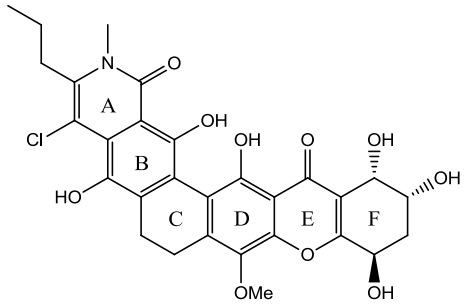
Total synthesis of (–)-kibdelone C

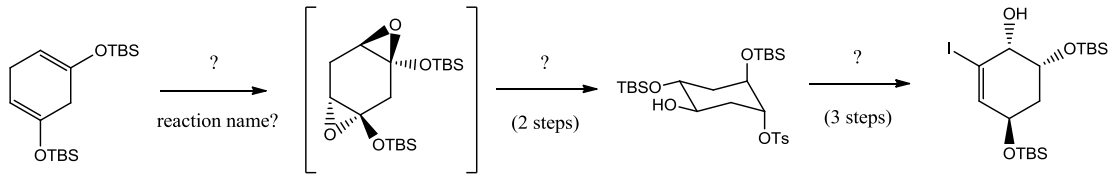
The kibdelones are aromatic polyketides recently isolated from a soil actinomycete. Kibdelones possess potent nematocidal and antibiotic activity. Additionally, they are impressive anticancer agents, displaying GI_{50}'s in the low nanomolar range against a panel of human cancer cell lines. Screening against the National Cancer Institute's 60-cell panel suggested a novel mode of action, although their curved, helical, and amphiphilic character is reminiscent of natural products known to bind nucleic acids or nucleic acid-binding proteins.



(-)-kibdelone C

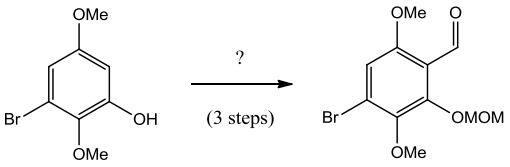
Below is shown a recently reported enantioselective total synthesis of (–)-kibdelone C, the enantiomer of the naturally occurring kibdelone C. Give reagents and structures where missing, as well as reaction mechanisms.

