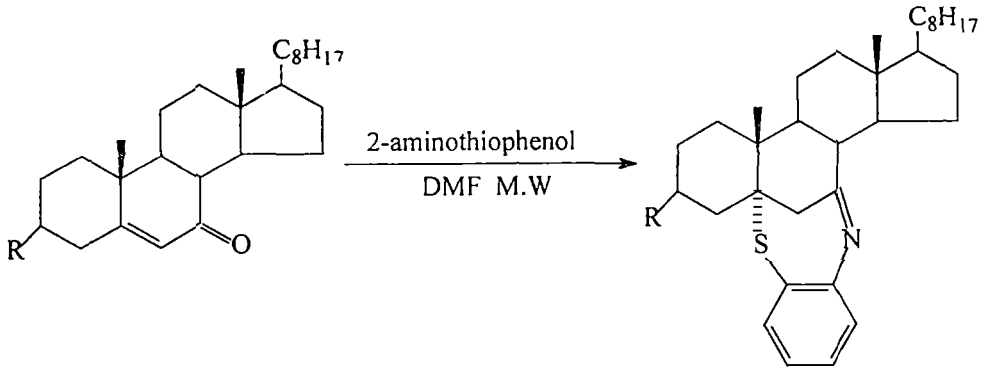
Summary

The chemistry of steroids is a matter of great interest because of their immense use in research and industry owing to their broad spectrum of biologically and pharmacological activities. The earlier work from our laboratories had described the preparation of hetero steroids mainly in the cholestane and stigmastane series. In continuation, the thesis embodies the preparation of some new steroidal derivatives as well as some known compounds prepared by use of new and more convenient methods. The structures compounds obtained during the work reported here are characterized / identified on the basis of chemical and spectral properties and comparison with authentic sample wherever aplicable. The results are summarized in the following chapters.

Chapter One

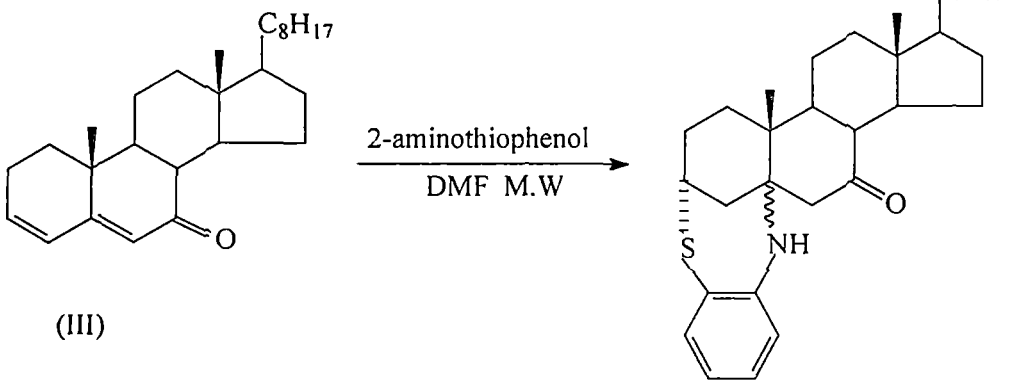
Microwave assisted synthesis of steroidal benzothiazepines

Benzothiazepines are important group of heterocyclic compounds having attained much significance in recent years due to wide range of pharmacological properties. In the last decade a number of steroidal benzothiazepines derivative were prepared which are known as good biologically active compounds. Our laboratories also reported the synthesis of some steroidal benzothiazepines. The survey of the literature revealed that some fruitful attempts have been made in the field of *microwave irradiation for steroidal modifications. Therefore in continuation with* our interest in the preparation of steroidal benzothiazepines, we carried out the reaction of some easily accessible α,β-unsaturated steroidal ketones such as 3β-acetoxycholest-5-en-7-one (I) and its analogues 3β-chlorocholest-5-en-7-one (II) cholesta-3,5-diene-7one (III) and cholest-5-en-7one (IV) with 2-aminothiophenol (VI) and DMF under microwave irradiation. This afforded 5α-cholestan-[5,7-bc]-2′,3′-dihydro-1′,5′-benzothiazepin-3β-yl acetate (V), 5α-cholestan-[5α,7-bc]-2′,3′-dihydro-1′,5′-benzothiazepin-3β-yl chloride (VI) 5α-cholestan-[3α,5-bc]-2′,3′,4′,5′-tetrahydro-1′.5′-benzothiazepin-7-one (VII) and 5α-cholestan-[5,7-bc]-2′,3′-dihydro-1′,5′-benzothiazepine (VIII) as single compound respectively in fair yield. The structures of these benzothiazepine steroids are confirmed on the basis of chemical, analytical and spectral (IR, ^{1}HNMR) and Mass spectrometry analysis and comparison with authentic samples. This procedure comes out to be better and ecofriendly as compared to the previously reported methods.



