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POLISH ACADEMY OF SCIENCES  
MEDICAL RESEARCH CENTRE  
3, Dworkowa Str., 00-784 Warszawa  
POLAND

Editor -

T. Dzieduszycki

Scientific Consultant -

W. A. Karczewski, M.D., D.Sc.

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<sup>■</sup> This unit, existing between 1962-1966 and then a part of the Dept. of Neurophysiology, was re-established in 1976.

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**PART I**

**INVESTIGATIONS AND SCIENTIFIC ACTIVITIES**



a. STUDIES ON THE FUNCTION OF THE NERVOUS SYSTEM

Basic chemo- and neuroregulatory integration  
in respiratory and cardiovascular system

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

Studies on the "memory" phenomenon in the respiratory system showed that its mechanism is based on temporal and spatial summation of information transferred to the respiratory complex via vagus nerves. The mechanism of summation is similar to a leaky integrator and depends on the excitatory state of the central nervous system which, in turn, is modified by temperature and the CO<sub>2</sub> level. A similar mechanism was found to operate in the reticular formation.

Studies on conduction blocking in the vagus nerves revealed that SO<sub>2</sub> inhalation blocks all types of pulmonary stretch receptors. Contrary to cold block, SO<sub>2</sub> block is frequency-independent. The balanced outcome of positive and negative vagal feedback is determined by the frequency spectrum of afferent vagal activity.

The chemosensitivity of pulmonary stretch receptors and their participation in the respiratory effects of hypercapnia were confirmed.

Reduction of the lung volume below the functional residual capacity (FRC) increases the steepness of the inspiratory slope and time of inspiration. The existence of specific deflation receptors might be implied.

Activity of the inspiratory neurones was recorded in the ventro-lateral part of the nucleus tractus solitarii (NTS) in rabbits, similar to that registered in cats. About fifty per cent of those neurones respond to vagal stimulation by short latency ( $<2$  msec), probably antidromic, excitation. Blocking of this region inhibits ipsilateral afferent vagal activity. The histological data have not confirmed the existence of a neuronal network considered as an "inspiratory nucleus" (infra-solitary nucleus). The results confirm the earlier concepts of different functional organization of the respiratory complex in cats, rabbits and probably man.

In the studies on the chemical control of breathing the new experimental method of  $\text{CO}_2$  infusion was introduced. Simultaneous intravenous infusion of lactic acid and bicarbonate mixed in the blood stream induces the release of  $\text{CO}_2$ . The results obtained with this method suggest that there is no virtual difference between  $\text{CO}_2$  inhalation and infusion, on condition that  $\text{CO}_2$ -loaded blood has enough time to attain the chemical balance. This finding could explain the controversial results of some authors on  $\text{CO}_2$  inhalation and infusion experiments. It was shown on two models of tissue hypermetabolism that stimulation of breathing could be related to venous hypoxia rather than hypercapnia. This could imply the existence of receptors of metabolic rate in the tissues.

A decrease in respiratory laryngeal resistance was found in rabbits with carrageenin pneumonia.

a.2. AN INFORMATION ENERGY ASPECT OF DEVELOPMENT  
OF THE LIVING SYSTEM

The actual notion of the essence of the biological stimulus and "value" of information have been subjected to methodological criticism. The own concept of the present authors is presented against the background of the negentropic principle of information (to the unit of information corresponds its energy equivalent) and on the basis of the postulated thesis of the energy-information divergence within the living system.

The biological stimulus, containing an informational component, is considered as an evolutionary result of action of environmental energy on the system during the development of its teleonomic (purposeful) functional structure. The notion of the value of biological information is estimated as regards its energy cost.

Neurohormonal mechanisms of cardiovascular regulation

a.3. THE ROLE OF BIOLOGICALLY ACTIVE SUBSTANCES  
IN REGULATION OF THE CIRCULATORY SYSTEM

Studies on the role of prostaglandins in regulation of cerebral circulation were undertaken with the following known facts taken into account:

(1) prostaglandins are the most potent of all vasoactive substances taking part in local regulation of blood flow in tissues and organs under certain physiological and pathological conditions;

(2) the cerebral and vascular tissues possess the ability to synthesize and to release these substances in response to various physiological and pathological stimuli.

