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'MEDICAL RESEARCH CENTRE

REPORT
ON SCIENTIFIC ACTIVITIES
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CONTENTS

CONTENTS

| | Page |
|---|------|
| OBITUARY professor E. Osetowska | 9 |
| SCIENTIFIC COUNCIL | 14 |
| EXECUTIVE BOARD | 16 |
| SCIENTIFIC STAFF | 17 |

PART I

INVESTIGATIONS AND SCIENTIFIC ACTIVITIES

| | |
|---|----|
| a. STUDIES ON THE FUNCTION OF THE NERVOUS SYSTEM | 41 |
| b. STUDIES ON THE STRUCTURE OF THE NERVOUS SYSTEM | 47 |
| c. STUDIES ON TRANSPLANTATION AND EXPERIMENTAL SURGERY. | 57 |
| d. OTHER RESEARCH WORKS | 63 |
| e. NEW METHODS AND TECHNIQUES IN RESEARCH | 67 |

LIST OF PUBLICATIONS

| | |
|--|-----|
| aa. Original papers | 71 |
| bb. Presentations | 91 |
| cc. Monographs | 123 |
| dd. Other works | 125 |
| ee. Name index to the list of publications | 129 |

PART II

INFORMATION

Page

Cooperation with Foreign Countries:

| | |
|---|-----|
| Department of Neurophysiology | 141 |
| Cardiovascular Laboratory | 143 |
| Department of Applied Physiology | 145 |
| Department of Neuropathology | 147 |
| Laboratory of Developmental Neuropathology | 152 |
| Department of Comparative Neurology | 152 |
| Department of Neurochemistry | 153 |
| Department of Neurosurgery | 156 |
| Department for Surgical Research and Transplantation | 158 |
| Annex | 167 |
| MISCELLANEA | 175 |

OBITUARY

OBITUARY

Polish Neuropathology suffered the grievous loss of its distinguished Member, Professor Ewa Osetowska, M.D., Head of the Department of Comparative Neurology, Medical Research Centre, Polish Academy of Sciences, the founder, and for many years Editor in Chief of "Neuropatologia Polska", who died on January 9, 1978.

Ewa Osetowska was born in 1919. She began her medical studies in 1937 at the Faculty of Medicine, Warsaw University, which she continued later during World War II at the Underground Warsaw University.

She received her diploma in 1945 from the Faculty of Medicine Warsaw University. In 1949 the Council of this Faculty conferred the degree of doctor of medicine on the basis of her thesis: "Neurological Manifestations in Paget's Disease", prepared under the supervision of Professor A. Opalski.

In 1955 she received the title of associate professor and in 1963 she was appointed professor of Medical Sciences in Neurology.

Already in the first period after receiving her diploma Ewa Osetowska became interested in the problems of pathomorphology of the nervous system. A characteristic feature of her research work conducted with great dedication was her ability of discerning connections between pathomorphological findings in the brain and clinical observations, in accordance with the principle, that the work of neuropathologists should serve for a better understanding of clinical symptoms and signs and for explaining disease processes.

The personality of Ewa Osetowska as a research worker developed under the influence and inspiration as well as personal contacts with such distinguished scientists as Professor A. Opalski and Professor L. van Bogaert with whom she worked in that period.

In 1963 Professor Osetowska was appointed Director of the Department of Neuropathology, Polish Academy of Sciences. This new period of her work was the most intense and most fertile stage in her scientific, as well as organizational, didactic and educational activities. In that period of time she published over two-thirds of her scientific works, 20 neuropathologists guided by her received the doctor's degree and 5 of her co-workers the title of associate professor.

She founded the Society of Polish Neuropathologists and for six years directed its activities. It was also on her initiative that the periodical *Neuropatologia Polska* was founded under her editorship during its first, most difficult years.

Professor Osetowska took part in the activities of the newly founded World Federation of Neurology, being one of the organizers and members of its Neuropathology Group, and was a member of the Editorial Committee of the periodical *Acta Neuropathologica* to the end of her life. She was also member of the Editorial Board of the *Journal of Neurological Sciences*, organ of the World Federation of Neurology.

She was one of the founders of the International Society of Neuropathology and for many years member of its Executive Board and representative of the Society of Polish Neuropathologists there.

In 1967, after the foundation of the Medical Research Centre of the Polish Academy of Sciences, Professor Osetowska organized in it the Laboratory of Neuroathology and Comparative Neurology, which was transformed in 1971 to the Department of Comparative Neurology which she headed and where she worked till the end of her life.

The very extensive and many-sided scientific activities of Ewa Osetowska covered nearly all fields of central nervous system pathology. She was a recognized international authority on the problems of inflammatory processes of the central nervous system. An evidence of this recognition was the fact that the task of writing the chapter on tick-borne encephalitis in the textbook of virology edited by R. Debré and J. Celeres was entrusted to her in the English and French versions. Her views and observations on the pathological mechanisms of encephalitis and its morphological expression were expounded most fully in the monograph: *Neuropathology of Viral and Allergic Encephalitides*, published in 1974. The last year of her life was devoted to the preparation of its English edition.

Another group of studies covering a significant part of her research work were the problems of endogenous and exogenous encephalopathies. On the ground of her own observations Professor Osetowska introduced a new classification of uraemic encephalopathies, demonstrating also the intravital character of these changes which underlie cerebellar lesions developing in extraneural malignant neoplasms. In association with W. Krücke and A. Taraszewska she described rheumatic cerebellopathies and demonstrated the vasogenic character of pseudosystemic cerebellar lesions accompanying acute rheumatic fever.

Her studies on exogenous encephalities, the works on remitting carbon-monoxide encephalopathy deserve attention and post-traumatic encephalopathies in the pathogenetic mechanism of which she demonstrated the essential role of chronic damage to the barrier systems in the brain.

In the description of the scientific achievements of Professor Osetowska her studies on the pathology of neuropilidoses and leucodystrophies, as well as demyelinating diseases, cannot be overlooked. In these works a particular characteristic features of her scientific thinking finds its expression - a tendency for simultaneous search for pathogenetic similarities and peculiarities of pathomorphological reactions, subordinated to the discipline of thinking in clinical categories. The Author demonstrated this most convincingly in her study on the morphogenesis of Rosenthal's fibres developing in the demyelinating plaques of multiple sclerosis.

The striving for better understanding of the mechanisms underlying the diseases of the nervous system in humans and the search for answers to questions which could not be found in brain sections from patients, brought E. Osetowska to experiments on animals. These experiments were not concerned, however, with disease models produced under artificial conditions not resembling the natural life of the animal. She was interested more in spontaneous pathological processes in the animals, although she did not eliminate completely experimental pathology. This trend in her interests is evidenced by a long list of publications on comparative neuropathology, with stress laid on the investigations on animal encephalitides, especially canine distemper and toxoplasmosis. Her pioneering studies on the processes of ageing of the brain in dogs, on the problem of congenital anomalies in animals, deficiency disease and general pathology of experimental animals belong also to this category.

The last of these groups of problems was the starting point of her interest in comparative neuropathology.

In the early sixties, Professor Osetowska observed on the farm of the Polish Academy of Sciences, breeding experimental animals a rabbit showing signs of a neurological disease. Further animals showing the same type of neurological defect were isolated from this group and thus the isolation of the pt-strain of rabbits (pt - paralytic tremor) with genetically determined neurological disease was started.

In the search for an anatomical-functional substrate of this tremor syndrome, Professor Osetowska began anatomical and functional investigations on closed motor-function circles in the pt-rabbits. She extended these investigations to include neurochemical and neurocytological studies, and applied electron-microscopic techniques.

The model of the pt-rabbit has been found to be applicable for more extensive studies than it has been planned initially. It serves not only for explaining the mechanisms of certain neurological clinical syndromes or the general pathomechanism of genetically determined nervous system diseases. It opens also certain prospects of studying the pathogenesis and morphogenesis of a group of processes and pathological reactions of the nervous tissue, such as neuronal calcifications, colliquative degeneration of neurons, abnormalities in the process of myelin sheath development etc.

These prospects have been noticed by Professor Osetowska who analysed these problems in several successive publications.

The original scientific achievements of Professor Osetowska cannot be restricted to the list of one hundred and several tens of publications. An important element of these achievements are the textbooks written by her, among which the ones worth mentioning include: Neuropathology of Viral and Allergic Encephalitides, the chapter in the international textbook of neuropathology edited by R. Debre and J. Celeres, and the first Polish Atlas of Neuropathology edited by her.

Besides research work a part of the life of Professor Osetowska was dedicated to teaching. She had been involved in didactic work from the very onset of her scientific career, she liked teaching and she had the rare, authentic talent. She was equally intent on instructing physicians, applicants for the M.D. degree, students, laboratory technicians and laboratory assistants.

In the last two years of her life, despite progressing disease, she maintained her work. She headed the Department, gave consultations, taught, published... Almost to the last days, struggling with her disease, she worked on the English version of Neuropathology of Viral and Allergic Encephalitides.

Her work was interrupted by death.

Death has deprived us of one of the most distinguished Polish neuropathologists, research scientist, organizer and teacher, who regarded her scientific research work as an aim of primary importance, as a source of satisfaction and joy.

An unusual personality has departed - a woman of great talent, of far-reaching humane ambitions, possibilities and ability.

This bereavement is increased by the fact that death has taken her from us at the peak of her creative abilities, extensive experience and wide recognition.

M. J. Mossakowski, M.D., Ph.D.
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PART I

INVESTIGATIONS AND SCIENTIFIC ACTIVITIES

a. STUDIES ON THE FUNCTION OF THE NERVOUS SYSTEM

Basic Chemoregulatory and Neuroregulatory
Integration in the Respiratory and
Cardiovascular Systems

a.1. CORRELATION BETWEEN VAGAL AND CENTRAL MECHANISMS
IN THE CONTROL OF BREATHING

Two types of motoneurons were found, participating in the generation of the inspiratory burst of phrenic nerve activity ("early" and "late"-threshold neurones) and the characteristic features of their activity were analysed.

High-frequency oscillations in the respiratory system were found to be dependent on the CO_2 level. Anaesthetic agents abolished them. It is proposed to explain these phenomena in terms of the leaky integration mechanism or corresponding terms used for describing the plasticity of the central nervous system.

The "regulatory sensitivity" of the respiratory centres was demonstrated to differ in reacting to endo- and exogenous carbon dioxide. Data were obtained suggesting a tonic inhibition of breathing generation by endorphines.

In co-operation with the Department of Anaesthesiology, Medical Academy in Warsaw it was shown that in patients prepared for surgery acute metabolic alkalosis (sodium bicarbonate infusion) associated with normoventilation can induce cerebrospinal fluid acidosis. Hyperventilation prevents this acidosis.

The effects of 5HT on respiration and the role of vagal nerves integrity in the development of these effects were studied.

New data were obtained on the location of the centre generating the respiratory activity in guinea pigs and stereotaxis atlases of the brain stem in rabbit and guinea pig were prepared.

Investigations have been started on a new mathematical model of breathing control, based on the theory of automata.

a.2. THE ROLE OF BIOLOGICALLY ACTIVE SUBSTANCES
IN THE REGULATION OF THE CIRCULATORY SYSTEM

I. Clinical observations indicate that patients with obstructive lung disease and subsequent cor pulmonale exhibit a lower incidence of myocardial infarction than the population of relevant age in general.

The question was whether prostacyclin, a vasodilator and antiaggregatory agent, generated by the lungs, might be a protective factor. Prostacyclin was bioassayed in arterial blood in conditions imitating ventilatory and circulatory alterations present in obstructive lung disease, i.e. during hypoventilation and excessive elevation of end expiratory pressure. In both these conditions arterial blood showed biological activity resembling prostacyclin (relaxing isolated vascular strips and deaggregating platelets), but not susceptible to prostaglandin synthetase inhibitors. The identity of this substance(s) has not been established, but the study indicates that endogenous factors released from lungs in the above conditions are worth studying since they might protect coronary circulation.

II. The effect of clonidine upon electrophysiological parameters of the heart was investigated in experiments on normal cat hearts in situ. Clonidine increased the diastolic threshold and prolonged the refractory period, this suggesting that the drug may reduce cardiac susceptibility to arrhythmias.

See the list of publications:

- I.-aa 10, aa 29, aa 91, bb 23, bb 112
- II. bb 11

Physiological Basis of Working Ability
and Tolerance of Environmental Factors:
Role of Neurohormonal Mechanisms

a.3. NEUROHORMONAL CONTROL OF ENERGY SUBSTRATE UTILIZATION
DURING PHYSICAL EXERCISE

A general concept of glucostatic control of metabolism during muscular work has been evolved on the basis of previous own results. The proposed regulatory mechanism includes: a detection system, an integrating link, and an effector mechanism. After prolonged physical exercise reduced effectiveness of the glucostatic mechanism was found. This phenomenon may participate in the mechanism of fatigue and reduced adaptability of the organism under conditions of physical exhaustion.

The effects of an excess as well as deficiency of thyroid hormones on muscle and liver glycogen utilization and synthesis were studied during and after prolonged physical effort.

Ultrastructural and biochemical changes in the skeletal muscles as well as modifications of exercise metabolism, body temperature, and working ability were found after prolonged restriction of physical activity. A hypothesis is put forward on the role of exercise hyperthermia, developing after restriction of motor activity, in the reduced ability to perform physical work.

An increase in the lipoprotein lipase activity in the skeletal muscles during prolonged physical exercise was demonstrated. This may partly explain the beneficial effect of physical activity on the blood VLDL concentration.

Data were obtained on glucose distribution in the muscles and liver after its intravenous administration to non-anaesthetized animals. Some other data of methodological importance and the basic pattern of the physiological response to exercise in dogs were also obtained.

The results of many years' investigations on the physiological criteria of working ability in diabetic patients have been prepared for practical use.

