Further Section

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Book Reviews


The only substances in the living organism that are able to accept, store and release information are the nucleic acids. As they are relatively stable and able to reproduce, they can preserve their identity in time without being disintegrated by the energetic and metabolic activity of the cells. Nucleic acids can thus retain permanent information for years. Findings made in recent years suggest that nucleic acids may participate in memory processes in living organisms. Many points still remain unresolved, e.g., the mechanisms by which neuronal impulses are transformed into structural changes in the RNA molecule and (perhaps an even more difficult task) how the information contained in the RNA molecule is transformed into neuronal activity. These and many other problems are discussed in the present volume.

After a general and very informative introduction by H.V. MAGALY (Los Angeles), the role of nucleic acids in the coding of genetic information is reviewed by NEUNEBERG (Bethesda); this article is supplemented by S.H. Fox’s (Tallahassee) description of his model of abnegation and of the origin of memory at the molecular level. In the subsequent article, ‘RNA — a functional characteristic of the neuron and its axons’, GOETHE (Göttingen) shows that the large amount of RNA present in neurons is not only an indication of the degree of protein synthesis in these cells, but that the bulk of the neuronal RNA comprises a special RNA system serving nervous function. An increase in the amount of RNA per nerve cell can be taken as an indication of increased neuronal activity. The ratio of bases in the nuclear RNA of rat vestibular neurons changed after the animals were trained to climb a wire.

S.L. Polk (Boston) analyses ‘The structural basis for neural action in electron micrographs and shows that only the cell organization itself, i.e., the way in which the constituent cells are put together and interact and not the cell structural units (mitochondria, ergastoplasm, vesicles, etc.), is specific for the nervous system. The nervous system is cellular almost to the exclusion of any other component and electron microscopy can be used advantageously to analyze the intimate relations of the cell. W. H. Go (Galveston) analyzes “Electrophysiological phenomena observed in single neurons and neuron cell cultures in central nervous tissue” and shows that it is possible to stimulate and record potentials from isolated nerve cells in culture. The study of neurons by tissue culture has the advantage that neurons do not multiply and hence do not change their structure in the culture as quickly as other cells. J.V. Lazo (Santiago), in an intravenous study of the electrical activity of isolated cockroach ganglion discusses the ‘Plasticity of neuronal function in learning and retention’, defining plasticity as the ability of nervous tissue to retain traces left by a past experience. Among other findings, some delayed responses observed as one of the expressions of autogenic activity triggered by stimulation displayed certain characteristics similar to the behavior of the organism as a whole in the process of learning.

‘Studies on learning and retention in planaria’, by E.J. John (Rochester), confirms the findings of MCCONUEL and others on the existence of learning in worms and submits some preliminary evidence on the possibility of transferring planarian “memory” to fish. F. Morel (Paris), in an article entitled ‘Modification of RNA as a result of neural activity’, argues that certain features of the pathophysiology of epilepsy may afford insight into the neural mechanisms underlying learning and memory. Among other findings, changes in neuronal RNA associated with the development of secondary epileptogenic lesions favor the possibility that some form of RNA complex may provide the substrate for the storage of information in nerve cells. L. H. KANTZ (Cambridge, England).

The volume concludes with ORR E. REYNOLDS’ (Washington) analysis of the ‘Relevance of basic research in the space program’, dealing with the problems of training, information, and work of teams in manned space flights, and with a short summary by A.B. KOGAN (Rostov-on-Don) of his work on the ‘Electrical activity and RNA of brain cells’. Differences were found in the RNA content of pyramidal cells in areas responsive and non-responsive to light stimulation.

The only hormones mentioned in the subject index are vasopressin, oxytocin and adrenalin (with only one entry for each); and obviously, no direct connection can be traced at present between endocrines, neural RNA and memory. There are, however, several indications that RNA is involved in memory function. V. Schreiber (Cambridge, England) describes ‘Impairment of learning and retention following experimental temporal lobe lesions’ in monkeys. The memory impairment produced in these animals by temporal lobe lesions was less severe than in human pathology, but learning ability was clearly affected. Similar problems are discussed in the article by W. Ross ADEN (Los Angeles), ‘Hippocampal mechanisms in processes of neurogenesis: thought on a model of central organization of learning’, in W. FREDERICH’s (Montréal) ‘Memory and speech function in the temporal lobe in man’, and in MARY A.B. BRAZIER’s (Los Angeles) ‘Simulation of the hippocampus in man using implanted electrodes’. M. VICTOR (Tel Aviv), in her article entitled ‘Observations on the amnestic syndrome in man and its anatomical basis’, deals predominantly with Korsakoff’s psychosis, its relationships to Wemicke’s disease, and particularly with the nature of antero- and retrograde amnesia in this syndrome. All these articles show more or less clearly that some portions of diencephalic-temporal structures are specifically involved in memory function, but that generalizations are extremely difficult owing to the differences between various species and difficulties in interpreting the experimental findings. The brain stem reticular formation and the neocortex also play some role in memory function, but the effects of lesions are related to the site rather than to the size of the lesion.

