cations. A salt gland (rectal gland) is charged with the duty of specifically excreting chloride.

Magnesium-inulin clearance ratios were always over one (total range, 1.45-34), and were lowered with magnesium loading. This ion seems to be always secreted, and there is always a net loss of it vis à vis plasma. Calcium-inulin clearance ratios were always below one (total range 0.115-0.95), rising on loading. This ion is always reabsorbed, but there may be a net urinary conservation or loss. Phosphate-inulin ratios ranged from 1.02-21.7, rising on loading. As indicated by others, this ion is secreted. Comparisons of plasma and centrifuged filtrates of plasma indicate that only calcium is markedly plasma-bound.

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NET SODIUM FLUXES IN THE SPINY DOGFISH, Squalus acanthias

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Previous measurements of salt and water excretion in urine and rectal gland fluid from the dogfish suggested that this elasmobranch normally takes up saline solution and not merely water as might be supposed from the hypertonicity of the blood compared with sea water. This postulate was tested directly by measuring Na influx at the head end of the dogfish and total Na efflux. The head end only of two unrestrained dogfish was immersed in a sea water bath to which Na^{22} was added. The fish had no open wounds. The bath was aerated and kept under 14°C. After a period in the bath, a blood sample was withdrawn through a previously implanted arterial catheter. The fish was returned to running sea water. Na^{22} was then injected arterially to determine the sodium space. Finally, arterial samples were taken over a two day period to determine sodium loss. After the efflux data had been collected, the urinary papilla was catheterized for urine collections. It was not feasible in these initial experiments to catheterize the rectal gland.

Using sodium figures of 440 mM/1 for sea water, and 250 mM/1 for plasma, and taking the minimal (1 hour) sodium space, the net influx of sodium into the head was: Fish 1, 1.0 mmoles/kg/hr; Fish 2, 0.89 mmoles/kg/hr. This is roughly equal to an uptake of 2 ml/kg/hr of sea water. These data do not define the site or sites of uptake.

The net loss of sodium was: Fish 1, 0.92 mmoles/kg/hr (first 18 hour period); Fish 2, 0.87 mmoles/kg/hr (14.5 hour period). Urinary loss varied from 15 to 42% of total sodium lost. It is noted that the net influx and efflux figures taken at different times are quite similar, indicating that the fish were in approximate sodium balance. It is clear that the dogfish takes up Na and not merely water.