

Comparative Study of Pancreas of Frugivorous, Carnivorous and Insectivorous Bat

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Abstract

Bat is an unique flying mammal represented by more than hundred genera which shows variable feeding habits like frugivorous, insectivorous, nectar eater, carnivorous, sanguivorous etc. In the present work the pancreas of bats were studied which have the different dietary habits. *Rousettus leschenaulti* a frugivorous bat, *Megaderma lyra lyra* a carnivorous bat and *Scotophilus heathi* an insectivorous bat were selected. The pancreas of *Rousettus leschenaulti* was bilobed with head, neck and body with tail having a length between 1.2 to 1.7 cm. long. The pancreas of *Megaderma lyra lyra* was axe or hatchet shaped having a length of 1.0 to 1.5 cm. containing head neck and body. The pancreas of *Scotophilus heathi* was serrated leaf shaped having two lobes one shorter than the other consisting of head neck and body. The body weight pancreas weight ratio was observed it was to be 1.02 mg./ gm. body weight in *Rousettus leschenaulti*, 3.63 mg./ gm. body weight in *Megaderma lyra lyra* and 5.28 mg./ gm. body weight in *Scotophilus heathi*. The endocrine islets of Langerhan's was found to be in between 3000 μ^2 to 36000 μ^2 having several hundred islet cells in *Rousettus leschenaulti*, 200 μ^2 to 3500 μ^2 in diameter consisting of few to hundred cells in *Megaderma lyra lyra* and 75 μ^2 to 3900 μ^2 containing few islet cells in *Scotophilus heathi*. All islet shows variable percentage of alpha, beta and delta cells secreting different hormones.

Keywords :- Bat, Pancreas, *Rousettus leschenaulti*, *Megaderma lyra lyra*, *Scotophilus heathi*.

1. Introduction

Bat is an unique flying mammal represented by more than hundred genera which shows variable feeding habits like frugivorous, insectivorous, nectar eater carnivorous, sanguivorous etc. In this work I like find out is there any change in the pancreas of bats having different dietary habits. *Rousettus leschenaultia* *Megaderma lyra lyra* and *Scotophilus heathi* was chosen which have frugivorous, carnivorous and insectivorous feeding habit respectively.

2. Methodology

Bats are nocturnal flying mammals that leave their roost at dusk and return back at dawn. The animals were collected with the help of butterfly net before they leave their roost. The frugivorous bat *Rousettus leschenaulti* collected from a well near Pauni located 20°47'13" N 79°38'12" E, carnivorous bat *Megaderma lyra lyra* was collected from the Kandri mines near Nagpur located 21°24'40" N 79°15'53" E and insectivorous bat *Scotophilus heathi* was collected from a roof of old house in Sindewahi located 20°17'22" N 79°39'25" E. The bats were weighted and anesthetized with the help of chloroform. The pancreas was dissected out and weighted and fixed in neutral buffer formalin and processed for histological slides. The slides were stained with haematoxyline eosin, Mallory Heidenhen azan stain, Ewens aldehyde fuschin method and Gomori method for histological and cytological studies. The sizes of the islets were measured with the help of ocular micrometer and the data were discussed in the light of published work.

3. Observations

The pancreas of *Rousettus leschenaulti* was bilobed consisting of head, neck and body having a length of 1.2 to 1.7 cm. (Fig. 1) The weight of pancreas ranges between 0.032 to 0.071 gm. The pancreas weight body weight ratio was found to be 1.02mg./gm. weight of body. The size of the islets ranges between 3000 μ^2 to 36000 μ^2 consisting of few to more than hundred islet cells having nearly 25% alpha cells, 70% beta cells and 5% delta cells. (Fig.2)

The pancreas of *Megaderma lyra lyra* was axe or hatchet shaped consisting of head, neck and body having a length of 1.0 to 1.5 cm. (Fig. 3) The weight of pancreas ranges between 0.097 to 0.153 gm. The pancreas weight body weight ratio was found to be 3.63mg./gm. weight of body. The size of the islets ranges between 200 μ^2 to 3500 μ^2 in diameter consisting of few to hundred islet cells having nearly 10% alpha cells, 85% beta cells and 5% delta cells.