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The neuron is the only known nerve cell body that is permanently vulnerable to destruction, and from an early age is subject to complete destruction by the nervous system. One finds, for example, in the discussion of the volume daily, but several of the problems reviewed here or stress, or perhaps more appropriately, the sign of a pressure, could present a volume that might seem to be a profit by the organism as a whole in the process of learning.

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For the neuroendocrinologist, the vegetative nervous system (v.n.s.) is—or should be—a component always to be considered in analyzing homeostatic regulations, even those of presumably purely humoral character. Knowledge of the v.n.s. is a prerequisite condition for understanding all neuroendocrine events. The ground is not unfamiliar to

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the neuroendocrinologist, since the hypothalamus is a central part of the v.n.s. and, as CROSS (Symp. Soc. Exp. Biol. 18: 157 [1964]) stated, "successive investigators have piled into it function upon function until its load of responsibilities exceeds that of any other region of the brain with comparable dimensions", i.e., 5-8% of the weight of the brain. The multiple functions of the vegetative nervous system and its complex structure are two of the chief reasons for the need of periodic revision of recent additions in this field, especially for those who are engaged in the endocrine aspects of neuroendocrinology rather than in its neural aspects.

The present 'written' symposium, edited by K. HARTMANN-VON MONAKOW (Zurich), offers such an opportunity. After a short introduction by the editor, E. HAGEN (Bonn) reviews the anatomy of the v.n.s. A thorough analysis of the anatomy of the parasympathetic and sympathetic systems is followed by a description of the hypothalamo-hypophysial system. From the neuroendocrinological aspect it is interesting to see the direct neural control of the adenohypophysis again postulated (in addition to the neurohumoral control). Two of the communications between the adenohypophysis and the v.n.s. are considered important—the direct connections with the parvicellular hypothalamic nuclei and the perivascular vegetative nerves supplying the adenohypophyseal cells. Optic and electron micrographs of synapses and ganglion cells form a substantial part of the subsequent paragraphs, with special reference to the intramural plexus, the function of synapses and the exact nature of the terminal spread of the v.n.s.

The second chapter, contributed by H. LANGEMANN (Zurich), deals with the pharmacology of the v.n.s. The autonomic transmitter substances are classified in a concise and very useful tabulation system, their function and structure are reviewed, and a list of pharmacologically active substances of chemically similar and dissimilar structure is given. The possibilities of potentiating the effect of transmitters (activation and block of enzyme systems) and of blocking them are discussed. The chemistry, physiology, and pharmacology (including human dosage) of practically all the known vegetative substances are very valuable parts of LANGEMANN's review. His analysis of the latest views on the storage of transmitter substances in central nervous structures and on the influence of drugs on them merits special attention.

The next chapter, 'The participation of the vegetative nervous system in the neuro-endocrine regulation of adaptive reactions', was written by E. BAJUSZ (Montreal, now Cambridge, Mass.). The chief subjects of interest to the author include the biological meaning of adaptation, the afferent input of the hypothalamus, the neural and humoral components of stress and the role of the sympathetic-adrenomedullary system. Special attention is given to the development of neurovegetative adaptive reactions, the influence of hormones on the central nervous system, and the clinical implications of experimental studies.

The last three chapters, 'Pain and the v.n.s.' (W. LAUX, Kiel), 'The v.n.s. and the regulation of sleep' (Ch. KAYSER, Strasbourg), and, 'Thermoregulation and the v.n.s.' (H. LABORIT, Paris), deal with vegetative functions. Some of them would be easier to read if they were properly subdivided (LAUX) and a few diagrams or illustrations would make welcome supplements; not only to this last group of papers, but also to some of the others. In LABORIT'S review the metabolic aspects of thermoregulation (the proportion of the Embden-Meyerhof and Krebs energy cycles and the hexose monophosphate shunt) and of hibernation are very clearly explained, but the central aspects of thermoregulation are somewhat neglected, as seen from the simple fact that the work of BRO-PECK, BENZINGER, HARDY and, in particular, ANDERSSON is not mentioned at all, although the section is entitled: 'The role of the central nervous system in the regulation of metabolic responses to cold'.

The book is a useful source of information for biologists, endocrinologists, pharmacologists and neurophysiologists, and in combination with Part II it will be especially useful to clinicians.

V. Schreiber

Book Reviews
The Atlas of Neuropathology by BLACKWOOD, DODDS, and SOMMERVILLE has established itself over the past one and one-half decades as a welcome compendium for those students of the pathology of the nervous system who desire quick, accurate, and yet not too detailed review.

The authors successfully accomplished simplicity without oversimplification. The new edition of the atlas has largely maintained the previous format which was proven successful and a few well chosen additions have enlarged the format of this book.