See the list of publications:

aa 5, aa 6, aa 78, bb 4, bb 28, bb 94

a.4. NEUROHORMONAL REGULATION OF BODY TEMPERATURE AND WATER ELECTROLYTE BALANCE (INCLUDING THE ROLE OF RENAL FUNCTION) UNDER VARIOUS WORK AND ENVIRONMENTAL CONDITIONS

In chronic experiments the role of renal innervation in the control of renal function was investigated by following different loads of water and electrolytes.

It was demonstrated that changes in electrolyte composition and in osmotic pressure of the ECF exert different effects on the development of hyperthermia during muscular work. The current views (Myers et al.) on the importance of the $\text{Na}^+/\text{Ca}^{++}$ ratio changes in the induction of this effect are put in doubt, and the role of cellular dehydration is stressed.

The mechanism of water metabolism disturbances during pyrogen-induced fever is explained, including changes in the activity of the thirst mechanism and hypothalamo-hypophyseal antidiuretic system.

On the basis of results obtained in our own investigations extending over many years, a general theory of interaction between volume and osmotic control of the thirst and antidiuretic mechanisms (an integrated system of water regulation in the organism) has been advanced.

The effects of general anaesthesia on chemical and physical thermoregulation, and modifications of thermoregulation produced by hypercapnia under various thermal environmental conditions, were investigated.

See the list of publications:

aa 36, aa 48, aa 93

bb 18, bb 40, bb 48, bb 49, bb 54, bb 62, bb 116

Intracellular Mechanisms Regulating
the Metabolism of Nerve Cells

a.5. CORRELATION BETWEEN INTRACELLULAR MECHANISMS REGULATING CARBOHYDRATE-ENERGY METABOLISM AND STRUCTURAL AND FUNCTIONAL STATE OF SUBCELLULAR ELEMENTS WITH REFERENCE TO NEUROTRANSMITTERS

In investigations on the effects of hypoxia on cerebral lipid metabolism, disturbances were demonstrated in the equilibrium between the pool of free fatty acids and their esters. During hypoxia phospholipases are activated with possible mediation of cAMP and calcium ions, and the incorporation of free fatty acids into glycerophospholipids is reduced. It was found, furthermore, that in view of the unchanged activity of acyltransferase and inhibition of thioester hydrolase in mitochondria and synaptosomes, the disturbances of reacylation of cerebral lysophosphatides may be due to the inhibition of CoA synthetase.

After hypoxia, incorporation of the isotope marker, $U = {}^{14}C$ -glucose, into cerebral proteins and lipids was found to be decreased pointing to inhibition of the synthesis of macromolecules from their direct precursors.

Besides increased glycolysis a fall was observed in the utilization rate of high-energy compounds lasting up to 3 h after cerebral hypoxia, which could reflect disturbances in the processes of synthesis. Later after hypoxia metabolic processes are activated as evidenced by increased utilization of high-energy compounds and lactate production.

In studies on the effects of hypoxia on adenylyl cyclase it was observed that it abolished the activating effect of adrenaline on adenylyl cyclase without changing its sensitivity to fluoride. A similar lack of enzyme sensitivity was observed in animals with an immature receptor system. The topography of the fragment binding the substrate of the catalytic part of adenylyl cyclase was determined.

It was demonstrated that the glycoprotein component of Na^+ - and K^+ -ATPase in the microsomal fraction of the cerebral tissue plays a role in enzyme catalysis. Hypoxia leads to a fall in the levels of glycolipid-bound sialic acids in the cerebral microsomal fraction.

Barbiturates have been shown to be a factor causing changes in the interactions of protein and lipid components of synaptosomal membranes with resulting disturbances in the activity of membrane enzymes, e.g. acetylcholine esterase. It was observed also that disturbances in the phospholipid composition of mitochondrial membranes caused by hypoxia produced disturbances in calcium accumulation in mitochondria, and changes in the level of SH groups caused inhibition of malate and citrate transport and this, in turn, could lead to disturbances in acetylcholine metabolism and release of neurotransmitters. It was shown that hypoxia leads to a fall in dopamine turnover in basal ganglia and accelerates noradrenaline turnover in the brain stem, this reflecting changes in the activity of the adrenergic and dopaminergic systems in various brain structures.

See the list of publications:

aa 79, aa 82, aa 86, aa 87

bb 14, bb 15, bb 16, bb 34, bb 43, bb 50, bb 55, bb 56, bb 63,

bb 90, bb 91, bb 92, bb 119, bb 120, bb 135, bb 136, bb 138, bb 140,

bb 141

b. STUDIES ON THE STRUCTURE OF THE NERVOUS SYSTEM

b.1. ENDOGENOUS ENCEPHALOPATHIES CONNECTED WITH IMPAIRMENT OF HEPATIC AND RENAL FUNCTION

In investigations on the pathomechanism of central nervous system damage in hepatic diseases it was established that, in chronic poisoning with carbon tetrachloride associated with hepatocellular damage leading to liver cirrhosis followed by hepatic encephalopathy, the level of alpha-ketoglutarate decreases statistically significantly in the brain in the period from the 2nd to the 6th month of intoxication. The progressive fall in the level of the substrate is accompanied by an increasing intensity of tissue lesions with features of hepatic encephalopathy. These observations validate the previous hypothesis that the underlying anomaly in hepatic encephalopathy is impairment of ammonia detoxication connected with an absolute or relative alpha-ketoglutarate deficiency in the nervous tissue.

In investigations on the pathomechanism of central nervous system damage in renal failure it was established that a noxious effect is exerted by the serum obtained from animals with chronic serum sickness which was treated as a model of immune complex disease, in which renal damage develops resulting in uraemia. This noxious effect was observed in the cells of an extracorporeal culture of cerebellar tissue. Two types of cellular damage were demonstrated. The first type observed in neurons and glial cells is thought to be related to a direct action of toxic substances present in the serum as a result of renal failure. The second type was found in cultures with a high titre of immune complexes but with low levels of urea and creatinine. The lesions were present exclusively in astrocytes and myelin sheaths and included accumulation of immune complexes in the cytoplasm of astroglia, damage to the cell membrane of astrocytes, separation of myelin lamellae and blurring of their structure. These data point to a complex character of tissue damage in the syndrome of uraemic encephalopathy and neuropathy.

In investigations on the localization of organ-specific antigens in the brain it was demonstrated that the animal brain contains, besides organ-specific, species-non-specific antigens, an antigen or antigens which are both organ-specific and species-specific. The structural localization and cellular localization (in glia) of this double-specificity antigen is not different from that of the organ-specific antigen common to various animal species, man included.

In electron-microscopic investigations on the development of vessels in organotypic nervous tissue culture it was demonstrated that the development of vessels occurs through their growing out of the explanted tissue and formation anew from bands of endothelial cells separated from other vessels. The successive stages of vascular wall development were studied, including development of contact points between neighbouring endothelial cells, formation of close junctions, development of basal membrane and perivascular glial membrane.

See the list of publications:

aa 41, aa 42, bb 73

b.2. STRUCTURAL AND METABOLIC CONSEQUENCES OF CENTRAL NERVOUS SYSTEM ISCHAEMIA

In investigations on the mechanism of central nervous system damage following its ischaemia, it has been demonstrated that unilateral ligation of the common carotid artery in Mongolian hamsters for 10-30 min leads to changes in the distribution and activity of enzymes participating in active transport in the structural elements of the cerebral vasculo-neural junction. A characteristic feature was also regional differentiation of histochemical abnormalities in the different structures of the central nervous system with presence of foci of complete disappearance of the reaction in the cerebral cortex.

In the same experiments a biphasic course of disturbances in cerebral vascular permeability for macromolecular substances was demonstrated. The first phase appears at an early period after ischaemia and it is transient and connected with the phase of cytotoxic oedema. The second phase is connected with fully developed vasogenic oedema.

A difference was shown in the sympathetic and parasympathetic innervation of pia vessels under normal conditions and during ischaemia. Changes in the innervation found during and after ischaemia showed a correlation in time with functional disturbances of various active segments of the network of pia vessels determining vascularization of the cerebral cortex.

In the analysis of the effects of hypoxia and ischaemia on RNA metabolism in the brain it was demonstrated that it has a biphasic course. The early phase shows inhibition of RNA transport from the nucleus to the cytoplasm and polyribosomes preceding changes in RNA synthesis characteristic of the later phase. The effect of restricted RNA penetration from the nucleus is limited to the pool of poly(A)⁺RNA, and is connected with a selective sensitivity of RNA polyadenylation in the nucleus. Reduced RNA flow from the nucleus seems to be the first cause of increased disorganization of polyribosomes during hypoxia. In ischaemia an additional effect observed is that of acid ribonuclease release, due to damage to the lysosomal membranes.

Analysis of the morphological condition of the hypothalamo-hypophyseal neurosecretory system during intracranial hypertension in humans and experimental animals showed activation of the neurosecretory activity in the acute and chronic phases of intracranial hypertension. Morphological observations have been confirmed in biochemical investigations, the morphotic evidence of this neurosecretory system activation showed far reaching differences in different types and phases of intracranial hypertension. They were associated with damage to the neurosecretory system and with changes suggesting tissue regeneration processes influencing the functional state of the system. The underlying cause of changes in the function of the system and of its damage was impaired blood supply to the neurosecretory centres and pathways and to the neurohaemal organ connected with haemodynamic disturbances in the hypothalamo-hypophyseal area.

See the list of publications:

aa 20, aa 21, aa 22, aa 39

bb 1, bb 30, bb 31, bb 41, bb 42, bb 74, dd 5

b.3. NERVOUS SYSTEM DAMAGE CONNECTED WITH HYPOXIA AND THE ACTION OF CHEMICAL SUBSTANCES FROM THE GROUP OF HEAVY METALS, PESTICIDES, CANCEROGENIC AND TERATOGENIC FACTORS

In investigations on the effects of acute hypoglycaemia it was demonstrated that ultrastructural changes included swelling of mitochondria and disappearance of their cistae, as well as dilatation of endoplasmic reticulum channels and cisterns of Golgi's apparatus. These changes were reversible and regressed gradually after return of the normal blood glucose level. There was no direct relationship between the dose of insulin and the intensity of structural damage in the brain in the early phase of hypoglycaemia. The pathomorphological pattern of central nervous system damage was modified by systemic disturbances depending on the degree of hypoglycaemia.

In investigations on the glycogen level and the activity of enzymes metabolizing glycogen in hypoglycaemia a bidirectional character of changes was shown. The early phase of blood glucose fall was characterized by a lowering of the brain glycogen level with simultaneous rise in the activity of phosphorylase. During hypoglycaemia the glycogen level rose and this rise was preceded by an increase in the activity of glycogen synthetase.

In studies on the effect of hyperbaric oxygen on the central nervous system the presence of early haemodynamic disturbances was demonstrated, leading to anaemic damage to the nervous tissue. In the late phase of exposure to hyperbaric oxygen passive congestion of the central nervous system develops leading to vasogenic brain oedema.

In investigations on the effect of ethyl-nitrosourea on the central nervous system differences were demonstrated in the character of structural lesions depending on the stage of nervous tissue development. Features of damage to the neurons, oligodendroglia and myelin sheaths prevailed and the myelin damage had the character of dysmyelination and demyelination.

In investigations on the action of methyl-nitrosourea on the nervous tissue in vitro a cytotoxic effect of the substance

on the neurons and myelin sheaths was observed, as well as a blastomastic effect on the glial elements, astrocytes, in the first place.

See the list of publications:

aa 30, aa 31, aa 43, aa 45, aa 46, aa 47

b.4. TOXIC AND ANOXIC DAMAGE TO THE DEVELOPING NERVOUS SYSTEM

In investigations on the anoxic-toxic perinatal damage to the central nervous system in humans it was found that toxæmias of pregnancy cause not only low birth weight of the newborn, but retard also the development and maturation of the nervous system and cause its focal damage. Similar central nervous system anomalies may be caused also by diabetes, but in these cases low birth weight and length are not observed. Periventricular focal necrosis in the hemispheric white matter occurs, most frequently, in the hypoxic syndrome and many of them develop as a result of haemodynamic disturbances in the areas at the periphery of vascularization regions of long subcortical arteries.

In investigations on the effects of organic phosphorus pesticides on the developing nervous system it was found that these substances cause the appearance of signs suggestive of tissue metabolism disturbances (low activity of succinic dehydrogenase and acid phosphatase) and retardation of myelination. Abnormalities in the structure of newly developing myelin sheaths are associated with axonal damage and mitochondrial swelling in myelin-producing glial cells.

Nervous System Ultrastructure

b.5. STUDY OF THE ULTRASTRUCTURE OF NERVOUS SYSTEM TUMOURS IN CHILDREN

Electron-microscopic investigations were carried out of in vitro cultures of neuroblastoma-type tumours obtained from surgically treated cases from the Oncology Department of the Mother and Child Research Institute in Warsaw.

The population of cells surviving in the culture comprised cells without any evidence of secretory granules development (catecholamines), and cells with more or less pronounced evidence of secretory activity detected in morphological investigations. Both types of cells were found in the same material. The non-secretory cells showed some variability: some had large, rather oval nuclei with abundant, sometimes irregularly distributed chromatin. Their cytoplasm, visible usually as a narrow brim, contained round or oval mitochondria and few lysosome-like structures. The presence of endoplasmic reticulum tubules was not noticed but small aggregations of ribosomal granules were fairly numerous. Cells with clear nucleus and abundant cytoplasm with much more numerous, fairly well developed and usually dilated endoplasmic reticulum tubules were also seen. These cells contained also delicate fibrillary structures and scant multilamellar structures. The "secretory" cells had abundant cytoplasm, frequently dilated endoplasmic reticulum tubules, filled with material of higher electron density. Dark secretory granules (many of them with punctate clear areas in the centre) varied in number, very frequently they were encased in wide membranous sacs.

Besides, 28 cases of central nervous system tumours in children aged 3 to 14 years were examined under the electron microscope.

b.6. CHANGES IN THE HYPOTHALAMO-HYPOPHYSEO-ADRENAL SYSTEM CAUSED BY UNFAVOURABLE ENVIRONMENTAL FACTORS

Differences were demonstrated in the electron-microscopic pattern of stimulation of the hypothalamo-hypophyseal AD system during acute and long-term hyperthermia, and changes in the activity of this system after colchicine administration were demonstrated.

