



Universiteit
Leiden
The Netherlands

Modeling vascular inflammation with immune cell-vessel crosstalk in hiPSC-derived 3D vessels-on-chip

Bulut, M.

Citation

Bulut, M. (2025, July 2). *Modeling vascular inflammation with immune cell-vessel crosstalk in hiPSC-derived 3D vessels-on-chip*. Retrieved from <https://hdl.handle.net/1887/4252702>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/4252702>

Note: To cite this publication please use the final published version (if applicable).

Curriculum Vitae

Merve Bulut was born on August 13th, 1993 in Yenimahalle, Ankara, Türkiye. She obtained her Bachelor's degree in Molecular Biology and Genetics from Middle East Technical University in 2016. During her undergraduate studies, she also completed a minor degree in Chemistry. She carried out her dissertation project in the group of Prof. Dr. Miguel Beato del Rosal at the Centre for Genomic Regulation (CRG) in Barcelona, Spain, focusing on hormone-dependent gene regulation in breast cancer. She then moved to Germany to pursue a Master's degree in Regenerative Biology and Medicine at the Center for Regenerative Therapies (CRTD), TU Dresden. Her studies were supported by Deutscher Akademischer Austauschdienst (DAAD) scholarship. During this time, she completed internships in several research groups focused on immunology and stem cell research. Her involvement in the Organ-on-Chip field began during her Master's thesis in the group of Prof. Dr. Olivier T. Guenat at the University of Bern, Switzerland, where she worked on developing a Vessel-on-a-Chip (VoC) platform to study the effect of respiratory cyclic stretch on *in vitro* pulmonary vascularization.

In 2019, she started her PhD in the Department of Anatomy and Embryology at Leiden University Medical Center (LUMC) under the supervision of Dr. Valeria Orlova and Prof. Dr. Christine Mummery. Her research focused on combining human induced pluripotent stem cell (hiPSC)-derived vascular and immune cells with Organ-on-Chip (OoC) technology to engineer and validate functional vascular microenvironments for disease modeling. In particular, she developed multicellular hiPSC-derived 3D Vessel-on-Chip (VoC) models to investigate immune–vascular interactions under inflammatory conditions. These models integrated endothelial cells, mural cells, and monocytes/macrophages differentiated from both healthy donors and patients with vascular pathologies, enabling the study of disease-specific inflammatory responses. During her PhD, she participated in numerous international conferences, presenting her work through abstract-selected oral and poster presentations. Her research was supported by the Marie Skłodowska-Curie Innovative Training Network (MSCA-ITN) as part of the European Organ-on-Chip Consortium (EUROoC), the LymphChip consortium, and the Novo Nordisk Foundation Center for Stem Cell Medicine (reNEW).

List of publications

Bulut, M., Cao, X., Wiendels, M., van den Hil, F. E., Mei, H., Mummery, C.L., & Orlova, V.V. (2025). 3D hiPSC-Derived Vessels-on-Chip Reveal Insights into Inflammatory Responses in Healthy and Disease States. *iScience*, Under Revision.

Vila Cuenca, M., **Bulut, M.**, Mummery, C.L., Orlova, V.V. (2025). Vascularization of organoid microenvironments: Perfusable networks for organoid growth and maturation. *Current Opinion in Biomedical Engineering*, 34, 100586. Doi: 10.1016/j.cobme.2025.100586.

Bulut, M., Cuenca, M. V., de Graaf, M., van den Hil, F. E., Mummery, C. L., & Orlova, V. V. (2022). Three-dimensional vessels-on-a-chip based on hiPSC-derived vascular endothelial and smooth muscle cells. *Current Protocols*, 2, e564. doi: 10.1002/cpz1.564

Ichwan, M., Walker, T. L., Nicola, Z., Ludwig-Müller, J., Böttcher, C., Overall, R.W., Adusumilli, V.S., **Bulut, M.**, Sykes, A.M., Hübner, N., Ramirez-Rodriguez, G., Ortiz-López, L., Lugo-Hernández, E.A. & Kempermann, G. (2021). Apple Peel and Flesh Contain Pro-neurogenic Compounds. *Stem Cell Reports*, 16(3), 548-565. Doi: 10.1016/j.stemcr.2021.01.005

In Preparation

Bulut, M., Hanczar, M., van den Hil, F. E., Mummery, C. L., & Orlova, V. V. 3D hiPSC-derived Vessels-on-Chip recapitulate inflammatory responses in Hereditary Hemorrhagic Telangiectasia-1.

Bulut, M.*, Tsikari, T.*, van den Hil, F. E., Cuenca, M. V., Mummery, C. L., & Orlova, V. V. 3D hiPSC-derived Vessel-on-Chip model for investigating perivascular macrophage function.

