surface water were 34.5° and 30.5° C respectively. The colony of *Acineta* sp. was found attached at the trunk region of *O. intermedia* (figure 1).

O. intermedia, being a filter feeder, sets up a current of water and so water along with nannoplankton is drawn into the house through the funnel-like structures guarded by a set of fine mesh gratings capable of excluding organisms greater than 0.13×0.03 mm size[6]. When water circulates through the inner filter it is capable of retaining organisms about 0.03 mm in diameter. So it is evident that the zooids of *Acineta* sp. less than 0.03 mm in diameter, would have been retained and developed into adults. Since the adult *Oikopleura*, generally bases its house after the internal net gets clogged, it is possible that adult *Acineta* sp. might have been attached when it was actively fabricating its house with mucous.

The authors express their sincere thanks to Dr M. D. K. Kuthalingam, for encouragement. They are also thankful to Dr Samuel Paul Raj for the microphotographs.

15 March 1983; Revised 28 June 1983

1. Fenaux, R., *Mar. Biol.*, 1969, **2**, 252.
2. Tokioka, T., *Publ. Seto. Mar. Biol. Lab.*, 1955, **5**, 74.
3. Ganapathy, P. N. and Bhavanarayana, P. V., *Curr. Sci.*, 1958, **27**, 57.
4. Dhandapani, P., in *Proceedings of the Symposium on warm water zooplankton*, N.I.O., Goa, Spl. Publication, 1977, 60.
5. Shelbourne, J. E., *J. Mar. Biol. Assoc.*, 1953, **32**, 149.
6. Sverdrup, H. U., Johnson, M. W., and Fleming, R. H. *The Oceans*, 1962, 888.

ON THE PRESENCE OF RENIN GRANULES IN THE KIDNEY OF TOAD *BUFO MELANOSTICTUS* (SCHNEIDER)

M. FIROZ AHMAD
Department of Zoology, Ranchi University,
Ranchi 834 001, India.

THE proteolytic pressor enzyme renin exists in the form of granules in Juxtaglomerular cells (JGC) of the afferent vessel of the kidney. This pressor substance is an important factor in renin-angiotensin system (RAS) which in turn is responsible for short term blood pressure regulations and stimulation of aldosterone secretion in mammals. The role of renin in amphibians has yet to be defined with certainty although the presence of renin has been reported in some of the representatives of this group[1-3].

The present communication is the first report which describes the site of renin granules and histomorphology of Juxtaglomerular apparatus in *B. melanostictus*.

Small pieces of renal tissue of *B. melanostictus* were fixed in Helly's fluid and embedded in paraffin. Sections were cut at 2 μm to 4 μm, and then stained with Bowie's[4] method specifically recommended for renin granules of JG cells.

The JG apparatus in *B. melanostictus* consists of JG cells only. The other components of JG apparatus like mucula densa(MD) and extraglomerular mesangium (EGM) are absent. The JG cells with distinct boundries are located (figure 1) along the wall of the afferent arteriole of the glomerular complex. These cells are beset with deeply stained granules in their cytoplasm. The cells located in the vicinity of the glomerulus are more granulated than the distal JG cells. Some of the granules which are also positive to Bowie's stain are present even in the glomerulus near the vascular pole.

The JG apparatus has been studied by several investigators in nearly all groups of vertebrates[5]. Literature survey revealed that JG apparatus of amphibians, despite its unique position has not attracted much attention as evident from the fact that renin granules have been demonstrated only in a few species.

Bowie's positive renin granules similar to *B. melanostictus* have been demonstrated in *Triturus pyrrhogaster, Rana catesbeiana, R. japonica, R. nigromaculata* and *Bufo vulgaris* only[3]. The renin granules have also been identified with the help of