See the list of publications:

aa 2, aa 23, aa 51,
bb 51, bb 52, bb 53

b.7. EVALUATION OF INTRACRANIAL PRESSURE IN NEUROSURGICAL DIAGNOSIS AND THE PATHOMECHANISM OF DISTURBANCES LEADING TO INTRACRANIAL HYPERTENSION

Frequency analysis was applied to the intracranial pressure (ICP) signal in neurosurgical patients. Power spectral density (PSD) was calculated in different clinical situations in patients with and without intracranial hypertension. It was shown that in most cases the most dominant component of the PSD was related to the heart-generated oscillations of the ICP. This component consists of a peak at the frequency corresponding to the pulse rate and of a series of peaks at harmonic frequencies. Another peak was found at the frequency corresponding to the respiratory rate. With increasing intracranial tightness the contribution of the respiratory component to the total power of the ICP signal decreases and at the same time the contribution of the subrespiratory components increases. In some cases these components dominate in the spectrum. Decompression obtained by draining the cerebrospinal fluid results in a distinct change in the spectrum, bringing it back to normal shape. A similar effect was observed after administration of Lassix - a distinct reduction of the subrespiratory components with an increase of respiratory and heart related components.

The results show that computerized frequency analysis can be used as an effective method of evaluation of the effect of various therapeutic procedures.

In experimental studies on ICP and CSF resorption resistance it was shown that a significant rise in the resorption resistance develops already in the early phase of subarachnoid haemorrhage.

The IPE-382 Histogram, designed in the Warsaw Polytechnical Institute was implemented in clinical practice. Its design was based on the "floating histogram" method, developed in the Department of Neurosurgery M.R.C.

b.8. EFFECT OF STEREOTAXIC SURGERY OF LIMBIC SYSTEM (AMYGDALA, HIPPOCAMPUS, CINGULATE GYRUS), THALAMIC NUCLEI AND NUCLEUS DENTATUS ON MEMORY, EMOTIONAL STATE AND BIO-ELECTRICAL ACTIVITY OF THE BRAIN

Investigations were carried out on short-term memory with the use of interfering factors before and early as well as late after operations in 16 patients with severe forms of epilepsy.

Disturbances were disclosed including narrowing of the scope of immediate recall and increased susceptibility of memory traces to heterogeneous distraction early after the operation. They persisted in varying intensity late after lesions placed in the amygdala (C.A.) and hippocampus (H). Despite these memory disturbances no impairment of intellectual functions was observed. Favourable conditions in the emotional state of the patients and improvement of cerebral bioelectric activity provided adequate conditions for further development of the observed patients.

Investigations of verbal memory were done in 10 patients before and after operation. A set of sensibilized tests was applied for intraoperative investigations. After electrical stimulation of amygdala and hippocampus no disturbances of consciousness and orientation in place and time or behaviour disorders were observed. A transient tendency was found, however, to verbal memory disturbances after electrical stimulation of the uncus and amygdala.

Ninty-five Seeg investigations in patients with epilepsy with predominating temporal-lobe pathology were analysed by comparing the bioelectric activity recorded simultaneously in the amygdala and hippocampus, temporal cortex and skull surface, and relating them to eeg investigations done before the operation. The presence of pathological elements typical of epilepsy was found. They occurred in different variants, synchronously or asynchronously, in leads at these levels.

Attention is called to the fact that seizure discharges recorded in the amygdala and hippocampus had no counterparts in the eeg recorded from the surface of the skull. The obtained data are important for the problems of epilepsy diagnosis.

The effect of electrical stimulation of amygdala and hippocampus on the bioelectric function of these structures and on egg was studied, revealing that seizures produced with electrical stimulation of deep temporal lobe structures show an identical pattern as spontaneous seizures produced by stimulation of temporal-lobe epileptogenic foci.

It has been shown that seizures recorded in deep temporal structures may take place without consciousness disturbances, the patients show no memory disorders and spatial disorientation and can participate in neuropsychological tests.

It was revealed that patients with dysphoric disorders exhibit hyperexcitability of amygdala to stimulating factors and react by strong seizure discharges to low parameters of electrical stimulation. Hippocampal stimulation in these cases caused only short-lasting after-discharges restricted to this structure.

The results of these investigations are of theoretical importance, shedding light on the mechanisms of temporal-lobe epileptic seizures of different types. A set of devices for brain electrostimulation and recording of bioelectric cerebral function designed previously was made available, experimental tests were done and the set has been introduced for routine Seeg investigations.

See the list of publications:

aa 49, aa 53, dd 4

b.9. DISORDERS OF SPEECH AND OTHER GNOSTIC FUNCTIONS IN PATIENTS WITH CEREBRAL NERVOUS SYSTEM DAMAGE

In investigations on visual perception two experiments were done, in one of them letters were shown in central exposition to patients with different focal brain damage, in the other experiment stereoscopic visual stimuli were used.

It was found that only in patients with damage to the parieto-occipital area no positive interaction was present between the letters. In cases of brain injury of another location (frontal or temporal areas) these interactions resembled those observed in healthy subjects. It should be stressed that in patients with parieto-occipital damage clinical examination failed to demonstrate visual agnosia.

In the light of the presently reported investigations it has been established that positive interaction between the exposed letters occurs in a late phase of visual information analysis and that these interactions are connected, most likely, with high levels of the nervous system and not with the retina or optic nerve.

These results are of mainly theoretical interest, it seems, however, that they may contribute to the understanding of the problem of what is called dyslexia in children and may help in a proper orientation of therapeutic methods.

b.10. EFFECT OF "pt" MUTATION ON VARIOUS LINKS OF "CLOSED" MOTORIC CIRCUITS

In investigations on damage to the visual-oculomotor-cerebellar circuits the presence of pathomorphological changes, typical of the pt syndrome, was demonstrated in all structures responsible for the maintenance of the normal functions of the eyeballs. The greatest abnormalities were discovered in the afferent nuclei involved both in the optokinetic (tegmental nuclei) and the vestibulo-oculomotor reflex (vestibular nuclei). Disseminated changes were also observed in all structures conducting visual information to the cerebellum, especially in the inferior olives. The coincidence of lesions in the particular elements of the visual oculomotor cerebellar circuits may be the cause of disturbances in the synchronization of eyeball movements with head position in some animals in the acute period of disease.

Ultrastructural investigations of the cerebellum in the acute phase of the disease demonstrated the presence of damage in all its structures. In the cerebellar cortex the lesions in nerve cell processes and synaptic endings were more pronounced than in the perikarya of nerve cells. In the white matter damage involved both the axons and myelin sheaths showing features of demyelination.

c. STUDIES ON TRANSPLANTATION AND EXPERIMENTAL SURGERY

c.1. INVESTIGATIONS ON RECIRCULATION OF LYMPHOCYTES
AND TRANSPORT OF IMMUNE PROTEINS

Investigations on the transport rate of immunoglobulins and complement proteins to the intercellular fluid and lymph in healthy subjects during increased capillary filtration showed that the volume of tissue fluid increased on the average, threefold, and the protein concentration fell by 15 to 55% depending on the size of the protein molecules. Nevertheless, in view of intensified capillary filtration, the total amount of protein transported to the intercellular spaces was raised to 340% in the case of low-molecular weight proteins, and to 280% in the case of high-molecular weight proteins. Raised tissue temperature up to 42°C failed to increase capillary permeability and prevented an even greater supply of high-molecular weight proteins, e.g. IgM. Increased capillary filtration without an accompanying rise in vascular permeability prevented an increase in Ig concentration and complement components in the tissue fluid.

In the tissue fluid and lymph of healthy subjects a low haemolytic activity of C3 was demonstrated, associated with a reduced ability of erythrocyte immunoadherence as compared with the serum of the same subjects. At the same time it was observed that C3 conversion was accelerated in the lymph in relation to the serum if the samples had been kept frozen at -70°C for several days. These findings remain unexplained. It is supposed that C3 in the tissue fluid is controlled by an inhibitor which is rapidly activated during its storage.

The kinetics of accumulation of lymphoblasts was studied after intravenous administration of two antigens: sheep erythrocytes and *Corynebacterium parvum* injected intravenously to syngeneic recipients. It was observed that accumulation of blasts in the tissues of highest predilection, i.e., the intestine, lungs, skin, was identical, independently of the antigen stimulating the lymphocytes. Differences were observed also in the distribution of blast cells from the thoracic duct,

as compared with blast cells from the lymph nodes. Blast cells, from the thoracic duct disappeared promptly from all tissues and after administration of blast cells from the lymph nodes their concentration increased in the intestine, spleen and lymph nodes. No significant differences were found in the kinetics of blast cell entrapment in the mesenteric and peripheral lymph nodes. The results of investigations showed that physiologically circulating blast cells from the thoracic duct have a different distribution than the blast cells separated mechanically from the lymphoid tissue, independently of the type of antigen used for stimulation.

In investigations on the cell composition in afferent lymph, cell populations penetrating across the capillary walls into tissue spaces and lymph were studied under normal conditions. The pre-lymph-node lymph in dogs contained on the average 34% lymphocytes, 20% monocytes and 36% granulocytes, while in the blood these proportions were: 48%, 14% and 38%, respectively. After separation of adhering cells with iron carbonylate in the pre-nodal lymph 24% of cells formed "warm" E rosettes, 27% formed "cold" E rosettes, 10% formed EA rosettes and 11% formed EAC rosettes. In the blood the respective values were 16%, 14%, 12% and 8%. This shows that pre-nodal lymph in dogs contains more thymus-dependent lymphocytes than the blood, but the proportion of lymphocytes B is relatively high, contrary to the findings in humans in whom the proportion of lymphocytes B is low. This fact suggests the necessity of studies on the kinetics of migration of lymphocytes B in different species.

See the list of publications:

aa 68, aa 69, aa 70, aa 71, aa 73, aa 102, bb 47, bb 79, bb 80, bb 81, bb 82, bb 83, bb 84, cc 1

c.2. STUDIES ON SPECIFIC IMMUNOSUPPRESSION IN ALLOGENEIC ORGAN TRANSPLANTATION

In investigations on the ways of achieving effectiveness (prolonged survival) or organ transplants the effect of intravenous administration of a suspension of platelets on the survival of allogeneic renal transplants was studied. The pla-

telets were obtained from the donor organ and were infused to the dog receiving the transplant.

A very significant prolongation of transplant survival was obtained in dogs which received, besides the ALG preparation, also intravenous infusions of platelets obtained from the donor of the graft (mean survival time 50.1 ± 16 days, while in ALG-treated dogs this time was 16.2 ± 2 days on the average). The antigenic specificity of this biological effect was demonstrated. The result confirmed previous observations that platelets may be used as a donor antigen producing a state of antigenically specific prolongation of survival of an allogeneic renal transplant in unmatched (for DL-A) mongrel dogs.

Studies were carried out in order to obtain enhancement of the effect of alloserum by short-lasting treatment of the graft recipient with heterologous antilymphocyte serum in an experimental model of heterotopic cardiac transplantation in rats. The experiments were conducted on inbred rats differing in the strong antigens of the AgB system (August, Ag-B₅ donor; Wistar, Ag-B₂ recipient). Administration of donor cellular antigen and syngeneic immune serum containing antibodies to donor antigens to cardiac transplant recipients 11 and 10 days before transplantation caused a significant prolongation of graft survival, by 18.4 ± 2.6 days, on the average. Rejection of the cardiac graft in untreated animals occurred after 6.9 ± 0.3 days.

Administration of antilymphocyte serum to cardiac graft recipients sensitized before transplantation with donor's antigen and syngeneic immune serum prolonged very markedly the survival of the grafted heart (by a mean time of 50.8 ± 13.5 days).

In vitro investigations of cell-mediated response in cardiac graft recipients treated with a full immunosuppressive regime to donor's target cells showed a very significant depression of the cell-mediated cytotoxicity in the early period after transplantation.

In investigations on the cell-mediated and humoral responses in Wistar rats after immunization with cell antigen from the August strain, a gradual rise of the cell-mediated and humoral responses (25-30% of specific chromium release) was observed in the successive weeks after sensitization.

On the 6th day after each recall-dose of the antigen 3 Wistar rats received heterotopic transplants of the August heart (a rat from the strain of antigen donors). Despite significant cell-mediated and humoral responses of sensitized recipients of grafts, the heart was rejected after 7 days, that is after the same time as in control animals.

The effect of polyvalent alloserum on the survival of allogeneic renal transplants was investigated in mongrel dogs. The serum was obtained from ten dogs immunized with six skin grafts transplanted at two-week intervals, and six administrations of cell antigen-leucocytes isolated from the blood by sedimentation. The antigen was given at weekly intervals, in doses of $2-5 \times 10^8$. The lymphocytotoxic test was used for assaying the sera. Recipients of the allogeneic kidney transplant were treated with polyvalent serum (PSS) alone (administered for 7 days in doses of 25 mg/kg or 75 mg/kg), or a combination of donor antigen (leucocytes 5×10^7 /kg or 5×10^8 /kg) given for 9 days or 1 day before transplantation with PSS in 25 mg/kg or 75 mg/kg doses given for 8 days before transplantation or on the day of transplantation.

No significant prolongation of allograft survival was observed. Neither was hyperacute rejection observed, although the administered serum had a high level of cytotoxins against donor lymphocytes.

Investigations on the effect of a hyperosmotic flush solution on prevention of anoxic kidney damage during its storage were begun by preparing three fluids differing in their content of magnesium, potassium and sodium.

The first tested fluid was a solution with low sodium and high potassium and magnesium contents. The preliminary results of investigations failed to show any significant protection offered by this fluid when the kidneys were subjected to 30 min of warm ischaemia prior to 18-h storage. Only two dogs survived

for a longer time with normal function of the renal transplant. The remaining animals died from uraemia or complications.

