Targeting human langerin receptor for T cell response

Iris BERMEJO [1], Christoph RADEMACHER [1]

[1] University of Vienna, Austria,

iris.bermejo@univie.ac.at

C-type lectins represent the largest and most complex family of mammalian carbohydrate-binding proteins. These lectins can have a distinct expression pattern on defined cellular subsets. For the last decades, these patterns have raised significant interest in targeting C-type lectins to enable cell specific delivery of therapeutics. C-type lectin receptors (CLRs) play a critical role in immunity, enabling internalization of foreign antigens via carbohydrate recognition. Nevertheless, traditional carbohydrate-based vaccines suffer from low specificity because most CLRs nonspecifically recognize similar antigenic glycans.

Along these lines, a modified heparin glycomimetic, N-tosylglucosamine, recently developed [1] is specific for one of those C-type receptors, human langerin, also improving affinity compared to natural glycans, such as mannose. This glycomimetic, presented onto proteins or liposomes, promotes highly specific antigen internalization by Langerhans cells (LCs).[2,3]

On this work, the beforementioned glycomimetic has been used as a human langerin targeting ligand onto different vaccine scaffolds such as peptides, lipid nanoparticles and liposomes to study the cellular immune response they elicit. The ultimate desired outcome is the transcutaneous administration of the formulations, as an advantageous alternative to classic intramuscular vaccination methods. Herein we show how to utilize CLRs for specific targeting LCs.

Bibliographic references:

[1] E.C. Wamhoff, J. Schulze, L. Bellmann, M. Rentzsch, G. Bachem, F.F. Fuchsberger, J. Rademacher, M. Hermann, B. Del Frari, R. Van Dalen, D. Hartmann, N.M. Van Sorge, O. Seitz, P. Stoitzner, C. Rademacher. (2019), ACS Cent. Sci. (5) 808–820.
[2] J. Schulze, M. Rentzsch, D. Kim, L. Bellmann, P. Stoitzner, C. Rademacher. (2019) Biochemistry (58) 2576–2580.
[3] M. Rentzsch, R. Wawrzinek, C. Zelle-Rieser, H. Strandt, (…) Stoitzner, C. Rademacher. (2021) Front. Immunol. (12) 1–10.