
spatialist AB

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(Sweden)

In situ data analysis project: Vizgen MERSCOPE

15th June 2024

Consultant

spatialist AB

Hammarby Allé 9 120 32 Stockholm

Henceforth referred to as spatialist

Company registration number: 559433-8716

Purchaser

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Henceforth referred to as the customer

Statement of work

Dr. Fossati, from the Pharmacology and Brain Pathology Laboratory has expressed interest in a consultation service, specifically involving the analysis of spatial-omics data to be generated in the early months of 2024 on a mouse model of prenatal infectious challenges and their impact on neurodevelopment. The data will be generated using the Vizgen mouse brain panel on the MERSCOPE platform, and will involve a number of sections comprising between 3 and 9, ideally spanning 3 experimental conditions and multiple samples per condition. The lab is not providing reference scRNAseq data, and cell type annotation will be based on literature and publicly available datasets.

The project involves naively exploring the cell type composition across healthy and diseased samples, with a predicted particular focus on the variation in the numbers and transcriptional states of the Astrocyte populations.

spatialist's tasks are detailed as follows:

1. Before the data generation : analysis of the scientific problem and feedback on the feasibility of the study in the terms suggested by the customer. Suggestions to refine experiment design if needed (ie: inclusion of custom probes, considerations on the expected statistical power of the proposed number of samples).
2. Exhaustive and critical quality assessment of the generated data: number of cells, number of detected genes, number of detected transcripts per cell, number of cells after quality filtering and thresholding. Transcriptional consistency across replicates, quality consistency across samples. Feedback on the data will be used to determine if/how to proceed in the downstream analysis, and to suggest further experiments if needed.
3. Analysis of the spatial data: clustering of cell types, cell type annotation and identification of disease associated states, quantitative analysis of cell types and of their spatial distribution, analysis of the interaction between neighboring cells, comparison across experimental conditions.
4. Interaction and feedback from the customer for successive iterations of data exploration and analysis.

Execution

Phase 1: How the project is designed and initiated

spatialist will conduct interviews with the customer to narrow down the focus of the scientific problem and target a few specific questions that will drive the initial exploration of the data.

Once the data generation is complete, the customer will transfer the data to spatialist for the downstream data analysis. The data is to be handled confidentially. The raw data, as well as the analysis results will remain exclusive property of the customer.

spatialist will initially perform a quality assessment of the data and provide feedback to the customer in the form of a meeting and powerpoint presentation. The purpose of this meeting is to give the customer a view of the data quality and informative metrics, detect potential pitfalls as early as possible, and suggest new experiments, if necessary. This is referred to as "meeting #1".

Phase 2: How the project is executed up to submission

If the initial quality assessment is considered satisfactory by both parties, spatialist will carry on a series of standard exploratory analyses on the data. A second meeting will follow, accompanied by a power point presentation of the initial findings. This is referred to as "meeting #2".

The results of these standard analyses will also be further discussed in a maximum of 4 joint biweekly (or otherwise agreed) meetings, during which the customer will have the chance to clarify doubts, discuss biological interpretations and suggest further refinements of the analyses to address specific needs. These are referred to as "meetings #3-6".

After the 6th meeting, a complete report will be prepared by spatialist, including publication-quality figures and detailed text for publication purposes, as well as powerpoint slides for scientific presentations. This will mark the completion of the deliverables.

Phase 3: How peer-review is handled

Due to the difficulty of estimating the workload needed to answer reviewer's comments in the publication phase, the current budget does not include any of the work posterior to the paper(s) first submission. In case more data and/or analyses are requested by referees, spatialist proposes two approaches to be discussed depending on the needs. One approach is to treat this work as a new (likely smaller) project, taking into account the estimated workload. A second approach is for spatialist to bill the work on an hourly basis, with a compensation rate of €250/ hour. This is to be discussed between the parties at the appropriate time.

Prerequisites for carrying out the assignment:

1. List of the probe panel that will be run on the MERSCOPE platform
2. MERFISH dataset from MERSCOPE
3. Corresponding sample information / annotation from MERSCOPE run
4. Working hypothesis of biological insights from MERFISH dataset
5. To simplify the interaction between the consultant and the customer, we'd like to have a single contact representative from each side. These persons are to collect all the needs on each side, prioritize them, and communicate them effectively to the counterpart.
6. Point 5 doesn't apply to the meetings described below, to which every involved member can attend.

DELIVERABLES

spatialist is to deliver:

1. A general introduction to spatial omics data and a guide to the different approaches of approaching analysis and visualization tools.
2. Publication grade figures as outputs of the relevant analyses.

Analysis will include:

- a. cell type identification, quantification, differential expression signatures, and abundance analysis between conditions, neighborhood enrichment analysis of the identified cell type and the generation of high quality spatial maps.
 - b. Cell type annotation (done in close collaboration with the customer.)
 - c. An annotated and documented repository with all the code used in the analysis, to ensure the reproducibility of the analysis done.
 - d. Description of the analytical steps taken for constructing a method's section of a manuscript.
3. Optionally: An introduction to Jupyter notebook, with clear documentation on its initial installation and the installation of the relevant packages used in the analysis
 4. A maximum of 8 hours of aftersale support (ie. for modification or generation of additional figures), within 60 days post completion of deliverables. This cannot be used for radical re-analysis of the data and/or the generation of additional deliverables.

Cost

The estimated cost for the project is €6400 (25% VAT excluded), for a total of € 8000 including VAT.

Validity of the offer

The present offer is valid for a year from the date of emission indicated above.

Payment

The payment is to be made as follows:

33% of the total amount including VAT shall be paid upon agreement of the project.

33% of the total amount including VAT shall be paid after meeting #2. The customer might opt out at this point if the results of this level of analysis are considered satisfactory.

The remaining amount is to be paid a maximum of 60 days after meeting #6, upon completion of the deliverables.

The payment is to be made at the following bank account:

spatialist AB

SE26 5000 0000 0500 4114 2977

BIC: ESSESESSXXX