A method has been elaborated for storage of murine peritoneal macrophages for immunological investigations and transplantation research. The cells were stored at -196°C for 3 months with dimethylsulphoxide used as cryoprotective agent. Cell recovery after freezing and storage was $91.2 \pm 13.8\%$. Macrophages retained their ability of phagocytosis of sheep erythrocytes labelled with ^{51}Cr in $89.5 \pm 22.7\%$ and there were no significant differences in the spontaneous migration of cells after storage in relation to control macrophages. The stored macrophages retained their Fc and C3b receptors in $70 \pm 3\%$ and $81 \pm 6\%$. Spontaneous cytotoxicity against Ehrlich's tumour cells remained unchanged.

Investigations on alterations of the cell-mediated immunity were continued in patients after abdominal surgery and in healthy volunteers. It has been observed that blastic transformation of peripheral blood lymphocytes cultured in the patient's own serum was much lower than, when cultures were carried out in the fetal serum. This difference was not observed in healthy volunteers. The proportion of lymphocytes forming warm and cold E rosettes differed in both groups, similarly as that of lymphocytes forming EA and EAC rosettes. The phenomenon of postoperative lymphopenia has been confirmed.

See the list of publications:

aa 2, aa 56, aa 57, aa 72, aa 76, aa 77, aa 88, aa 89, aa 90, aa 91,
aa 95, aa 98, aa 100, bb 59, bb 60, bb 87, bb 106, bb 107, bb 108, bb 109,
bb 111, bb 118

c.3. NEUROREGULATION OF OXYGEN SUPPLY TO TISSUE WITH REFERENCE TO PARTICIPATION OF ARTERIOVENOUS COMMUNICATION IN MICROCIRCULATION

In 1978 the Laboratory of Experimental Surgery continued investigations on vascular changes developing after severing of peripheral nerves. It has been demonstrated previously that cut-

ting of the sciatic nerve caused persistent opening of arteriovenous communications. In 1978 investigations were continued on changes of arteriovenous communications in the hands of patients with attacks of Raynaud's phenomenon. The observed material included 100 patients.

Angiographic investigations showed that in the cyanotic phase of Raynaud's phenomenon the natural arteriovenous communications are open and after cooling of the extremity the arteries enter a phase of arteriospasm.

In reference to the results of the previous investigations with the observation of opening of arteriovenous communications in the hands of patients with attacks of Raynaud's phenomenon the cervical spine was examined in all cases. This was done under the assumption that the cause of opening of arteriovenous communications in the hands of these patients may be damage to the mixed peripheral nerves originating from the cervical nerve roots. In 96% of patients with Raynaud's phenomenon bone changes were demonstrated in the cervical vertebrae which could exert pressure on the mixed peripheral nerves of the upper extremities. In a control group of 100 patients without Raynaud's phenomenon similar vertebral changes were found in 10% of cases only. These investigations were, to some extent, original, indicating the possibility of a different than the present explanation of the pathological mechanism of Raynaud's phenomenon. This may open also new therapeutic possibilities. The work was presented at the Meeting of Surgeons in Lyon in 1978 and was published in the Journal of Cardiovascular Surgery, 1978, No.19.

d. OTHER RESEARCH WORKS

d.1. BIOLOGICAL, PSYCHOLOGICAL AND SOCIAL CONDITIONS
OF DEVELOPMENT OF UNCOMMON ABILITIES IN CHILDREN
AND ADOLESCENTS

The developmental conditions of 86 adolescents were analysed. These adolescents were regarded as very gifted in elementary or secondary schools and that opinion was confirmed by testing.

It was found that at the time of analysis the biological conditions of these exceptionally gifted young subjects were not significantly different than those in 86 controls, and in both groups they were good or very good.

Exceptionally gifted subjects showed a greater activity in life with more productive work, with greater achievements reached, through making use of their abilities. The exceptionally gifted subjects showed also a greater maturity in the orientation in their interests and abilities facilitating the choice of a right field of activity in agreement with their predispositions. The high level of orientation in own interests and abilities, and a strong dynamic drive in life provided favourable psychological conditions for the development of exceptionally gifted youths.

The exceptionally gifted young subjects showed also, in relation to the control group, a higher level of maturity in certain social functions, especially as members of family group and institutionalized formal groups. In view of this, the conditions of social development of the exceptionally gifted subjects were more favourable than those of control subjects.

These results were obtained in the study of young subjects after completion of elementary and secondary education. In very gifted subjects completing elementary education there was also a greater intellectual stimulation provided by their parents, and their activities undertaken for satisfying their curiosity were also much more pronounced than in the control group of average intelligence level.

On the basis of the results of these investigations and also on those of former studies the Research Group postulate organization in secondary schools, especially those preparing for further studies, of a special system of developing in the students the ability of self-determination of the main direction of their interests and abilities. This could bring to a higher level the intellectual functions of the students and prevent emotional disturbances caused by inappropriate choice of further studies disagreeing with the interests and abilities of the students.

d.2. FACTORS DETERMINING MENTAL HEALTH OF ADOLESCENTS

Medical examinations were carried out in a group of 73 individuals out of 133 notified cases of drug abuse in health service institutions in the City of Łódź. Drug dependence was found in 69.9% of cases. Most of them took alcohol treating it either as a component of stupefying mixtures, or as a replacement of the usual stupefiant.

Eighty cases of suicidal attempts of adolescents were analysed. The psychiatric diagnoses in this group were mainly depressions of varying intensity and etiology (57.5%), 35 patients came from broken families (43.7%). No statistically significant correlation was observed between depression and familial upset, but in patients with repeated suicidal attempts abnormal family conditions were more numerous. Alcohol intoxication during suicidal attempt was found in 11.2% of patients.

Psychological examination of 50 subjects after suicidal attempts and 50 drug-dependent patients permitted a correlation to be found between the personality pattern, perceptivognostic patterns, regulatory mechanisms and the manifested behavioural forms. The adolescents after suicidal attempts manifested usually primitive defense mechanisms with a striving to obtain fulfilment of their needs by others and to obtain sympathy. The drug-addict group owing to stronger compensatory mechanisms reached more easily the decision of breaking all previous social ties and keeping to the standards of their peer group.

The data concerning 110 young drug abusers from the City of Łódź indicate that the group could be divided into a subgroup of individuals with an early psychosocial desadaptation syndrome with behaviour disorders manifested already in elementary school and a group in which these disorders appeared later, in secondary school. In both subgroups the family conditions were unfavourable. In the group of adolescents aged 15-20 years, after suicidal attempts by poisoning, disturbances of family function were revealed in 90% of cases. The school environment played a much smaller role in causation of suicidal attempts.

An anonymous inquiry form was sent to 316 teachers from various schools in Łódź. The main drawbacks of their occupation were: an excess of overtime work, lack of understanding on the side of the administration, and the necessity of additional remunerative work. In 46% of cases the teachers regarded their health as unsatisfactory (laryngological diseases, digestive tract diseases, neurotic symptoms).

See the list of publications:

bb 10, bb 36, bb 45

d.3. STUDIES AND CONSTRUCTIONS OF BIOMEDICAL APPARATUS

In 1978 the activities of Medipan Laboratories covered studies, designing and construction of biomedical apparatus. Besides, services were rendered in maintenance and repair of equipment in research institutions using that equipment.

In the prototype equipment the following were designed:

- a model of writer making possible obtaining of an "on line" record in an xt 325 recorder. Further work on this prototype will be continued in 1979;
- a model of a new infusion pump type 573, trial series of which will be produced in 1979.

In 1978 the programme of production of Medipan Laboratories included:

| | Type | No. of units produced |
|--|--------|-----------------------|
| 1. dispenser | 461 | 50 |
| 2. diluter | 462 | 30 |
| 3. 3-channel recorder | xt 352 | 10 |
| 4. 6-channel recorder | 352 | 4 |
| 5. Camera for oscilloscope photography | KO-3 | 15 |
| 6. Respiratory classic pump | CLR-1 | 6 |

Besides, many small auxiliary apparatus and laboratory equipment units were made. About 7% of the value of the production went to laboratories of the Medical Research Centre, the remaining production went to other scientific research centres in the country.

e. NEW METHODS AND TECHNIQUES IN RESEARCH

1. A modified method for measuring ventilatory flow.

The method has been elaborated by:

Andrzej Huszczuk, M.Sc. (eng.), D.Nat.Sc. and

Andrzej Szymonowicz, M.Sc. (eng.),

at the Department of Neurophysiology.

Application: measurements of air flow and respiratory volume with possibility of continuous determination of the F.R.C.

2. A computerized method for determination of the ability of intracranial volume compensation.

The method has been evolved by the team of the

Department of Neurosurgery - including:

Doctor hab. J. Szewczykowski M.D., S. Śliwka M.Sc. (eng.)

Professor A. Kunicki M.D., J. Korsak-Śliwka M.Sc. (eng.)

P. Dytko P.G. (dip.).

Application: in neurosurgical intensive care.

3. Histogramphy of intracranial pressure using the IPE-382 device.

The method has been developed by the team of the

Department of Neurosurgery - including:

Doctor hab. J. Szewczykowski M.D., S. Śliwka M.Sc. (eng.)

Professor A. Kunicki M.D., J. Korsak-Śliwka M.Sc. (eng.)

P. Dytko P.G. (dip.).

Application: in neurosurgical intensive care.

4. Frequency analysis of intracranial pressure, an additional component to the computerized intensive care system.

The method has been developed by the team of the

Department of Neurosurgery - including:

Doctor hab. J. Szewczykowski M.D., S. Śliwka M.Sc. (eng.)

Professor A. Kunicki M.D., J. Korsak-Śliwka M.Sc. (eng.)

P. Dytko (dip.).

LIST OF PUBLICATIONS

Notice:

All English titles in parantheses in this publication indicate, that the original language of those titles is other than English.

aa. Original papers

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(Regulation of cerebral glycolytic activity in hypoxia).
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121. STROSZNAJDER J., DĄBROWIECKI Z., DOMAŃSKA-JANIK K.

Wpływ niedoboru tlenowego na metabolizm fosfolipidów, peroksydację kwasów tłuszczowych, poziom antyoksydantów w mózgu dorosłych szczurów.

(Influence of hypoxia on phospholipid metabolism, peroxidation of fatty acid, and the level of antioxidants in the brain of adult rats).

Presented at: IV Conf. of the Pol. Assoc. of Neuropath., Poznań, Poland, 1978, April 5-12. Abstr. pp. 118-119.

122. SZEWCZYKOWSKI J., ŚLIWKA S., KUNICKI A., KORSAK-ŚLIWKA J., DYTKO P.

Analysis of intracranial pressure for clinical applications.

Presented at: Danube Symp. of Neurol., Budapest, Hungary, 1978, November 23-26.

123. SZEWCZYKOWSKI J., DYTKO P., KUNICKI A., ŚLIWKA S., KORSAK-ŚLIWKA J.

Erkennung und Behandlung von Vergiftungen; Arzneitherapie: Fortschritte, Fehler und Gefahren.

(Diagnosis and management of intoxications.

Pharmacological treatment: Advances, Errors and Dangers).

Data: see on the next page pos. 124.

124. SZEWCZYKOWSKI J., DYTKO P., KUNICKI A., ŚLIWKA S.,
KORSAK-ŚLIWKA J.

Intracranial pressure after mannitol infusion.

Are there any rebound effects?

Two papers presented at: Symp. Inst. of Anaesthesiol.,
University of Mainz, F.R.G., 1978, March 2-6.

125. SZUMAŃSKA G., OSTENDA M.

Zmiany histoenzymatyczne naczyń mózgowych w
niedotlenieniu hipoksyjnym.

(Histoenzymatic changes in cerebral vessels in
hypoxia).

Presented at: IV Conf. of the Pol. Assoc. of Neuropath.,
Poznań, Poland, 1978, April 6-8. Abstr. pp. 122-123.

126. TRUSKOLASKI P., HERBACZYŃSKA-CEDRO K., RUSZCZEWSKI P.

Inhibitory effect of hydrocortisone on prostaglandin
release into cerebral venous blood induced by hypoxia
and cerebral embolism in the dog.

Presented at: XIV Congr. of the Pol. Physiol. Soc.,
Łódź, Poland, 1978, September 11-13.

Ann. Acad. Med. Lodziensis, 1978, 19, Suppl. 16,
pp. 392.

127. WEINRAUDER H., KRAJEWSKI S., MICHALAK T.

Immunofluorescencyjna lokalizacja swoistych antygenów
w mózgu w układach homo- i heterologicznych.

(Immunofluorescent localization of specific antigens
in brain in homo- and heterologus systems).

Presented at: IV Conf. of the Pol. Assoc. of Neuropath.,
Poznań, Poland, 1978, April 6-8. Abstr. pp. 130-131.

128. WIDEMAN J., BRINK L., STEIN S.

New automated fluorimetric peptide assay at the picomole
level using HPLC.

Presented at: XII FEBS Congr. on Biochem., Dresden,
G.D.R., 1978, July 1-7. Abstr. pp. 3338.

129. WIDEMAN J., STEIN S.

Purification of brain encephalins by chromatography on LH-20 Sephadex.

Presented at: II Meeting of the Eur. Soc. of Neurochem., Göttingen, F.R.G., 1978, August 25-31.

Ed.: V. Neuhoff. Publishers: Weinheim-New York, 1978, Verlag Chemie, Vol. 1. Abstr. pp. 457.

130. WIDEMAN J., STEIN S.

Purity of commercially available radioactive encephalins as studied by HPLC.

Presented at: II Meeting of the Eur. Soc. of Neurochem., Göttingen, F.R.G., 1978, August 25-31.

Ed.: V. Neuhoff. Publishers: Weinheim-New York, 1978, Verlag Chemie, Vol. 1. Abstr. pp. 458.

131. WIERCIOCH L. R.

Disulfiram implantations: the problem of implant rejection.

Presented at: XXXII Int. Congr. on Alcoholism and Drug Dependence, Warsaw, Poland, 1978, September 3-8. Abstr. pp. 24.

