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New chemistry for life sciences

1. Development of novel generation methods for benzyne species and their synthetic applications
2. Development of new methods for chemical modification of biomolecules by strained alkynes
3. Development of new methods for target identification of bioactive compounds by photoaffinity labeling based on azide chemistry
4. Development of efficient methods for connecting multiple molecules based on the characteristic features of azido groups
5. Design and synthesis of efficient substrates for bioluminescence reactions, and fluorescent probes for bioimaging and diagnosis of diseases
6. Development of PET (positron emission tomography) probe candidates for *in vivo* imaging to promote drug discovery

1. Yoshida S, Kanno K, Kii I, Misawa Y, Hagiwara M, Hosoya T: Convergent synthesis of trifunctional molecules by three sequential azido-type-selective cycloadditions, Chem Commun, 54, 3705-3708, 2018.
2. Yoshida S, Shimizu K, Uchida K, Hazama Y, Igawa K, Tomooka K, Hosoya T: Construction of condensed polycyclic aromatic frameworks through intramolecular cycloaddition reactions involving arynes bearing an internal alkyne moiety, Chem Eur J, 23, 15332-15335, 2017.
3. Sakaguchi H, Uetake Y, Ohashi M, Niwa T, Ogoshi S, Hosoya T: Copper-catalyzed regioselective monodefluoroborylation of polyfluoroalkenes en route to diverse fluoroalkenes, J Am Chem Soc, 139, 12855-12862, 2017.
4. Kanemoto K, Sugimura Y, Shimizu S, Yoshida S, Hosoya T: Convergent synthesis of trifunctional molecules by three sequential azido-type-selective cycloadditions, Chem Commun, 53, 10640-10643, 2017.
5. Nishiyama Y, Hazama Y, Yoshida S, Hosoya T: Synthesis of unsymmetrical tertiary phosphine oxides via sequential substitution reaction of phosphonic acid dithioesters with Grignard reagents, Org Lett, 19, 3899-3902, 2017.

We aim to develop molecular probes and methodologies that can be used to elucidate and regulate biological phenomena, based on synthetic organic chemistry. In particular, we are focusing on the synthesis of functional compounds based on developing new reactions using highly distorted molecules, and developing molecular imaging probes that can be used *in vivo*.