SCIENCES & BIOENGINEERING SCIENCES

The Research Group
Brussels Center for Immunology

has the honor to invite you to the public defence of the PhD thesis of

Aarushi Audhut Caro

to obtain the degree of Doctor of Bioengineering Sciences

Joint PhD with KU Leuven

Title of the PhD thesis:

Exploring dendritic cell heterogeneity in tumors: From preclinical models to therapeutic applications

Supervisors:
Prof. dr. Damya Laoui (VUB)
Prof. dr. An Coosemans (KU Leuven)

The defence will take place on

Wednesday, March 18, 2026 at 1 p.m. in promotiezaal D.2.01

The defence can be followed through a live stream: Aarushi's Public PhD Defence

Members of the jury

Prof. dr. Joris Messens (VUB, chair)
Prof. dr. Kiavash Movahedi (VUB)
Prof. dr. Cleo Goyvaerts (VUB)
Prof. dr. Abhishek Garg (KU Leuven)
Prof. dr. Jan Remsik (KU Leuven)
Prof. dr. Pierre Guermonprez (Université de Paris, FR)
Prof. dr. Jitka Palich-Fučíková (Charles University, CZ)

Curriculum vitae

Aarushi Caro obtained the degree of Master of Molecular Biology with the greatest distinction at the VUB in 2020. She then started a joint PhD between VUB and KU Leuven under the supervision of Prof. Damya Laoui (VUB) and Prof. An Coosemans (KU Leuven).
During her PhD, she was supported by predoctoral fellowship funding from Fonds Wetenschappelijk Onderzoek and Kom Op Tegen Kanker.
Aarushi has contributed to six research articles, including two as co-first author. In addition, she is the first author of one review article and a co-author of another review. During her PhD, Aarushi supervised two master thesis students.

Abstract of the PhD research

Dendritic cells (DCs) are cells of the immune system that serve as the "security guards" of the body by constantly patrolling for issues like infections or tumors and are critical in orchestrating anti-tumor immunity. Evidently, their investigation as an anti-cancer therapy is warranted. However, multiple studies have described several DC types, often using inconsistent nomenclature, complicating translation across studies. To bridge this knowledge gap, we generated pan-cancer mouse and human tumor-associated DC (TADC) atlases using single-cell RNA sequencing, encompassing 14 mouse tumor models and 10 human cancer types, thoroughly characterizing the TADC compartment. TADCs were found to be broadly conserved between mice and humans, although species-specific differences were evident. Moreover, a comprehensive assessment of how different human TADCs associate with patient survival outcomes was performed.
Next, to assess the potential of DCs as an anti-cancer therapy, we focused on ovarian cancer (OC), wherein currently, 40% of the patients still die from the disease. However, currently available orthotopic OC models are rather slow progressing and fail to reach Stage IV of the cancer, which is commonly seen in OC patients at diagnosis. To address these constraints, we developed a fast-progressing orthotopic OC mouse model that replicates Stages I-IV seen in OC patients. Furthermore, in-depth characterization of the immune compartment in OC tumors and other relevant organs, along with a thorough profiling of the metastatic dissemination, allowed a better understanding of this model and its congruence with OC patients.
To evaluate the potential of DCs as anti-cancer therapy against OC, we performed prophylactic and therapeutic vaccinations using TADCs in our newly generated mouse model. Moreover, as an alternate therapeutic strategy, we used AXL-targeting nanobodies, given that AXL is highly expressed in OC patients and correlates with a worse prognosis. We found that anti-AXL nanobodies trigger cell death of OC cells and act synergistically with Olaparib to suppress OC cell proliferation.
Overall, the different chapters of this thesis follow a logical progression from investigating dendritic cell heterogeneity, to developing a highly patient translatable mouse model and the testing of novel therapies against this model, providing useful resources to the field for further investigation and validation.