Since intracranial hypertension is associated with profound disturbances of cerebral blood flow, the effect of intracranial hypertension caused by epidural haematoma or subarachnoid haemorrhage on the generation of prostaglandins in the brain was studied. It was shown that these pathological conditions in dogs were associated with increased release of prostaglandins of E type into the cerebral venous blood. An increased level of prostaglandins in cerebral venous blood was also found in cerebral embolism and in cerebral ischemia and hypoxia. In an attempt to study the relation between increased prostaglandin release into the cerebral venous blood and the blood flow, an isotope method was adapted for measuring cerebral blood flow.

Physiological basis of working ability and tolerance of environmental factors: role of neurohormonal mechanisms

#### a.4. NEUROHORMONAL CONTROL OF ENERGY SUBSTRATE UTILIZATION DURING PHYSIC EXERCISE AND THE ROLE OF EMOTIONS IN ADAPTATION MECHANISMS

In further studies on the previously suggested concept of a glucostatic mechanism of control of exercise metabolism, a relationship was found between the activation of adrenaline and noradrenaline release, insulin, cortisol and glucagon secretion during hard work, on the one hand, and the carbohydrate stores in the organism, on the other. Post-exercise

decrease of the hyperglycaemic effect of glucagon is described and a tentative explanation of its mechanism is suggested.

It was found that exercise metabolism, body temperature during exercise and ability to perform prolonged physical efforts were modified in dogs treated chronically with thyroxine ( $T_4$ ). The lipolytic and lactacidaemic reactions to exercise were altered, hyperthermia developed and the ability to prolonged work was considerably reduced. Single doses of  $T_3$  increased in dogs the glycogenolytic and lipolytic effects of adrenaline and nor-adrenaline. The type of adrenergic receptors mediating this effect was studied. It was found that thyroidectomy in dogs reduced drastically or abolished completely the exercise-induced increases in body temperature increased the exercise-induced activation of the adrenergic system, and FFA mobilization.

The conclusions drawn on the basis of the experiments performed on animals were extended to human patients with hyperthyroidism. The hyperthyroid patients reached a higher internal body temperature during exercise, but the amplitude of this rise was the same as in the control group of healthy subjects. This type of body temperature changes confirms the previously suggested hypothesis (based on the experiments with intraventricular administration of  $T_4$  in dogs) that in hyperthyroidism the level of regulated body temperature (set-point), is shifted without any change in the sensitivity of thermoregulatory mechanisms. In the hyperthyroid patients an increased metabolism of FFA and higher LA production were found with a more rapid decrease in blood glucose level, a tendency to an increased rate of oxygen utilization by the organism, and altered activation

of the adrenergic system. These results indicate an exaggerated physiological load in hyperthyroid patients performing physical efforts as compared with healthy controls.

In the investigations undertaken for establishing the physiological tolerance of work-load in the patients with essential arterial hypertension the pressor reaction to the static effort was found to be greater than in healthy subjects, and a different pattern of the adrenergic system activation was demonstrated. This was observed also during prolonged dynamic exercise. Suggestions have been put forward concerning the elimination of static efforts from the professional work and other daily activities, of hypertensive subjects.

Physiological basis of adaptation  
to various environmental conditions

a.5. NEUROHORMONAL REGULATION OF BODY TEMPERATURE AND WATER-ELECTROLYTE BALANCE (INCLUDING THE ROLE OF RENAL FUNCTION) UNDER DIFFERENT CONDITIONS OF WORK AND ENVIRONMENT

In the investigations on the mechanism of renal function changes in hyperthermia it was found that local raising of the temperature of the hypothalamic "heat loss centre" causes a change in renal function - with a decreased output of concentrated urine and a transient decrease in blood flow and glomerular filtration rate. These changes do not depend on direct thermal stimulation of the supraoptic nucleus. This mechanism contributes to water "conservation" in hyperthermia.

By using a model devised by the authors of non-filtering kidney in dogs it was observed that blockade of the tubular receptor (macula densa) does not prevent renin secretion in response to reduced perfusion pressure. The autoregulation of renal blood flow is maintained despite cessation of glomerular filtration. These results indicate the predominant role of the vascular receptor (in afferent arteriole) in the control of renin secretion and autoregulation of renal blood flow.