To the chapter on normal structures has been added a discussion of the development of myelin. The chapter on vascular diseases was made more comprehensive. Most welcome was the addition of new sections, especially on muscle diseases, demyelinating diseases, leukodystrophies, and lipidoses. The wisdom of listing separately BAILEY CUSHING and KERNohan’s classification of gliomas might be questioned. But the simplicity of the grade classifications, welcomed by the busy clinician, might represent a valid reason for incorporating it into the atlas.

The form of the second edition has been improved by numerous, inconspicuous yet important corrections while the most important part of the atlas, the visual illustrations of the normal and abnormal, both on gross and microscopical appearance, has been judiciously presented in well balanced black and white as well as very good color photography. The diagrams are clear and essential.

As the authors suggest in the preface to the first edition, this is a volume for a senior medical student, clinician and pathologist. The intended audience has already been successfully reached by the authors. This book can be highly recommended despite its premeditated simplicity. The value of the visual illustrations in an atlas serves both to recollect some basic phenomena and often, by simple illustration, to demonstrate a disease process better than a verbose description without adequate illustration.

It can be safely assumed that as welcome as the first edition of the Atlas was in 1949, so will the second one be today.

Leopold Liss


This written symposium contains 28 articles published in two volumes, covering all the aspects of the morphology, physiology, biochemistry and clinical disorders of the thyroid. A historical introduction by TROTTER is followed by a chapter by BRYD on the development of the human thyroid. WOLK then discusses thyroid morphology and cytology. HAML the accumulation and recirculation of iodide; PITT-RIVERS and CAVALLIER biosynthesis of the thyroid hormones, EDELHOCH and RALL the thyroid proteins and enzymes; FREINKEL the intermediary metabolism of thyroid tissue; TATA the distribution and metabolism of thyroid hormones; SIETZ the effect of the thyroid hormones on growth and differentiation; BAILEY CUSHING and KERNohan’s classification of gliomas; EVANS the role of the thyroid in the reproduction of mammals, DODD and MATTY comparative aspects of thyroid function; GREER, KENDALL and SMITH antithyroid compounds and GOULDEN the Application of radioactive iodine isotopes.

The second volume opens with a chapter by PURVES on the control of thyroid function. MURAY and MACRITIE then describe iodine metabolism in the thyroid dysfunction, RAGHUNATHAN endemic goitre; KELPVoigt at Wilson simple, non-toxic goitre; MACGREGOR hyperthyroidism, SKILLSKI thyroiditis, MORGAN hyperthyroidism, RUBLEN goiter, GIMLETTE localization myxoeplasia, TATA and POCHIN cancer of the thyroid, FRASER the pathological aspect of thyroid disease and BELYAVIN their genetic aspects.
Book Reviews

From the neuroendocrinological point of view the book is a valuable source of basic information on the thyroid; several chapters deal directly with some thyroid hormones, hardly at all. Although, this chapter does not deal directly with some neuroendocrinological aspects. In the chapter on the distribution of the thyroid hormones, TATA classifies the brain among the group of organs that 'concentrate the hormones hardly at all', although this is obviously not true for some parts of the brain. BAKER, in his chapter, includes an analysis of the role of the thyroid hormones in thermoregulation, but does not mention an analysis of the role of the brain in thermoregulation. In his analysis of thyroid hormones, ANDESON does not mention the important work done by ANDERSON. In his analysis of the thyroid hormones, SHELABARGER does not mention that the only organ that grows when there is a deficiency of these hormones, is the adenohypophysis. In PURVES' review, when the only space is devoted to vasopressin effects on THS secretion, twice as much space is devoted to TRF, which, for 1964, seems somewhat outdated. These articles and those concerned with any aspect of thyroid function, including its neuroendocrine aspects, are not the only major, secretory, and perhaps subjective, source of information for all those concerned with any aspect of thyroid function, including its neuroendocrine aspects.

V. Schreiber


Although no endocrine gland except the parathyroid is mentioned in the subject index and no endocrine functions are discussed in the sections on the hypothalamus, this book is a source of useful information for the neuroendocrinologist, as well as for the physicians, neurologists, surgeons, anesthetists and physiologists to whom it is primarily addressed. The title is somewhat broader than the contents, since the book deals exclusively with the influence of hydrogen ions on the central nervous system (on neuronal function, central nervous excitability, cerebral cortical activity and cerebral circulation), but as all metabolic disorders manifest themselves in changes in the blood pH or alkali reserve, the reader will find them all included in the contents. From the neuroendocrinological aspect, the influence of hydrogen ions on the brain stem reticular formation merits special attention, as this part of the brain exerts important modulating influences on the hypothalamic glandostatic servomechanisms. The stimulant effects of low carbon dioxide concentrations on the brain stem neurones and the production of general anaesthesia by high carbon dioxide concentrations through depression of reticulo-cortical activity undoubtely have endocrine repercussions, but these still remain to be demonstrated. This book is the first attempt to review the relationship between changes in the acid-base balance of the body fluids and the functions of the brain and it sums up a vast quantity of experimental and clinical data. It provides an excellent survey of the present situation and gives a sound analysis of contemporary perspective for all those concerned with the functional relationships between the brain and its chemical environment.

V. Schreiber