# A BIVARIATE STEREOLOGIC MAP OF CYTOMORPHOMETRIC SUBSETS OF THE MEDIAL MAMMILLARY NUCLEUS OF THE CAT

By

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A. B., Indiana University, 1967
M. S., Arizona State University, 1971

A Dissertation
Submitted to the Faculty of the
Graduate School of Indiana University in Partial
Fulfillment of the Requirements
for the Degree of

DOCTOR OF PHILOSOPHY

Department of Anatomy
Indiana University
Indianapolis, Indiana

September, 1975

Accepted by the Graduate School Department of Anatomy, Indiana University, in partial fulfillment of the requirements for the degree Doctor of Philosophy.

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## ABSTRACT

Neuronal cytoarchitectonics of the medial mammillary nucleus of the cat brain was mapped morphometrically in two classification domains and two grouping domains. Perikaryon size and numerical cell density were the criterion variables. Perikaryon size and numerical cell density are elements, respectively, of two classification domains: cell type and cell dispersion. Linear rostrocaudal distance and quadrants of the frontal plane were grouping categories.

A stereologic map of principle cytomorphometric subsets of the neuronal population of the medial mammillary nucleus of one cat was derived by statistical reduction of the original matrix, which consisted of the two criterion variables distributed among four quadrants per stratum (serial section), nested within 36 strata. Sample size was usually 40-50 bivariate observations per quandrant. Other specimens were mapped in selected regions for comparison.

The map divides the nucleus into five subdivisions, which disclose, in a bivariate measurement space, the configuration of neuronal subsets in real space. In addition to demonstrating principle cytomorphometric subsets of the medial mammillary nucleus, the study demonstrates how quantitative subparcellation of any complex griseum may be accomplished with a small number of easily measured variables.

The existence of cytomorphometric subsets of a griseum can often be inferred through qualitative observation a-sisted by a few simple measurements. Boundaries and conformations of the subsets are rarely discernable. Quantitative subparcellation provides objective insight into regional differences and sources of variation in neuronal organization. The quantitative map provides a "model" of organization, which will assist experimental studies of dynamic brain morphology (pathology, ontogeny, and phylogenesis).

Examples are presented to illustrate experimental applications of the map. Localized maps were made of cat brains containing lesions in the mammillofugal and mammillopetal pathways. The maps reveal interesting aspects of neuronal organization not previously demonstrated.

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26 September 1975

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