132. WIERCIOCH L. R.

Reakcja furagin - alkohol etylowy.
(Furagin - ethanol interaction).

Presented at: III Pol. Conf. on: Effect of Ethanol on Drug-Action Results, Łódź, Poland, 1978, November 18. Abstr. pp. 26.

133. WIERCIOCH L. R.

Suicidal behaviour in children and adolescents: the significance of diagnosis of masked depression.

Presented at: IX Congr. on Suicide Prevention and Crisis Intervention, Mikkeli, Helsinki, Finland, 1978. Ed.: V. Aalberg, 1978, Proc. 526-528.

134. WIERZBA-BOBROWICZ T.

Wczesne zmiany w OUN w doświadczalnym niedocukrzeniu szczura.

(Early cerebral changes in experimental hypoglycemia of the rat).

Presented at: IV Conf. of the Pol. Assoc. of Neuropath., Poznań, Poland, 1978, April 6-8. Abstr. pp. 136-137.

135. WRÓBLEWSKI J. T., ŁAZAREWICZ J. W.

Brain particulate hexokinase: localization of the latent enzyme.

Presented at: XII FEBS Congr. on Biochem., Dresden, G.D.R., 1978, July 2-8. Abstr. 0878.

136. WRÓBLEWSKI J. T., DOMAŃSKA-JANIK K., ZALEWSKA T.

Opposite hexokinase distribution in hypoxic and ischaemic rat brain.

Presented at: XII FEBS Congr. on Biochem., Dresden, G.D.R., 1978, July 2-8. Abstr. 0879.

137. ZAKRZEWSKI P.

Les origines du processus d'alcoolisation chez les futures jeunes alcooliques.

(Origins of the process of alcohol habituation in future young alcoholics).

Presented at: XXXII Int. Congr. on Alcoholism and Drug Dependence, Warsaw, Poland, 1978, September 3-8. Abstr. pp. 230.

138. ZALESKA M.

Serotonin metabolism in hypoxic rat brain: effect of pentobarbital pretreatment.

Presented at: XII FEBS Congr. on Biochem., Dresden, G.D.R., 1978, July 2-8. Abstr. 0854.

139. ZALESKA M., JANKOWSKA L., GRIEB P.

Zwiększenie poziomu 2,3-DPG we krwi królika in vivo.
(Increasing of blood 2,3-DPG level in rabbit in vivo).
Ann. Acad. Med. Lodziensis, 1978, 19, Suppl. 16,
pp. 422.

140. ZALESKA M., KSIĘŻAK H.

Przemiana neurotransmiterów w przebiegu doświadczalnego
niedotlenienia mózgu.
(Metabolism of neurotransmitters in the course of
experimental hypoxia of the brain).
Presented at: IV Conf. of the Pol. Assoc. of Neuropath.,
Poznań, Poland, 1978, April 5-12. Abstr. 142-143.

141. ZALEWSKA T., DOMAŃSKA-JANIK K.

Energy utilization and changes in some intermediates
of glucose metabolism in normal and hypoxic rat brain
after decapitation.
Presented at: II Meeting of the Eur. Soc. of Neurochem.,
Göttingen, F.R.G., 1978, August 25-31.
Ed.: V. Neuheim. Publishers: Weinheim-New York, 1978,
Verlag Chemie, Vol. 1. Abstr. pp. 306.

142. ZELMAN I. B., MAJDECKI T.

Zmiany strukturalne w mózgu szczura spowodowane
zatruciem fosforoorganicznym pestycydem Dichlorfosem.
(Structural changes in the rat brain provoked by
intoxication with the organophosphorus pesticide DDVP).
Presented at: IV Country Conf. of the Pol. Assoc. of
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Abstr. pp. 144-145.

143. ZIEMBA A. W.

Effect of high CO₂ concentration in the respiratory air on thermoregulation during heat exposure.

Presented at: XIV Congr. of the Pol. Physiol. Soc.,
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Ann. Acad. Med. Lodziensis, 1978, 19, Suppl. 16, 430.

cc. Monographs

1. OLSZEWSKI W. L.

Obrzęki kończyn.

(Oedema of extremities).

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(The Library of the Surgeon and Anesthesiologist)

Publishers: PZWL, Warszawa 1977.

dd. Other works

1. ALBRECHT J.

Wpływ niedotlenienia i niedokrwienia na metabolizm RNA w mózgu.

(Streszczenie pracy habilitacyjnej).

(Effect of hypoxia and ischaemia on RNA metabolism in the brain).

(Summary of Ph.D. thesis).

Neuropat. Pol., (1979), 17, 155-162.

2. KLIMOWICZ A., POSEŁ Z.

Wybrane zagadnienia odpowiedzialności karnej nieletnich.

(Selected problems of legal responsibility of juveniles).

Psychiatria Pol., (1979), 13, 2, 165-171. .

3. KOZŁOWSKI S., NAZAR K.

Fizjologiczna regulacja metabolizmu wysiłkowego.

(Physiological regulation of exercise metabolism).

Acta Physiol. Pol., Suppl. 18, (1979), 30, 19-61.

4. MEMPEL E.

Zastosowanie metody kriochirurgicznej w neurochirurgii klasycznej i stereotaktycznej.

(Cryosurgery applied in classical and stereotaxic neurosurgery).

Probl. Techn. Med., 1978, 8, 3/4, 173-180.

5. RAP Z.

Morfologiczna ocena funkcji podwzgórzowo-przysadkowego układu neurosekrecyjnego w nadciśnieniu wewnątrzczaszkowym. (Streszczenie pracy habilitacyjnej).

(Morphological evaluation of the function of the hypothalamo-hypophyseal neurosecretory system in intracranial hypertension).

(Summary of Ph.D. thesis).

Neuropat. Pol., 1978, 16, 2, 293-302.

6. ROWIŃSKI W., OLSZEWSKI W. L.

Problemy immunologii w chirurgii.

(Immunological problems in surgery, in Polish).

Mimeographed lectures for participants in courses at the Postgraduate Medical Education Centre.

Eds. Postgraduate Medical Education Centre, Warsaw, 1978,

7. SZAFRAŃSKA M., GODLEWSKA U.

Problemy zdrowia psychicznego uczniów szkół ponadpodstawowych.

(Mental health problems in secondary school pupils).

Zag. Wychowawcze Zdr. Psych., 1978, 5, 65-75.

NAME INDEX

ee. Name index to the list of publications

ADAMCZEWSKA-GONCARZEWICZ Z., aa 58

ADAMSKI M., aa 67

AFEK-KAMIŃSKA M., aa 75

ALBRECHT J., aa 1, bb 1, dd 1

AUGUSTYNIAK B., bb 68

AUGUSTYNOWICZ S.D., aa 57, aa 76, bb 85

BAGIROV E., bb 34

BANCEWICZ J., aa 98

BERTOLI E., bb 50, bb 56

BERTRAND F., aa 8, aa 99, bb 6

BOROWICZ J.W., aa 2, aa 23, aa 24, aa 42, aa 51

BORUTA E., bb 62

BOSKOWSKI M., aa 21

BRINK L., aa 102, bb 128

BRONISZEWSKA-ARDELT B., aa 3, aa 4, aa 10, bb 2, bb 3, bb 7, bb 22

BRZEZIŃSKA Z., aa 5, aa 6, aa 7, aa 35, aa 40, bb 4, bb 28

BUDZIŃSKA K., aa 38, bb 5

CAILLE D., aa 8, aa 99, bb 6

CALANAN D., aa 15

CEDRO A., aa 9

CEREMUŻYŃSKI L., aa 10, bb 7, bb 8, bb 22

CHODAROWSKA J., bb 78

CHWALBIŃSKA-MONETA J., aa 93, bb 78

CURATOŁA G., bb 50, bb 92

CWYNAR S., bb 9, bb 10

CZAJKOWSKI J., aa 11

CZARNECKI W., bb 11

DANIELEWICZ A., aa 2, aa 12, aa 23, aa 51

DAVIES A., aa 15

DĄBSKA M., aa 12, aa 13, aa 60, bb 12, bb 64

DĄBROWIECKI Z., aa 86, bb 13, bb 112, bb 121

DĄBROWSKA B., aa 14

DĄBROWSKI M., bb 111

DIXON M., aa 15

DOMAŃSKA-JANIK K., bb 14, bb 15, bb 16, bb 33, bb 121,
bb 136, bb 141

DYDYK L., aa 16, aa 17, aa 18, aa 19, bb 17

DYMECKI J., aa 58

DYTKO P., bb 122, bb 123, bb 124

DZIDUSZKO J., bb 57

ENGESET A., aa 68, aa 69, aa 70, aa 71, bb 80, bb 81, bb 82

FINI G., aa 79

FLORIDI A., aa 79

GADAMSKI R., aa 20, aa 21, aa 22, aa 64, bb 76

GAJKOWSKA B., aa 23, aa 24, aa 43, bb 38

GALKOWSKA H., bb 107, bb 108, bb 109

GARBER L.D., aa 25

GELLERT R., bb 1-, bb 48, bb 49, bb 115, bb 116

GŁOGOWSKA M., aa 26, bb 19

GODLEWSKA U., bb 20, dd 7

GODLEWSKI A., bb 20

GORACCI G., aa 79

GRADOWSKA L., aa 100, bb 106

GREENLEAF J.E., bb 94

GRIEB P., aa 33, bb 21, bb 27, bb 99, bb 139

GROCHOWSKI W., bb 71

GROMYSZ H., aa 8, aa 27, aa 99, bb 6

HERBACZYŃSKA-CEDRO K., aa 9, aa 10, aa 28, aa 29, aa 92, bb 7,
bb 8, bb 11, bb 22, bb 23, bb 24,
bb 112, bb 113, bb 126

HILGIER W., aa 1, aa 17, aa 30, aa 31, bb 25

HUGELIN A., aa 8, aa 99, bb 6

HORROCKS L.A., aa 79

HUSZCZUK A., aa 15, aa 32, bb 26

JANKOWSKA L., aa 33, bb 27, bb 139

JAZOWIECKA E., aa 38

JUCHA Z., aa 34, bb 9

JURKIEWICZ J., bb 69, bb 70

JUSTYNA M., aa 17

KACIUBA-UŚCİLKO H., aa 5, aa 6, aa 35, aa 36, bb 4, bb 28

KAPUSCIŃSKI A., aa 37, bb 29, bb 30, bb 31, bb 41, bb 42

KARCZEWSKI W.A., aa 27, aa 38, aa 39, bb 32

KHATCHATRIAN L., bb 33, bb 34, bb 63

KLIMOWICZ A., bb 9, bb 35, bb 36, dd 2

KOBRYŃ A., aa 7, aa 35, aa 40, bb 28

KOCHETKOV S., bb 34

KONIECZNY W., bb 42

KORSAK-ŚLIWKA J., bb 122, bb 123, bb 124

KOZŁOWSKI P., bb 41

KOZŁOWSKI S., aa 36, aa 62, bb 77, bb 88, bb 94, dd 3

KOZYRSKA A., aa 75

KRAJEWSKI S., aa 41, aa 101, bb 127

KRAŚNICKA Z., aa 42, aa 43, aa 44, bb 37, bb 38

KROH H., aa 45, aa 46, aa 47, bb 39

KRUK B., aa 48, aa 93, bb 40

KRYST-WIDŹGOWSKA T., bb 41, bb 42

KSIĘŻAK H., bb 43, bb 44, bb 140

KUBASIEWICZ S., bb 45

KUCIŃSKI L., aa 49, bb 46

KUNICKI A., bb 122, bb 123, bb 124

KUPIEC-WĘGLIŃSKI J., aa 50, aa 73, bb 47, bb 83, bb 84

KURKUS J., bb 18, bb 48, bb 49, bb 115, bb 116

LAO M., aa 100, bb 106

LENAZ G., bb 50, bb 92

LIPSKA M., aa 30, bb 25

LOESCH A., aa 2, aa 51, bb 51, bb 52, bb 53

LUCIANI A., aa 24, aa 45, bb 39

ŁASZCZYŃSKA J., bb 55
ŁAWECKI J., aa 10, bb 7, bb 22
ŁAZAREWICZ J.W., aa 52, aa 79, bb 43, bb 55, bb 56, bb 63, bb 117
LUCZYWEK E., aa 53, aa 54, aa 55, bb 57, bb 58
ŁUKASIEWICZ H., aa 72, bb 86
LUKOMSKA B., aa 56, aa 57, aa 76, bb 59, bb 60, bb 85
ŁYSZCZARZ J., bb 61, bb 62

MAJDECKI T., bb 142
MAJEWSKA M.D., bb 63
MARKIEWICZ D., aa 58
MAZZANTI L., bb 50 bb 92
MAŚLIŃSKA D., aa 59, aa 60, aa 61, bb 12, bb 64, bb 65
MAŚLIŃSKI S., aa 60, bb 65
MEDIO DE C.E., aa 79
MEMPEL E., aa 49, aa 53, aa 54, aa 55, bb 46, bb 58, bb 66,
bb 67, bb 68, bb 69, bb 70, bb 71, bb 72, dd 4
MICHALAK J., bb 20, bb 127
MORZYCKA M., aa 100, bb 106
MOSSAKOWSKI M.J., aa 1, aa 31, aa 63, aa 64, aa 65, aa 66,
bb 31, bb 73, bb 74, bb 75, bb 76
MOTYKA K., bb 77

NASŁOŃSKA K., aa 38
NAUMAN A., aa 10, bb 7, bb 8, bb 22
NAUMAN J., bb 7, bb 8, bb 22,
NAZAR K., bb 78, bb 88, bb 94, dd 3
NIELUBOWICZ J., aa 67
NIELUBOWICZ H., bb 41
NOREMBERG K., bb 56

