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Host: Niels Reichardt

Glycomimetic-mediated targeted delivery to Langerhans cells for transdermal vaccination



Wednesday, 23th October
12.00 p.m.

CIC biomaGUNE - Seminar Room

The ability to target hepatocytes using trivalent presentations of GalNAc has revolutionized therapeutic approaches. This innovation has paved the way for the recent approval of several RNA-based drugs, including Givlaari, Oxlumo, Leqvio, Amvuttra, and Rivfloza. These successes highlight the power of carbohydrate-based delivery systems in achieving cell-specific delivery, a cornerstone of many groundbreaking nucleic acid-based medicines, including gene editing technologies. This targeted delivery approach represents a significant advancement in precision medicine.

In this work, we present the discovery and development of a novel glycomimetic small molecule specifically designed to bind to Langerin, a C-type lectin receptor expressed on Langerhans cells (LCs) [1,2]. LCs, antigen-presenting cells residing in the epidermis, play a critical role in orchestrating systemic immune responses against invading pathogens. Additionally, under normal conditions, they contribute to maintaining peripheral T cell tolerance. Given their strategic location in human skin, our glycomimetic-driven active targeting approach demonstrates exceptional capabilities in reaching LCs [3,4]. Ex vivo and in vivo investigations have confirmed the efficacy of our platform technology in targeted therapeutic delivery, ultimately leading to enhanced immune responses. These findings emphasize the transformative potential of this glycomimetic platform for efficient and targeted delivery of therapeutic payloads specifically to LCs.

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[2] J. Schulze, M. Rentsch, D. Kim, L. Bellmann, P. Stoitzner, C. Rademacher, Biochemistry, 2019, 58, 2576-2580.

[3] M. Rentsch, R. Wawrzinek, C. Zelle-Rieser, H. Strandt, L. Bellmann, F.F. Fuchsberger, J. Schulze, J. Busmann, J. Rademacher, S. Sigl, B. Del Frari, P. Stoitzner, C. Rademacher, Frontl Immunol, 2021, 12, 732298.

[4] L. Bellmann, C. Zelle-Rieser, P. Milne, A. Resteu, C.H. Tripp, N. Hermann-Kleiter, V. Zaderer, D. Wilflingseder, P. Hortnagl, M. Theochari, J. Schulze, M. Rentsch, B. Del Frari, M. Collin, C. Rademacher, N. Romani, P. Stoitzner J Invest Dermatol, 2021, 141, 84-94 e86