Evidence is presented for the presence of osmoreceptors in the portal system of the liver, participating in the control of ADH secretion; their role in the regulation of the water balance in the organism is explained.

The blood ADH concentration was determined in infants and children to elucidate development of the antidiuretic system function. Changes in ADH secretion during acute intracranial hypertension were noted in dogs.

In the investigations on the mechanism of thermoregulation, a relationship was found between thermal sensitivity (to local temperature changes) of the hypothalamic thermoregulatory centre and the ambient temperature (information from skin thermoreceptors), and the sequence of activation of different thermoregulatory reactions was established during thermal stress in rabbits. The circadian rhythm of changes in heat production in rabbits is described. The influence of hypoxia in body temperature regulation was investigated.

The effect of cellular glycopenia (after 2-DG administration) on the pattern of body temperature changes during exercise is described in dogs.

Intracellular mechanisms regulating  
the metabolism of nerve cells

a.6. CORRELATION BETWEEN INTRACELLULAR MECHANISMS REGULATING  
CARBOHYDRATE-ENERGY METABOLISM AND THE STRUCTURAL AND  
FUNCTIONAL STATE OF SUBCELLULAR ELEMENTS WITH REFERENCE  
TO NEUROTRANSMITTERS

The studies revealed a close relationship between the structural and functional state of membranes in central nervous system cells under normal and hypoxic conditions and the course and regulation of several metabolic processes in the brain. The metabolic consequences of membrane damage during hypoxia may be attributed, among other things, to the changes of activity and localization of membrane enzymes or to the changes of intracellular environment resulting from transport disturbances.

The study of the disturbances in the membrane structure of CNS cells during hypoxia demonstrated that these conditions result in a decrease of the antioxidant ability of the brain tissue, accompanied by an increase of free-radical oxidation and activation of brain phospholipid breakdown. Barbiturate anesthesia raises the antioxidant ability of the brain tissue, which may be related with the rise of the acetylcholine level. It was demonstrated that after hypoxia most persistent is the decrease of ethanolamine plasmalogens, which may be partly explained by the decrease of activity of enzymes synthesizing plasmalogens in the brain during hypoxia. It was shown that the inhibition of protein biosynthesis at the step of initiation of



polypeptide chain synthesis accompanying brain ischemia, occurs in the early postischemic period and not in the course of ischemia.

The state of the membranes was found to affect the activities of several membrane-bound enzymes. A correlation was shown between the changes of the phospholipid component of microsomal membranes during hypoxia and the activity of brain glucose-6-phosphatase. The changes in CNS cellular membranes during hypoxia concern mainly their glycoprotein layer, leading to a decrease of  $(\text{Na}^+ - \text{K}^+) - \text{ATPase}$  activity.

The properties of several enzymes were found to depend on their localization in the membrane and soluble fractions under normal and pathological conditions. The direct effect of free fatty acids released in the brain during hypoxia is probably limited to the membranes, having no regulatory influence on the activities of phosphofruktokinase and other glycolytic enzymes in the cytosol. Soluble brain fractions show the activities of enzymes participating in both pathways of citrate oxidation: citrate lyase and IDH-NADP, with a 5-fold higher activity of the latter, while mitochondrial citrate is oxidized only by IDH with isoenzyme composition differing from the cytoplasmic enzyme. IDH-NADP activity decreased with the age of the animals by 80% in the cytoplasm and 45% in mitochondria. In adult animals hypoxia resulted in the release of mitochondrial IDH-NADP into the cytoplasm, while in an immature nervous system the same conditions yield a magnesium-dependent binding of cytoplasmic IDH-NADP to the mitochondria.

