25 Years Ago in the Canadian Journal of Neurological Sciences

Ultrastructure of Hypothalamic Neurons and of the Median Eminence

R.E. Clattenburg

SUMMARY: Our light, and electron microscopic (EM) findings within the hypothalamic supraoptic (SO) and paraventricular (PV) nuclei of the normal female rabbit are in agreement with those reported earlier by other investigators for the same nuclei of the dog and rat. The neurons of these nuclei are the hypothalamic synthesis sites of the neurohypophyseal hormones.

With the exception of the arcuate nucleus, none of the hypothalamic nuclei associated with the control of adenohypophyseal function have been studied extensively with the electron microscope. On the basis of our EM findings within the female rabbit hypothalamus, all neurons observed within the preoptic (PO) and suprachiasmatic (SCH) nuclei of the non-mated control animal were morphologically identical to the conventional neuron. Ultrastructural findings within the rabbit hypothalamus may provide evidence of a morphological nature for releasing factors and their storage sites as well as their synthesis within neurons of the anterior hypothalamus.

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Role of the Ventricular System in Neuroendocrine Processes: Synthesis and Distribution of Thyrotropin Releasing Factor (TRF) in the Hypothalamus and Third Ventricle

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SUMMARY: In vitro biosynthesis of thyrotropin releasing factor (TRF) by different regions of the hypothalamus of mink was examined. Homogenates of hypothalamic tissue were incubated in Krebs-Ringer medium containing 200 mg% glucose, 10- ^{3}M ATP, 0.1 mM histidine and glutamic acid and 0.15 μ c ^{3}H-proline (40 Ci/mmol) per mg tissue. Extraction, purification and estimation of ^{3}H-TRF biosynthesis involved several steps of charcoal extraction, carboxymethylcellulose and sephadex chromatograpy. ^{3}H-TRF was synthesized throughout the entire antero-posterior extent of the hypothalamus in its dorsal and medial portions. ^{3}H-TRF was synthesized also in a more discreet region, the arcuate nucleus. In vitro biosynthesis of ^{3}H-TRF was stimulated significantly by thyroxine, but not by TSH, estradiol, corticosterone or melatonin. A method is described for collection of cerebrospinal fluid of the third ventricle of the rat brain; TRF concentration in this fluid was approximately 18 pg/μl in normala animals.

The distribution of TRF-producing cells in the hypothalamus and presence of TRF in cerebrospinal fluid of the third ventricle is discussed with respect of the hypothesis that this releasing factor may be delivered to the median eminence and adenohypophysis in part, via the cerebrospinal fluid.

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Complex Symptomatology Simulated By Unstructured Neural Nets

R.A. Cyrulnik, P.A. Anninos and R. Marsh

SUMMARY: A Neural net model with random interconnections is shown capable of exhibiting the features of Parkinson's disease, including cogwheel rigidity, resting tremor, and dysdiadochokinesis. These properties are simulated uniquely for extrapyramidal disease, with spasticity and hypereflexia predicted for other upper motoneuron lesions.

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25 Years Ago in the Canadian Journal of Neurological Sciences

The Aphasia Quotient: The Taxonomic Approach to Measurement of Aphasic Disability

Andrew Kertesz and Elizabeth Poole

SUMMARY: 150 aphasiacs and 59 controls were examined with a scorable, comprehensive battery, designed to be used by the clinican and the research worker. The subtests of Fluency, Information, Comprehension, Repetition and Naming were added and compared to a hypothetical normal of 100 obtaining the "Aphasia Quotient". This is a measurement of the severity of language impairment. On the basis of their performance on the subtests, the patients were classified according to taxonomic principles into Global, Motor (Broca's), Isolation, Sensory (Wernicke's). Transcortical motor, Transcortical Sensory, Conduction and Anomic groups (in order of severity). This classification is considered a clinically valid baseline for research, diagnosis and prognosis.

Can. J. Neurol. Sci. 1974; 1: 7

Localization of Neuroendocrine Functions Within the Hypothalamus

Lee L. Bernardis

SUMMARY: The results of lesion, stimulation, deafferentation, implantation and transplantation studies employed in the identification of hypophysiotrophic control areas in the hypothalamus to date suggest the following probable locations: corticotropic releasing factor (CRF) is formed in a diffuse area along the base of the median eminence, if not the base of the entire hypothalamus. Follicle stimulating hormone releasing factor (FSHRF) is elaborated in the paraventricular-suprachiasmatic areas but its cyclic control may reside in the anterior hypothalamic area luteinizing hormone (LH) is controlled by luteinizing hormone releasing factor.

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Scanning and Transmission Electron Microscopy of the Ependymal Lining of the Third Ventricle

J.E. Bruni

SUMMARY: In its simplest form, the ependyma of the third ventricle consists of a single layer of cuboidal cells. Although these typical mural cells constitute the greater part of the lining of the ventricle, a specialized variety of ependymal cell (the tanycyre) can also be distinguished within circumscribed areas of the ventricular wall. Although such cells are found scattered throughout the dorsoventral extent of the third ventricle, they are particularly numerous along the ventrolateral walls and floor. The regional variation in the surface morphology of the ventricle walls as evident with the scanning electron microscope is consistent with this pattern of tanycyte distribution. Ultrastructural studies have established that the tanycyte is a fundamentally distinct cell with a long basal process extending into the subjacent neuropil and frequently directed toward a capillary wall. This unique morphology conforms closely to its three-dimensional appearance as demonstrated with the scanning electron microscope. The significance of ependymal tanycytes particularly of the third ventricle derives largely from the connections they establish between the ventricular lumen and vasculature of the median eminence. This intriguing structural relationship has led to the suggestion that ependymal cells and cerebrospinal fluid of the third ventricle may be involved in the regulation of adenohypophysial activity. Evidence indicating the functional involvement of specialized ependymal cells in the neuroendrocrine control of pituitary activity is reviewed.

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