OLSNES K., aa 53
OLSZEWSKA K., aa 42, bb 88, bb 94, bb 100
OLSZEWSKI W.L., aa 11, aa 50, aa 56, aa 57, aa 62, aa 69, aa 70,
aa 71, aa 72, aa 73, aa 74, aa 76, aa 88, aa 91,
aa 95, bb 47, bb 59, bb 60, bb 79, bb 80, bb 81,
bb 82, bb 83, bb 84, bb 85, bb 86, bb 87, bb 107,
bb 109, bb 111, cc 1, dd 6

ORLOF J., aa 95

OSETOWSKA E., aa 75

OSTENDA M., aa 65, bb 89, bb 125

PALMERINI C., aa 79

PASTUSZKO A., bb 50, bb 56, bb 90, bb 91, bb 92

PAWTEL B., aa 57, aa 76, bb 85

PELKA-SŁUGOCKA M.D., bb 93, bb 117

PIEKARCZYK A., aa 16, aa 19

PLACHTA J., aa 77

POHOSKA E., aa 78, bb 88, bb 94

POKORSKI M., bb 95, bb 96, bb 97, bb 98, bb 99

POLOWIEC Z., bb 100

PORCELLATI G., aa 79

POSEŁ Z., bb 10, bb 35, bb 36, dd 2

PROKOPCZYK J., aa 16, aa 19

PRONASZKO-KURCZYŃSKA A., aa 65

PRZYBYLSKI A., aa 44

PRZYBYSZ R., aa 80, aa 81

RAFAŁOWSKA U., aa 82, bb 43

RAP Z.M., bb 13, bb 22, bb 112, dd 5

RATYŃSKI B., aa 21

RENDECKA A., aa 34, aa 84

RENKAWEK K., aa 83, bb 101

ROMANIUK J.R., aa 38, aa 39, aa 85, bb 32, bb 102, bb 103,
bb 104, bb 114

ROSSOWSKA M., aa 86, aa 87

ROWIŃSKA D., aa 100

ROWIŃSKI W., aa 77, aa 88, aa 89, aa 90, aa 95, aa 96, aa 100,
bb 105, bb 106, bb 107, bb 108, bb 109, bb 110,
bb 111, bb 118, dd 6

RUBINSTEIN M., aa 25

RUKA M., aa 14, aa 72, aa 74, aa 77, aa 88, aa 91, bb 86, bb 87,
bb 107, bb 108, bb 109

RUSZCZEWSKI P., aa 29, aa 92, bb 22, bb 112, bb 113, bb 126

RUTCZYŃSKA M., bb 65
RYBA M., aa 38, bb 114
RYFFA T., aa 77, aa 88, aa 89, aa 90, bb 107, bb 108, bb 109,
bb 110, bb 111, bb 118

SADOWSKI J., aa 48, aa 93, bb 18, bb 40, bb 48, bb 49, bb 115,
bb 116
SASHCHENKO L., bb 34
SAYERS H.J., aa 95
SCHMIDT-SIDOR B., aa 13
SEROKOWA D., aa 104
SIEIŃSKI W., aa 94
SIKORSKA M., aa 1, aa 96
SKÓRKA B., bb 78
SŁUGOCKI L., bb 93, bb 117
SOBOCIŃSKA J., aa 36
STACHNIO D., bb 20
STADNICKI R., bb 57
STEFAŃSKA E., aa 72
STEIN S., aa 25, aa 102, bb 128, bb 129, bb 130
STRĘPKOWSKI S., aa 88, aa 89, aa 90, bb 107, bb 108, bb 109,
bb 110, bb 111, bb 118
STROSZNAJDER J., aa 79, bb 63, bb 119, bb 120, bb 121
SUN LEE., aa 95
SZAFRAŃSKA M., aa 103, bb 45, dd 7
SZAMOWSKA R., aa 66, aa 67
SZEREDA-PRZESTASZEWSKA M., aa 94
SZEWCZYKOWSKI J., bb 122, bb 123, bb 124
SZMURŁO W.F., aa 57, aa 76; bb 85
SZRETER T., aa 16, aa 19
SZUMAŃSKA G., aa 21, bb 125
SZYDŁOWSKA H., aa 96
ŚLIWKA S., bb 122, bb 123, bb 124
ŚMIAŁEK M., aa 17, aa 96
ŚRÓDKA A., bb 65

TARASZEWSKA A., aa 97
THOMAS E., aa 59
TILNEY N.I., aa 98
TOMCZAK J.W., bb 10
TROVARELLI G., aa 79
TRUSKOLASKI P., aa 29, bb 112, bb 126
TURLEJSKA E., bb 94

UDENFRIEND , aa 25

VIBERT J.F., aa 8, aa 99, bb 6

WACHAL B., bb 86
WALCZAK E., aa 14
WAŁASZEWSKI J., aa 100
WAŃKOWICZ B., aa 19
WAŚOWSKA B., aa 88, aa 89, aa 90, bb 107, bb 108, bb 109,
bb 110, bb 111, bb 118
WEINRAUDER H., aa 101, bb 127
WESOŁOWSKI J., aa 21
WIDDICOMBE J.G., aa 15
WIDEMAN J., aa 25, aa 102, bb 99, bb 128, bb 129, bb 130,
WIERCIOCH L.R., aa 103, bb 45, bb 131, bb 132, bb 133
WIERZBA-BOBROWICZ T., bb 134
WIESE J.C.M., aa 15
WIŚNIEWSKI S., aa 80, aa 81
WITKIEWICZ B., aa 54, bb 68
WOCIAL B., bb 78
WOŹNIEWICZ B., aa 10, aa 88, bb 7, bb 22
WRÓBLEWSKI J.T., bb 135, bb 136

YANAGIHARA T., bb 1

ZAJĄC S., aa 67
ZAKRZEWSKI P., bb 137
ZALESKA M., bb 138, bb 139, bb 140

ZALEWSKA T., aa 61, aa 62, aa 87, bb 8, bb 14, bb 15, bb 16,
bb 64, bb 136, bb 141

ZELMAN I.B., aa 58, aa 66, bb 141

ZIEMBA A.W., bb 143

ŻUKOWSKA-GRÓJEC Z., bb 78

ŻURAW J., aa 34

PART II

INFORMATION

COOPERATION WITH FOREIGN COUNTRIES

Notice:

Abbreviations used: P.A.S. - Polish Academy of Sciences
M.R.C. - Medical Research Centre
C.M.E.A. - Council for Mutual Economic
Assistance (COMECON)
G.D.R. - German Democratic Republic
F.R.G. - Federal Republic of Germany

DEPARTMENT OF NEUROPHYSIOLOGY

I. Bilateral cooperation between the: Polish Academy of Sciences, and the Royal Swedish Academy of Sciences

Realization: Department of Neurophysiology M.R.C.
Nobel Institute, Charles University
Stockholm, Sweden

The subject of the collaborative work are investigations on the central nervous control of the respiratory system in the aspects of physiology, biochemistry and structure.

1. Dr M. GŁOGOWSKA -

from the Department, established with the co-author Prof. C. von Euler from the Nobel Institute, the final version of the paper on: Respiratory-facilitatory reflexes provoked by rapid inflation and deflation in cats. The paper contains the results of research carried out during Dr Głogowska's stay at the Institute in 1976. The paper will be published in Acta Physiologica Scandinavica.

2. Prof. W. A. KARCZEWSKI -

Head of the Department - discussed during his visit in Stockholm the present research and the programme of further cooperation.

II. Long-term fellowships awarded to the scientists of the Department by foreign scientific centres.

Dr A. PRZYBYLSKI -

stayed from September 1977 for one-year training at the Damer Laboratory, University of California, Berkely, USA. During his stay there he conducted investigations on the effects of hypoxia on the function of neurons in vitro. Besides he studied

the methods of computer-assisted analysis of neuron functions, and worked also on improving the technique of electrophysiological investigations of neurons in tissue culture.

III. Individual visits of foreign scientists at the Department.

Dr S. LAHIRI -

Head of the Department of Physiology, Institute for Environmental Medicine, University of Pennsylvania, USA.

During a short visit Dr Lahiri discussed the principles of joint studies on chemical regulation of respiration and delivered a lecture on "Regulation of Respiration in Hypoxia".

Prof. G. AGUGGINI -

Director of the Istituto di Fisiologia Veterinaria e Biochimica, Milano, Italy.

Prof. Aguggini stayed one week for studying the profile of investigations at the Department and took part in a series of experiments on the regulation of respiration with particular reference to bronchial circulation in the pig.

Prof. K. WASSERMAN -

Head of the Laboratory of Respiration Physiology, UCLA School of Medicine, Dept. of Medicine, Torrance, California, USA.

Prof. Wasserman stayed for several days for consultations of the investigations carried on at the Department and delivered a paper on: "Chemical Regulation of Respiration during Exercise".

CARDIOVASCULAR LABORATORY

I. Multilateral cooperation between the C.M.E.A. countries.

Realization: Cardiovascular Laboratory, M.R.C.
Miastnikov Cardiology Institute, Academy of
Medical Sciences, Moscow, USSR.

The subject of collaborative work are experimental investigations of the mechanisms of ventricular fibrillation in acute coronary failure.

In March 1978 Assoc. Prof. K. Herbaczyńska-Cedro took part in a working conference, presenting the results of investigations conducted at the Laboratory on the role of catecholamines in myocardial infarction.

A pilot series of investigations were performed at the Cardiovascular Laboratory and the results were compared in December 1978, during the visit of Prof. Raiskina to the M.R.C., with the results of experiments performed at the Cardiology Institute.

In these investigations the level of catecholamines was determined by biological and spectrofluorimetric methods in the arterial blood and blood from the coronary sinus, during experimental myocardial infarction in dogs.

The preliminary results seem to confirm the previously observed relationship between the rise in the adrenaline level in the arterial blood and the development of arrhythmias.

II. Bilateral cooperation between the Cardiovascular Laboratory and the:

1. Institute of Pharmacology, Medical University in Szeged, Hungary.

Dr W. CZARNECKI -

stayed at the Institute in Szeged, studying the methods of cardiac potential recording in situ, and an original experimental model of angina pectoris designed to reproduce pathomechanism of angina in humans.

2. Cardiovascular Laboratory and the Miastnikov Cardiology Institute, Academy of Medical Sciences, Moscow, USSR

Collaborative work was continued on the assessment of the blood and myocardial levels of catecholamines in relation to ventricular fibrillation in myocardial infarction.

In these investigations the level of catecholamines was determined by biological and spectrofluorimetric methods in the arterial and coronary sinus blood in experimental myocardial infarction in dogs.

Preliminary analysis of the results failed to establish any correlation between the level of catecholamines in the coronary sinus in myocardial infarction and the development of ventricular fibrillation. In view of the divergent results, complementary experiments have been planned.

III. Visits of foreign scientists to the Laboratory

Prof. G. GUDBJARNASON -

Head of a Department at the Science Institute, University of Iceland, Reykiavik, Iceland.

Prof. Gudbjarnason stayed for several days at the Laboratory to become acquainted with the investigations conducted there and discussed the forms of scientific contacts between both centres.

He delivered also a lecture on: "Fatty Acid Composition of Cardiac Lipids in Relation to Myocardial Vulnerability and Coronary Artery Disease".

DEPARTMENT OF APPLIED PHYSIOLOGY

I. Long-term agreement of the C.M.E.A. member countries within the Intercosmos Programme.

Realization: Department of Applied Physiology M.R.C. -
- "Intercosmos", Moscow, USSR

The subject of common research were the physiological consequences of gravitation changes including model investigations in hypokinesia, and studies on the adaptation of the organism to thermal stress under conditions of changed gas environment.

- In December 1978 Dr G. I. Kozyrevski and Dr A. I. Grigorev visited M.R.C. They became acquainted with the techniques and problems of investigations carried out at the Department concerning the regulation of the water-electrolyte balance and the mechanisms of adaptation to exercise in man. The problems of water-electrolyte balance and the methods of preventing its disturbances during space flights were discussed.
- Prof. Kozłowski - Head of the Department - participated in the Symposium of the Working Group "Intercosmos" in Prague, Czechoslovakia (June 1978), where the presence and future of joint investigations was envisaged.

II. Bilateral cooperation between the Department of Applied Physiology -

1. The II Department of Internal Diseases Medical University in Budapest, Hungary

Assoc. Prof. J. SADOWSKI -

visited the Hungarian centre to get acquainted with current investigations carried out there on the efferent and afferent activity of renal nerves. He delivered a lecture on the role of renal innervation. Since the Hungarian centre is in this field

among the foremost specialised research centres in Europe, closer cooperation with this institution opens new possibilities of extending and modernizing the research of the Department on the neurohormonal regulation of the water-electrolyte balance.

2. August Krogh Institute, Copenhagen, Denmark

Dr K. NAZAR -

from the Department, stayed at the Institute for two months carrying out investigations on work adaptation of patients with latent diabetes, under the supervision of Prof. B. Saltin. The investigations included cardiovascular, respiratory hormonal and metabolic responses to exercise.

Dr Nazar became also acquainted with some modern techniques of metabolite and enzyme determination in muscle tissue samples.

III. Fellowships granted to the scientists of the Department by foreign institutions

Assoc. Prof. H. KACIUBA-UŚCIEŃKO -

was appointed as Research Associate Professor for six months (since October 15, 1978) at the Upstate Medical Center, State University of New York, Syracuse, USA. She carried out common investigations with Prof. dr R. Terjung on the role of thyroid hormones in the regulation of lipid metabolism at rest and after physical training.

IV. Individual visits of foreign scientists to the Department.

Prof. dr P. H. FENTEM -

Head of Physiology and Pharmacology Department,
University of Nottingham, Great Britain,
stayed at the Department for a few days discussing
basic problems concerning the joint research on adap-
tation to physical work in aged human subjects and in
patients with metabolic, and circulatory disturbances.
Prof. Fentem delivered a lecture on "The Relationship
between Physical Activity and Fitness in Older People".

Dr L. HERMANSEN -

from the Institute of Work Physiology, Oslo, Norway
visited the Department for methodological and basic
consultations concerning the research on physiological
control of exercise metabolism. He delivered a lecture
on "Physiological Mechanisms of Fatigue during
Muscular Work".

