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MOVEMENT OF INULIN AND BICARBONATE ION ACROSS THE BLADDER OF AN AGLOMERULAR TELEOST, Lophius americanus

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Studies of renal function in aglomerular fish have contributed greatly to current concepts of modern renal physiology. Such studies have assumed that substances in the urine result solely from the activity of the kidney.

It is well known that the urinary bladder in a number of species is capable of modifying urinary composition. Recent studies reporting the excretion of carbohydrate substances like inulin and some pentoses by the aglomerular kidney have been disturbing.

In a study of the renal response to HCO_3^- infusion it was noted that both HCO_3^- and inulin appeared in bladder urine following intravascular infusion. In order to determine whether the urinary bladder was permeable to inulin and HCO_3^-, solutions of inulin and HCO_3^- were instilled into the bladder. Under these conditions inulin and increased HCO_3^- concentrations were found in plasma. This suggested that the inulin and HCO_3^- found in the urine may have resulted from direct penetration of the bladder without renal mediation.

To test this hypothesis, one ureter was cannulated to obtain renal urine and both ureters were ligated above the bladder. Previously collected goosefish urine was installed into the bladder. Inulin and HCO_3^- were given intravascularly. Under these conditions, inulin and bicarbonate appeared in the urine in the bladder, whereas the composition of renal urine was unchanged.

These data establish that the urinary bladder of Lophius is capable of profoundly altering the composition of urine and suggest that previous studies based on the assumption that the composition of the urine results solely from the function of the kidney require reevaluation.

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FACULTATIVE AEROBIOSIS IN A VERTEBRATE: ANAEROBIC METABOLISM IN THE FRESHWATER TURTLE, Pseudemys scripta elegans

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Molecular O_2 is generally considered essential for life in all animal species and the ability to survive without O_2 is limited to very brief periods of time.

It is well known that the freshwater turtle is able to remain submerged for days. It has been suggested that survival during diving is mediated through O_2 extraction from water by means of pharyngeal mucosa or by the lateral bladders.

Experiments have been performed which demonstrate that no significant O_2 extraction from water occurs during diving and that survival is possible because the turtle obtains energy from anaerobic sources.