UNIVERSITÄT
BERN

Faculty of Medicine

Department for BioMedical Research

Benoît Pochon Prize

The Benoît Pochon Prize was established in honour of the memory of Mr. Benoît Pochon, a former PhD student in the Radio-Oncology research group of the DBMR. The prize is awarded yearly to a doctoral student of the Department for BioMedical Research in recognition of the high quality and productivity of their research work.

Benoît Pochon Prize 2025

At DBMR Day for BioMedical Research on July 1, PD. Dr. Michaela Medová announced the winner of the Benoît Pochon Prize 2025.

The prize went to:

Dr. Saranda Nimani

Supervisor: Dr. Katja E. Odening
Co-advisor: Dr. Rachel M.A. ter Bekke

Title of the PhD thesis:

"QT syndromes: arrhythmogenic mechanisms and novel therapeutic approaches"

The DBMR congratulates Dr. Nimani!

Lay Summary:

Every heartbeat is triggered by a coordinated wave of electrical signals that spreads through the heart. These signals are controlled by ion channels, which regulate ion movement in and out of heart cells. When genes encoding these channels are altered, this coordination becomes disrupted, increasing the risk of arrhythmias and sudden cardiac death.

Short QT syndrome type 1 (SQT1) and long QT syndrome type 1 (LQT1) are examples of such conditions. While the heart recovers too quickly between beats in SQT1, this process is delayed in LQT1, both predisposing to life-threatening arrhythmias. Available therapies manage symptoms but do not target the underlying disease mechanisms.

To address this unmet need, my thesis explored a gene therapy strategy called suppression-replacement (SupRep), which silences the faulty gene and replaces it with a healthy copy. Unlike many gene therapies that target specific variants, SupRep targets the entire gene, making it effective regardless of disease-causative variant.

SupRep was evaluated in genetically engineered rabbit models of SQT1 and LQT1 that closely mimic human disease. To minimize off-target effects, SupRep was delivered directly to the heart. Therapeutic efficacy was assessed *in vivo*, *ex vivo*, and at cellular level.

In SQT1 rabbits, SupRep restored the physiological phenotype and improved mechano-electrical interplay. In LQT1 rabbits, it normalized electrical function at rest and under stress, when arrhythmia risk is highest.

These findings provide first evidence of gene therapy efficacy in medium-sized animal models of SQT1 and LQT1, offering a promising mechanism-based therapeutic approach for these and related inherited cardiac disorders.

Published articles (selected):

Nimani, S.*, Bains, S.*, Alerni, N., Ördög, B., Horváth, A., Matas, L., Louradour, J., Giammarino, L., Tester, D. J., Beslac, O., Lopez, R., Meier, S., Egle, M., Christoforou, N., Barbieri, M., Vashanthakumar, V., Perez-Feliz, S., Parodi, C., Garcia Casalta, L. G., Kim, C. S. J., … Odening, K. E. (2026). AAV9-mediated KCNH2 suppression-replacement gene therapy in a transgenic rabbit model of type 1 short QT syndrome. *European heart journal, 47*(2), 199–213. https://doi.org/10.1093/eurheartj/ehaf660

Bains, S. *, Giammarino, L. *, **Nimani, S.**, Alerni, N., Tester, D. J., Kim, C. S. J., Christoforou, N., Louradour, J., Horváth, A., Beslac, O., Barbieri, M., Matas, L., Hof, T. S., Lopez, R., Perez-Feliz, S., Parodi, C., Garcia Casalta, L. G., Jurgensen, J., Barry, M. A., Bego, M., … Ackerman, M. J.§, Odening, K. E.§ (2024). KCNQ1 suppression-replacement gene therapy in transgenic rabbits with type 1 long QT syndrome. *European heart journal, 45*(36), 3751–3763. https://doi.org/10.1093/eurheartj/ehae476

Nimani, S., Barbieri, M., Rieder, M. & Odening, K. (2025). Current and future precision therapy approaches in the long QT syndrome. *Medizinische Genetik, 37*(3), 189–196. https://doi.org/10.1515/medgen-2025-2015

Lewetag, R. D.*, **Nimani, S.***, Alerni, N.*, Hornyik, T., Jacobi, S. F., Moss, R., Menza, M., Pilia, N., Walz, T. P., HajiRassouliha, A., Perez-Feliz, S., Zehender, M., Seemann, G., Zgierski-Johnston, C. M., Lopez, R., & Odening, K. E. (2024). Mechano-electrical interactions and heterogeneities in wild-type and drug-induced long QT syndrome rabbits. *The Journal of physiology, 602*(18), 4511–4527. https://doi.org/10.1113/JP284604