An "Outside-In" Iterative Cross Coupling Strategy Towards the Total Synthesis of Synechoxanthin

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Deficiencies in proteins that inhibit lipid peroxidation are linked to many prevalent diseases such as atherosclerosis and cancer. Small molecules, specifically the carotenoid natural products, which can safely and effectively inhibit peroxidation of lipid bilayers, have strong potential to act as surrogates for these deficient proteins. To overcome the self-destructive mechanism of action of many common carotenoids, we turned our attention to the synthesis of synechoxanthin. With its polar benzoic acid appendages and aromatic termini, this atypical carotenoid has potential to serve as an improved antilipoperoxidant via minimized self-destructive mechanisms and maximized self-preserving mechanisms. Herein, an "outside-in" iterative cross coupling strategy towards the total synthesis of synechoxanthin is reported.