Salt Transport By Eel Gill Epithelium
II. Attempts To Define The Site Of Active Transport

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In general, the transport properties must be different at the two surfaces of secretory cells which are normal to the direction of secretion. These experiments are part of an attempt to define these differences in the salt secreting cells of the gill epithelium. In order to characterize ion transport across each surface of a cell, it is necessary to know the electrical potential difference across each surface. Therefore, preliminary measurements were made of the electrical potential difference between the fluid bathing the outside of the gills and the inside of the cells, as well as between blood stream and gill cells in eels anesthetized with MS 222 (Sandoz). The intracellular potentials were recorded with Ling-Gerard glass microelectrodes (tip diameter less than 1 micron) filled with 3 M KCl and connected via a silver-silver chloride electrode to a very high impedance electrometer (Cary). The indifferent silver-silver chloride electrode made contact via a catheter filled with KCl agar either with the fluid outside the gills or with the mesenteric artery. When .15 M NaCl bathed the outside of the gills, the average cell potential was -15 mV to the outside solution and -17 mV to the blood. When the outside of the gills was bathed with .005 M NaCl, the average cell potential was -30 mV to the outside solution and -50 mV to the blood. When the outside of the gills was bathed with sea water, the average cell potential was -10 mV to the outside solution and -5 mV to the blood. Marked variation in the potential recorded in successive punctures suggested that the potential is not the same in all cells of the gill epithelium.

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Salt Transport By Eel Gill Epithelium
III. The Role Of Blood Pressure And Flow In Salt Transport In The Perfused Eel Gill

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In order to evaluate the role of filtration in producing the high ratios of NaCl outflux to influx noted in the previous report, the experimental setup was modified by replacing the heart with a constant frequency variable stroke pump which maintained a constant output independent of the pressure into which it was pumping. A similar pump produced a constant flow of fluid over the outside surface of the gills. The temperature of the perfusion fluids on both the outside and the inside of the gill membrane were maintained at 12°C by an appropriate cooling system. The fluid perfusing the outside of the gill membrane flowed through a vial placed in a