The pancreas of *Scotophilus heathi* was serrated leaf shaped consisting of head, neck and body having a length of 0.8 to 1.2 cm. (Fig. 5) The weight of pancreas ranges between 0.88 to 0.209 gm. The pancreas weight body weight ratio was found to be 5.28mg./gm. weight of body. The size of the islets ranges between 75 μ^2 to 3900 μ^2 containing few islet cells having nearly 30% alpha cells, 70% beta cells (Fig.6)

4. Discussion

The pancreas found in the mesenteries as reported by Raghukumar (1975) in bandicoot shows arborization, Sonia A. et al. (1987) differentiated into head, neck and tail, in the three species of bats pancreas shows morphological variation as shown in Fig. 1,3 and 5. The weight of the pancreas was also found to be variable it was 1.02 mg./ gm. body weight in frugivorous bat *Rousettus leschenaulti*, 3.63 mg./ gm.of body weight of carnivorous bat *Megaderma lyra lyra* and 5.28 mg./ gm.of body weight of insectivorous bat *Scotophilus heathi* it was reported 13.69mg./gm.of body weight in *Suncus murinus* and 3.65mg./gm.of body weight in rats by R. Dahare & A. A. Dhamani (2009)

The size of the islets was found to be smallest in insectivorous bat *Scotophilus heathi* 75 μ^2 to 3900 μ^2 with few cells, the size of the islets found in carnivorous bat *Megaderma lyra lyra* 200 μ^2 to 3500 μ^2 and it was found to be largest 3000 μ^2 to 36000 μ^2 in frugivorous bat *Rousettus leschenaulti*. Fredrik Jaffe (1951) reported it as 6000 μ^2 to 10500 μ^2 in rabbit and 10000 μ^2 to 20000 μ^2 in Chacma baboon by Sonia A. et al.(1987). The percentage of alpha, beta and delta cells are variable in different animals it was 25% alpha cells, 70% beta cells and 5% delta cells in *Rousettus leschenaulti*, 10% alpha cells, 85% beta cells and 5% delta cells in *Megaderma lyra lyra* and 30% alpha cells, 70% beta cells in *Scotophilus heathi* Dao (1991), Fredrick Jaffe (1951), Michelmore (1998) observed the dominance of beta cells in wister rat, rabbit and *Rousettus aegyptiacus* respectively.

5. Conclusion

The pancreas of different bat shows morphological variations as shown in figure.1,3 and 5The pancreas weight body weight ratio was found to be less in frugivorous bat *Rousettus leschenaulti*, moderate in carnivorous bat *Megaderma lyra lyra* and highest in insectivorous bat *Scotophilus heathi*. The diameter of islet and number of islet cells was less in carnivorous bat *Megaderma lyra lyra* moderate in insectivorous bat *Scotophilus heathi* and largest in frugivorous bat *Rousettus leschenaulti*. The alpha, beta and delta cells were observed in *Rousettus leschenaultia* and *Megaderma lyra lyra* and only alpha and beta cells were observed in *Scotophilus heathi*, The variation in endocrine cell percentage was observed among three bats having different dietary habits.

6. Acknoelgement

The authors are highly thankful to Dr. M. M. Gadegone Ex Director Institute of Science Nagpur for his encouragement and laboratory work facilities and also Dr. I. H. Jeevaji Principal Dr. Ambedkar college Nagpur for valuable suggestion and guidance.

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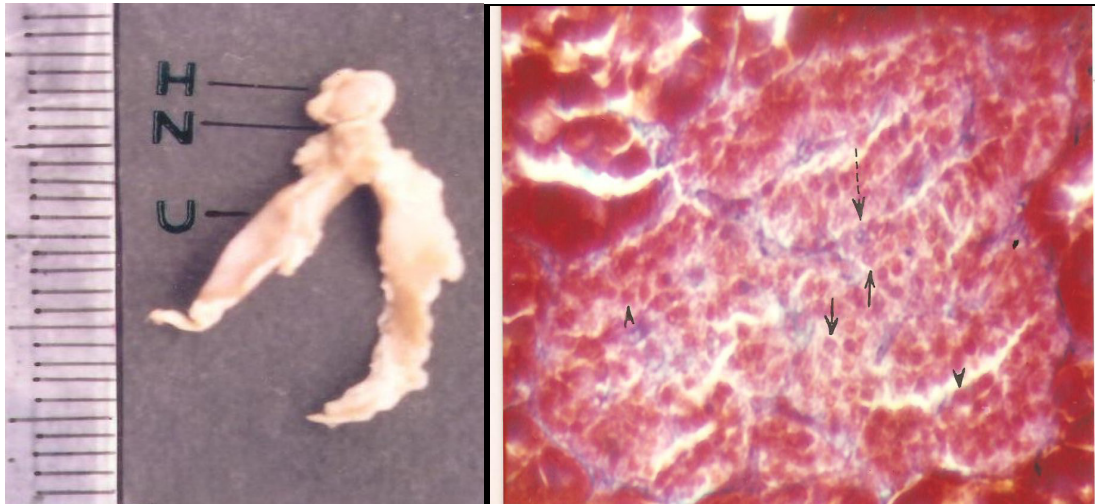