The structure and the specific function of membranes (ion transport, oxidative phosphorylation, membrane polarization) affect the energy state of the cell, ion level, neurotransmitter action and indirectly modify other metabolic processes. It was shown that the regulation of pyruvate dehydrogenase in the brain depends on ADP and pyruvate. Magnesium and calcium ions importantly affect the response of mitochondrial and cytoplasmic hexokinase to the change of adenylate energy charge, increasing the differences between both enzyme forms. Calcium ions exert also a direct (through the inhibition of anaerobic glycolysis) and indirect effect (through energy disturbances caused by calcium transport) on the metabolism of brain slices in vitro and participate in the mechanism of reversing the Pasteur effect in the brain. It was demonstrated that glucose metabolism in the brain is specifically regulated by noradrenaline, which activates the pentose cycle independently of  $\alpha$  and  $\beta$ -receptors and cAMP, while the factors depolarizing the membrane and activating energy metabolism inhibit this cycle.

**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 pathological mechanisms of central nervous system damage in liver diseases it was established that portocaval anastomosis causes a rise in the blood ammonia level, which is associated with development of hepatic encephalopathy. Administration of alpha-oxoglutarate decreases the development of hepatic gliopathy without affecting the serum ammonia level. The protective action of alpha-oxoglutarate is connected probably with its role in the process of ammonia detoxication in nervous tissue.

In investigations of the pathological mechanisms of central nervous system damage in renal insufficiency it was demonstrated that reproducible pathological changes develop in the cellular elements of nervous tissue cultured in vitro in a medium containing serum of uraemic patients, exogenous urea or creatinine. These changes involve in the first place glial cells and myelin sheaths. These observations indicate that both urea and creatinine may be factors damaging nervous tissue. However, the intensity of tissue damage was not related to the concentration of urea or creatinine when uraemic serum was used, this suggesting that other substances present in the serum play a role in the pathogenesis of these changes.

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

A correlation was demonstrated between the intensity and time of appearance of central nervous system lesions, on the one hand, and the duration of ischaemia, on the other.

The morphological features of early consequences of ischaemia are described. It has been shown that selective sensitivity of various groups of neurons to ischaemia depends on the intensity of their metabolism.

It was found that in early stages of cerebral ischaemia changes develop in synapses, loss of the contents of synaptic vesicles being the first sign observed.

Impairment of myocardial oxygenation resulting in reduced myocardial efficiency was demonstrated to occur in various types of massive central nervous system ischaemia. Impairment of cardiac efficiency caused by a secondary rise in central venous pressure reducing venous outflow from the central nervous system is an important pathogenetic factor in the development of post-ischaemic brain oedema. A similar, although less pronounced role, is played by respiratory disturbances accompanying cerebral ischaemia.

Investigations on the pathological mechanisms of brain oedema revealed that an acute increase of intracranial pressure leads to increased secretion of vasopressin and changes in serum osmolarity and sodium ions concentrations. These changes are accompanied by abnormalities in the histochemical and ultra-structural pattern of the neurosecretory system, suggesting increased neurosecretion.

In studies on the biological features of normal nervous tissue differences were demonstrated in the character and metabolism of proteins in template-active and non-active chromatin in different tissues of the developing animal organism. Proteins of brain chromatin showed the presence of low-molecular weight components and greater differences in electrophoretic mobility in the range of molecular weights of 70-100 thousand daltons.

In investigations of antigenic properties of the brain differences were demonstrated in the reactions of antibodies against organ-specific antigens in heterologous systems. It appeared that the endothelium of capillaries in the brain choroid plexus differs in its histoenzymatic features in in vitro culture from the epithelium of capillaries from barrier areas of the brain and that the features of the former resemble those of capillary epithelium in internal organs.

### 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

Disturbances of cerebral circulation during short-lasting hypoxia were studied. It was shown that hypoxia leads to transient microcirculation disorders, the intensity and dynamics of which depend on the degree and duration of hypoxia. These disturbances are initially generalized and are probably a part of generalized haemodynamic disturbances. Later developing isohaemic micro foci are caused probably by disturbances of the autoregulatory mechanisms of cerebral circulation.

It was demonstrated that carbon monoxide intoxication causes a marked decrease of resting membrane potentials in neurons and glial cells cultured in vitro. Changes in the polarization of cell membranes in neurons and glial cells resembled those observed during cyanide poisoning in vitro and were a result of disturbances in active transport of ions and changed activity of  $\text{Na}^+ - \text{K}^+$ -dependent ATP-ase. The higher sensitivity of neuroglia suggests its possible role in the development of carbon monoxide leukoencephalopathy.

