**Total Synthesis and Structural Revision of the Piperarborenines**

**Significance:** Isolated from the shrub *Piper arborensis*, the piperarborenines display in vitro cytotoxicity against cancer cell lines (P-388, HT-29 and A549). The piperarborenines feature a central cyclobutane core appended with both aromatic and imide groups.

**Comment:** Key to the synthesis of the proposed structure of piperarborenine D was the sequential C–H-activated arylation of a cyclobutane core (E → G and H → J). However, it was found that the true identity of piperarborenine D was that of a head-to-head [2+2] cycloaddition.