
Induce vascular networks in large degradable porous scaffolds by influencing the local microenvironment; spatiotemporal control of growth factors and patterning of mechanical signals

A Data Management Plan created using DMPonline

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Project abstract:

Porous scaffolds have for some time shown potential to help tissue regeneration, but to date only a few engineered tissues have achieved clinical success. This is mainly due to insufficient vascularization within the scaffolds. We believe that the impaired vascularization in large porous degradable scaffolds would be improved by spatiotemporal control of copper ions, fibroblast growth factors, platelet-derived growth factor and appropriate exposure to external mechanical stimulation. The project is based on that hypothesis and presents an innovative 3D printed multi-layer scaffold and a unique well-thought out surface-based photoactive method to improve angiogenic sprouting. The project combines competences in polymer chemistry, molecular and functional mechanisms of angiogenesis and vascular biomechanics, including modelling. This unique combination will make it possible to understand microenvironment parameters important for vascularization, from scaffold fabrication to polymer functionalization and their influence on endothelial sprout location. We seek to build degradable scaffolds that have the potential to transform modern tissue engineering using innovative polymer

functionalization, 3D printing and electrospinning combined with biomechanical modelling and advanced cell biology.

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Start date: 01-01-2021

End date: 31-12-2024

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Induce vascular networks in large degradable porous scaffolds by influencing the local microenvironment; spatiotemporal control of growth factors and patterning of mechanical signals

General Information

Project Title

Induce vascular networks in large porous scaffolds by manipulation of the local microenvironment; spatiotemporal control of growth factors and patterning of mechanical signals

Project Leader

Anna Finne Wistrand

Registration number at the Swedish Research Council

Diarienummer: 2020-03427

Version

1

Date

2021-03-09

Description of data - reuse of existing data and/or production of new data

How will data be collected, created or reused?

This project focus on polymer synthesis and characterization and the data will be generated and collected during and after polymer synthesis.

Raw data will be generated by different characterization methods such as NMR, SEC, DSC, SEM.

We will use KTH Box to store all raw data and the analysed data.

An excel-sheet will summarize all stored data according to the following:

Raw-data number	Details	Software used to analyse	Analysis saved (KTH Box)	Used in publication (Y/N)
AW2021-1_1	NMR		AW2021-1_1A	

The procedure will be the following:

1. Each experiment will have a unique number (initials_year_number; for example AW_2021-1).
2. Raw data from a characterization method will have a unique number related to the experiment number (Experiment number_number; for example AW_2021-1_1).
3. The analysed raw data that are used in a publication will also be stored in a well known format such as tiff, jpeg, pdf and numbered with the raw data number followed with A (AW_2021-1_1A)

What types of data will be created and/or collected, in terms of data format and amount/volume of data?

See answer above

Documentation and data quality

How will the material be documented and described, with associated metadata relating to structure, standards and format for descriptions of the content, collection method, etc.?

The collected data will be summarized and published, in the publication will collection method etc be described in detail.

In the excel file will DOI number to the publication be included:

Raw-data number	Details	Software used to analyse	Analysis saved (KTH Box)	Used in publication (Y/N)
AW2021-1_1	NMR		AW2021-1_1A	DOI

How will data quality be safeguarded and documented (for example repeated measurements, validation of data input, etc.)?

The data quality will be ensured by using standardized methods, using standardized characterization methods and designing experiments according to current routines in the research field. When possible, statistical analysis will be implemented.

Storage and backup

How is storage and backup of data and metadata safeguarded during the research process?

Data will be stored at KTH Box.

How is data security and controlled access to data safeguarded, in relation to the handling of sensitive data and personal data, for example?

No sensitive data or personal data will be included in this project.

Legal and ethical aspects

How is data handling according to legal requirements safeguarded, e.g. in terms of handling of personal data, confidentiality and intellectual property rights?

No sensitive data or personal data will be included in this project.

The raw data as such will not influence the patentability and handling of the intellectual property rights. Intellectual rights will be discussed and planned for within the project. When collaboration starts with other research groups it will be considered to clarify in agreements which conditions apply to patenting and publication of both results and data.

How is correct data handling according to ethical aspects safeguarded?

No sensitive data or personal data will be included in this project.

Accessibility and long-term storage

How, when and where will research data or information about data (metadata) be made accessible? Are there any conditions, embargoes and limitations on the access to and reuse of data to be considered?

The data will be uploaded to KTH Zenodo community and the DOI for that dataset will be the written in the publication.

There will be no limitation to the access of and reuse of data.

In what way is long-term storage safeguarded, and by whom? How will the selection of data for long-term storage be made?

All raw data will be stored at KTH Box and raw data related to the publication will be stored at KTH Zenodo community for at least 10 years.

Will specific systems, software, source code or other types of services be necessary in order to understand, partake of or use/analyse data in the long term?

All raw data will be saved in the original format. The data used in the publication will also be saved after analysis and these will be stored in a common format such as tiff, jpeg, xls, pdf. These files will include information of obtained numerical values.

A readme file will be used to explain the data set. In this file will also important information of the instruments be included such as calibration, solvent and temperatures.

How will the use of unique and persistent identifiers, such as a Digital Object Identifier (DOI), be safeguarded?

KTH Zenodo will generate a DOI

Responsibility and resources

Who is responsible for data management and (possibly) supports the work with this while the research project is in progress? Who is responsible for data management, ongoing management and long-term storage after the research project has ended?

Responsible for the data management: Anna Finne Wistrand

What resources (costs, labour input or other) will be required for data management (including storage, back-up, provision of access and processing for long-term storage)? What resources will be needed to ensure that data fulfil the FAIR principles?

