DMP title

Project Name My plan (FWO DMP) - DMP title

Project Identifier G073622N

Grant Title G073622N

Principal Investigator / Researcher Frederic Lluis Vinas

Description The dynamics of extracellular signals coordinate cell lineage decisions during early embryo development. The correct specification of the Inner Cell Mass in Epiblast (Epi), giving rise to the fetus, and Primitive Endoderm (PrE) cells, contributing to the extra-embryonic tissues, ins essential to ensure proper development. Even though the Epi/PrE lineage segregation during early human development is of great importance, its regulation remains understudied due to a lack of suitable in vitro models and human embryo material. In this project, we will block, stimulate, and knock-out pivotal signaling associated transcription factors for early development by signaling modulation and by the CRISPR/Cas9 technology in both human oocytes and naive embryonic stem cells, to characterize molecular networks involved in human Epi/PrE cell lineage commitment, with a specific focus on the role of Wnt/ÃŸ-catenin, for which we have obtained preliminary indications. Our results might provide new model systems for in vitro human extraembryonic cell modeling to clarify how extraembryonic lineages coordinate embryo development and how defects in these lineages might contribute to pregnancy failure, which is of great interest for the field of reproductive medicine.

Institution KU Leuven

1. General Information

Name applicant

Frederic LLuis

FWO Project Number & Title

G073622N

Unraveling early cell fate decisions during human preimplantation development

Affiliation

- KU Leuven

2. Data description

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

- Generate new 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).

We will generate new experimental data, more specifically human preimplantation embryos culture treated with Wnt signaling modulators. We will generate also new data regarding treatment of human embryonic stem cells with Wnt signaling modulators. These culture systems will be analysed by among others RTqPCR, ELISA, RNA-sequencing data, possibly spatial transcriptomics data, as well as microscopy data and flow cytometry data ((.xls, .czi,.csv, .cloupe, .tiff and .jpeg depending on the data lifecycle stage) and flow cytometry data (.fcs). The main part of the data will be generated in the host institution. When a researcher starts at the KULStem Cell Institute they are instructed regarding concerning proprietary information and intellectual property rights on research results and to maintain adequate written records of all research results. Results are preserved in hard copy notebooks or electronically on the host institute’s servers. It is the responsibility of the researcher and his supervisor to make use of the IT infrastructure. All necessary measures will be taken to archive all biological material according to good scientific practices. The estimated volume of data is 5TB.

Type of Data	Format	Volume	How created

Confocal images of Cultured human embryos	.LIF , .ometiff, .tif	100GB-500GB	Confocal microscopy images of stained human embryos taken using a Leica SP8 Confocal microscopy
Analysis of western blot images	.xls, .pzfx	50-200MB	Numerical data. Quantification of western blot images, performed Using imageJ, in microsoft excel and graph pad prism.
Raw data and associated statistical analysis	.xls , .pzfx	50-200MB	Numerical data. Recording of count data, analysis of data, saved in microsoft excel and graph pad prism.
Raw FACs sort reports	.CSV, .fcs	50-200MB	Reports describing fluorescent stained human embryonic cells for lineage commitment or proliferation markers.
Analysis of FACS files	.wsp	50-200MB	flow cytometric analysis processed in FlowJo
Fluorescent imaging files	.zen, .ometiff, .tiff	10-100GB	Images of stained human embryonic stem cells for lineage commitment or proliferation markers.
DNA plasmids	tubes of liquid containing DNA plasmids		DNA plasmids produced during the project, derived from existing DNA plasmids provided by commercial and non-commercial suppliers.

qRT-PCR data analysed files and statistical analysis	.xls, .pzfx	100-500MB	Analysis of qRTPCR data. Statistical analysis performed in graph pad prism.
Raw RNAsequencing data	.fastq	200-500GB	Sequencing of RNA by genomics core from human embryonic cells treated with Wnt modulators.
Analysis RNA sequencing data	.xls .csv	10-20GB	Analysis of Raw RNA-seq data for differentially expressed genes

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.

