Group	**:**	Bioconjugate Chemistry
Project	**:**	**Next-generation strained alkynes for copper-free click chemistry**
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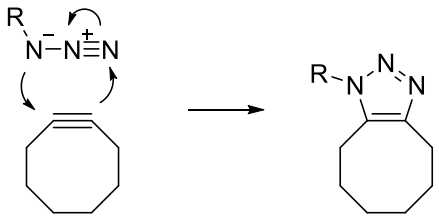
Keywords: Organic synthesis, bioconjugation, click chemistry, SPAAC, bioorthogonal reactions

Introduction: The term **bioorthogonal chemistry** refers to any chemical reaction that can occur inside of living systems without interfering with native biochemical processes. A popular reaction that fulfills the requirements of bioorthogonality is the copper-free click reaction, or more scientifically the 1,3-dipolar cycloaddition between azides and cyclooctynes (strain-promoted alkyne-azide cycloaddition, or **SPAAC**).



Scheme1: Mechanism of SPAAC

Bioorthogonal reactions are perfectly apt for successful conjugation in biological systems, as they do not interfere with native biomolecular functionality. For example a target biomolecule can in various ways be modified to contain an azide, after which a cyclooctyne-bearing probe can conjugate to the system. The labeled biomolecule can now be tracked (imaged) and/or characterized, depending on the nature of the probe. One particular disadvantage of all of the currently applied cyclooctynes, however, lies in the high lipophilicity of the cyclooctyne ring, which reduces water-solubility and may lead to undesired aspecific binding.

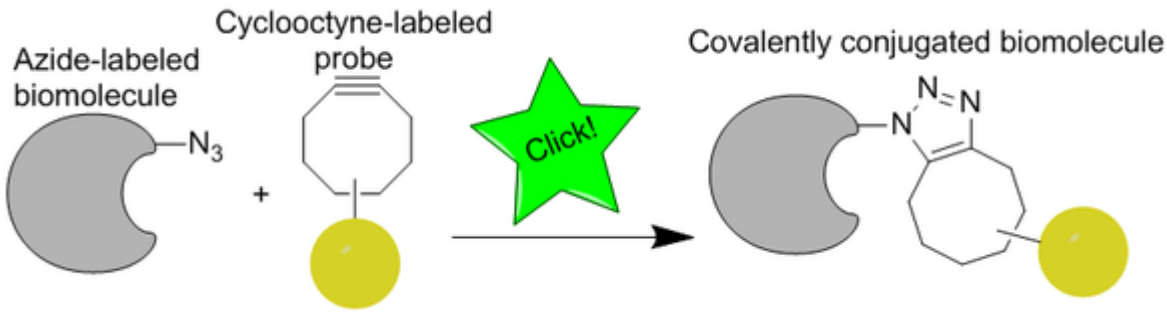


Figure 1: Usage of bioorthogonal reactions for labeling purposes

Goal of this project:
In this project, new strained alkynes are explored for conjugations to small molecules and proteins. The group of molecules envisioned in this project, should be similarly reactive as the known compounds but have higher water-solubility and reactivity.

Topics to be studied:
- Synthesis and characterization of new strained alkynes
- Testing reactivity and properties of the synthesized strained alkynes
- Performing bioconjugations to proteins with the synthesized strained alkynes

Techniques involved in this project:
General organic synthesis techniques such as reaction set-up, TLC, column chromatography, NMR and HPLC studies on reaction products, bioconjugation to proteins.

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