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New synthetic methods for medicinal chemistry

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Our research group is interested in developing new radical reactions with a strong focus on a later application in the field of medicinal chemistry. Key reaction types are alkene and arene functionalizations. While important contributions could be made in the area of the Meerwein arylations (carboamination, carboxygenation, carbofluorination), our efforts in radical aryl-aryl coupling are mainly dedicated towards the improvement of reactivity and selectivity as well as the late stage functionalization of peptides. The recent discovery of phenylazocarboxylates as versatile bifunctional reagents not only offers attractive synthetic pathways regarding the preparation of 18-fluorine-labeled radiopharmaceuticals, it also provides multiple options for combinatorial synthesis. Moreover, we have been able to show that important building blocks for pharmaceuticals can be prepared in a highly sustainable way using nitrogen oxides. So far, our newly developed reactions have been applied for the synthesis of antimalarials, numerous GPCR ligands, enzyme inhibitors as well as diverse radiolabeled compounds for PET imaging.

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