THE GROSS AND MICROSCOPIC ANATOMY OF THE HYPOPHYSIS AND HYPOTHALAMO-HYPOPHYSIAL SYSTEM IN BUFO VIRIDIS AND EUMECES SCHNEIDERI

By

EL-SAYED FIKRI ALI EL-DAWI

B. Sc.

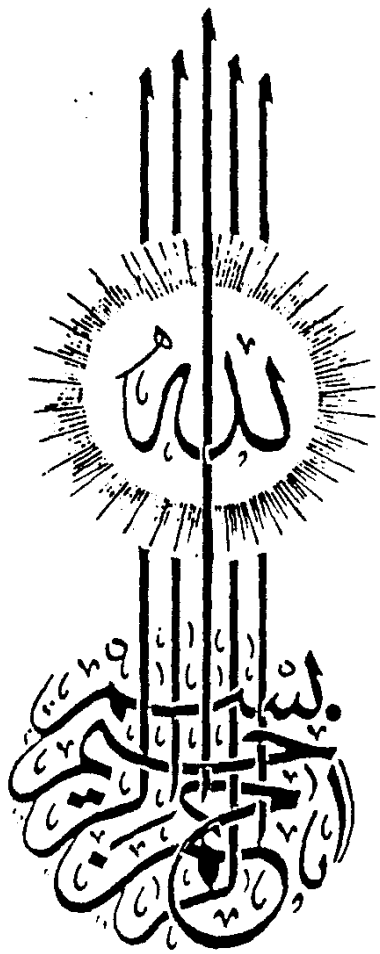
Department of Zoology
Faculty of Science
Ain Shams University

A THESIS

Submitted in Partial Fulfilment
For the Award of the Degree of
MASTER OF SCIENCE

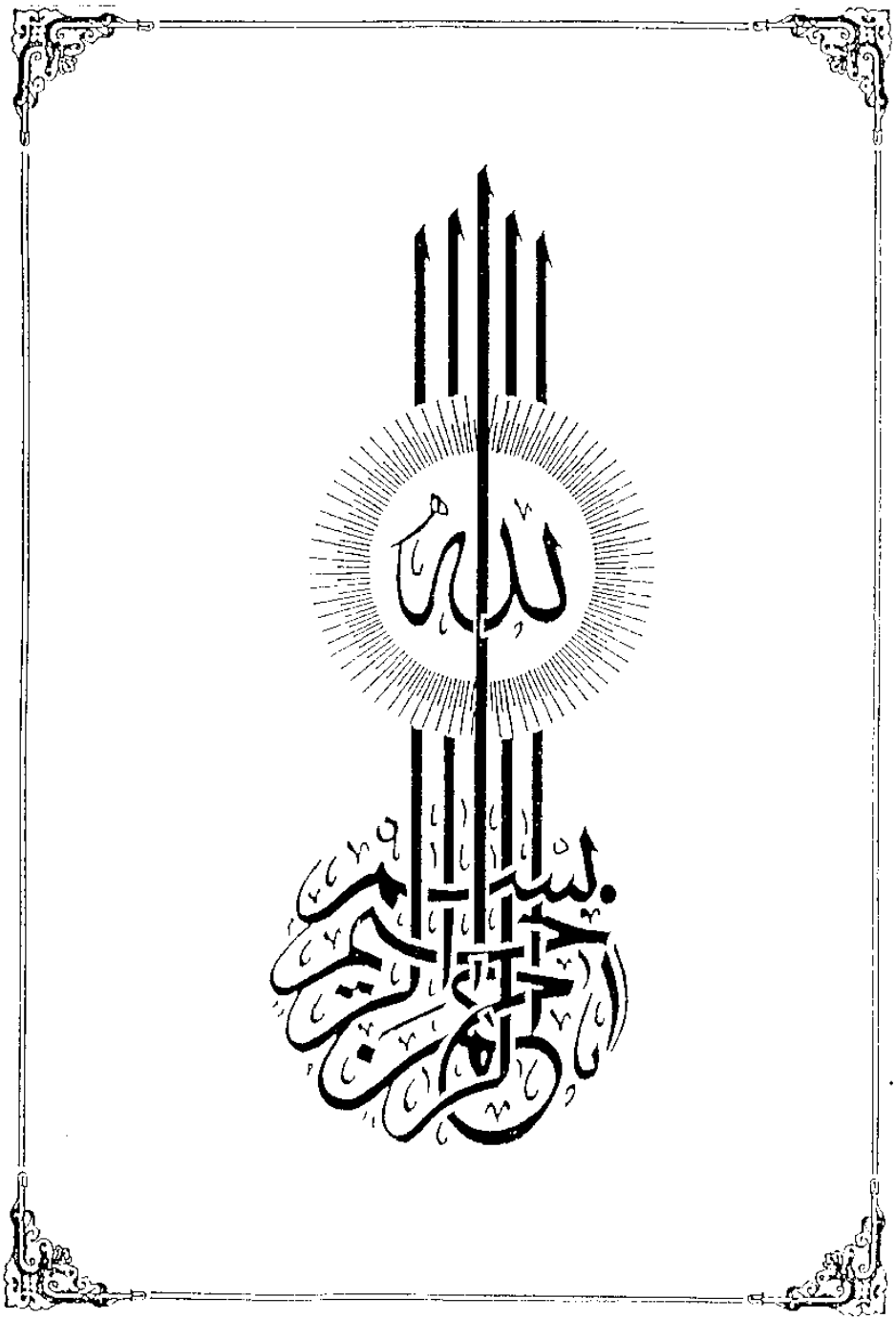
Faculty of Science
Ain Shams University

1984



وما توفيقي إلا بالله

صدق الله العظيم



TO

MY PARENTS AND

MY WIFE

Beside the presented thesis, the student has successfully passed an examination in the following postgraduate courses:

1- Evolutionary Morphology.

