

## TESTICULAR OVA IN *URAEOTYPHLUS* NARAYANI SESHACHAR

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OVA in the testis of Amphibia have been reported by a number of workers both normally as well as during implantation experiments. In the toads, however, they have been more frequently found than in other Amphibia. The development of the Bidder's organ in many species of *Bufo* is probably the culmination of this faculty to develop ova by the male. The development of the Bidder's organ and its probable function have formed the subjects of numerous memoirs to which that of Witschi (1933) is probably the latest contribution helping to elucidate many obscure points in regard to this peculiar organ.

While the development of ovarian structures in species of Amphibia other than *Bufo* is comparatively rare, Swingle (1917), Crew (1921) and Rau and Gatenby (1923) have described in various species of *Rana* isolated ova in the testis of both adults and larvæ. The last-mentioned authors noticed in a male specimen of *Rana temporaria* a structure resembling the Bidder's organ.

The presence of ova in relation to the testis is more common in experimental work. Meyns's (1910) classic experiments on transplantation of testis in frogs yielded results which pointed generally to the fact that in transplanted and regenerating testis fragments, eggs are commonly found. These observations have been substantiated by the work of Ponse (1924) on *Bufo vulgaris* and later by Welti (1928) in the same species. But contrary results have been reported by Lauche (1915) in *Rana*, Witschi (1925) in *Bufo* and Moszkowska (1932) in *Bombinator*. No eggs were found by these authors in the testicular implants.

Champy (1921) has produced precisely similar results by different means. In a specimen of *Triton alpestris*, starvation produced a suppression of spermatogenesis but when later the specimen was fed, the gonocytes of the starved male gonad had metamorphosed into oocytes and the individual in every way resembled a female.

A review of the existing literature reveals nothing regarding this problem in Apoda. So far as I am aware, a Bidder's organ has not been noticed in any example of this group nor have testicular eggs been reported, either normally or as a result of experimental work.

So the interest attached to the discovery of testicular eggs in a member of the Apoda is considerable. During my study of the spermatogenesis of *Uraotyphlus narayani*, I came across a set of sections of the testis showing eggs. Three such ova were found in the different lobes of the testis of the same animal. The following is a brief description of the ova.

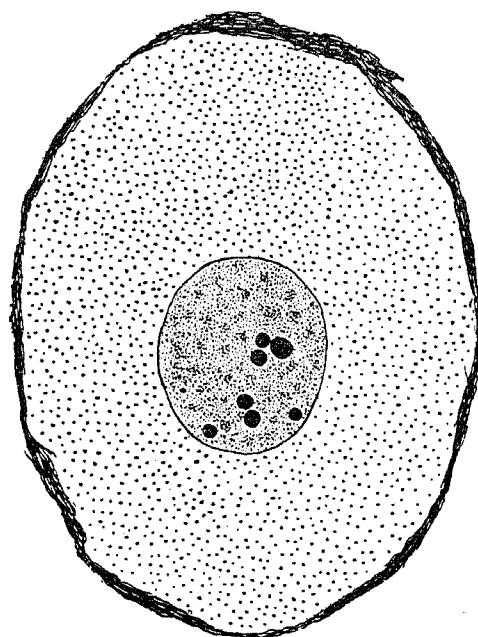


FIG. 5

The ova are all intratubular. They are large and all the three are of about the same size and in about the same stage of development. The cells present all appearances of typically developing ova of the female. The nucleus appears to be in the germinal vesicle condition. No distinct chromosomes nor a nuclear network can be seen. The nucleus takes an almost uniform dark stain. An interesting feature is the presence in the nucleus of each ovum, of a large number of nucleoli. They vary from 15 to 27 in number. This is another feature in which the testicular ova resemble normal ova of the female, where also multiple nucleoli are met with. At least in one of the ova, the nucleoli are extruded into the cytoplasm and a number of them occur scattered all over the cytoplasm (Fig. 6). An extrusion of nucleoli into the cytoplasm is common in normal ova also. In one of the

