Synthetic Versatility in C—H Oxidation: A Rapid Approach to Differentiated Diols and Pyrans from Simple Olefins

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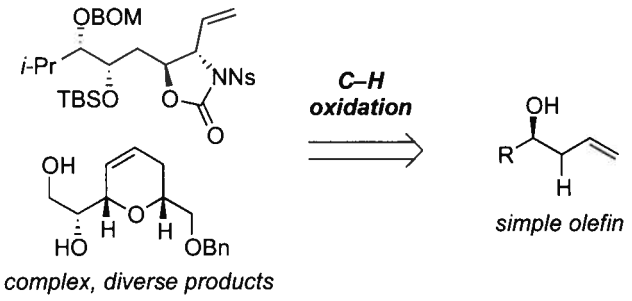
Conventionally, C—H oxidation reactions are used to install functional groups onto preformed carbon skeletons. The use of C—H oxidation to transform simple starting materials into highly versatile intermediates, which enable rapid access to a range of complex target structures is a new area with tremendous potential in synthesis. To this end, we have developed a Pd(II)/sulfoxide-catalyzed allylic C—H oxidation to form *anti*-1,4-dioxan-2-ones from homoallylic oxygenates. These versatile building blocks are rapidly elaborated to differentiated *syn*-1,2-diols, stereodefined amino polyols, and *syn*-pyrans, structures ubiquitous in medicinally important complex molecules found in Nature.



Understanding the Antilipoperoxidant Activity of Peridinin

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Polar carotenoids demonstrate the capacity to function as antilipoperoxidants and may act as surrogates for deficient human proteins that protect cells from lipid peroxidation. Astaxanthin is considered a "gold standard" carotenoid antilipoperoxidant, yet we have discovered that the architecturally unique carotenoid peridinin displays superior antioxidant activity. A series of biophysical assays have been applied to elucidate the mechanistic origin of the observed exceptional antilipoperoxidant ability of peridinin.