moth larvae and biochemically this can be taken as abnormal.

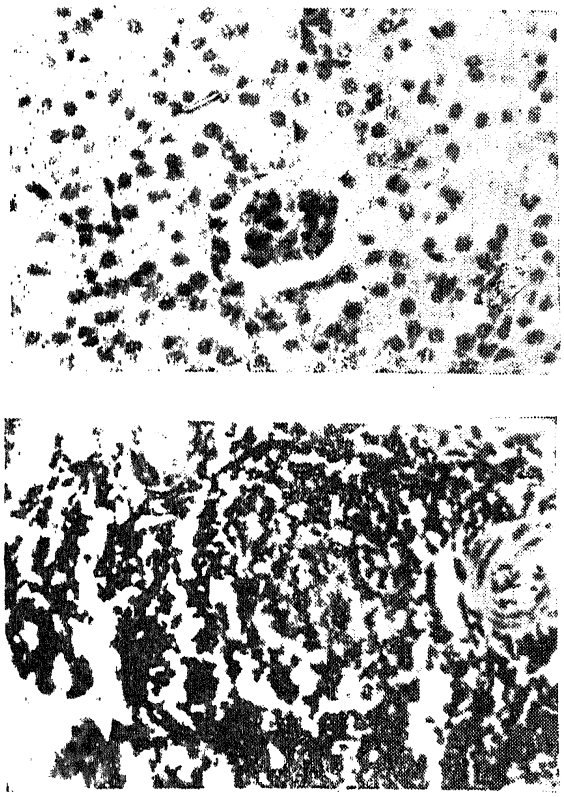

FIG. 2 (A–B). A. Section of a normal mouse kidney, × 400. B. Section of the kidney of mouse fed with cultures of *P. piceum* indicating focal accumulation of lymphocytes and focal nephritis, × 400.

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Univ. Biochemical Laboratories, A.C. College Campus, Madras-25 (India), *April* 4, 1972.

V. V. PARTHASARATHY.
M. SURENDRANATH.
C. DAMODARAN.
C. S. RAMADOSS.
E. R. B. SHANMUGASUNDARAM.

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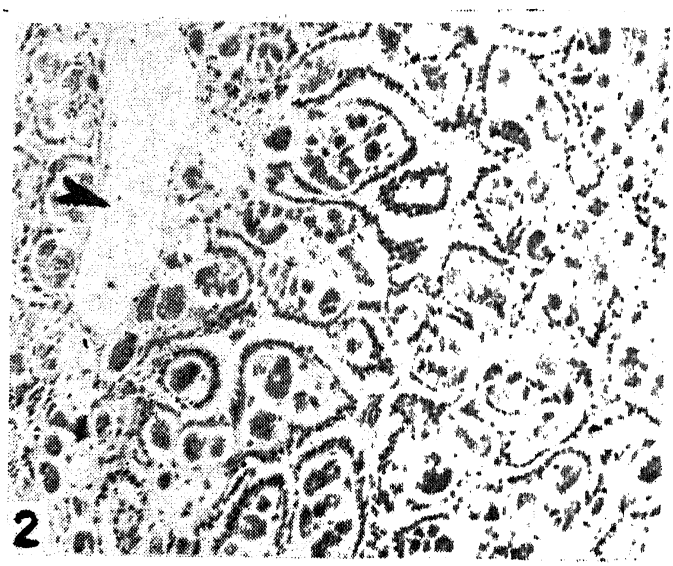
THE YOLK-SAC GLAND IN THE INDIAN FRUIT-BAT, *ROUSETTUS LESCHENAULTI* (DESMARET)

