



Master project 30-45 hp:

Understanding the pathways driving lymphatic metastasis and its effects on tumor immunity

open for motivated students with interest in experimental mouse models of cancer, flow cytometry and imaging

The lymph nodes are hubs for our adaptive immune response and are essential for induction of anti-tumor responses. Lymph nodes are also one of the earliest places for tumor metastasis. However, we still do not fully understand which properties in tumor cells facilitates metastasis, which will require an ability to interact with and enter into the lymphatic vessels, survive the transport in lymph and to extravasate and grow inside the highly immune competent environment of the lymph node. We also have incomplete knowledge of how metastasis to the lymph nodes affects the ability to mount anti-tumor responses. Our lab is establishing new experimental tumor models that will allow us to answer some of these questions. If you have an interest to explore these questions and to use high dimensional flow cytometry and imaging, you are very welcome to contact me. Background knowledge and strong interest in immunology is a big advantage.

Email: maria.ulvmar@imbim.uu.se

Maria Ulvmar, Senior Lecturer Experimental Immunology, Department of Medical Biochemistry and Microbiology (IMBIM), Uppsala University, Sweden

More information about our work:

<https://www.imbim.uu.se/research-groups/infection-and-immunity/Maria+Ulvmar>

For news also check Twitter: [@ulvmar_maria](https://twitter.com/ulvmar_maria)

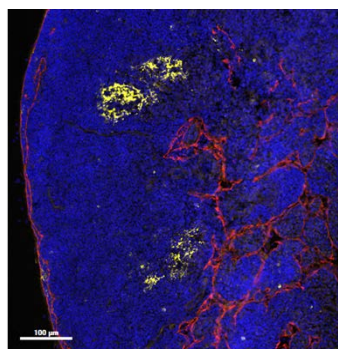
References of relevance for the project:

1. Nawaf, MG et al., Concurrent OX40 and CD30 Ligand blockade abrogates the CD4-driven autoimmunity associated with CTLA4 and PD1 blockade, while preserving excellent anti-CD8 tumor immunity. *Journal of Immunology* (2017) Aug; 199(3):974-981.

2.) Xiang M, et al., A Single-Cell Transcriptional Roadmap of the Mouse and Human Lymph Node Lymphatic Vasculature. *Front. in Cardiovascular Med.* (2020) Apr 30;7:52.

3.) Bekkhus T, et al., Remodeling of the Lymph Node High Endothelial Venules Reflects Tumor Invasiveness in Breast Cancer and is Associated with Dysregulation of Perivascular Stromal Cells. *Cancers (Basel)*. (2021) Jan 8;13(2):211.

4.) Arroz-Madeira Set al., Lessons of vascular specialization from secondary lymphoid organ lymphatic endothelial cells, *Circulation Research*, (2023). 132(9): p. 1203-1225.



Lymph node
with tumor
antigens

Tdtomato signal
tumor antigen.
Lyve-1:
lymphatic vessels
DAPI: nuclei