Acknowledgments

This was a transforming journey filled with extraordinary people and immense support. I will be forever grateful for the people who contributed to this achievement.

To promoter Christine, thank you for the insightful discussions that helped me see the bigger picture; for ensuring the resources that made my PhD research possible and for your valuable career advice.

To my co-promoter Valeria, your dedication, attention to detail, and sharp memory for literature have been inspiring. Thank you for your enthusiasm for my work and your support for my growth as a junior scientist.

A heartfelt thank you to everyone in the Orlova group and Anatomy department for building such a collaborative and friendly community, for lunches, coffee breaks, scientific discussions, and borrels. Special thanks to those with whom I shared great times in the lab, office, and outside: Dhanesh, Sara, Sebastiaan, Giulia, Viviana, Nikola, Noelle, Maury, Laura, Arend, Yolanda, Karina, Eline, Dorien, Marcella, James, Milica, Beatrice, Veronika, Linda, Jeroen, Berend, Mervyn, and Dorien.

To Lisa, the endothelial cell production expert, thank you for providing high-quality differentiations and for always being available to help, even on short notice. I truly appreciated your support in the lab and your care for the well-being of the group members.

To my brilliant colleagues who became friends, Axelle, Albert, Sara, Ruben, Ben, Amy, Loukia, Athina, Isa, Louise, Sanne, Spiros, Mehmet, Dennis, Kendy, Marc, Amy, your uplifting energy and kindness filled this journey with joy. Thank you for the great times in the office/lab, for the fun trips, parties, cocktail nights, summers with volleyball and sunsets at the lake. Dennis, my favorite Dutch guy, thank you for the special time we shared in the lab (except for the times you annoyed me). Marc, thank you for your valuable input in my research and for sharing your enthusiasm for vessel-on-chip. Amy, thank you for your immense support in the early days of my PhD. To my expat friends outside of LUMC, Natalia, Jan, Conal, Ayfer and Tolga, thank you for the fun times, weekend trips, dinners, and for sharing the ups and downs of (PhD) life in the Netherlands.

To Julieta, Tessa, and Theano, you inspire me more than you know. Thank you for your love, your care, and the many heartfelt conversations that felt like therapy for the soul. No matter where life takes us, you will always hold a special place in my heart. Julieta, my lioness sister, thank you for the unforgettable birthday parties, for our shared love of EDM, and for your colorful and generous spirit. Tessa, the best part of COVID was that it brought us closer. Thank you for the (illegal) borrels, cocktail nights, and for always bringing your radiant energy. Theano mou, thank you for making me feel at home, far from home. Your empathy

and caring heart carried me through difficult moments. I will always cherish our long conversations while setting up chips in the lab; you were the best lab-mate.

Thank you all for sharing this journey with me and for being my chosen family in the Netherlands. I look forward to many more memories together.

To my loving and caring family, thank you for making me who I am, for believing in me and for your unconditional support. Canım ailem, anneciğim, babacığım, ablacıklarım Aslı ve Neslihan ve biricik yeğenim Arda, beni bugün olduğum kişi yapan ve hayatımın bu noktasına ulaşmamı sağlayan katkılarınız için çok teşekkür ederim. Aldığım tüm kararlarda koşulsuz desteğiniz, bana her zaman inandığınız ve güvendiğiniz için size minnettarım. Sizi çok seviyorum ve biliyorum ki siz yanımda olduğunuz sürece, bana verdiğiniz güçle dağları bile delebirim. Canım teyzelerim Naime ve Naile, çocukluğumdan bu yana eğitim hayatımdaki desteğiniz ve yüreklendirmeniz için teşekkür ederim. Canım kuzenlerim Esin ve Canan, saatlerce süren telefon konuşmalarımızda, uzakta olsak da ilginizi ve desteğinizi hissettirdiğiniz için teşekkür ederim. Bilge ve Zeynep, arkadaştaan öte kız kardeşlerim, akademik yolculuğumdaki öneminiz çok büyük. Yurtdışı hayatını ve doktoranın acı-tatlı yanlarını, uzaktan da olsa paylaştığımız ve her zaman yanımda olduğunuz için çok teşekkür ederim. To the Hertel and Wupperman family, thank you for your kindness and emotional support during these challenging years.

Stefan, my soulmate, my personal cheerleader, words fall short of expressing how much you've meant to me throughout this PhD journey and far beyond. I feel incredibly lucky to have you by my side. Thank you for your unconditional love and support, for caring for me even when I forgot to care for myself, and for lifting me up when I was down. Thank you for your patience through countless late nights, working weekends and missed moments. Thank you for celebrating my achievements even more than I did, for supporting my career decisions, and for your openness to follow this path with me, wherever it may lead. Every day, every experience and every road is special with you by my side. I look forward to discovering the next chapters together.