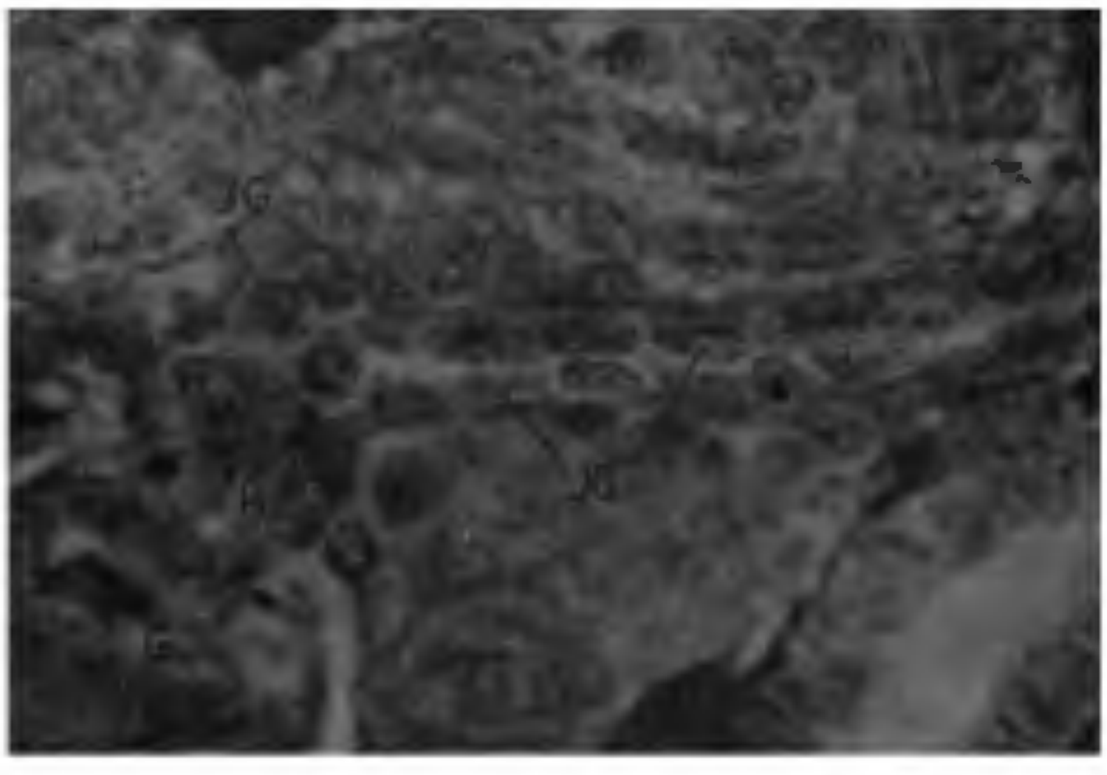

Figure 1. Portion of kidney of *B. melanostictus*, showing Juxtaglomerular cells (JG) with renin granules (R) in their cytoplasm. Note the aggregation of renin granules near the glomerulus (G).

periodic-silver methenamine (PA-AG-M) in *Rana pipiens*[6,7] and with silver impregnation in *B. bufo*[8]. In all the cases the renin granules have been found to be restricted to the wall of afferent vessels. The granules present inside the glomerulus near the vascular pole are also renin as indicated by their affinity to Bowie's stain.

Keeping the architectural configuration in mind it is interesting to speculate the secreting mechanism of renin in this amphibian. Currently[9] two control paths, feed-forward and feedback for the release of renin granules have been envisioned for non-mammalian and mammalian vertebrates respectively. As the mucula densa is absent in *B. melanostictus*, and JG apparatus consists only of JG cells, the investigator favours a feed-forward mechanism for the release of renin from the JG cells. Although mucula densa has been reported earlier in some amphibia[10].

The author is grateful to Prof. M. Ogawa of Saitama University, Japan for his generous help and Dr P. N. Mehrotra, Head, Department of Zoology, Ranchi University for encouragements and facilities.

22 March 1983

1. Yoshimura, F., Hoshiko, N. and Suziki, M., *Nisshin Igaku*, 1951, **26**, 631.
2. Connel, G. M., and Kaley, G., *Biol. Bull.*, 1964, 127, 366.
3. Sokabe, H., Ogawa, M., Oguri. M. and Nishimura, H. M., *Tex. Rep. Biol. Med.*, 1968, **27**, 867.
4. Bowie, D. J., *Anat. Rec.* 1936, **64**, 357.
5. Sokabe, H. and Ogawa, M., *Int. Rev. Cytol.* 1974, **37**, 271.
6. Sutherland, L. E., *Ph. D. Thesis.* University of Toronto, Toronto, 1966.
7. Capelli, J. P., Wesson, L. G. Jr. and Aponate, G. E., *Am. J. Physiol.*, 1970, **218**, 1171.
8. Lamer, A. P. M. and van Dongen, W. J., *Gen. Comp. Endocrinol* 1972, **18**, 602.
9. Sokabe, H., *Nippen Ishikai Zasshi*, 1968, **59**, 602.
10. Edwards, J. G., *Anat. Rex.*, 1940, **76**, 381.

EFFECT OF COPPER ON THE ESTRADIOL RECEPTORS IN RAT UTERUS

R. K. PURI* AND R. K. JOHRI†
Division of Endocrinology, Central Drug Research Institute, Lucknow 220 001, India.
Present Address:
* Department of Cell Biology, Mayo Clinic, Rochester, Minnessota, U.S.A.
† Regional Research Laboratory, Jammu Tawi 180 001, India..

IT has been understood that a Cu-IUCD has a localised effect and prevents implantation[1]. However, the mode of action of copper in the uterus remains unclear. The effect of metallic copper on endogenous steroid hormones has been investigated as one of the many events responsible for the contraceptive efficacy of Cu-IUCD[2-4]. Earlier reports indicate that copper wire fitted in one horn of rat uterus induces estradiol uptake in both horns[5,6]. *In vitro* studies further reveal that metallic copper influences estradiol receptor complex[4,7,8]. However, these investigations were confined only to cytosol fraction obtained from uterus and no direct estimate of the effect of copper on nuclear receptors and on the translocation process is available. Therefore, these events have been studied in the present work.

In one group of healthy adult albino rats (150–175 g) a pure (99%) copper wire (diameter 0.2 mm; area 12.6 mm^2) (group C) and in other group (B), a nylon thread of the same specifications was fitted bilaterally in the uterine lumen under asceptic conditions. One group (A) was sham-operated and kept as control. Twelve days post-operated animals were killed by decapitation and the uterine horns were processed to isolate nuclear and cytosol fractions as reported earlier[9]. The specific binding of estradiol to nuclear receptor was determined by the exchange assay method[10]. The method of *West et al*[11] was employed to determine the cytosol receptors. Dissociation constant (K_d) was determined by the method reported earlier[9]. The effect of metallic copper on the distribution of radioactive estradiol between cytosol and nuclear fraction was studied using both uterine horns. The uteri were incubated with metallic copper of the same area and diameter as mentioned previously at 37° C in 2 ml of Eagle medium containing 0.03 mmol of (1,3,5,7) ^{3}H-estradiol-17 β (specific activity 49 Ci/ mmole, supplied by Biochemical Centre, Amersham), for various times as indicated (table 2). At the end of the respective incubations the mixtures were cooled and the uteri washed thrice for 3 min by tris-EDTA buffer (0.01 M–Tris-HCl, 0.001 M-EDTA and 1%-sodium azide,