excreted only in the second 24 h. As the total recovery was only 30% a further study was made. The same subject took guanoxan (20 mg daily) for 7 days and collected excreta during a 24 h period following the final dose. A recovery of 59·5% based on one dose was obtained and as with hypertensive patients only 7-hydroxyguanoxan (51·5%) was excreted in urine. Faecal excretion was again low, the guanoxan concentration falling to 2% with 7-hydroxyguanoxan at 6%.

Despite the strong basicity of the guanidine group, guanoxan readily crosses body membranes and is extensively hydroxylated in the aromatic ring in man. Other work in this laboratory has shown guanoxan to be similarly hydroxylated by animal liver preparations. There was no indication of conjugation of guanoxan or 7-hydroxyguanoxan and the renal rather than biliary clearance of the latter would be anticipated. Although not all of an oral dose was accounted for, there was no evidence in excreta for degradation of the guanidine moiety of guanoxan. This is in agreement with the generally observed biological stability of the guanidine group in non-endogenous compounds, but in contrast to the major route of metabolism of guanoxan in the dog (Cañas-Rodriguez, 1966), in which the guanidine group underwent transamidination.

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REFERENCE

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Interactions between phosphatidylethanolamine monolayers and phenols in relation to antibacterial activity

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Considerable evidence already exists suggesting that damage to the bacterial cytoplasmic membrane occurs in the presence of phenols. This evidence has been reviewed by Proudfoot (1971). One question has not so far been conclusively answered:—is cytoplasmic membrane damage a direct or an indirect effect of phenols? The answer may be sought by determining whether phenols affect those molecular interactions which maintain the integrity of the cytoplasmic membrane.

To determine whether phenols do so affect lipid-lipid interactions the effects of phenol, *o*-cresol, *p*-cresol and 2,6-xylenol on monolayers of phosphatidylethanolamine (obtained from *E. coli*) at the liquid-gas interface have been examined using a film balance technique.

One observed effect of the phenols was a reduction in the total lateral cohesion between adjacent phosphatidylethanolamine molecules. For example, a subphase concentration of $4{\cdot}2 \times 10^{-3}$ mol/dm^3 phenol was found to reduce the total lateral cohesion of a phosphatidylethanolamine monolayer to the point where desorption of phosphatidylethanolamine molecules and disruption of the monolayer occurred at surface pressures greater than 15·2 mN/m.

The relative abilities of four phenols to disrupt monolayers of phosphatidylethanolamine was assessed by noting the mean highest surface pressure to which the lipid monolayers spread on sub-phases containing $2{\cdot}1 \times 10^{-3}$ mol/dm^3 of each phenol could be compressed before disruption occurred. On this basis, the relative disruptive abilities of phenol, *o*-cresol, *p*-cresol and 2,6-xylenol were 1·0, 2·0, 2·2 and 3·5 respectively. These values have the same order and relative magnitudes as the published phenol coefficients of these chemicals. If lipid-lipid interactions contribute to the maintenance of the integrity of the bacterial cytoplasmic membrane, the experimental observations suggest that phenols are capable of physically impairing this integrity. The observed similarity between the relative disruptive effects of the phenols and their phenol coefficients suggests that the antibacterial action of phenols involves disorganization of phospholipid molecules present in bacterial cytoplasmic membranes.

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