Copper/DNA G-Quadruplex-Catalyzed Diels–Alder Reaction

Significance: A terpyridine–copper(II) complex supported on human telomeric G-quadruplex DNA (HT-21-A) was prepared by treatment of HT-21 with the copper–terpyridine complex A in the presence of NH₄Cl. HT-21-A catalyzed the enantioselective Diels–Alder reaction of azachalcones with cyclopentadiene to give the corresponding products in >99% conversion, ≤99:1 endo/exo selectivity, and ≤99% ee.

Comment: The formation of HT-21-A was confirmed by CD-spectroscopic analysis, UV melting, and ITC experiments. In the reaction of 3-phenyl-1-(pyridin-2-yl)prop-2-en-1-one with cyclopentadiene, HT-21-A promoted the enantioselective Diels–Alder reaction with about a 73-fold rate acceleration compared with the copper complex A alone.

**Category**
Polymer-Supported Synthesis

**Key words**
DNA
copper catalysis
metalloenzymes
Diels–Alder reaction
azachalcones