Biomolecule functionalization using hypervalent iodine reagents

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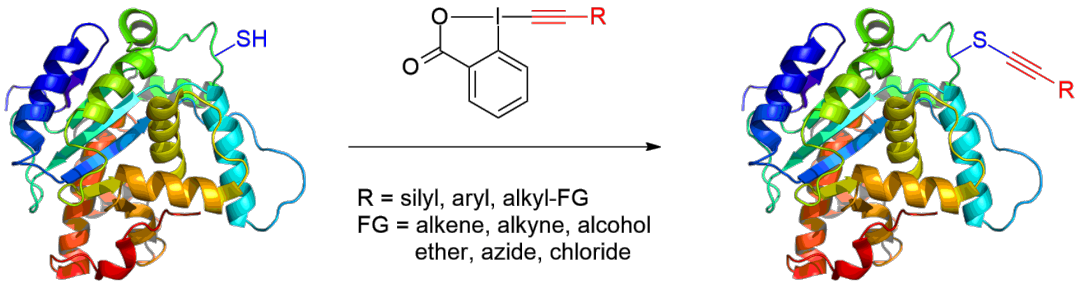
Organosulfur compounds are an important class of molecules, which is highlighted by the importance of cysteine residues for the structural stability and catalytic activity of proteins. Labelling methods selective for sulfurs into highly functionalized proteins are furthermore important tools in chemical biology.

Recently, our group developed a fast and practical thio-alkynylation reaction using the exceptional properties of hypervalent iodine reagents.[1] This reaction proceeds in less than 5 minutes, under air, with high tolerance towards a broad array of functional groups. The high chemoselectivity of these reagents led us to study their application in living cells in collaboration with the group of Prof. Adibekian. [2],[3]

This study demonstrated high chemoselectivity and intact reactivity in aqueous buffers, as well as a cell-membrane penetrating property for some of the hypervalent iodine reagents. Comparative studies showed that the new reagents are complementary in their protein targets when compared to iodoacetamide probes, the golden standard for cysteine functionalization in chemical biology.

Herein, we will present new advances concerning thio-functionalization on biomolecules using hypervalent iodine reagents.



[1] a) R. Frei, J. Waser, *J. Am. Chem. Soc.* **2013**, *135*, 9620. b) R. Frei, M. Wodrich, D. Hari, P.-A. Borin, C. Chauvier, J. Waser, *J. Am. Chem. Soc.* **2014**, *136*, 16563.
[2] D. Abegg, R. Frei, L. Cerato, D. Hari, C. Wang, J. Waser, A. Adibekian, *Angew. Chem., Int. Ed.* **2015**, *54*, 10852.
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