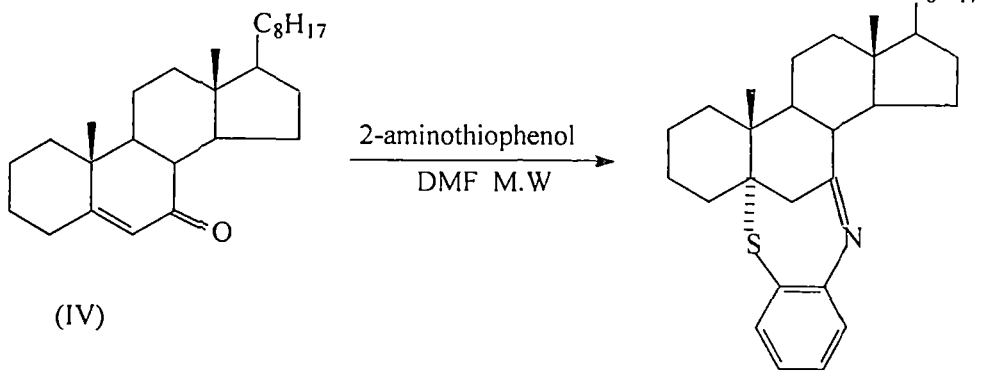
	R
(I)	AcO
(II)	Cl

	R
(V)	AcO
(VI)	Cl



(III)

(VII)



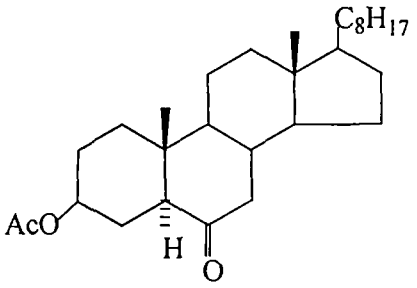
(IV)

(VIII)

Chapter Two

Steroidal Indole

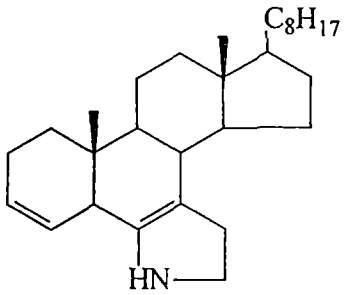
The synthesis of indoles is a very active field due to their wide spread occurrence in nature and their wide ranging biological activities. Indoles and its myriad derivative continue to capture the attention of synthetic organic chemists and a large number of original of indole ring synthesis. Inevitably they may be used on manufacture of pharmaceutical intermediate and in industry. Indoles due to their wide occurrence and many fold biological activities shown have attracted the attention of synthetic chemists in the past. As a result a number of indoles have been synthesised using different methods. But only a few studies have been reported regarding the steroidal indoles.In continuation with the synthesis of modified steroids and the fact very limited number of steroidal indoles are reported prompted us to prepare some steroidal compounds with fused indole ring from easily accessible ketone in the cholestan series. The present study includes, the survey of important relevant study and attempts to obtained [6,7-b] steroidal derivative. The compounds obtained have been characterized on the basis of their elemental analysis and spectral studies: 3β-Acetoxy-5α-cholestan-6-one(IX) its 3β-chloro (X) and 5α-cholestane-6-one (XI) analogues were treated with phenyl hydrazine in glacial acetic acid at reflux condition for four hours afforded cholesta-3,6-diene [6,7-b] indole (XII) and its 3β-chloro-5α-cholestan [6,7-b] indole (XIII) and 5α-cholestan [6,7-b] indole (XIV) respectively.



