

Progress Towards Bioorthogonal Catalysis with Organometallics

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Abstract: The exceptional ability of transition metal complexes to catalyze a wide variety of chemical transformations has not yet been fully exploited for applications in the life sciences. Such catalysts could eventually be used to amplify signals by turning over a substrate multiple times, catalytically label or deactivate target biomolecules, or release prodrugs, and all this in a cellular environment. However, identifying or designing catalysts which work under physiological conditions is a significant challenge due to the combined presence of air, water, and a plethora of cellular components such as millimolar concentrations of thiols that are prone to poison organometallic catalysts, especially under protic and aerobic conditions. This presentation will provide an update on our progress to identify transition metal complexes for bioorthogonal catalysis under biologically relevant conditions as well as inside living mammalian cells.

Primary research from our group on this topic:

1. C. Streu, E. Meggers, *Angew. Chem. Int. Ed.* **2006**, *45*, 5645.
2. P. Sasmal, S. Carregal-Romero, A. Han, C. Streu, Z. Lin, K. Namikawa, S. Elliott, R. Klöster, W. Parak, E. Meggers, *ChemBioChem* **2012**, *13*, 1116.
3. P. Sasmal, S. Carregal-Romero, W. Parak, E. Meggers, *Organometallics* **2012**, *31*, 5968.
4. T. Völker, F. Dempwolff, P. L. Graumann, E. Meggers, *Angew. Chem. Int. Ed.* **2014**, *53*, 10536.

Reviews from our group on this topic:

1. P. K. Sasmal, C. N. Streu, E. Meggers, *Chem. Commun.* **2013**, *49*, 1581.
2. T. Völker, E. Meggers, *Curr. Opin. Chem. Biol.* **2015**, *25*, 48.