1) Construction of F-ring



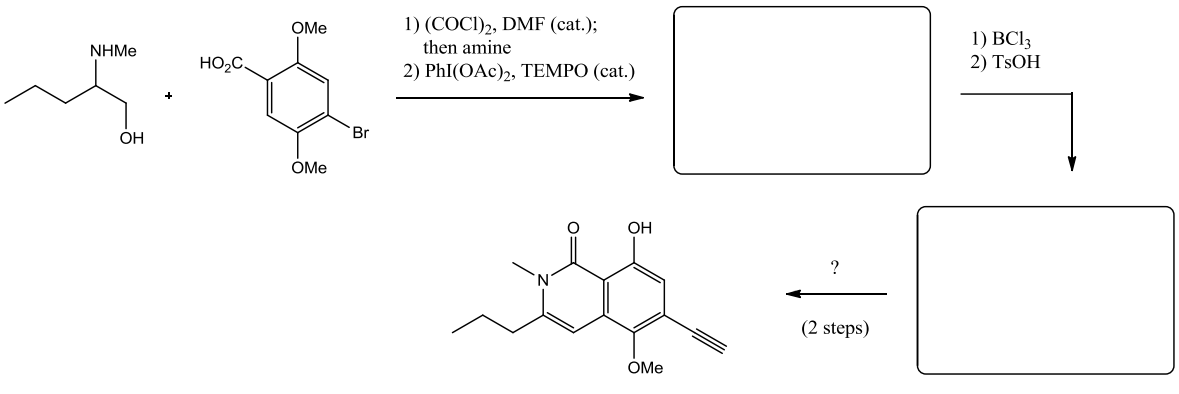
F

2) Synthesis of D-ring



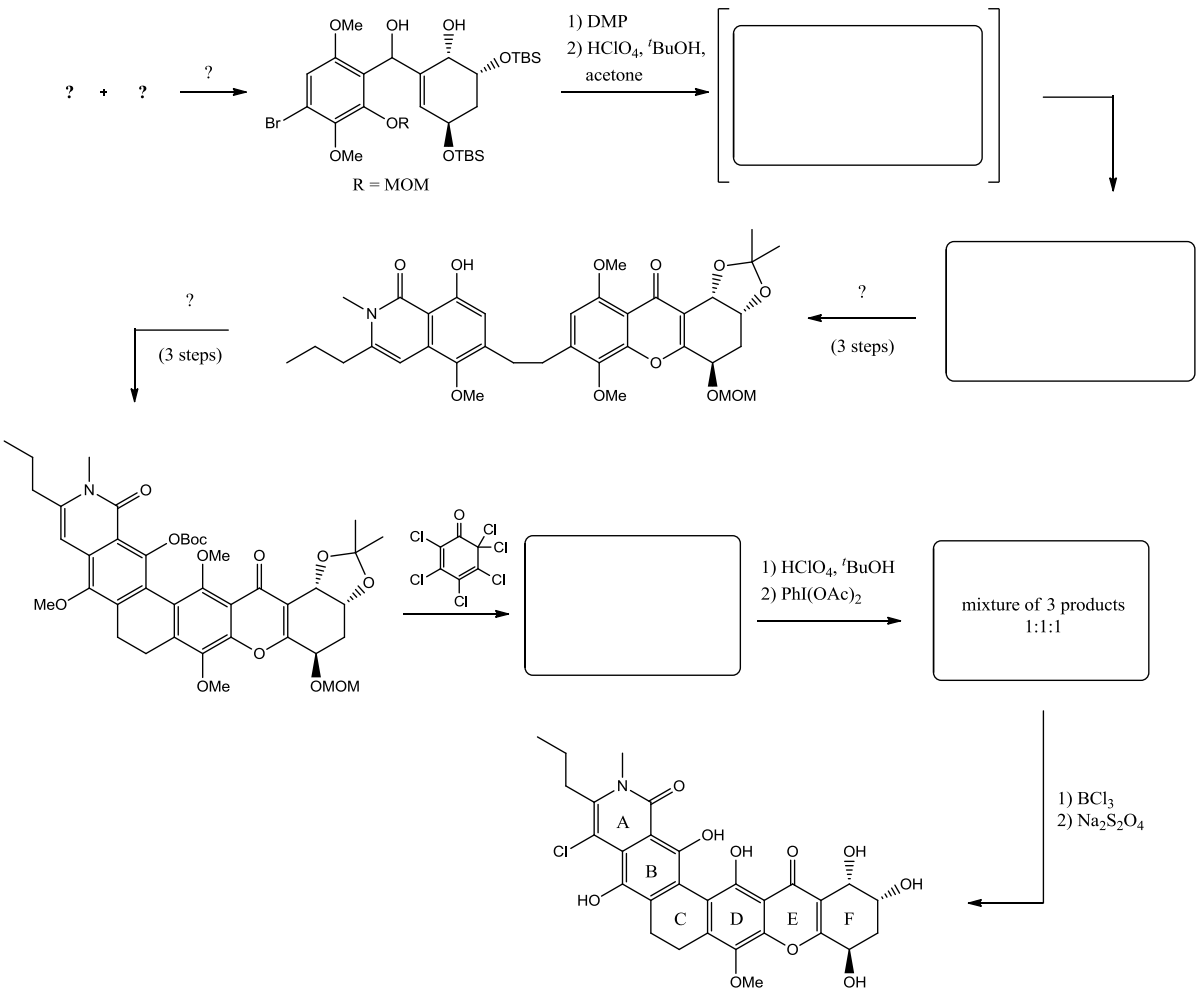
D

3) Construction of AB bicyclic system



AB

4) Synthesis of kibdelone C



(-)-kibdelone C