- No

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

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

All experiments will be conducted according to institutional, national and European regulations.
The Lluis lab and the Stem Cell Institute already have ethical clearance files approved by the ethical committee regarding the use of induced human pluripotent stem cells at the KU Leuven S52426.
For some WPs, ethical approval is currently being requested (S66397).

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?

- No

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?

Documentation and metadata linked to each experiment will be documented by the technical and research staff in hard copy lab notebooks and in digital format in this project. This includes the research design, protocol, context of data collection, data collection methods,

quality control procedures, processing and analysis procedures.

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

Currently the use of metadata standards has not been implemented in the daily routine of the research group. In case this will change in the course of the project this change and its timing will be reported at the end of the project. For all data common metadata are collected: (1) title, (2) author, (3) data type, (4) data created and date modified, (5) file size, (6) equipment reference (such as manufacturer and model identification).
Depending on the nature of data additional metadata are collected. Microscopy: (7) lense type, pinwholes, gain, laserstrength and magnification. FACS: (8) channels used. Fluorescence: (9) wavelength.

5. Data storage and backup during the FWO project

Where will the data be stored?

Time-stamped master copies of all data will be stored centrally at the KUL lab.
Personnel involved in the project will use different types of data storage and reporting: (1) A physical lab book with the chronological reporting of all related experiments and results including a cross reference to electronic storage of data. These lab books are owned by the research group and remain in the laboratory during the entire time. Finalized lab books are stored in the lab archives for at least 10 years. (2) Large data set, such as images from microscopy are stored on the KU Leuven L drive (large storage server). In addition, the members of the laboratory use the OneDrive for daily backup of all personal folders.

How is backup of the data provided?

Backup is secured daily on central servers of the university.

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 OneDrive does have limitation in storage capacity (2TB) and provides periodic backups. For large data, the laboratory has reserved 5TB of storage capacity which can be extended on demand.

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

The OneDrive (2TB) comes without charge. For the large data storage (L-Drive) the current costs are €1138.40 per year, which is shared by the PIs of the Stem Cell Insitiute Leuven. These costs are financed through grant applications.

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

The following measurements are taking to ensure secure data storage and to prevent modification by unauthorized persons: controlled physical access to the building, firewalling (on both departmental and individual server levels), encrypted communications, network compartmentalization & MAC authentication, least-known ports for well-known services, brute-force intrusion detection & isolation, individual account expiry in accordance with contract of employment, ACL’s (Access Control Lists).

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 will be retained for at least 10 years after the project. Thus complying to the data preservation rules of KU Leuven

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

Hard copy notebooks will be archived in the host institute's building. Digital data will be archived in team folders on the storage (L-Drive).

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

Digital data storage costs are included in general lab costs/paid at the department level (in case of retirement). The cost for storage on the L-drive is €1138.40 per year, which is shared by the PIs of the Stem Cell Insitiute Leuven

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)?

- No

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

All data that are not under IP. Data, is available upon publication of the results. Bioinformatics data are put on public repositories.

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

- In an Open Access repository

Transcriptomics and flow cytometry data will be available in an open access repository.

Restricted access repositories may also be used if required depending on nature of the data.

When will the data be made available?

- Upon publication of the research results

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

Published data are accessible to all.

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

Most of the data are put without costs on public repositories.

8. Responsibilities

Who will be responsible for data documentation & metadata?

The individual researcher producing data will have the final responsibility for data documentation and metadata. In case of PhD students and technical personal the collection will be supervised by the scientific project responsible while the final responsibility of data integrity by the researcher performing the experiments.

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

Data storage and back-up underlies the responsibility of the individual researcher, who will be supervised by the scientific coordinator. The responsibility for maintaining the infrastructure access for data storage lies in the hands of the IT responsible of the research team. Finally, the maintenance of servers and integrity of data stored on these servers underlies the ITC services of the university.

Who will be responsible for ensuring data preservation and reuse ?

The host institute's IT team is responsible for digital preservation.

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

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