2- Advanced Histology.

3- Histochemistry.

4- German Language.

ACKNOWLEDGEMENT

I wish to express my deep gratitude to Dr. W. Rizkalla, Professor of Vertebrate Anatomy and Dr. F.I. Amer, Professor of Embryology, Faculty of Science, Ain Shams University, for suggesting the topic of investigation, valuable guidance, fruitful discussions and reading the manuscript.

Sincere thanks to Prof. Dr. M.Gabr, Head of Zoology Department, Faculty of Science, Ain Shams University for his kind help through the course of the work.

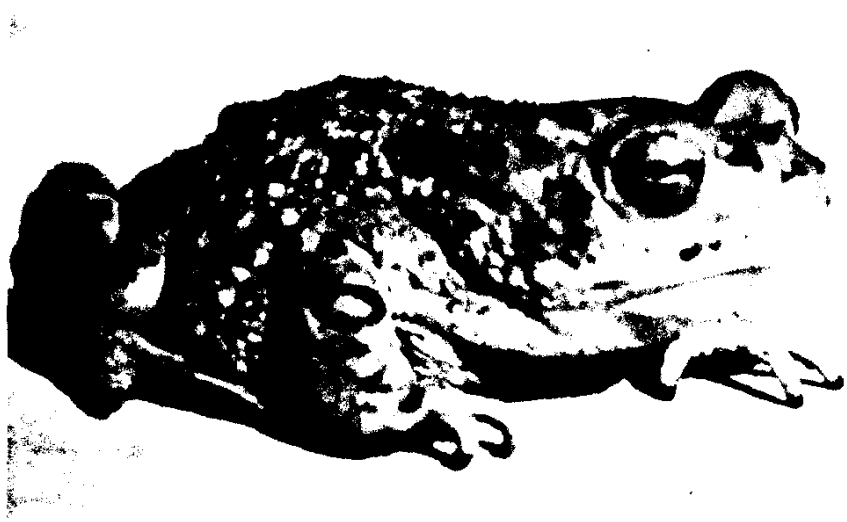
CONTENTS

PART I
BUFO VIRIDIS

PART I

BUFO VIRIDIS

INTRODUCTION AND HISTORICAL REVIEW



BUFO VIRIDIS

INTRODUCTION AND HISTORICAL REVIEW

The occurrence of the pituitary gland in all vertebrates has been established by the anatomists during the ninteenth century and, at the end of this century, its anatomical structure has been recognized in mammals.

The structural complexity of the pituitary gland and its relation to the fore-brain have attracted the attention of many investigators than any other endocrine gland. Nowadays, the study of this gland extends to include its histological and cytological structure, its relation to the fore-brain and its physiological role in controlling the activity of the other endocrine glands.

The extensive studies on the relation between the fore-brain and the pituitary gland lead to the discovery of a distinct system, known as the "hypothalamo-hypophysial system". This system is formed of certain centres (hypothalamic neurosecretory centres), for the elaboration of the neurosecretory material, and a special tract (hypothalamo-hypophysial tract) for the transmission of this material to the pituitary gland. Moreover, the comparative anatomical studies of this system in different vertebrate classes furnish us with a basis for understanding the mechanism of the nervous control over the pituitary gland.

Among the vertebrates, Amphibia must receive a special importance, since its individuals are the first tetrapods that attempt to leave water from now and then and colonize the land.

Herring (1913) found that the pituitary glands of various vertebrates are remarkably similar in the essential features of their structure. Each gland is composed of a glandular lobe (pars distalis and pars intermedia), a nervous lobe (pars nervosa) and a swelling nervous tissue (median eminence).

Beer (1926) stated that the pars anterior (pars distalis) of the amphibian pituitary gland is formed of acidophils and basophils, whereas the pars intermedia and pars tuberalis consist of basophilic cells only.

Rimer (1931) stated that the pituitary gland of the South African clawed toad, Xenopus laevis, is "salamandrine" in form, as the pars tuberalis remains attached to the pars anterior and is not detached to form two separate epithelial plaques as in other toads.

Herrick (1933 and 1934) distinguished five different parts in the preoptic nucleus of Necturus maculosus; namely the anterior, magnocellular, periventricular, posterior and epichiasmatic parts.

Roofe (1937) suggested a new term " subdistalis" for the medio-ventral portion of the pars distalis of Amblystoma tigrinum.

Scharrer and Scharrer (1937), in Bufo vulgaris, described the process by which the neurosecretory material reaches the cerebrospinal fluid of the third ventricle.

Atwell (1941) studied the morphology of the hypophysis cerebri in five species of toads; namely Xenopus laevis, Scaphiopus holbrookii, Bufo arenarum, Bufo fawlerii and Bufo valliceps. He found that the pars tuberalis consists of two separate epithelial plaques which are attached to the ventral part of the hypothalamus.

Etkin (1941) concluded that, in the tadpole of several American anurans, the hormone secretion of the pars intermedia is under the control of the fore-brain and this control could be mediated either by the hypophysial portal system or by nerves originating from or passing through the infundibular area.

Copeland (1943) described the histology and cytology of the pituitary gland in the developing and adult red-spotted salamander, Triturus viridescens. He found that