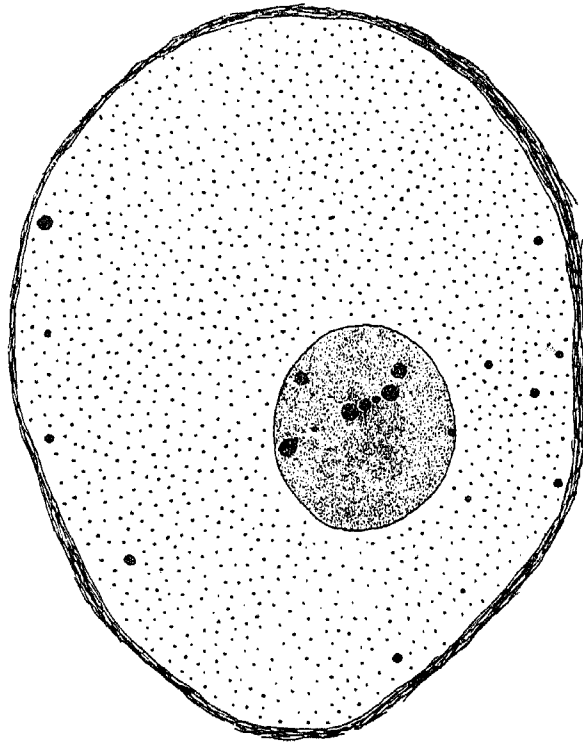


FIG. 6

oocytes a cap of granules is found in relation with the nucleus (Fig. 7). I believe these are mitochondrial granules. It is obviously hazardous on my

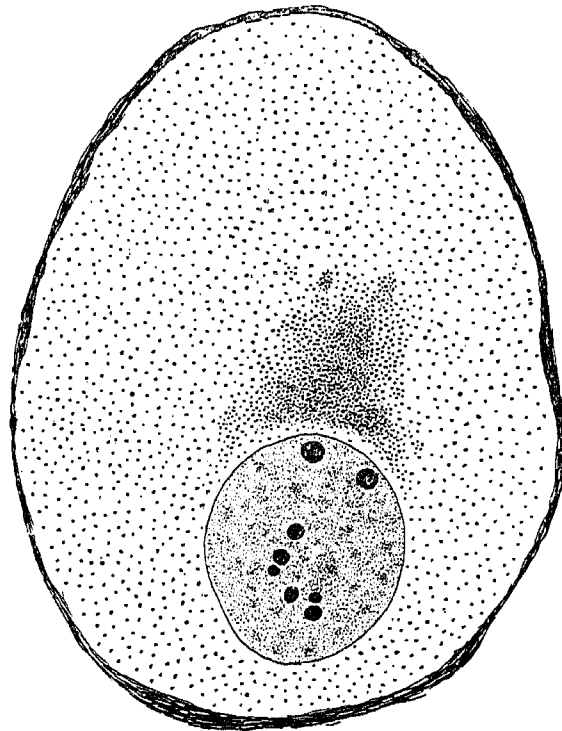


FIG. 7

part to attempt to discuss the cytology of these cells, seeing the paucity of the material at my disposal and also the absence of any particular methods for this type of cytological work (the material was fixed in Flemming's fluid with acetic acid and later the sections were bleached in hydrogen peroxide for the study of the chromosomes). However, a few tentative conclusions can be arrived at as a result of the examination of the material at my disposal. The Apoda obviously fall in a line with other Amphibia, especially with the Anura, in the occurrence of oocytes normally in the testis. Witschi (1934) has discussed at length the origin of such oocytes in normal adult testis in Anura and assigns two important reasons for their occurrence: (1) A passive conveyance of the eggs from the cortex to the medulla by the sex cords in young specimens belonging to sex races of the undifferentiated type; and (2) A transformation of primitive gonidia into ovicells by their enlargement and by a change in their nuclear organization. Ova which have been derived by the latter method are usually intratubular. This transformation has been called 'oviform degeneration'. I believe the ovicells found in the testis of *Uræotyphlus narayani* belong to the second type and have been formed by a transformation of primitive gonidia. The oocytes probably degenerate.