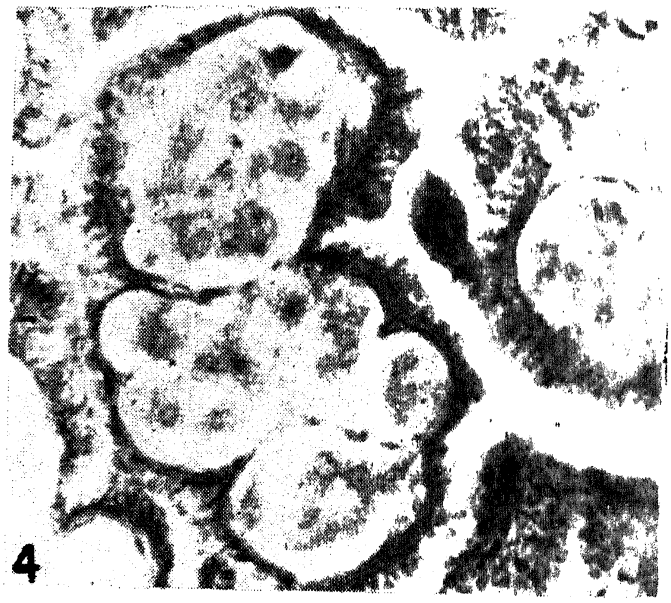
THE yolk-sac of megachiropteran bats undergoes unique modifications during development and becomes converted into a solid, free, vascular, gland-like structure abutting against the chorio-allantoic placenta (Gohre, 1892 ; Van der Sprenkel, 1932 ; Moghe, 1951, 1956 ; Wimsatt, 1958). This peculiar modification of the yolk-sac is "not even suggested in any other known group of mammals" (Mossman, 1937). However, the details of the structure of this unique gland has not been described so far. In the present note the histological structure of the yolk-sac gland of the Indian fruit-bat, *Rousettus leschenaulti* at full term is described.

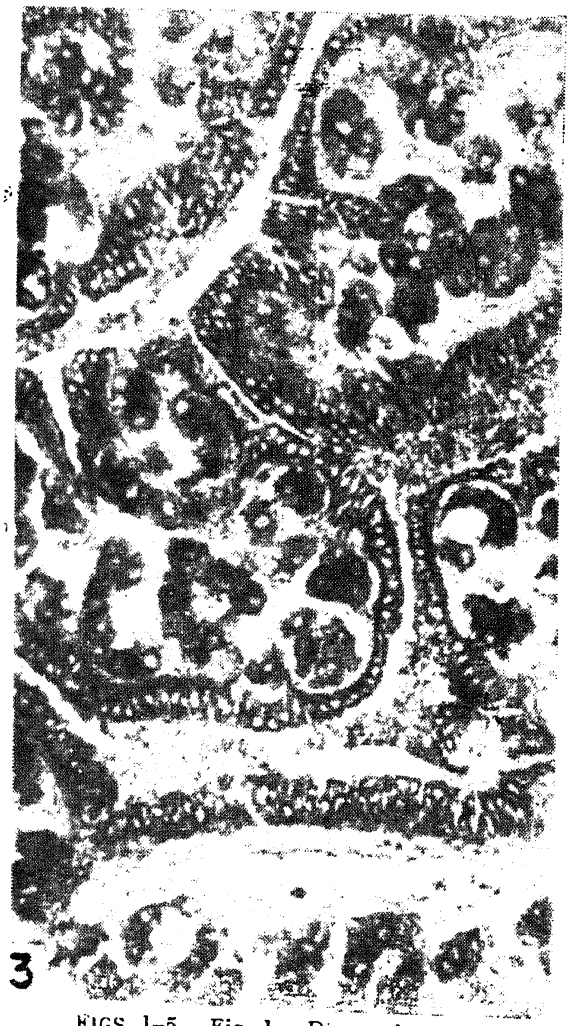
The yolk-sac of this bat occurs as a solid, glandular structure of irregular shape abutting against the chorio-allantoic placenta (Fig. 1) on the mesometrial side of the uterus. The surface is marked by numerous blister-like projections and irregular grooves giving the yolk-sac a warty and lobulated appearance.

Histologically, the yolk sac is a conglomerate of numerous acini (Fig. 2) composed of hypertrophied endodermal cells (Figs. 4 and 5). The acini have no lumen. The endodermal cells of each acinus lie on a distinct basement membrane which is PAS-positive and azan-positive (Figs. 3 and 5). The endodermal cells contain vacuolated cytoplasm and vesicular centrally placed nuclei, each typically with a dark nucleolus. They are moderately PAS-positive after salivary digestion and take a deep blue azan stain (Fig. 3). They also take a rich stain when stained by Best's carmine technique thereby indicating that they contain rich deposits of glycogen.

Each lobe, made up of several acini, is enclosed in a definite sheath of mesodermal cells, one or more layers thick. The mesodermal cells surrounding the lobes are hypertrophied. The entire gland is enveloped in a thick mesodermal sheath. The mesoderm also forms the matrix for the gland and contain fine strands of cells and fibres. The hypertrophied mesodermal cells surrounding the







FIGS. 1–5. Fig. 1. Dissected uterus of *Rousettus leschenaulti*. Arrow-head points towards the yolk-sac gland, × 1½. Fig. 2. Part of the section of the yolk-sac to show numerous acinar groups. Arrow head points towards a blood vessel, × 40. Fig. 3. Part of the section of the yolk-sac stained by Mallory azan technique, × 260. Fig. 4. A few acini with hypertrophied endodermal cells surrounded by mesoderm. Haematoxylin-eosin, × 500. Fig. 5. A few acini. PAS staining, × 500.

lobes are intensely PAS-positive even after salivary digestion and are stained deep blue in Mallory azan stain.