The effect of carbon monoxide poisoning on the activity of brain poly A polymerase, the enzyme which determines polyadenylation of RNA in cell nuclei, was studied. It was shown that acute CO poisoning leads to a significant but short-lasting depression of the activity of poly A polymerase. Decreased mRNA polyadenylation may be one of the causes of the decreased level of active polyribosomes in the brain.

Under identical conditions the activity of phosphodiesterase of 3'-5'-cyclic nucleotides was determined in the brain. It was demonstrated that this enzyme is not very sensitive to histotoxic as well as ischaemic hypoxia, in contrast to adenylcyclase which shows a significant rise of activity under the same conditions.

In investigation on the myelinoclastic effect of alkyl derivatives of nitrosourea, the pathogenetic role of disturbances in their permeability in the development of demyelination due to transplacental action of ethylnitrosourea in mice was ruled out on the basis of histochemical examination of cerebral blood vessels in mice.

In studies on the effect of dichlorvos (DDVP), an organo-phosphorus pesticide, on the central nervous system, it was found that poisoning of adult animals causes significant transient disturbances in nervous tissue metabolism manifested as accumulation of abnormal glycogen deposits, disturbances in the activity of glycogen-metabolizing enzymes, decreased activity of mitochondrial enzymes (succinic dehydrogenase, cytochrome oxidase) and acetylcholinesterase. The use of higher doses of the substance leads to severe damage to the cerebral white matter (oedema, diffuse damage to myelin sheaths, microvacuolization) while the grey matter of the brain remains essentially unchanged.

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

The effects of dichlorvos (DDVP) poisoning of rabbits and rats in the last stage of pregnancy were evaluated taking into account the condition and development of the offspring. It was shown that transplacental administration of the agent in the end-phase of pregnancy had no effect on the motor development and weight gain of the offspring in the early period of extra-uterine life.

In the investigations on the effects of halothane anaesthesia on the immature central nervous system it was found that one-step anaesthesia leads to reversible neuronal changes with swelling of mitochondria, widening of the canals in endoplasmic reticulum and appearance of lysosome-like bodies. Repeated anaesthesia caused more intense changes of the above

type including also development of irreversible lesions. The newborn subjected to halothane anaesthesia showed impairment of structural maturation of cerebral cortex. Analogous changes were demonstrated in the liver of the animals.

#### Control of neoplastic diseases

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

Electron microscopic investigations of tumours of neuroblastoma type demonstrated the presence of catecholamine granules in the perikaryon of malignant cells as well as in nerve fibres. The presence of these granules points to a secretory activity of malignant cells in neuroblastoma tumours.

In electron microscopic investigations of astrocytoma tumours a great variety of cells was observed. In cases of differentiated tumours, Astrocytoma fibrillare, besides the presence of cells typical for this tumour other cells characteristic of Astrocytoma protoplasmaticum and gemistocytes were observed. Sporadic cells could not be included into any classification system. In the case of Astrocytoma pilocyticum, electron microscopic investigations showed structures termed in light microscopy Rosenthal fibres. In the case diagnosed as Astrocytoma partim anaplasticum undifferentiated cells prevailed producing numerous cytoplasmic fibrils.



Preliminary investigations were carried out on the hypothalamo-hypophyseal system of dehydrated rats and after re-hydration. Dehydration was followed by signs of reduced production of neurosecretion. No significant morphological changes were found in the hypothalamo-hypophyseal system of rats, related to the type of fluid used for hydration.

The role of the limbic system and hypothalamus  
in sensory-motor and motivational regulation

b.6. THE EFFECT OF STEREOTAXIC SURGERY OF LIMBIC SYSTEM  
(AMYGDALA, HIPPOCAMPUS, CINGULATE GYRUS), THALAMIC NUCLEI  
AND DENTAL NUCLEUS ON MEMORY, EMOTIONAL STATE AND  
BIOELECTRICAL ACTIVITY OF THE BRAIN

The effects of partial (medio-dorsal) amygdalotomy on memory and emotional state were studied in patients with epilepsy. Comparative studies before and after surgery showed that amygdalotomy is beneficial in the treatment of memory disturbances (recent and long-term memory) and emotional behaviour in epileptic patients. Although partial destruction of the amygdala does not have a direct effect on recent and long-term memory, the partial exclusion of this structure in epileptic patients diminishes the degree of brain irritation, thus producing a general improvement in brain function. This results in a considerable improvement of mnemonic ability and gnostic processes. A set of psychological tests for objective evaluation of the functions studied was also developed. Suitable apparatus for

the study of bioelectrical properties of the amygdala was assembled and the first experiments with animals were carried out.

