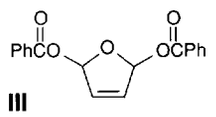
Novel syntheses of tetrahydropyrroloquinolines

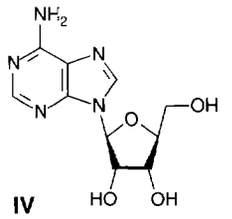
Recently, a number of alkaloids based on the tetrahydropyrroloquinoline structure have been found to exhibit potent cytotoxic activity against human tumour cell lines through possible inhibition of DNA topoisomerase II. Peat, A.J. and Buchwald, S.L. [*J. Am. Chem. Soc.* (1996) 118, 1028–1030] report two novel synthetic routes utilizing intramolecular olefin insertion involving a zirconium-benzyne complex, followed by a palladium catalysed aryl amination for the synthesis of tetrahydropyrroloquinoline ring systems (Schemes 1 and 2). These synthetic routes have been used to prepare dehydrobufotenine **I** and an intermediate **II** in the syntheses of makaluvamine C and damirones A and B.

Synthesis of nucleosides from furan

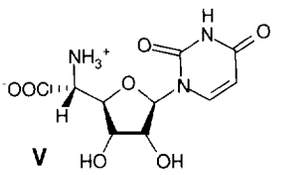
The increasing therapeutic use of nucleosides has led to the development of numerous synthetic precursors. In most cases, synthesis of these compounds involves a carbohydrate precursor for the furanose ring. This approach often presents problems of chemoselectivity and diastereoselectivity and, in some cases, requires deoxygenation of the furanose ring. Trost, B.M. and Shi, Z. [*J. Am. Chem. Soc.* (1996) 118, 3037–3038] describe an alternative approach to the synthesis of nucleosides from furan involving desymmetrization of *cis*-2,5-diacyloxy-2,5-dihydrofuran **III**. The substituents at the 2,5-positions are readily displaced to give stereochemistry appropriate to the nucleoside family using a palladium catalyst. The group have demonstrated that it is possible to synthesize L-nucleosides **IV** from furan in nine steps with 18% overall yield and have also prepared the polyoxin-nikkomycin core **V** in just six steps in 39% overall yield.



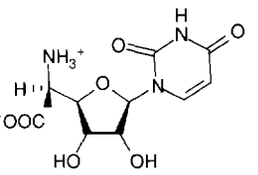
III



IV



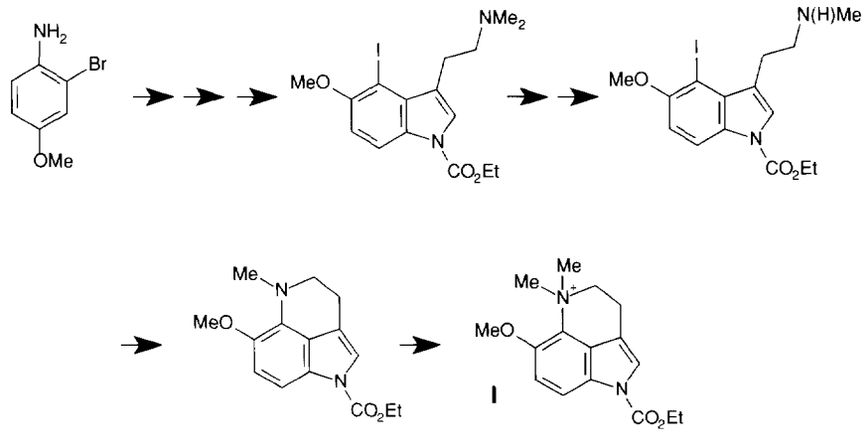
V



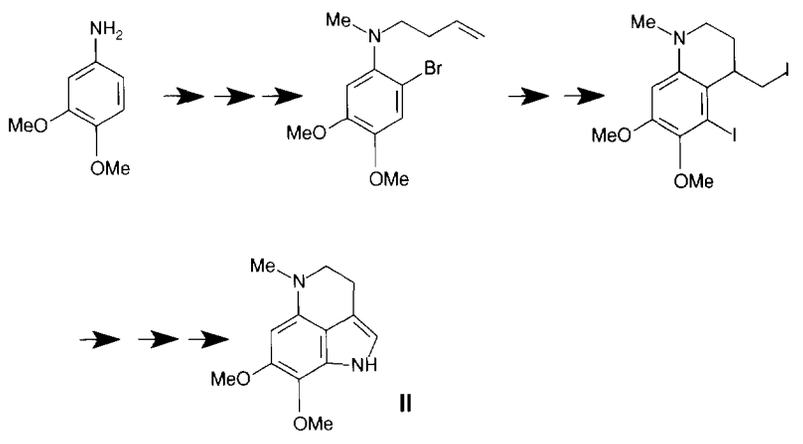
1-Aryl-2-(tosylamino)-1*H*-imidazoles

Bossio, R., Marcaccini, S. and Pepino, R. [*J. Org. Chem.* (1996) 61, 2202–2203] describe the synthesis of a novel class of imidazole derivatives from 2,2-diethoxy-1-isocyanoethane **VI**, anilines and chloramine T (Scheme 3). The initial condensation occurred readily under phase transfer catalyzed conditions to give the *N*-tosylguanidines **VII**. The *N*-tosylguanidines were found to cyclize readily on heating the crude product with acetic acid.

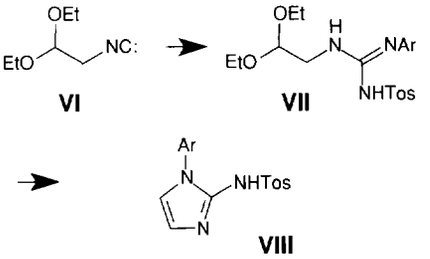
Scheme 1



Scheme 2



Scheme 3



VI **VII**

VIII