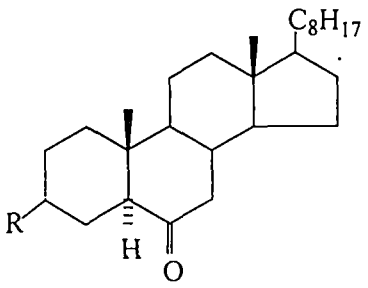
(IX)

$AcOH, PhNHNH_2$

BF_3 - etherate

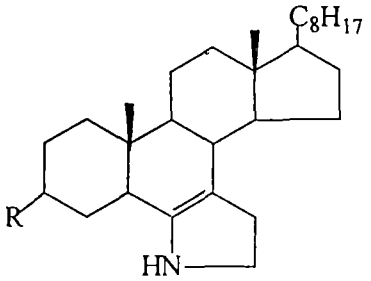


(XII)



$AcOH, PhNHNH_2$

BF_3 - etherate

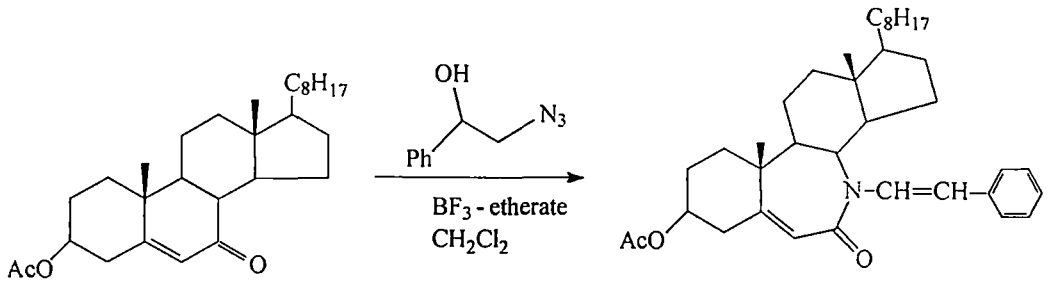


	R
(X)	Cl
(XI)	H

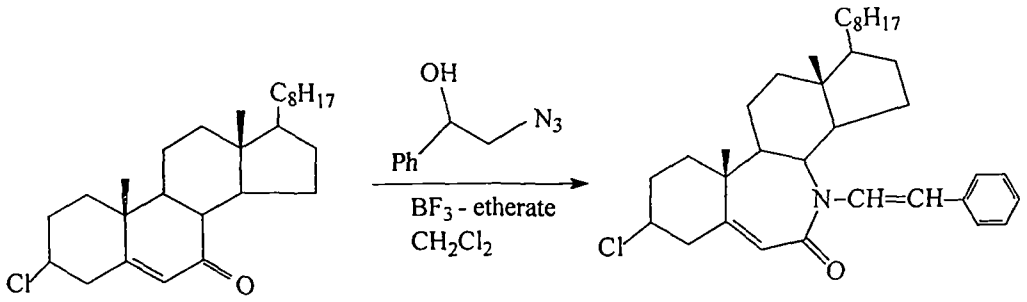
	R
(XIII)	Cl
(XIV)	H

Steriodal Lactam

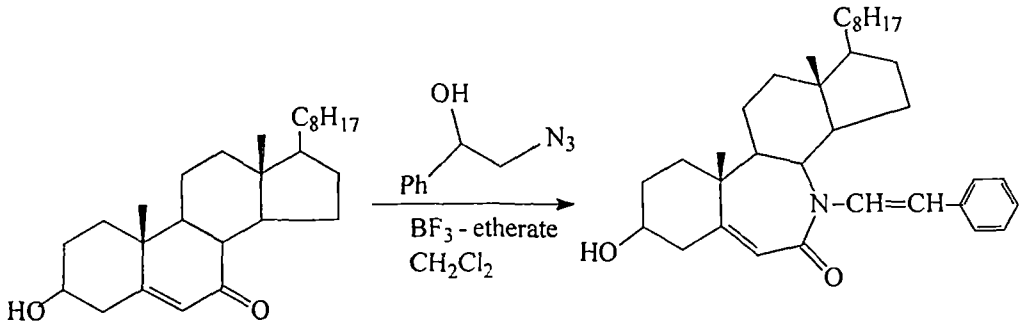
Lactams are particularly important molecules owing to their versatility as synthetic intermediate and wide spread occurrence in biologically important compounds. During the last decade a number of azasteroids have been synthesized. Here we have reported the synthesis of N-hydroxyalkyl lactams utilizing the slightly modified version of Schmidt reaction as described recently by Aube and co-worker where hydrozoic acid had been replaced by hydroxyl alkylazide. The present study describes the reaction of some easily accessible steroidal ketone as 3β-acetoxycholest-5-en-7-one (XV) and its 3β-chloro (XVI) 3β-hydroxy (XVII) analogues and cholest-4-en-3-one (XVIII) on reaction with 2-hydroxy-2-phenylethylazide in presence of BF_3-etherate gave N-2-phenylethenyl-7a-aza-B-homo-3β-acetoxycholest-5-en-7-one (XIX), N-2-phenylethenyl-7a-aza-B-homo-3β-chlorocholest-5-en-7-one (XX), N-2-phenylethenyl-7a-aza-B-homo-3β-hydroxy-cholest-5-en-7-one (XXI) and N-2-phenylethenyl-4-aza-A-homo-cholest-4a-en-3-one (XXII). The characterization of the compounds is based on spectral methods (IR, ^{1}HNMR spectroscopy analysis) and chemical transformation.



