Two different types of sulfolipids have thus been isolated from human kidney. In regard to the analytical results one of them has the same chemical composition as brain sulfatides, acyl-sphingosine-galactose-sulfate. The other is probably an acyl-sphingosine-glucose-galactose-sulfate, which structure would best agree with the sugar and sulfate values found. The nitrogen content is on the other hand almost 40 % too high. Probably this is due to impurities, as even small contaminating amounts of any substance with a high nitrogen content would add a considerable error to the nitrogen determination.

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Optical Rotatory Dispersion and Configuration of *Solanum* Alkaloids

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Two isomeric series of *Solanum* alkaloids (aminoketal alkaloids) are known. They can be represented by tomatidine and 5α-solasodan-3β-ol and are usually characterized in the same manner as the steroid sapogenins by the prefixes neo- and iso-, respectively. The close relationship to the sapogenins has been established in various ways [1] and both compounds have the same structure and stereochemistry except for the spiroaminoketal side chain.

Schreiber [2] showed that the two series differ in configuration at C_{25} and related the configuration at this center to L(+)-α-methylglutaric acid for tomatidine and to D-(−)-α-methylglutaric acid for 5α-solasodan-3β-ol. The two series can thus be referred to as 25 L and 25 D, respectively.

Arguments advanced in the sapogenin field concerning the stereochemistry of the spiroketal side chain have been considered valid also in the case of the aminoketal alkaloids (*cf.* Ref. [1]). Both tomatidine and 5α-solasodan-3β-ol have been described as 22α-compounds, and the only difference between them should be that the C_{25}-methyl group is axial in tomatidine (structure 1) and equatorial in 5α-solasodan-3β-ol (structure 2). However, there remains the possibility that the alkaloids of the two series are both 22β-compounds (3 and 4) or that they differ in configuration at C_{22} as well as at C_{25}. A difference in configuration at C_{22} will then cause the methyl groups at C_{25} in alkaloids of both series to be either equatorial (2 and 3) or axial (1 and 4). According to Schreiber [2] tomatidine should be represented by structure 3 and 5α-solasodan-3β-ol by structure 2. This alternative is also

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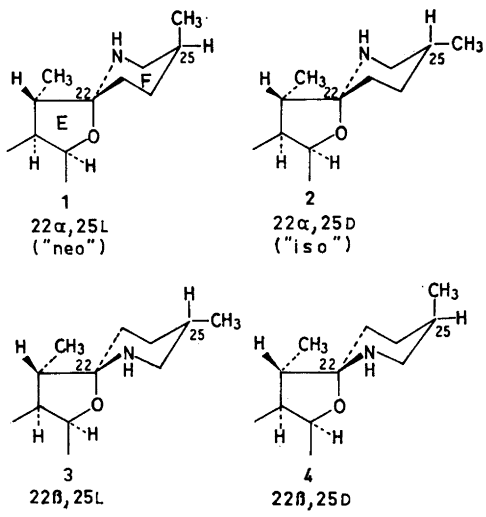

supported by various chemical and physical properties of these compounds and their derivatives [3,4].

Callow and Massy-Beresford [5] showed that the configuration at C_{22} in steroid sapogenins is the same in both the neo- and iso-series, and this fact in conjunction with the known relative stability of the two series made it possible for the authors to assign the conformation of ring F with the methyl group axial in neo-sapogenins and equatorial in isosapogenins. No chemical evidence is available for definition of the configuration at C_{22}, but conformational analysis [1] as well as infrared investigations [6] have shown the $C_{22}-O$ bond in both series to be in the α-position.

In order to get further data which might prove the stereochemical relationship between tomatidine and 5α-solasodan-3β-ol we have now undertaken a study of the optical rotatory dispersion of these and related compounds. The rotatory dispersion of a variety of steroid sapogenins has previously been investigated by Djerassi and Ehrlich [7] who found plain negative dispersion curves for all the compounds with the exception of cyclo-pseudo-sarsasapogenin which had a plain positive curve. Cyclo-pseudo-sarsasapogenin is generally considered [1,8] to differ from the other sapogenins in configuration at C_{22} (and C_{20}) and described as a 22β-compound.

