



Olli Dufva, 31, graduated in 2020 as a MD and in 2022 as a PhD, after the MD/PhD program at the Faculty of Medicine in the University of Helsinki, Finland. In his PhD, Olli studied immune interactions and precision medicine in blood cancers with Pr Satu Mustjoki, seeking to understand immune responses to blood cancers using systems biology and functional genomics, to develop more effective cancer immunotherapies. He has authored 26 original research articles, including 1st-author publications in *Immunity*, *Cancer Cell*, *Blood* and *Nature Communications*.

Cancer immunotherapy is a promising treatment option in haematological malignancies, but its therapeutic benefit is limited by various resistance mechanisms. Olli's PhD work was motivated by the notion that more effective immunotherapies could be applied with higher precision if we better understood how immune properties depend on the cancer type and genetic makeup of the cancer cells, which mechanisms determine whether a cancer cell is eliminated by immune cells, and how to pharmacologically exploit such mechanisms.

To discover connections between the immune properties and molecular subtypes of blood cancers, Olli co-led a study integrating transcriptomic and multi-omic data from over 10,000 patient samples across haematological malignancies. This work revealed immunological hallmarks specific to certain blood cancers, such as elevated immune infiltration in a myelodysplastic syndrome-like subtype of acute myeloid leukaemia.

In another study, Olli adapted a high-throughput drug screening platform to identify the effects of oncology drugs on immunity against cancer cells. This led to the discovery of SMAC mimetics, a class of apoptotic modulator drugs, as potent sensitizers of leukaemia cells to killing by chimeric antigen receptor T cells and uncovered impaired death receptor-mediated apoptosis as a mechanism of immune resistance.

Finally, Olli co-led a collaborative study into resistance mechanisms to natural killer (NK) cell therapies in haematological malignancies using functional genomics approaches, including single-cell transcriptomics of interacting NK cells and cancer cells and genome-scale CRISPR screens of NK cell resistance. The efforts led to the discovery of previously undescribed NK cell activation states, high sensitivity of myeloid leukemias to NK cells and new inhibitory checkpoints such as the adhesion molecules PSGL-1 and CD43 on cancer cells.

These findings suggest that considering molecular subtypes of cancer can aid in the search for optimal immunotherapies. They provide leads on genetic mechanisms and drugs that could facilitate new cancer immunotherapies in haematology and beyond.

Since 2023, Olli has been working as a postdoctoral fellow in Drs Sarah Teichmann's and Mathew Garnett's laboratories at the Wellcome Sanger Institute and the University of Cambridge in the United Kingdom. Olli's postdoctoral research, supported by EMBO and MSCA fellowships, focuses on deciphering genomic determinants of anti-cancer immunity and developing improved cellular immunotherapies using single-cell genomics, organoid models and genetic engineering.