A STUDY ON THE INFERIOR COLLICULUS OF THE ADULT ALBINO RAT.

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THESIS

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Dedicated
To The Soul
Of My Beloved
F A T H E R.

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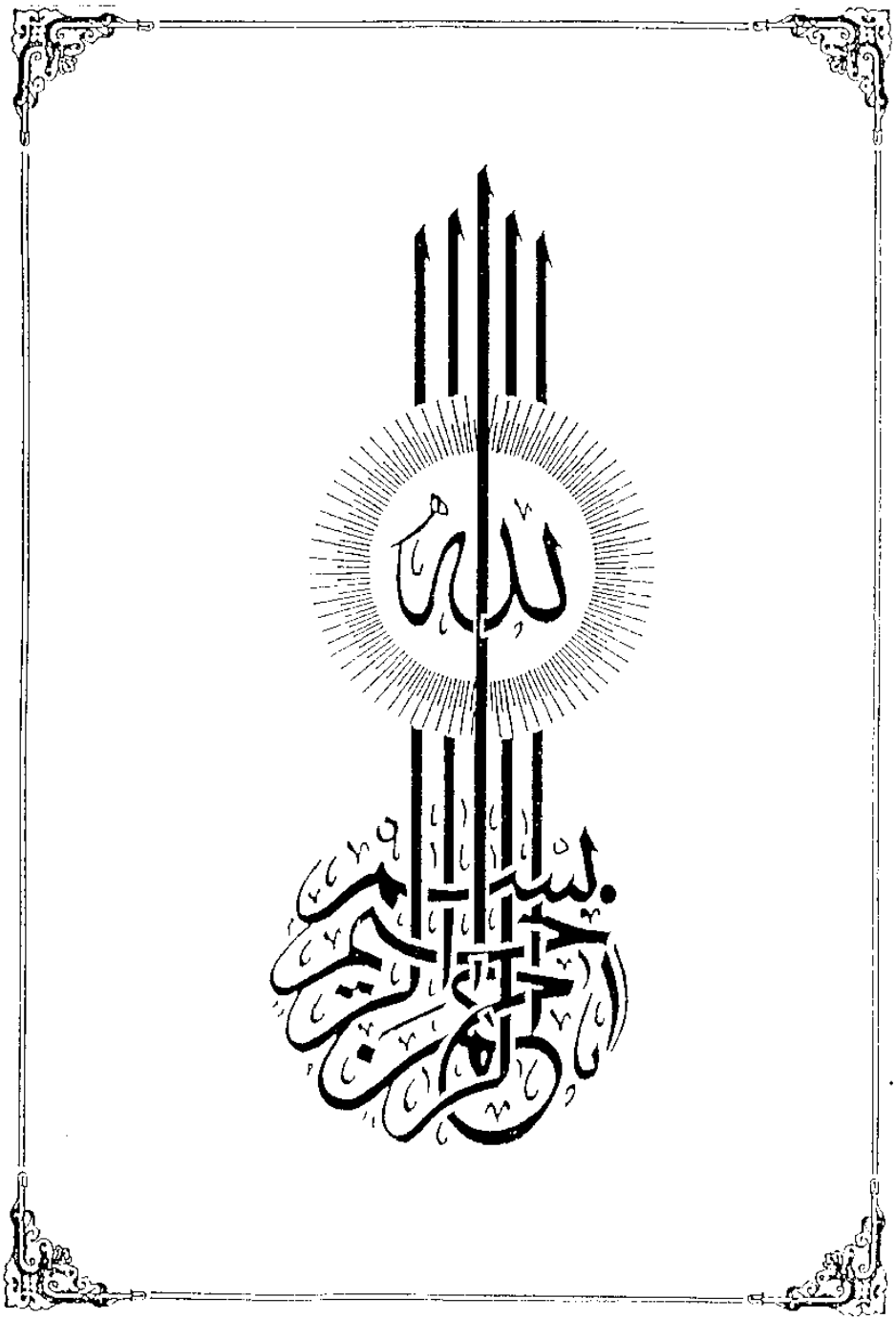

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INTRODUCTION

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INTRODUCTION

The connections of the inferior colliculus were studied in man (Ballantyne and Groves, 1971; Geniac and Morest, 1971; Warwick and Williams, 1973; Carpenter, 1976 and Paparella and Shumrick, 1980), the monkey (Goldberg and Moore, 1967 and Fitz-Patrick and Imig, 1978), the cat (Wollard and Harpman, 1940; Rasmussen, 1960; Rose, et al, 1963; Goldberg and Moore, 1967; Diamond, et al, 1969; Rockel and Jones, 1973; Atikin and Boyd, 1975; Hand and Winkle, 1977 and Roth, et al, 1978) and the guinea pig (Wollard and Harpman, 1940). Furthermore, the internal structure of the inferior colliculus has been reported in man (Mettler, 1948; Ranson and Clark, 1966; Geniac and Morest, 1971; Warwick and Williams, 1973 and Carpenter, 1976), the monkey (Fitz-Patrick, 1975) and the cat (Cajal, 1911; Rose, et al, 1963; Rockel and Jones, 1973; Bandrimont, 1976 and Yamawaki, 1980) but not in the rat. Accordingly, it became the aim of the present work to study the detailed histological structure of the inferior colliculus of the albino rat as it was not previously reported

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especially that a study concerning its connections was recently reported (Beyerl, 1978).

