Lanthanide-Loaded Dendrons as Antibody Labels for Mass Cytometry Applications

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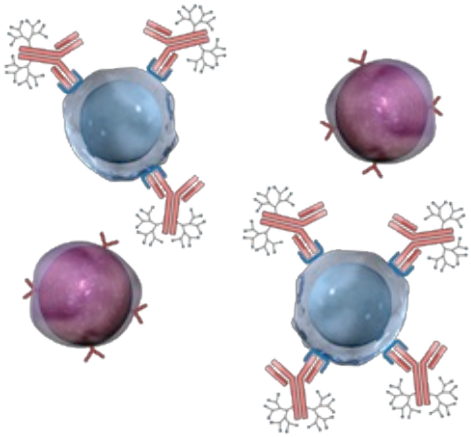
Mass cytometry (CyTOF) is a technique that uses metal isotopes conjugated to monoclonal antibodies for the simultaneous evaluation of multiple parameters on individual cells.[1] The use of probes carrying multiple copies of an isotope increases CyTOF sensitivity, boosting its ability to investigate complex cellular systems.[2] In addition, the strict control over the architecture of the probes is expected to augment their performances in CyTOF. Herein, the use of dendrons as sensitivity-enhancing probes for CyTOF applications is reported. Two generations of molecularly-defined, orthogonally-functionalized dendrons were designed and synthesized using a modular synthetic approach. The periphery of the dendrons was loaded with multiple copies of a metal isotope while the orthogonal group at the dendrons focal point enabled their conjugation to a monoclonal antibody by Cu-free click chemistry. The antibody-dendron conjugates were demonstrated to specifically bind to their receptor using human peripheral blood mononuclear cells as model system, generating a good separation between the positive populations and the background. Highly defined dendrons bearing orthogonal functional groups can serve as high-performance probes for mass cytometry applications. In addition, the versatility of the bioorthogonal conjugation is expected to readily generate a large array of metal-labelled antibodies and expand the capabilities of multiplex analyses.[3]



[1] M. H. Spitzer, G. P. Nolan, *Cell*, **2016**, *165*, 780-791.
[2] X. D. Lou, G. H. Zhang, I. Herrera, R. Kinach, O. Ornatsky, V. Baranov, M. Nitz, M. A. Winnik, *Angew. Chem., Int. Edit.*, **2007**, *46*, 6111-6114.
[3] L. G. Tulli, D. Miranda, C. C. Lee, Y. Sullivan, R. Grotzfeld, G. Hollingworth, R. Kneuer, A. S. Karpov, *Bioconjugate Chem.*, **submitted**.