Effect of Glucagon Administration on Kidney Morphology in House Shrew, *Suncus murinus*

By

AJAI K. SRIVASTAV and KRISHNA SWARUP

Department of Zoology, University of Gorakhpur, Gorakhpur—273 001, India

—Received for Publication, June 18, 1981—

**Key words**: Glucagon, Calcium, Kidney.

Summary: Glucagon administration to house shrews causes no histological change in the kidney, but calcium depositions are noticed at 10 and 15 days following the treatment in certain tubular epithelia.

Glucagon has been reported to stimulate calcitonin release and to evoke hypocalcemia (Paloyan et al., 1967a, b; Avioli et al., 1969; Williams et al., 1969; Raman, 1970; Hollo et al., 1979; Swarup et al., 1979; Swarup and Srivastav, 1980; Swarup and Tewari, 1980). It also increases urinary excretion of calcium and other electrolytes (Staub et al., 1957; Elrick et al., 1958; Charbon et al., 1963; Dewonck et al., 1963; Pullman et al., 1967). There seems to be no previous report on the effect of this drug (glucagon) on the calcium reabsorption by the kidney. The present work was, therefore, carried out to study whether administration of glucagon affects the morphology and/or calcium absorption in the kidney of house shrew, *Suncus murinus*.

**Materials and Methods**

Forty-eight house shrews (body wt. 72-80 g) were collected locally and acclimatized to the laboratory conditions for a week. They were then divided into two numerically equal groups—i) diluent-injected (control) and ii) glucagon-injected (experimental).

The experimental animals were daily injected intraperitoneally with crystalline glucagon (Eli Lilly and Company, Lot 258-V016-235) in a dosage of 0.002 mg/g body wt. The drug was dissolved in 0.005 N HCl (pH 2.6) and diluted with 0.9% sodium chloride solution containing 0.1% gelatin (diluent). The controls were injected intraperitoneally with 1 ml of diluent. Both, experimental and control specimens were fed on live fish (*Heteropneustes fossilis*) and were provided tap water for drinking. Animals were killed under ether anesthesia in the batches of six from each group after two hours of the last injection at 1, 5, 10 and 15 days of the treatment. The kidney was extirpated and fixed in aqueous Bouin's fixative and in 70% ethanol. The sections (6 μm in thickness) were stained with HE and PAS/H. For the localization of calcium the sections (10 μm in thickness) were subjected to Von Kossa (1975) method from 70% ethanol fixed tissue.
Results

No histological changes have been observed in the kidney of glucagon-treated specimens (Fig. 1) when compared to the kidney of diluent-injected specimens, but calcium depositions are seen at 10 and 15 days of the treatment in certain tubular epithelia when subjected to Von Kossa method (Fig. 2). Bowman's capsules lack calcium deposition (Fig. 2).

Discussion

In the present study, deposition of calcium has been noticed after 10 and 15 days following the glucagon-treatment. This can be attributed to the hyperactivity of the parathyroid gland (from the specimens of the same experiment (Swarup and Srivastav, 1980) reported earlier) which enhances the tubular reabsorption of calcium in the kidney. Calcium deposition during hyperparathyroidism has also been reported by other workers (Albright et al., 1934; Cantarow et al., 1938; Anderson, 1939; Carone et al., 1960; Hellstrom and Ivemark, 1962; Boquist and Fahraeus, 1975).

Acknowledgments

One of us (AKS) wishes to thank Dr. W.W. Bromer of Eli Lilly and Company for the generous gift of glucagon and to CSIR, New Delhi for the financial assistance.

References

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Explanation of Figures

Plate I

Fig. 1. Kidney of 15 days glucagon-treated specimen showing no change in histological structure. HE (×100).

Fig. 2. Calcium deposit in the tubular epithelium of kidney of 15 days glucagon-treated house shrew. Von Kossa (×100).