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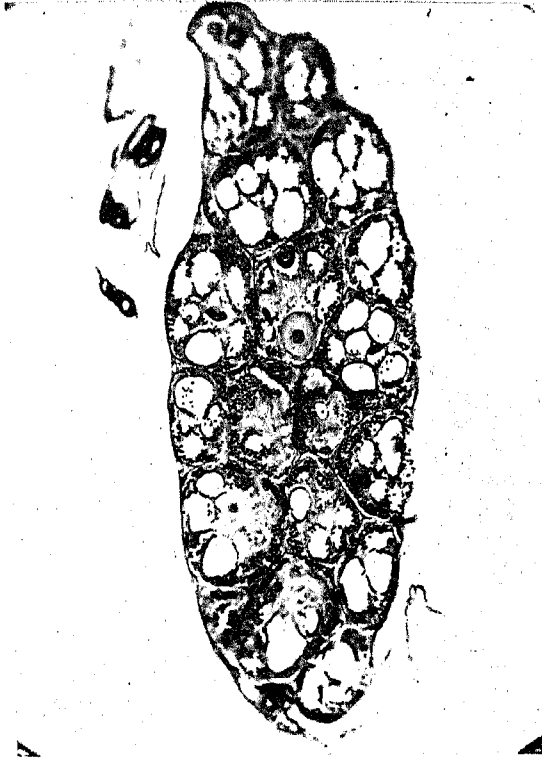


FIG. 1



FIG. 2

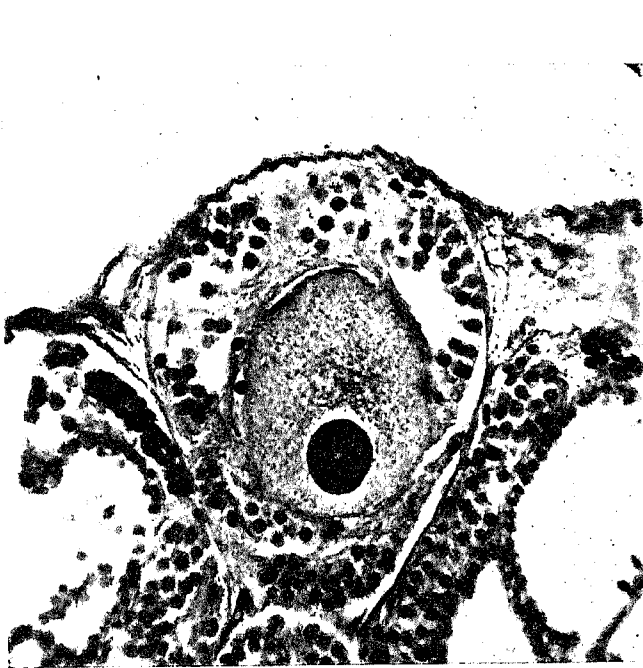


FIG. 3

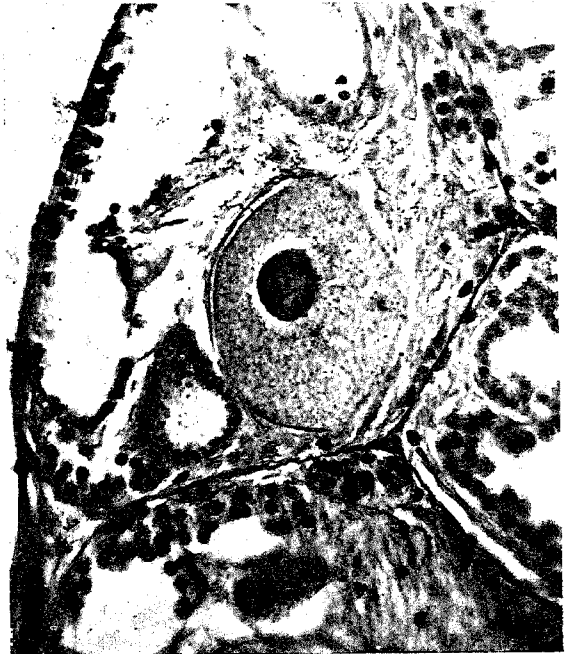


FIG. 4



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EXPLANATION OF FIGURES

- FIG. 1. Photomicrograph of the longitudinal section of a testis lobe of *Uraeotyphlus narayani* showing an ovicell in one of the locules of the testis. × 38.
- FIG. 2. The ovicell enlarged to show the multiple nucleoli. × 165.
- FIG. 3. Photomicrograph of another ovicell showing an aggregation of what are probably mitochondria in relation with the nucleus. × 165.
- FIG. 4. Photomicrograph of the third ovicell. × 165.
- FIG. 5. Drawing of the ovicell seen in Figs. 1 and 2. × 533.
- FIG. 6. Drawing of the ovicell seen in Fig. 4 showing the distribution of the extruded nucleoli in the cytoplasm. × 533.
- FIG. 7. Drawing of the ovicell seen in Fig. 3 showing the distribution of the mitochondrial granules in relation with the nucleus. × 533.