Synthesis of Vericiguat

**Significance:** Vericiguat (BAY 1021189) is an orally available soluble guanylate cyclase (sGC) stimulator that has entered phase-three trials for the once-daily treatment of chronic heart failure. Key steps in the synthesis depicted are (1) construction of the 5-fluoro-(2-fluorobenzyl)-1H-pyrazolo[3,4-b]pyridine-3-carboxylate **C** by condensation of the 5-amino-1H-pyrazole-3-carboxylate **A** with the aldehyde **B** and (2) construction of the pyrimidine-4,5,6-triamine derivative **H** through reaction of [(E)-phenyldiazenyl]malononitrile **G** with amidine **F**.

**Comment:** Experimental details are provided for the noteworthy four-step synthesis (not shown) of the crystalline 2-fluoro-(3-morpholin-4-yl)acrylaldehyde **B** from commercially available 2,2,3,3-tetrafluoro-1-propanol. The synthesis of pyrazole **A** is described in a patent (A. Straub et al. WO 2000/006569 A1). The [(E)-phenyldiazenyl]malononitrile **G** was generated in situ by reaction of phenyldiazonium chloride with malononitrile.

**Key words**
- Vericiguat
- soluble guanylate cyclase stimulator
- (E)-phenyldiazenylmalononitrile
- pyrimidine-4,5,6-triamine ring formation
- 1H-pyrazolo[3,4-b]pyridine ring formation

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