The gland has a rich vascular supply, and numerous blood capillaries occur between the lobes of the gland and sometimes between adjacent acini within the lobe. The general picture of the gland is very similar to that of an endocrine gland. Nothing is yet known concerning the physiology of this gland in the fruit-bats. However, looking at the yolk-sac gland as an organ derived from the endoderm-mesoderm complex, it is not surprising that the yolk-sac should become converted into a gland, since it is well known that the endoderm-mesoderm complex of the gut is able to give rise to glands during the course of development in the vertebrates. Detailed histophysiological investigations on this unique structure are being carried out, and will be reported later.

Department of Zoology, Institute of Science, Nagpur, *April* 11, 1972.

A. GOPALAKRISHNA.
(MISS) K. B. KARIM.

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THE FREQUENCIES OF SERUM HAPTOGLOBIN AND TRANSFERRIN TYPES IN AN ANDHRA POPULATION

HAPTOGLOBIN (Hp), the serum protein which binds specifically with hemoglobin, appears in three phenotypic forms in humans. The phenotypes have been designated Hp 1–1, Hp 2–2, and Hp 2–1 and are controlled by two autosomal allelic genes, Hp^1 and Hp^2.[1] Hp 1–1 appears electrophoretically as a single band. Hp 2–1 and Hp 2–2, however, exhibit multiple banding and appear to consist of a polymeric series. The physiological and chemical significance of these polymorphic forms is not very well understood. A high Hp^1 gene frequency is, however, reported where sickle cell and Glucose-6-phosphate dehydrogenase (G-6-PD) deficiency genes are predominant[2]. The frequencies of the common haptoglobin types vary widely in different populations. There is a marked difference in the distribution of Hp genes between European and African populations. Studies done on several Indian populations are remarkable for the fact that there is generally a low Hp^1 gene frequency, which in South India reaches the lowest value reported anywhere else in the world[3].

The iron binding serum protein transferrin is also present in several forms, some rare and others relatively common in particular population or group of populations. In all human populations the common form of transferrin is transferrin C. Indian populations so far studied are uniform in possessing transferrin C except the Oraons in Chota Nagpur in whom transferrin CD has been reported[4].

We have studied the distribution of haptoglobin and transferrin types in Telugu speaking Hindus from Andhra Pradesh to provide further information on South Indian populations. A low Hp^1 gene frequency and a uniform presence of transferrin C is reported.

183 unselected blood samples were obtained from Hindus residing in Warangal, Andhra Pradesh. Serum was separated from the clotted blood one day after collection. Typing was done the same day or samples were stored at $-20°$ C until examined. A simplified disc electrophoresis was carried out according to Clarke[5] using 5% Acrylamide. 3 μl serum was mixed in 0·1 ml of 20% Sucrose and layered directly on the separation gel. 2·5 m Amp. current per tube was allowed for the first 5 minutes and then it was raised to 5 m Amp. for the rest of the run of 20 minutes. For haptoglobin typing serum samples were complexed with hemoglobin and after electrophoresis gels were stained with benzidine-peroxide solution[6]. Typical band patterns were obtained with free hemoglobin running ahead. Two samples did not show any band pattern and after repeated runs were typed as Hp 0–0. Transferrin was stained with Nitroso-R salt[7] as an iron indicator. Distinct but very faint green band develops. Routinely transferrin was identified along with haptoglobins using benzidine stain. Transferrin band shows up next to free hemoglobin.

Table I gives the distribution of haptoglobin types in this population. The gene frequencies have been calculated by direct gene counting and χ^2 computed assuming Hardy-Weinberg equilibrium. The Hp^1 gene frequency for the population was 0·12. Two persons showed ahaptoglobinemia. These two persons were healthy and had no history of anaemia or haemolysis. These two samples are not included in the gene frequency calculations. All the samples typed for transferrin showed only transferrin CC and no variants were observed.

Table II shows Hp^1 gene frequencies of some Indian populations along with the one reported in