patient data, this data is always pseudonymized to make patient name tracing impossible.

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, add the reference to the formal approval by the relevant ethical review committee(s)

- Yes

The Ethics Committee Research UZ Leuven/KU Leuven approved the use of samples of patients and healthy controls for the purposes of this research project (S65508; Role of posttranslational modifications of chemoattractants in leukocyte recruitment in the context of auto-inflammation and chronic arthritis). In addition, the samples were approved to be stored in the UZ Leuven Biobank. Moreover, PRET application (GDPR Questionnaire) was also approved for this study (G-2021-3615).

Request for ethical approval of animal studies will be submitted to the Ethical Committee for Animal Experimentation at KU Leuven.

Does your work possibly result in research data with potential for tech transfer and valorisation? Will IP restrictions be claimed for the data you created? If so, for what data and which restrictions will be asserted?

- Yes

All research data generated during this project will be secured by the need for login registration on datacentre/luna and use of u-number and password, which are also

restricted. In case of potential IP establishment for methods to detect and quantify specific proteoforms of CXCL10 in patient samples (such as plasma and synovial fluid) developed in the project, restrictions will applicable related to access to all the data related to the development of this method (instrument raw data files, processed data files, .emf files of the mass spectrometer, western blot data of the CXCL10 proteoforms, information with regard to the pre-purification method of the chemokine, …). These restrictions will be lifted as soon as IP is secured.

Do existing 3rd party agreements restrict dissemination or exploitation of the data you (re)use? If so, to what data do they relate and what restrictions are in place?

- No

4. Documentation and metadata

What documentation will be provided to enable reuse of the data collected/generated in this project?

1. With regard to patient and instrumental research data files:

Patient characteristics and observational numerical data will be stored and ordered in word formats (.docx), which automatically imprint the metadata (user, date, time, equipment parameters) from these experiments. Moreover, information on quantification and experimentation parameters will be embedded by the users on the digital document folders to insure adequate data reproducibility and maintenance.

In addition, the protocol used and other relevant methodological features of the experiment will be written in detail in the lab book. The results of the experiments will be described in the lab book also.

2. With regard to imaging data (i.e., pictures and movies)

Imaging data are created by default with metadata imprinted by the image acquisition software automatically. This includes information on user, data and time, duration of experiments, equipment parameters and imaging configurations. The metadata are saved and transferred with the original imaging file. The created data files will be organized in folders named by the data of the experiment (DDMMYYYY) followed by the research who performed it and the title of the experiment. The methodology and protocol of each experiment will be described in detail in a lab book

Will a metadata standard be used? If so, describe in detail which standard will be used. If no, state in detail which metadata will be created to make the data easy/easier to find and reuse.

- No

5. Data storage and backup during the FWO project

Where will the data be stored?

Electronical data will be stored in conformity with KU Leuven and FWO RDM policy

Research data will be stored in several locations, including on internal computer disks, at the shared local virtual drive (Rega drive), on internal computer disks, in redundant NAS (network adapted storage)-devices, on personal external HDDs, on KU Leuven OneDrive and on the KU Leuven central storage servers. The KU Leuven datacenters provide storage on two locations and promise high availability and disaster recovery to preserve data for a substantial period. Hard copy notebooks with raw data will be stored physically in our laboratory. The large raw data volumes from analysis equipment are stored redundant on hard disks in or connected to the lab computers and the workstations. The backups of the analysis data are stored on dedicated redundant NAS-devices.

How is backup of the data provided?

We will use the central server storage of KU Leuven (Data centre ICTS Luna storage), which provides a daily automatic back up. Moreover, the data will be backed up on the Rega Institute Virtual Drives (Rega NAS (network adapted storage)) and on external hard-drives kept by the investigators.

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

Enough storage and back-up capacity is available at the systems of Rega Institute

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

Long-term data storage and costs will be managed by the principal investigator working in the project, Prof. Dr. Paul Proost. The cost for data storage is 519 euro/TB/year, thus the accumulated cost for 4 years is approximately 2000 euro. The costs will be covered by previous funding obtained by the host lab and by the bench fee offered by the FWO PhD fellowship.

Data security: how will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

Research data are secured by the need for login registration on datacentre/luna and use of u-number and password, which are also restricted.

6. Data preservation after the FWO project

Which data will be retained for the expected 5 year period after the end of the project? In case only a selection of the data can/will be preserved, clearly state the reasons for this (legal or contractual restrictions, physical preservation

issues, ...).

All data generated during this project, raw or processed, will be stored for a minimum of 5 years.

Where will the data be archived (= stored for the longer term)?

The data will be stored redundantly during and after the research on our computers, on 3 external hard-drives of the researcher, on the personal KU Leuven Onedrive of the researcher and also in the KU Leuven data centers (ICTS Luna storage [J:// drives] and Rega NAS [network adapted storage]).

What are the expected costs for data preservation during the retention period of 5 years? How will the costs be covered?

Long-term data storage and costs will be managed and evaluated by the principal investigator of this project, *i.e.* my promotor Prof. dr. Paul Proost. The expected cost for data storage is 519 euro/terabyte/year.

7. Data sharing and reuse

Are there any factors restricting or preventing the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)?

- Yes. Specify:

potential IP: Data will only be available to 3rd party when potential IP is secured.

Which data will be made available after the end of the project?

All the data will be made available at the end of the project (after publishing the results) and securing IP.

Where/how will the data be made available for reuse?

- In a restricted access repository

Data will be available by access to the data storage facilities of KU Leuven and the Rega Institute as described above. Access to external users will be evaluated and authorized by Prof. Paul Proost.

When will the data be made available?

- Upon publication of the research results

The data will become immediately available after publication and securing IP.

Who will be able to access the data and under what conditions?

Direct access to the research data will be restricted to laboratory members, project members and collaborators. External members, who are not directly related to the project, will be given access after contact and evaluation by the principal investigator,

Prof. Paul Proost.

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

Local costs are minimal. Data transfer to external partners will be a at the partners cost.

8. Responsibilities

Who will be responsible for data documentation & metadata?

The principal investigator (Prof. Dr. Paul Proost) and the researcher (Luna Dillemans) bear the responsibility for the data documentation.

Who will be responsible for data storage & back up during the project?

The principal investigator (Prof. Dr. Paul Proost) and the researcher (Luna Dillemans) bear the responsibility for data storage and back-up.

Who will be responsible for ensuring data preservation and reuse ?

The principal investigator (Prof. Dr. Paul Proost) and the researcher (Luna Dillemans) bear the responsibility for data preservation and sharing.

Who bears the end responsibility for updating & implementing this DMP?

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

The principal investigator (Prof. Dr. Paul Proost) and the researcher (Luna Dillemans) bear the responsibility for updating and implementing the data management plan. My promotor and I will update the data management plan in case conditions have changed. In addition, the mid-term review will be accompanied by a detailed DMP and a final reviewed DMP will be sent along with the final report.