Photobiology and Bioimmuntherapy
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Project title

Analysis of scRNA-seq data of cutaneous T-cell lymphoma patients undergoing phototherapy treatment

Supervisor

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Co-supervisor(s)

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b) TBD

Brief description of the project

Cutaneous T-cell lymphoma (CTCL) is a disease that demonstrates the strength and potentially devastating capacity of the immune system in the skin. Although the emergence of malignant T-cell clones orchestrates the seriousness of the disease, it is unclear how malignant clonal density triggers clinical inflammation and what it signifies for therapeutic outcome. We have generated single cell RNA sequencing (scRNA-seq) data from CTCL patients undergoing phototherapy to investigate the transcriptional profile of malignant cells and to assess the effect of the treatment in the main cellular components of peripheral blood (ie. monocytes, NK cells B- and T-lymphocytes)

Research question and objectives of the position

We aim to identify the main signaling pathways involved in the pathogenesis of CTCL and evaluate how they shift upon treatment.

Requirements

- Basic understanding of transcriptional regulation and gene expression
- Skills in coding: R language and Galaxy workflows (desirable)
- Data management

Responsibilities

- Translate biological questions into code for data analysis
- Expand pipeline for analysis of scRNA-seq data
- Data visualization
- Basic biostatistics analysis

Our offer

We are looking for a motivated Masters student to carry out his/her thesis project analyzing scRNA-seq data. The student will be under the direct supervision of a senior postdoctoral fellow and will have the support of trained clinicians and experienced bioinformatics experts.

Literature

Vieyra-Garcia, P; Wolf, P. *Extracorporeal Photopheresis: A Case of Immunotherapy Ahead of Its Time*. Transfusion Medicine and Hemotherapy. **2020** June; 47(3):226–234 (**IF:** 2.8)

Vieyra-Garcia, P; Wolf, P. *A deep dive into UV-based phototherapy: mechanisms of action and emerging molecular targets in inflammation and cancer*. Pharmacology & Therapeutics **2020** Dec 11;222:107784. (**IF:** 10.55)

Vieyra-Garcia, P; Crouch, JD; O'Malley, JT; Seger, EW; Yang, CH; Teague, JE; Vromans, AM; Gehad, A; Win, TS; Yu, Z; Lowry, EL; Na, JI; Rook, AH; Wolf, P; Clark, RA. *Benign T cells drive clinical skin inflammation in cutaneous T cell lymphoma*. Journal of Clinical Investigation Insight. **2019**. Jan 10;4(1). pii: 12433