DEPARTMENT OF NEUROPATHOLOGY

I. Cooperation between the Polish Academy of Sciences and
the German Service for Scientific Exchange (DAAD), F.R.G.

Realization: Department of Neuropathology, M.R.C.
Department of Neuropathology, Institute
of Pathology, University of Koeln, G.F.R.

Dr Z. RAP -

from the Department stayed for two months at the
Institute conducting together with Prof. Müller
morphological investigations (by light and electron
microscopy) on the hypothalamo-hypophyseal neuro-
secretory system in patients dying of intracranial

hypertension. The results of these investigations will be presented at the Neuropathological Symposium in Leipzig, G.D.R. in March 1979.

II. Bilateral cooperation between the:

1. Department of Neuropathology M.R.C. and the Institute of Neurology, Academy of Medical Sciences, Moscow, USSR.

The subject of these collaborative studies is elaboration of methods of immunomorphological investigations for application in electron microscopy, and assessment of location of cerebral antigens in different structures of the central nervous system. The methods will be used and improved in further collaborative work of both scientific research centres.

The results of investigations performed so far were discussed and further experiments were programmed on the occurrence of antibodies to brain antigens in different tissues. A preliminary project of a collaborative publication of Shironova, Weinrauder and Gannushkina: Investigations of anticerebral antibodies in the sera of patients with neurological diseases by immunofluorescence and immunodiffusion, has been elaborated.

In cooperation with Dr L. J. Sukhorukova from the Moscow Institute a method has been developed for localization of glial antigens by means of immunoperoxidase. Pilot experiments were done on rat brain sections and in in vitro glial cell cultures. Immune reactions were studied at the levels of light microscopy and electron microscopy. Dr L. J. Sukhorukova received embedded blocks for electron microscopy and sections will be prepared from them in Moscow. The results will be published jointly.

Working visits:

Dr H. WEINRAUDER -

stayed for a week in September 1978 at the Institute in Moscow.

Dr L. J. SUKHORUKOVA -

stayed for 3 weeks at the Department in November-December 1978.

2. Department of Neuropathology M.R.C. - Institute of Physiology, Georgian Academy of Sciences in Tbilisi, USSR.

The subject of investigations conducted for several years has been:

1. Assessment of the effects of changes in the systemic venous pressure on the dynamics of brain development.
2. Assessment of the innervation of active segments of pial blood vessels under normal conditions and during cerebral ischaemia.

Dr D. G. BARAMIDSE -

from the Institute studied in cooperation with the scientists from the Department sympathetic and parasympathetic innervation of pial blood vessels under normal conditions and during ischaemia, and the changes of histoenzymatic properties of these vessels during ischaemia. The results of these investigations explain the mechanism of focal brain damage during hypovolaemic hypoxia. The results will be published in *Neuropatologia Polska*.

Prof. G. J. MCHEDLISHVILI -

in cooperation with Prof. M. J. Mossakowski, Head of the Department, carried out investigations on the effect of a rise in the systemic venous blood pressure and blood volume in the blood vessels of the central nervous system on the development and dynamics of brain oedema. These investigations will make possible determination of the role of haemodynamic factors in the pathogenesis of brain oedema.

Working visits to the Department: Dr D. G. Baramidse -
3 months (October-December 1978), Prof. G. J. Mchedlishvili -
2.5 months (November 1978-January 1979).

3. Department of Neuropathology, M.R.C. - Institute of Experimental Medicine, USSR, Academy of Medical Sciences, Leningrad.

The subject of collaborative studies is the effect of ethylnitrosourea on the nervous tissue in in vitro culture.

Assoc. Prof. Z. KRAŚNICKA -

stayed in June 1978 for one week at the Institute to design the final version of the joint paper. The paper dealing with anoxia has been submitted for publication in Archives of Pathology.

Dr H. WEINRAUDER-SEMKOW -

stayed in October 1978 at the Institute on a working visit for becoming familiar with the work conducted by Dr G. Konovalov on the immunological aspects of allergic polyneuritis and on the mechanisms of demyelination of axons in in vitro culture.

During her stay at the Institute a project of collaborative investigations on the location and changes of glial antigens by the method of immunoperoxidase reaction in in vitro cultures has been worked out. This method enables cellular location of the brain antigen to be determined accurately in the cellular structures of the central nervous system.

III. Long-term fellowships granted for the scientists of the Department by foreign scientific centres.

Dr J. ALBRECHT -

stayed from December 1976 on an 18-month fellowship at the Neurochemistry Research Unit, Mayo Clinic, Rochester, USA, conducting investigations on the

mechanisms of brain protein synthesis impairment during hypoxia and ischaemia, and studied the metabolism of RNA.

Dr M. ŚMIAŁEK -

stayed since November 1976 on a 2-year fellowship at the Laboratory of Neuropathology and Neuroanatomical Sciences NIH, Bethesda, USA, where he carried out a series of experiments on prevention of central nervous system damage caused by hypoxia.

Dr M. SIKORSKA -

has been staying since June 1978 on a one-year fellowship at the Division of Biological Sciences, National Research Council of Canada, Ottawa, for studying the methods of microbiochemical investigations and new experimental models, and for investigating the metabolism of cAMP-dependent protein kinases in the central nervous system.

Dr H. KROH -

has been staying since May 1978 on a one-year fellowship at the Max Planck Institute für Systemphysiologie, Dortmund, G.F.R. investigating toxic damage to the central nervous system.

IV. Individual visits of foreign scientists to the Department:

Prof. J. H. GARCIA -

Director of the Institute of Pathology, John Hopkins University, Medical School, Baltimore, USA.

During his one-week stay Prof. Garcia got acquainted with the research conducted at the Department, and had consultations on the problems of central nervous system hypoxia and ischaemia.

Prof. L. STERN -

from the Arizona Medical Center, Tucson, USA, spent 8 days at the Department studying the research conducted at the Polish neuropathological centres and delivering lectures on malignant hyperthermia and steroid-induced myopathy.

LABORATORY OF DEVELOPMENTAL NEUROPATHOLOGY

Long-term fellowship granted to the scientists of the Department by foreign scientific centres.

Dr L. IWANOWSKI -

stayed since August 1977 on a one-year fellowship at the Department of Pathology, Medical School, University of Maryland, USA where he studied brain hypoxia and post-traumatic cerebral changes, with particular reference to vascular lesions, in comprehensive ultrastructural and histochemical investigations.

DEPARTMENT OF COMPARATIVE NEUROLOGY

1. Dr A. TARASZEWSKA -

spent 4 weeks in the Department of Neuropathology, Max-Planck Institute for Brain Research in Frankfurt/M., G.F.R., where she continued research on the ultrastructural changes in the brains of "pt" rabbits.

2. Dr T. WIERZBA-BOBROWICZ -

stayed three weeks at the Department of Pathology, State Hospital in Miercurea Ciuc, Rumania, becoming acquainted with special histological and impregnation methods applied in nerve tissue research.

DEPARTMENT OF NEUROCHEMISTRY

I. Bilateral agreements concluded by the Polish Academy of Sciences.

1. P.A.S. - Royal Swedish Academy of Sciences - agreement

Realization: Department of Neurochemistry, M.R.C.,
Brain Research Laboratory, University
of Lund, Sweden.

Dr B. BRONISZEWSKA-ARDELT -

conducted during a working visit to the Lund University in cooperation with the team of scientists at the Swedish centre experiments on the effects of anaesthetic agents on the survival of mice under different conditions of hypoxia. The obtained results will be prepared for a common publication.

Dr Broniszewska studied also many new methods among others, the method of preparation of the experimental material for different metabolic determinations and storing of samples. These methods can be used in scientific research in our Department.

2. P.A.S. - Italian Council for Scientific Research -
agreement.

Realization: Department of Neurochemistry, M.R.C.
Istituto di Biochimica, Facolta di Medicina
e Chirurgia, Ancona, Italy

Prof. E. BERTOLDI -

visited our Department (March-April 1978) carrying out collaborative investigations on the effects of barbiturates on the lipid-protein interaction in synaptosomal membranes, and on the effect of these compounds on calcium metabolism in the synaptosomal fraction. These investigations may help in elucidating the mechanism of action of anaesthetics. An information on the results of these investigations was given in a communication at the Meeting of the European Society of Neurochemistry, Göttingen, F.R.G. (August 1978).

II. Bilateral agreement between the: Department of Neurochemistry, M.R.C. and the Institute of Physical Chemistry, State University Ohio, Columbus, USA, and the Institute of Physiological Chemistry, University of Missouri, USA

Dr J. STROSZNAJDER -

paid a 6-week visit to the American scientific centres and carried out at the laboratory of Prof. L. A. Horrocks a series of experiments on the activity of phospholipases A₁ and A₂ in the brain of rats during ischaemia and hypoxia. The results of these experiments will be presented at the Meeting of the European Society of Neurochemists in Selva di Fasano, Italy, April 1979.

Prof. G. SUN LEE -

from the University of Missouri, USA stayed at the Department of Neurochemistry in December 1978 participating in a series of experiments on acylation and deacylation of brain phospholipids under normal and hypoxic conditions. The results worked out in cooperation with Dr Strosznajder have been prepared for publication.

III. Long-term fellowships granted by foreign scientific centres to scientists of the Department

Dr H. KSIĘŻAK -

has been staying on a 10-month fellowship since September 1978 at the Department of Environmental Health Sciences, John Hopkins University, Baltimore, USA, continuing investigations on the metabolism of acetylcholine in the central nervous system.

Dr U. RAFAŁOWSKA -

has been staying on a one-year fellowship since August 1978 at the Johnson Research Foundation, University of Pennsylvania, Philadelphia, USA, conducting investigations on the energy metabolism and membrane potential of isolated nerve endings.

Dr Z. DĄBROWIECKI -

has been staying on a one-year fellowship since March 1978 at the Ohio State University, USA carrying out investigations on the metabolism of phospholipids in the central nervous system.

IV. Individual visits of foreign scientists to the Department.

Prof. G. PORCELATTI -

Director of the Institute of Biochemistry at the Medical Faculty of the University of Perugia, Italy stayed for several days at the Department and had talks on a closer cooperation in the research on the effects of hypoxia on the metabolism of lipids in the brain.

Prof. R. MARCHBANKS -

from the Department of Biochemistry, Institute of Psychiatry, London University, spent 10 days at the Department for consultations on the methods of investigating the transport of acetylcholine, choline and Ca^{++} .

Professor Marchbanks had also a lecture on the metabolism of acetylcholine.

DEPARTMENT OF NEUROSURGERY

I. Bilateral cooperation between the Department of Neurosurgery, M.R.C. and the Burdenko Institute of Neurosurgery, Moscow, USSR

The subject of collaborative research were investigations on brain-stem mechanisms in the regulation of brain blood flow and intracranial pressure.

Dr J. SZEWCZYKOWSKI -

who stayed in September 1978 at the Institute participated in the investigations conducted by means of a method assessing the degree of impairment of brain-stem function efficiency.

In cooperation with the scientists of the Institute a project has been worked out for integration of the research methods used in both centres. The results of the investigations are prepared for publication in *Voprosy Neirokhirurgii*.

Dr E. B. SIROVSKI - and

Dr A. A. POTAPOW -

stayed for a working visit at the Department in November-December 1978. They participated in a number of collaborative investigations on the resorptive ability of the cerebrospinal fluid system in neurosurgical patients.

The results obtained by the collectively worked out methods have opened possibilities of their gradual introduction into clinical practice and methodological training.

II. Long-term fellowships granted to the scientists of the Department by foreign scientific centres.

Dr Z. CZERNICKI -

has been staying since December 1977 on an 18-month fellowship at the Division of Neurosurgery, University of Pennsylvania, USA studying the problems of traumatic injury to the brain in clinical cases and in experiments on monkeys.

III. Individual visits of foreign scientists to the Department

Dr N. TUBBS -

from the Birmingham Accident Hospital and Rehabilitation Centre, Birmingham, England stayed for several days at the Department studying the methods of investigations of intracranial volume compensation in man.

Prof. J. ERNICH -

Director of the Boltzmann Institute in Vienna, Austria, stayed for several days at the Department for becoming acquainted with investigations on disorders in verbal communication development in children. Professor Ernich delivered a lecture on the: Methods of Speech, Reading and Writing Rehabilitation in Developmental Aphasia.

DEPARTMENT FOR SURGICAL RESEARCH AND TRANSPLANTATION

I. Multilateral agreements between the member countries of the C.M.E.A.

The subject of the work conducted in international cooperation are studies on transplantation of organs and tissues, on problems of transplantation immunology, and experimental and clinical liver transplantation.

Realization:

1. Coordinating unit - Department for Surgical Research and Transplantation, M.R.C.
2. Polish research centres in the Medical Academies in Warsaw, Łódź, Białystok and Zabrze.
3. Foreign research centres in the member countries of the C.M.E.A.:
 - Surgical Department, K. Marx University, Leipzig, G.D.R.
 - Institute of Experimental and Clinical Medicine, Prague, Czechoslovakia,
 - II Department of Surgery, Purkinje University, Brno, Czechoslovakia,
 - Institute of Transplantation of Organs and Tissues, Moscow, USSR.

1. April 12-14, 1978 a scientific meeting with a symposium on experimental and clinical transplantation of the liver and on treatment of acute hepatic failure was held in Jabłonna near Warsaw. The participants were 30 scientists from the cooperating research centres. The scientific organization of the meeting was provided by Prof. W. L. Olszewski and Dr W. Rowiński from the Department for Surgical Research and Transplantation.

The collaborative investigations carried out up till now made possible:

- elaboration of technical problems of hepatic transplantation
- establishment of criteria for the diagnosis of liver transplant rejection
- elaboration of a method for liver storage for 3-4 h
- working-out of a method for extracorporeal perfusion of pig liver with the blood of patients with acute liver failure.

