

CYTOLOGICAL AND HISTOCHEMICAL STUDIES ON REPTILIAN GASTRIC MUCOSA

THESIS

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By

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INTRODUCTION

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The lacertilian lizards are numerous and widely distributed in Egypt. Some of these reptiles are small in size, live in the vegetative areas in the Nile Valley and feed on insects and other tiny animals. Examples of these forms are genus Chalcides, genus Mabuya and genus Scinus. Other forms are much larger in size and inhabit the desert areas, such as the genera Uromastyx, Agama and Varanus. They are terrestrial and also feed on insects and other small animals. A third group of such lizards, including genus Chamaeleon, are arboreal, living attached to the branches of the trees and are insectivorous too.

In Egypt, there are two species of genus Varanus namely; Varanus griseus and Varanus niloticus. These lizards reach a very considerable size ranging sometimes from one to two meters in length. Varanus griseus inhabits the desert areas making tunnels in the sands of the desert and lives inside these tunnels. Other species; namely Varanus niloticus live in the River Nile regions making tunnels in the muddy areas along the banks of the River. They leave the tunnels to water from time to time for catching the preys.

Both Varanus species are carnivorous; they eat rats, mice, lizards and other small animals. However, Varanus griseus prefers rats and mice.

One of the most important behavioural features of these lacertilian lizards is their ability to hibernate during the winter season for a period ranging between 2-4 months from the end of November to the end of March. Nevertheless, not all of these lacertilian species have the ability to complete such period of hibernation; some spend a relatively short period of hibernation as genera Mabuya, Chalcides and Agama. On the contrary, other species exhibit a long duration of hibernation which reaches almost 4 months. Among these species is Varanus griseus.

During hibernation, animals stop feeding completely, and it is believed that this behaviour is controlled by the body hormones.

The present work was planned to investigate the influence of hibernation on the histological, cytological and histochemical characteristics of the gastric mucosa of one of these lacertilian lizards; namely Varanus griseus. Besides the general histology, the cytological section was devoted for investigating the Golgi apparatus

and mitochondria, whereas the histochemical part includes a study of the general carbohydrates glycogen and mucopolysaccharides; total protein, amino groups, disulphides; nucleic acids and general lipids. These studies were carried out along two seasons (i.e.) the feeding (non-hibernating) season during summer, and the hibernation season during winter, for the sake of comparing the results together.

The electron microscope was also used in the present work to examine the ultrastructure of the component cells of the gastric mucosa during normally feeding and hibernation periods.

PREVIOUS WORK

PREVIOUS WORK

Many histological investigations on the mucosa of the alimentary tract of various animals have been carried by many authors. One of these investigations, which was carried out by Singh (1967) on the alimentary canal of the snake headed fish Ophiocephalus marulius, showed that the alimentary tract of that fish is comparatively small. The oesophagus is provided by large number teeth and the stomach is a large sac-like structure, which is divisible into cardiac and pyloric portions. The gastric glands are present in both regions of the stomach, but they are more complicated in the pyloric stomach, and the intestine is a narrow long tube. Later on, Clarke and Witcomb (1980) have shown that the stomach of the common eel fish Anguilla anguilla showed well developed folds which decreased in size and number towards the pyloric sphincter. Columnar epithelium and gastric gland cells were present; the latter being absent from the pyloric region.

In reptilian animals, El-Toubi and Bishai (1955) have studied the histological structure of the mucosae of fundic and pyloric portions of the stomach of the lizard Uromastix aegyptia. They declared that the mucosa is thick and contains gastric glands that open

into the gastric pits which are continuous with the surface epithelium. Thus, the mucosa of fundic region of the stomach consists of surface epithelial cells which secrete a substance related to mucin, and the fundic glands are tubular with narrow cavities and consist of many oxyntic cells. In addition, the mucosa of pyloric region of the stomach contains surface epithelium and pyloric gland cells which are tubular or branched tubular glands with long necks.

In addition to the above study, Bishai (1959) has studied the histological structure of the alimentary tract of the lizard Varanus griseus. He reported that the stomach of that lizard is a straight tube composed of cardiac, fundic and pyloric portions. The wall of the stomach is formed of the serosa, muscularis, sub-mucosa and mucosa. The mucosa of cardiac region of the stomach consists of surface epithelium, composed of columnar epithelial cells, peptic cells and mucous-secreting cells or light cells, and the sub-mucosa consists of connective tissue cells and blood capillaries. In addition, the mucosa of pyloric region of the stomach contains the same cellular elements but it lacks the peptic cells. In (1960), Bishai has investigated the histological structure of the mucosae of fundic and pyloric regions of

stomach of the lizard Chamaeleon Vulgaris and showed that the mucosa of fundic region of the stomach consists of gastric gland cells composed of surface epithelial cells which are not typical mucous-secreting cells and oxyntic gland cells which are more numerous in the middle of the stomach and diminished near the pylorus. The mucosa of the pyloric region of the stomach contains pyloric gland cells which are simple tubular glands similar to those described above in the lizard Varanus griseus.

Recently, Amer and Ismail (1976) have shown that the stomach of agamid lizard Agama stellio contained gastric glands composed of peptic cells, oxyntic cells and mucous-secreting cells and the presence of peptic cells was considered as adaptation to the available food.