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REVIEW OF LITERATURE

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A. Macroscopic Appearance Of The Inferior Colliculus

Parker and Haswell (1963) described the external appearance of the midbrain of the rabbit. They mentioned that the dorsal part of the midbrain showed the corpora quadrigemina; two superior and two inferior.

Miller, Christensan and Evans (1964) described the tectum of the midbrain of the dog as consisting of a rostral and a caudal pair of rounded dorsal eminences; the superior and inferior colliculi. They added that the inferior colliculi were somewhat smaller than the superior ones and did not meet along the mid-line. They stated that, a band of white matter, the commissure of the inferior colliculus, connected the two colliculi. They added that, the commissure was visible from the outside as it crossed the mid-line immediately caudal to the superior colliculi. Furthermore, on each side, the brachium of the inferior colliculus extended rostroventrad from the lateral aspect of the inferior colliculus

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along the ventro-lateral edge of the superior colliculus to the medial side of the medial geniculate body.

Last (1972) described the inferior colliculus of the man. He mentioned that the dorsal aspect of the midbrain showed four low rounded eminences; the colliculi, two superior and two inferior. The author stated that, the colliculi were situated below the pineal body, behind the posterior ends of the thalami and overlapped by the splenium of the corpus callosum. The author added that, They were related caudally to the superior medullary velum.

Warwick and Williams (1973) described the macroscopic appearance of the inferior colliculus of the man. They mentioned that, the region of the tegmentum, dorsal to the cerebral aqueduct was called the tectum and comprised the colliculi which consisted of four rounded elevations, symmetrically arranged in superior and inferior pairs.The authors stated that, the colliculi were separated by a cruciform sulcus from one another.

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Furthermore, The author found that, the inferior colliculi were smaller and lighter in colour than the superior. However, the inferior colliculi were somewhat more prominent than the superior. The authors added that, from the lateral aspect of each colliculus a ridge; termed the brachium, ascended in a ventro-lateral direction to the medial geniculate body.

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B. Internal Structure Of The Inferior Colliculus

Cajal (1911) described the internal structure of the inferior colliculus in the cat. He mentioned that, the inferior colliculus consisted of a large central nucleus which was surrounded dorsally and laterally by an external nucleus. The author added that, the external nucleus might be further subdivided into a lateral and a dorsal sectors. The author found that, the lateral sector consisted of nerve cells of various sizes. The dorsal sector, on the other hand, was made up of a densely-packed region of cells through which the fibres of the commissure of the inferior colliculus passed.

Mettler (1948) described the inferior colliculus in the man. He found that, the dorsal portion of the mid-brain presented on either side of the mid-line, a mass of grey matter. The author added that, within each colliculus, a large number of nerve cells of different sizes and shapes was found, which constituted the

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nucleus of the inferior colliculus. The author added that, nerve fibres were seen joining the two nuclei constituting the commissure of the inferior colliculus.

Rose, Greenwood, Goldberg and Hind (1963) studied the internal structure of the inferior colliculus in the cat. They mentioned that, the inferior colliculus was formed of a central nucleus which was surrounded on its dorsal and lateral aspects by an external nucleus. Furthermore, the external was divisible into dorsal and lateral regions. They added that, the dorsal region was more densely packed than the lateral one.

Ranson and Calrk (1966) described the internal structure of the inferior colliculus in the man. They stated that, each inferior colliculus contained a large grey mass, oval in transverse section and known as the nucleus of the inferior colliculus. The authors added that, the lateral lemniscus was traced to that nucleus and formed a capsule within which it was enclosed. Furthermore, the authors found that, some of the lateral

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lemniscal fibres reached the median plane and decussated with similar fibres from the opposite side. Moreover, within the nucleus, the lateral lemniscal fibres formed a network within which were scattered nerve cells of various shapes and sizes.

Geniac and Morest (1971) described the central nucleus of the inferior colliculus in the man. They found that, it could be subdivided into a dorsomedial and a ventrolateral regions. They stated that, the dorsomedial division consisted mainly of multipolar cells and received fibres from the auditory cortex, lateral lemniscus and contra-lateral inferior colliculus. On the other hand the ventrolateral division, contained small to medium-sized neurons and was the major recipient of the fibres of the lateral lemniscus.

Rockel and Jones (1973) studied the neuronal organization of the inferior colliculus of the adult cat. They found that, on the basis of the cytoarchitecture and fibre connections, the central nucleus could be

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