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**The Effect of Trimethylamine on the Renal Excretion of  
Trimethylamine Oxide and Acid by the Dogfish,  
*Squalus Acanthias*\***

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Previous observations on the renal conservation of trimethylamine oxide (OXIDE) by the dogfish established that this weak base is freely filterable at the glomerulus and is almost completely reabsorbed by the renal tubule (Cohen, Krupp, Chidsey, and Hook, 1956). It was also reported that trimethylamine (TMA) caused a large increase in the rate of excretion of the OXIDE.

The study of the effect of TMA on net OXIDE reabsorption has been continued. After administering large doses of TMA, complete blockade of OXIDE reabsorption was observed. No net secretion of the OXIDE occurred. This has been interpreted to indicate that the TMA blocks OXIDE reabsorption competitively.

A similar but less pronounced blockade of OXIDE reabsorption occurred after administering dimethylamine. However, no effect on OXIDE reabsorption was found after monomethylamine.

During the experiments in which large doses of TMA were given the urinary pH rose from between pH 5.6-5.9 to as high as 6.3. This was associated with large excretory rates of free amine (presumably TMA) of from two to five times the rate of inorganic  $\text{PO}_4$  excretion. However, the ratio of titratable acid:  $\text{PO}_4$  in the urine remained close to unity.

These observations have been interpreted to indicate that the free amine gains entry into the tubular urine at a point above the locus of inorganic phosphate secretion. Unless there are marked differences in the permeabilities of the proximal and distal regions of the dogfish tubule, the free amine must be actively transported into the acid proximal tubular urine. At this site it effects blockade of OXIDE reabsorption. The free amine, as the trimethylammonium ion, then reaches the distal tubule where the dihydrogen phosphate is postulated to be secreted, and therefore does not affect the ratio of titratable acid:  $\text{PO}_4$  significantly.

Further studies of OXIDE reabsorption and acid production by the dogfish kidney are planned.

\* The observations were made in the laboratory maintained by the Department of Physiology, New York University College of Medicine.