In the present investigation it was found that tomatidine (I) has a plain positive dispersion curve similar to that of cyclo-pseudo-sarsasapogin [7], whereas Δ^5-tomatiden-3β-ol (II), 5α-solasodan-3β-ol (III) and Δ^5-solasoden-3β-ol (IV) exhibit plain negative dispersion. Introduction of a double bond in the 5,6-position gives rise to an anticipated negative shift in the same manner as found [9] in the cholestane series, and in the tomatidane series the dispersion curve has in fact changed from a plain positive (I) to a plain negative one (II). The dispersion curves of the compounds I—IV give some evidence for a steric relationship between 5α-solasodan-3β-ol and the common sapogenins and between tomatidine and cyclo-pseudo-sarsasapogenin. However, the rotatory dispersion characteristics of the compounds I—IV cannot be selectively related to a chromophore in the spiroaminoketal system, and stereochemical variations in the F-ring may not cause pronounced changes in the dispersion curves.

It has previously been shown that the "nonchromophoric" amino group can be converted into various "chromophoric derivatives such as dithiocarbalkoxy [10,11], thionocarbalkoxy [12], thiobenzoyl or phenylthioacetyl [13] and nitroso [14] derivatives. Attempts to prepare N-thionocarbethoxy-tomatidine and N-thionocarbethoxy-5α-solasodan-3β-ol met with no success, probably due to steric hindrance. The corresponding N-nitroso derivatives could however readily be prepared. Tomatidine reacted very rapidly with nitrous acid and was completely converted to the N-nitroso derivative, whereas Δ^5-solasoden-3β-ol gave only a poor yield of the derivative even when it was allowed to react with nitrous acid for 12 h. This observation as well as the failure of 5α-solasodan-3β-ol in contrast to tomatidine to form an N-bromo derivative [3,4] indicate less steric hindrance in the tomatidane series.

The optical rotatory dispersion curves of N-nitrosotomatidine (V) and N-nitroso-Δ^5-solasoden-3β-ol (VI) are shown in Fig. 1. N-Nitrosotomatidine (V) has a strong negative Cotton effect centered around the low intensity absorption band at 357 mμ while N-nitroso-Δ^5-solasoden-3β-ol (VI) has a positive Cotton effect of even larger amplitude. The center of the Cotton effect of (VI) is displaced about 10 mμ towards longer wavelengths as is also the absorption maximum. The opposite sign of the dispersion curves of the two compounds clearly indicate that the main steric interactions from the various parts

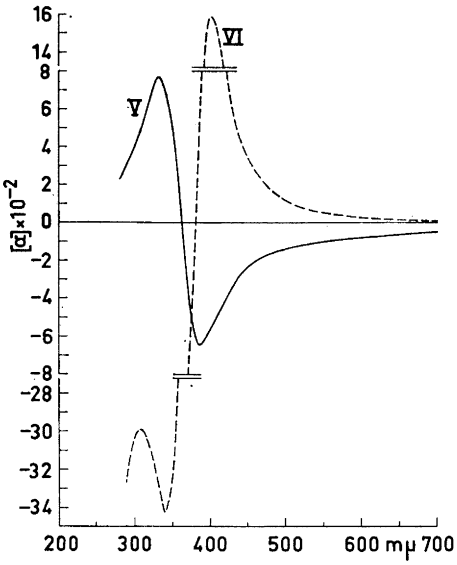

Fig. 1. Optical rotatory dispersion curves of N-nitrosotomatidine (V) and N-nitroso-Δ^5-solasoden-3β-ol (VI).

of the molecule on the nitroso group is from opposite side in N-nitrosotomatidine and N-nitroso-Δ^5-solasoden-3β-ol. From molecular models it appears as in the 22α-configuration (structures of type 1 and 2) the main interaction on the nitroso group will come from the methyl group at C_{20}. In structure 1 there is an additional interaction from the axial C_{25}-methyl group. In view of the stronger interaction from the C_{20}-methyl, which is sterically similar in both structure 1 and 2, it is not likely that N-nitroso derivatives in these two series should be represented by Cotton effect curves of opposite sign. Furthermore, if tomatidine and 5α-solasodan-3β-ol were 22α-compounds Schreiber's degradation studies [2] will assign structure 1 for tomatidine and structure 2 for 5α-solasodan-3β-ol. This is not consistent with the experimental facts that tomatidine forms N-chloro as well as N-bromo derivatives whereas 5α-solasodan-3β-ol only forms an N-chloro derivative [4], nor with the previously mentioned difference in rate of nitrosation. However, a representation of tomatidine by structure 3 and 5α-solasodan-3β-ol by 2 is consistent with the rotatory dispersion behaviour of these compounds and their derivatives.

A full report of this work together with an attempt to determine the absolute configuration at C_{22} by means of rotatory dispersion studies of model compounds will be published later.

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