

MSC OPPORTUNITY IN CANCER NEUROIMMUNOLOGY

Dissecting Neuro-Immune Interactions in cancer

Project Outline

Accumulating evidence indicates that cancer and the nervous system bear a much closer, entangled relationship than had been previously appreciated. The innervation landscape of the tumour microenvironment (TME) appears to impact tumour progression, but the mechanisms underlying this observation remains completely unresolved and understudied. The aim of our research is to use powerful complementary technologies to address a key interdisciplinary question in cancer – The role of neuroimmune interactions in tumour progression and anti-tumour immunity.

Your Profile

We offer a master's project to work closely with an Early Independent PI within an interdisciplinary team (Cancer Neuroimmunology). We are looking for a highly curious and motivated student with excellent communication skills and a strong interest and background in neuroscience to work on and develop this research project. In this project, you will focus on the imaging of innervation within cancer tissues, utilising and mastering advanced imaging techniques such as immunohistochemistry (IHC), whole tissue clearing, confocal microscopy, and widefield microscopy. You will gain hands-on experience in capturing high-resolution images, performing 3D reconstruction of tissue structures, and analysing neural-tumour interactions in the tumour microenvironment (TME). Additionally, you will be involved in the optimisation and standardisation of these imaging protocols to ensure reproducibility and accuracy in data collection and interpretation. Furthermore, you will be expected to work both independently and within a group, contributing to the development of innovative approaches to understand neuro-immune interactions in the TME. Your work will be crucial in advancing our understanding of how the nervous system impacts tumour biology and in identifying potential therapeutic targets.

Our Contribution

We offer you an environment where you can network, be inspired and develop your own ideas. You will be able to interact and train with highly skilled experts in oncology, immunology, and cell biology and work with human material as well as with animal models. In addition, you will have the opportunity to learn to perform cell culture, flow cytometry, histology, in vivo techniques, bioinformatics, and more.

How to apply

Please send your full application consisting of a motivation letter and CV with 2-3 references by E-Mail to: karen.dixon@unibas.ch. Please specify in your email why you would like to work with us, what lab experience you already have, and which skills you would like to acquire.

References

- Amit M, Anastasaki C, Dantzer R, Demir IE, Deneen B, Dixon KO*, Egeblad M, Gibson EM, Hervey-Jumper SL, Hondermarck H, Magnon C, Monje M, Naxara S, Pan Y, Repasky EA, Scheff NN, Sloan EK, Talbot S, Tracey KJ, Trotman LC, Valiente M, Van Aelst L, Venkataramani V, Venkatesh HS, Vermeer PD, Winkler F, Wong RJ, Gutmann DH, Borniger JC. Next Directions in the Neuroscience of Cancers Arising outside the CNS. *Cancer Discov.* 2024 Apr 4;14(4):669-673. doi: 10.1158/2159-8290.CD-23-1495.PMID: 38571430
- Dixon K.O et al, Expression of Tim-3 on dendritic cells restrains anti-tumour immunity by regulating Inflammasome activation. *Nature.* 2021 Jul;595(7865):101-106. doi: 10.1038/s41586-021-03626-9.
- Zhu C*, Dixon KO* et al, Tim-3 adapter protein Bat3 is a molecular checkpoint of T cell terminal differentiation and exhaustion. *Science Advances,* 2021 Apr 30;7(18): eabd2710. Doi: 10.1126/sciadv.abd2710. PMID: 33931442.