Syntheses of Nitrogen Heterocycles from Pyridines

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Suzuki coupling

BrCN, EtOH/H₂O

63–87% yield

R = 4-OMe, 5-OMe, 4-CF₃, 5-CF₃, 4-F, 5-Cl, 6-Br
R¹ = H, Me
X = CH, N

6α retro electrocyclization, or expulsion of the electron-deficient cyanamidate followed by tautomerization

porothramycin A : R=Me, R¹=H, X=OMe, Y=H
porothramycin B : R=Me, R¹=Me, X=OMe, Y=H
anthramycin : R=H, R¹=Me, X=OH, Y=Me