2. Bilateral cooperation between the Department for Surgical Research and Transplantation, M.R.C. and Laboratory of Transplantation of Organs and Tissues, Moscow, USSR

The subject of the research work carried out in this cooperation were:

- assessment of the biological functions of nucleated cells of the blood flowing out of xenogeneic and allogeneic transplants,
- isolation and functional characteristic of cells infiltrating allogeneic grafts.

In 1978 preliminary investigations were carried out on the composition of cells in blood flowing to and out of the graft, and in perfusing fluid. The phagocytic activity of nucleated cells was investigated.

In investigations on the type and function of cells infiltrating the grafts, implantation of fibroblastic sponge was used. The results demonstrated the full usefulness of this model.

A joint publication has been prepared for the Acta Medica Polona.

II. Bilateral cooperation between the Department for Surgical Research and Transplantation, and the Norwegian Radium Institute, Oslo, Norway.

The subject of collaborative investigations are studies on the regulation of lymphocyte migration and immune proteins transport to tissues, and studies on the characteristics of cell populations in the tissue fluid in humans.

In 1978 the following studies were performed:

- the concentration of complement inhibitors was determined in the tissue fluid and lymph of healthy humans,
- the 1st stage of work on the characteristics of cell populations in the blood from the spleen, mesentery and liver has been completed,
- it was observed and documented that human lymph vessels have their own rhythm of contractions, necessary for producing pressures indispensable for lymph flow.

This observation is quite original and has wide clinical implications. The presence of this mechanism in humans has been doubted so far.

Working and training visits to the Norwegian Institute:

J. PŁACHTA, M.B.vet.

conducted during two months of her stay there investigations on the energy metabolism in stored cells and organs, and studied the methods of investigating the products of adenine nucleotide degradation (these investigations are a part of the doctoral thesis of Mrs. Płachta).

S. STĘPKOWSKI M.B.vet. -

stayed 4 months at the Institute conducting work on labelling of lymphocytes and lymphoid tissue with ^{51}Cr and ^{125}I DUR. He carried out a series of investigations on the migration of splenic cells in vivo into lymphoid and non-lymphoid tissues. (These investigations are a part of the doctoral thesis of Mr Stępkowski).

Dr B. ŁUKOMSKA -

received from the Norwegian Radium Institute a one-year fellowship (since July 1978). The main purpose of her research was to study cell-mediated immunity in the peripheral tissues.

Visits of scientists from the Norwegian centre:

Dr H. E. HEIER -

visited the Department for a few days discussing the common research work conducted at the Department.

N. LARSEN -

stayed at the Department during 4 weeks, studying the techniques of determination of lymphocyte surface markers and participating in standardization of certain laboratory techniques.

III. Individual visits of foreign scientists to the Department.

Prof. N. TILNEY -

Director of the Experimental Laboratory and Head of the Transplantology Department, Peter Bent Brighton Hospital, Harvard Medical School, Boston, USA, paid a one-week visit to the Department consulting the current research work and delivering two lectures:

- Identification of cells infiltrating allogenic grafts.
- Investigations on transmission of transplantation immunity in the system of partial antigenic incompatibility.

Dr B. KELLY -

from the Davis and Geck firm, Pearl River, USA paid us a visit during her stay in Warsaw at the International Course of Microsurgery (Warsaw, September, 1978). She delivered a lecture in the Department on her investigations on nerve transplantation.

Prof. G. SUN LEE -

from the University of California, San Diego, USA who came to the above mentioned Course of Microsurgery paid a visit to the Department discussing the works connected with the application of microsurgery and consulting the programme of the course.

Prof. M. MITO -

from the Medical School, Asahinava University, Japan, stayed for several days at the Department and presented the results of his own investigations on the storage of hepatocytes at the temperature of liquid nitrogen and their transplantation into the spleen. Prof. Mito delivered also a lecture on the storage and transplantation of isolated hepatocytes.

IV. Symposia organized by the Department for Surgical Research and Transplantation

1. Symposium: Haemoperfusion in the Treatment of Intoxications and Liver Failure, April 26-29, Zakopane, Poland.

Scientific Organization: Prof. W. L. Olszewski, Dr W. Rowiński
The number of participants was 120, including 20 foreign guests.

The aim of the Symposium was the presentation of haemoperfusion methods in the treatment of renal and hepatic failure and in chemical intoxications.

The Symposium was associated with an exhibition of haemoperfusion equipment. The proceedings will be published at the expense of the firm Gambro, in the annals of the University in Lund, Sweden.

2. International Course of Microsurgery, September 25-30, Warsaw, Poland.

Scientific organization: Prof. W.L. Olszewski, Dr W. Rowiński
The number of participants was 30: 9 physicians from socialist countries and 21 from Poland. The participants got acquainted with the new techniques of vascular microanastomosis performance and nerve suturing, and with the problems of vascularized organ transplants in small animals for experiments in physiology and transplantology.
The instructor of the Course was Professor Sun Lee from the University of California, San Diego, USA.

ANNEX

ANNEX

In 1978 the following research workers of the Medical Research Centre took an active part in scientific Congresses, Meetings and Conferences, as listed below.

January

- Session of the Executive Committee of the Societas Europaea Physiologiae Clinicae Respiratoriae.
London, England, January 20-23.
Prof. W. A. Karczewski, Member of the Committee.

February

- Meeting of the Society of University Surgeons
Louisville, USA, February 8-12.
Prof. W. L. Olszewski (1 paper presented)
- Board Session of the European Society for Surgical Research, Rotterdam, Holland, February 18-19.
Prof. W. L. Olszewski, President of the Society.

March

- Symposium, Institute of Anaesthesiology, University of Mainz, Mainz, G.F.R., March 2-6.
Dr hab. J. Szewczykowski (2 paper presented)
- Conference on the Experimental Investigations on:
Mechanisms of Ventricular Fibrillation in Acute Coronary Circulation Failure, Moskwa, USSR, March 27-31.
Assoc. prof. K. Herbaczyńska-Cedro.

April

- C.M.E.A. Members' Meeting on Problems of Scientific Research Organization, Mińsk, USSR, April 10-13.
Dr W. Rowiński (1 paper presented)

- IV Symposium "Bloodflow Through the Brain",
Tbilisi, USSR, April 18-22.
P.G. (dip.) P. Dytko, M.Sc. (eng.) S. Śliwka.
- Meeting of the European Society for Clinical Investigations
Rotterdam, Holland, April 19-26.
Assoc. prof. K. Herbaczyńska-Cedro, Dr K. Nazar
- Symposium "Organ Preservation"
Odensee, Denmark, April 25-26.
Prof. W. L. Olszewski (1 paper presented)

May

- Symposium "Cholinergic Synapses"
Zinkovy, Czechoslovakia, May 14-19.
Dr H. Księżak (1 paper presented)
- VIII Meeting of the European Society for Surgical Research
Helsinki, Finland, May 21-26.
Prof. W. L. Olszewski - President of the Society,
Dr W. Rowiński, M.Biol. H. Gałkowska, Dr (vet.)
B. Łukomska, M.Biol. M. Murawska, M.D. J. Kupiec-
Węgliński, M.Vet. M. Ruka (6 papers presented).
- International Symposium on "Kidney and Kidney Hormones"
Sofia, Bulgaria, May 31-June 4.
Assoc. prof. J. Sadowski (2 papers presented).

June

- Meeting of the European Dialysis and Transplantation
Association, Istanbul, Turkey, June 3-9.
Dr W. Rowiński (1 paper presented)
- Symposium and Workskop of the CMEA Working Group
"Intercosmos", for Cosmic Medicine and Biology,
Praha, Czechoslovakia, June 18-22.
Prof. S. Kozłowski - Member of the Working Group.

- Session of the Italian Neurological Society,
Roma, Italy, June 21-28.
Prof. M. J. Mossakowski (1 paper presented)

July

- FEBS Congress of Biochemistry
Dresden, G.D.R., July 1-7.
Dr T. Zalewska, Dr L. Khatchatrian, Dr K. Domańska-Janik,
Dr A. Pastuszko, Dr J. Wideman, Dr J. Wróblewski,
M.Biol. M. Zaleska (7 papers presented).
- IV Prague International Symposium on Child Neurology
Praha, Czechoslovakia, July 2-6.
Assoc. prof. M. Dąbska (1 paper presented).
- Symposium on Cerebral Vascular Diseases
Reims, France, July 20-26.
Dr Z. Rap (2 papers presented)

August

- II Meeting of the European Society of Neurochemistry
Göttingen, G.F.R., August 25-31.
Prof. M. J. Mossakowski, Dr J. Łazarewicz, Dr T. Zalewska,
Dr K. Domańska-Janik, Dr A. Pastuszko, Dr B. Broniszewska-
Ardelt, Dr Z. Khatchatrian, M.Biol. M. Majewska,
Dr J. Strosznajder, Dr J. Wideman (9 papers presented)

September

- Meeting on Mechanisms of the Central Nervous Control
in Regular, Periodic and Irregular Breathing
Stockholm, Sweden, September 3-7.
Prof. W. A. Karczewski, Dr W. Głogowska (1 paper
presented).
- Meeting of the International Transplantation Society
Roma, Italy, September 3-9.
Prof. W. L. Olszewski, Dr W. Rowiński,
M.Pharm. B. Wąsowska, M.D. J. Kupiec-Węgliński
(4 papers presented).

- II Neuroscience Meeting
Florence, Italy, September 4-11.
Dr M. Pokorski (1 paper presented).
- FIMS World International Congress on Sport Medicine
Brasilia, Brasil, September 6-14.
Prof. S. Kozłowski
- Symposium on Modelling of a Biological Control System
"The Regulation of Breathing"
Oxford, England, September 10-16.
Dr A. Huszczuk, Dr J. Romaniuk (2 papers presented).
- II International Congress of the World Federation
of Nuclear Medicine and Biology
Washington, USA, September 17-21.
Assoc. prof. A. Kapuściński (2 papers presented)
- VIII World Congress of Cardiology
Tokyo, Japan, September 17-22.
Assoc. prof. K. Herbaczyńska-Cedro (2 papers presented)
- VIII International Congress of Neuropathology
Washington, USA, September 22-October 2.
Prof. M. J. Mossakowski, Assoc. prof. A. Kapuściński,
Dr L. Iwanowski (3 papers presented)
- The Satellite Symposium on Heart Failure
Delhi, India, September 25-October 2.
Assoc. prof. K. Herbaczyńska-Cedro (1 paper presented).
- IX International Salzburg Conference on Cerebral
Vascular Disease
Salzburg, Austria, September 26-October 1.
Dr G. Szumańska.

October

- Meeting of the International Society of Microsurgery
Bonn, G.F.R., October 4-7.
Prof. W. L. Olszewski, Dr W. Rowiński (2 papers presented).
- Conference "Bionica 78"
Leningrad, USSR, October 17-24
Dr J. Romaniuk (1 paper presented).

November

- II All-Soviet Union Symposium on Acute Ischaemic Changes
and Tissue Disturbances
Zwinograd, USSR, November 18-24.
Prof. W. L. Olszewski, Dr W. Rowiński, M.Vet. M. Ruka
(1 communication presented).
- Meeting of Neuropathology
Bonn, G.F.R.
Dr G. Szumańska, Dr T. Zalewska (1 paper presented).
- Danube Symposium of Neurology
Budapest, Hungary, November 23-26.
Prof. A. Kunicki (1 paper presented).
- International Symposium on Postresuscitation Brain
Pathology
Moskva, USSR, November 26-December 1.
Prof. M. J. Mossakowski, Assoc. prof. A. Kapuściński,
Dr J. Łazarewicz, M.D. R. Pluta (3 papers presented).

MISCELLANEA

AWARDS OF SCIENTIFIC DEGREES

Doctor of Science degree's awarded to:

M. SIKORSKA, M.Chem. (eng.)

from the Department of Neuropathology -
- Doctor of Natural Science - for the thesis:
"Metabolism of cyclic adenosine 3,5-monophosphate
in rat brain during hypoxia".

Z. DĄBROWIECKI, M.Chem.

from the Department of Neurochemistry -
- Doctor of Natural Science - for the thesis:
"Effect of hypoxia and ischaemia on the structure
and function of the lipid component of microsomal
membranes in rat brain".

I. GRZELAK-PUCZYŃSKA, M.Biol.

from the Department for Surgical Research and
Transplantation -
- Doctor of Natural Science - for the thesis:
"Direct immunofluorescence reaction used for
detection of the Bacterioides fragilis organisms".

B. ŻUKOMSKA, M.Vet.

from the Department for Surgical Research and
Transplantation -
- Doctor of Natural Science - for the thesis:
"Storage of peritoneal macrophages at -196°C ".

A. SAWICKA-GRZELAK, M.Biol.

from the Department for Surgical Research and
Transplantation -

- Doctor of Natural Science - for the thesis:
"Biological activity of endotoxine of *Bacterioides
fragilis*".

B. ZAKRZEWSKA, M.Psych.

from the Research Group of School Mental Hygiene -

- Doctor of Psychology - for the thesis:
"Effect of re-education procedures on scholastic
progress of the dyslexic child".

J. W. ŁAZAREWICZ, M.D., Ph.D.

head of the Department of Neurochemistry -
was granted the degree of:

- Doctor Habilitatus of Medical Science (in Chemistry),
for the thesis:
"Calcium transport and role in the metabolism
of brain cells".

Associate professor W. L. OLSZEWSKI, M.D., D.Sc.

head of the Department for Surgical Research and
Transplantation was honoured with the title:

- Professor of Medical Science (in Surgery).

SCIENTIFIC AWARDS

The 1978 awards of the Polish Association of Neuropathologists were granted to the following workers of M.R.C.:

Z. RAP, M.D, Ph.D.

for his work: "Morphological evaluation of functions of the hypothalamo-pituitary neurosecretory system in intracranial hypertension".

H. WEINRAUDER-SEMKOW, D.Nat.Sc.

for her paper: "Immunofluorescence in localization of specific antigens in rat brain in the homologous and the heterologous system".

WDN zam. 169/0/80 n. 413