Fig. 1 Pancreas of *Rousettus leschenaulti* shows head neck and tail or uncinata

Fig. 2 Islet of *Rousettus leschenaulti* shows alpha (arrow), beta (arrowhead) and delta cells (dotted arrow) Mallory azan X 302

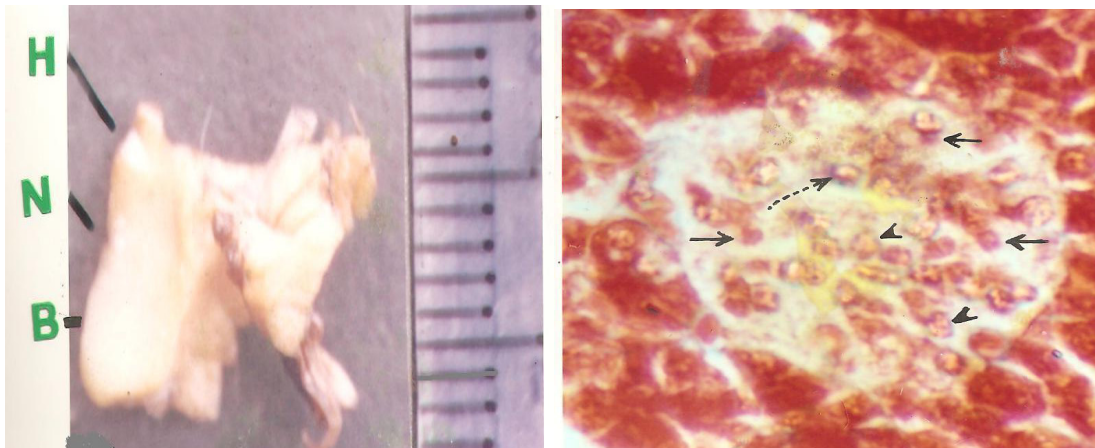


Fig. 3 Pancreas of *Megaderma lyra lyra* shows head neck and body

Fig. 4 Islet of *Megaderma lyra lyra* shows alpha (arrow), beta (arrow head) and delta cells (dotted arrow) Mallory azan X 1512

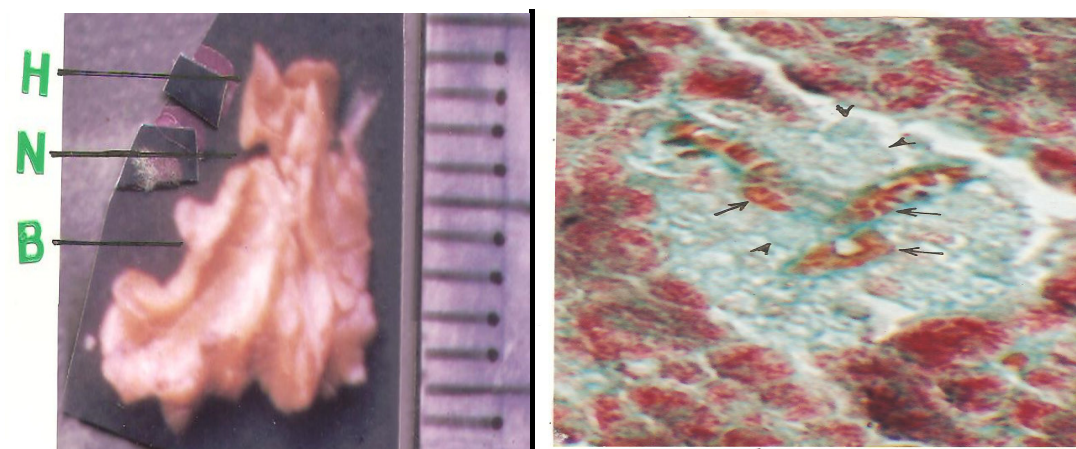


Fig. 5 Pancreas of *Scotophilus heathi* shows head neck and body

Fig. 6 Islet of *Scotophilus heathi* shows alpha cells (arrow), beta cells (arrow head) Aldehyde fuchsin X 1512

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