

## Research Reports: 1956

### **In Vitro Transport of Dyes by Isolated Renal Tubules of The Flounder As Disclosed by Direct Visualization. Intracellular Accumulation And Transcellular Movement.**

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Certain representative acidic and basic dyes have been observed directly while undergoing cellular transport in an isolated renal tubule preparation *in vitro*. For compounds capable of being actively transported across renal cells, movement into the cells from ambient medium is the rate-limiting process, and subsequent concentration in the lumen than proceeds without detectable intracellular accumulation. However, those compounds not transported actively themselves tend to accumulate within the cell, and they act most effectively as competitive inhibitors of the more actively transported members of an homologous series such as the phenolsulfonphthaleins. The behavior of various dyes during uptake and run-out under experimentally imposed conditions supports the view that transport across renal cells involves at least three phases, each of which for the different dyes may or may not be dependent upon energy-yielding metabolic events. These include the two steps which move substances across the peritubular and the luminal cell membranes, and an intracellular "trapping mechanism" which usually is exhibited most prominently with those basic and acidic compounds which are least actively transported.

The basic dye Neutral red was concentrated intraluminally by some energy-independent process which operated in the presence of 2, 4-dinitrophenol and cold; and general metabolic inhibitors did not facilitate run-out of the dye after tubules were transferred to dye-free medium subsequent to accumulation. Cyanine #863 was also taken up in the presence of DNP and in the cold but, in contrast to Neutral red, it exhibited very strong intracellular accumulation. Indigo carmine (Ponceau R), a typical sulfonic acid dye, was taken up intraluminally and to some extent intracellularly by an energy-demanding process. After accumulation, it appeared to be "trapped" and little run-out of dye occurred when tubules were transferred subsequently to cold dye-free medium.

### **Run-Out of Chlorphenol Red Following Luminal Concentration By Isolated Renal Tubules of The Flounder.**

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In this series of studies observations were made after isolated tubules had been exposed for 60 minutes to  $3 \times 10^{-5}M$  concentrations of chlor-