2 were prepared because of their potential as irreversible progesterone antagonists. The 13β,16β bridge was constructed by intramolecular alkylation of the C-16 enolate anion from 3-methoxy-13β-(3'-tosyloxypropyl)gona-3,5-dien-17-one, the latter being obtained *via* Birch reduction of both aryl groups of **1**. The 11β,13β bridge was constructed by Prins cyclization of 17β-acetoxy-3-methoxy-13β-(3'-oxopropyl)gona-1,3,5(10),9(11)-tetraene (**3**), itself obtained *via* Birch reduction of only the side chain aryl group of **1**. The *in vitro* binding affinities of 11β,13β- and 13β,16β-propano derivatives of 17α-ethynyl-17β-hydroxygon-4-en-3-one for the cytosol receptor protein were 22% and 1.3% relative to progesterone.

7. Conjugate addition of organocopper reagents to steroidal polyenones

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Introduction of a 7α-methyl function and a Δ^{14}-double bond into 19-nortestosterone enhances androgenic activity to 1000 × testosterone in the chick comb assay. 7α-Methyl-14-dehydro-19-nortestosterone was prepared from 7α-methylestrone which in turn was obtained from dehydroisoandrosterone. An early step in the synthesis involves conjugate addition of copper-catalyzed methyl Grignard reagent to 17-ethylenedioxyandrosta-4,6-diene-3,17-dione, resulting in a mixture of 7α- and 7β-methyl isomers in the ratio of 2:1; separation of the 7α-isomer is laborious. In contrast, conjugate addition of lithium dimethylcuprate to 17β-acetoxyestra-4,6-dien-3-one, a 19-norsteroid, yields only the 7α-methyl adduct. In this light one would also expect 17β-acetoxyestra-4,6,14-triene to undergo "normal" conjugate addition to form a 7α-methyl adduct. Contrary to expectation, the conjugate addition yielded the 7β-methyl adduct *exclusively*. The steric factors responsible for the 7β-methyl adduct from a Δ^{14}-steroid can be explained by X-ray crystal data obtained on a variety of Δ^{14}-steroids.

8. Identification of natural spirolactones in man

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The extract of a urinary pool of normal man without treatment was analysed by Gas Liquid Chromatography (GLC) with electron capture detection using an OV_{17} 3%—6 feet column. The chromatogram shows two peaks with a retention time (R_T) of 26.4 and 41.2 min, respectively. The ^1H and ^{13}C n.m.r. spectra of the purified compound with R_T value of 41.2 indicates a steroid molecule with a spirolactonic structure similar to that of Spironolactone or Canrenone, and with two O-atoms localized on carbon 6 and 7 respectively as an hydroxyl group or as a methoxy group. Mass spectrometry of this compound confirms the n.m.r. data. Finally the preliminary results also indicate a spirolactonic structure for the compound with R_T of 26.4 min

9. Regional- and stereo-specific synthesis of 11β-substituted 19-nor-steroids

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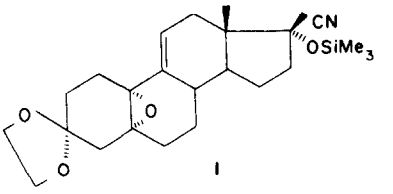
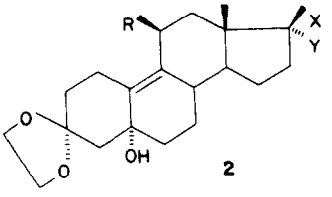
Treatment of 5α,10α-epoxy $\Delta^{9(11)}$-steroids with lithium organocuprates or copper I catalyzed Grignard reagents, leads to exclusive 11β-substitution (**1** → **2**). Dehydration of the intermediate allylic alcohol and simultaneous unmasking of the 3-keto function affords the novel 11β alkyl, alkenyl or aryl 3-keto-$\Delta^{4,9}$ dienones (**3**) which can be further transformed by known procedures to the corresponding ring A aromatic steroids (**4**). The mechanism of 11β-alkylation will be discussed. Cytosolic receptor affinities will be briefly presented.



1



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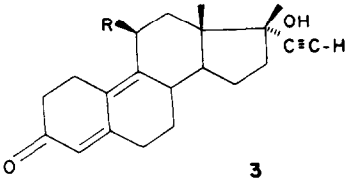
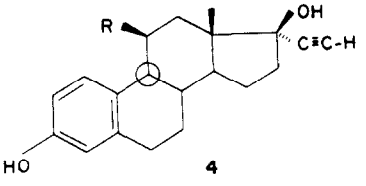


3



4

(a) X = CN
Y = $OSiMe_3$

(b) X = OH
Y = C≡C-H

10. Sultine analogues of spirolactones

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New structural analogues of the antimineralocorticoid spirolactones, where the carbonyl group of the 17β lactonic ring has been replaced by a sulphinyl group, have been synthetised from 17,20-epoxysteroids.

The resulting spirosultines (**1**) and (**2**), each of which existing in two diastereoisomeric forms, have been studied systematically *in vitro* for their ability to bind to hormonal receptors and *in vivo* for their aldosterone antagonising properties in rats. All spirosultines of type (**1**) bind moderately to mineralocorticoid receptors. As in spirolactone series diuretic potencies and hormonal side effects depend largely on the nature of the substituents in different pos-