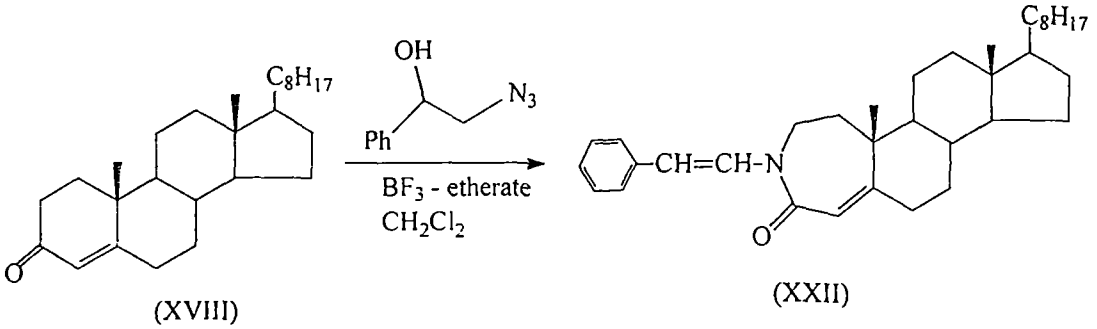
(XV) (XIX)



(XVI) (XX)



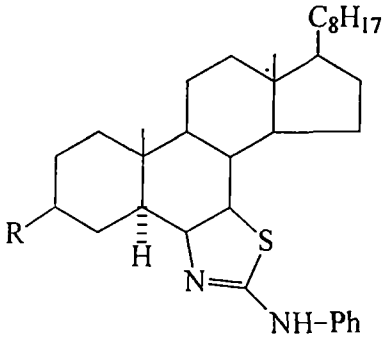
(XVII) (XXI)



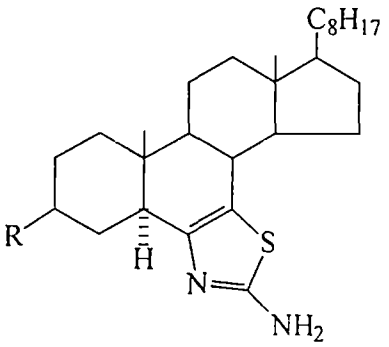
(XVIII) (XXII)

Mass spectral studies of Thiazoles

A survey of literature revealed that no systematic mass spectral study of thiazoles has been reported. In the previous chapter we have described the preparation of a number of such steroidal compound and our laboratories has reported the mass spectral studies reveal class of steroidal compound in the recent past. This prompted us to examine the mass spectra of these compounds as an attempt to establish spectra structure relationship. The compounds included in the study are 2′-N-phenylamino-5α-cholest-6-eno [6,7-d] thiazole (I) 3β-acetoxy-2′-N-phenylamino-5α-cholest-6-eno [6,7-d] thiazole (II), 3β-proponoxy-2′-amino-5α-cholest-6-eno [6,7-d] thiazole (III), 2′-amino-5α-cholest-6-eno [6,7-d] thazole (IV), 3β-acetoxy-2′-amino-5α-cholest-6-eno [6,7-d] thiazole (V) and 3β-proponoxy-2′-N-phenyl-amino-5α-cholest-6-eno [6,7-d] thiazole (VI). These compounds are structurally very close to each other. It was anticipated that they will follow similar fragmentation patterns thus offering a simple and effective method of their characterization by mass spectrometry.



	R
(XXIII)	H
(XXIV)	AcO
(XXV)	PrO



	R
(XXVI)	H
(XXVII)	AcO
(XXVIII)	PrO