Intracranial tightness and intracranial pressure  
Experimental brain oedema

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

The computerized on-line ICP monitoring system was further extended to permit continuous measurement of several physiological parameters (mean ICP, elastance, amplitude of pulse-related ICP oscillations, optimum ICP levels in individual patients, heart rate, respiration rate) by means of a single pressure transducer connected with one of the lateral ventricles. A specialized program package, SPEKTRAN, for analysing the spectral density of ICP waveforms was developed. Preliminary clinical tests show that this method of ICP analysis is of great value in neurosurgical diagnostics and treatment. A new, fast method of evaluating the degree of intracranial tightness in neurosurgical patients was developed and implemented in the clinic. The method enables the physician to detect imminent intracranial tightness before the occurrence of first clinical symptoms. The ratio of production-to-absorption of cerebrospinal fluid was determined by measuring ICP changes produced by infusion of known quantities of physiological saline. Studies

performed in patients with and without intracranial pathology made it possible to establish physiological standards which were then used as the basis for evaluating CSF production and absorption rates in neurosurgical patients. The research program concerning the pathomechanism of brain oedema involved a study of the effect of sudden decompression on the behaviour of cerebral tissue pressure in both hemispheres and on cerebrospinal fluid pressure. It was established that, after sudden decompression of the brain, there follows a transitory phase of volume compensation which gradually changes into a decompensated oedematous phase. The dynamic development of brain oedema following surgical injury or sudden decompression was examined. Sodium, potassium and lactate concentrations in nerve tissue sampled during surgery and CSF lactate concentration were determined. It was found that unfavourable clinical prognosis is associated with tissue lactate levels above 0.9 mg/g of fresh tissue, a simultaneous increase in CSF lactate concentration and changes in tissue sodium and potassium concentrations.

#### b.8. DISORDERS OF SPEECH AND OTHER GNOSTIC FUNCTIONS IN PATIENTS WITH CNS INJURY

The starting-point in the study of visual perception were the results obtained in normal subjects to whom single letters and letter pairs were exposed biocularly and centrally under the conditions of experimental camera. Differences in visual perception were observed, depending on the method of letter exposure and on the quality of the visual stimulus. It was

established that the first letter in a pair is read more easily (facilitation) than the same letter exposed individually. Statistical calculations showed that the total number of errors in the perception of the second letter in a pair is equal to the number of errors observed in single-letter perception. With the above findings as the starting point, the following problems were tackled: differences in the visual perception of letters by healthy subjects and by patients with focal brain lesions; possible differences in visual perception depending on the location of lesions; ratio of errors in visual and speech perception in aphatic patients. Preliminary results showed that there are differences in the quality and time of visual perception as compared with normal subjects. These studies will be continued and analysed when more patients will have been examined (6 patients in 1976). In September, 1976, the first volume of a book (manual) entitled "Methods for the Diagnosis of Aphasia" was submitted for publication by PZWL Publishers. The first volume contains a basic classification of aphasias, symptomatology, and a set of ready colour tests for patient examination.

b.9. EFFECT OF MUTATION "pt" ON VARIOUS LINKS  
OF CLOSED MOTOR CIRCUITS

The purpose of these investigations is to establish the anatomical substrata of parkinsonian-like tremor. In the first paper from three examined subcortical grey structures, the pallidum showed the most severe lesions, although neither the stria-

tum nor substantia nigra were free of changes. The authors correlate the observed damages rather with spastic pareses in the pt-syndrome than with the tremor.

In urine analysis in 5 groups of pt-rabbits (symptomatic males and females, carriers, healthy females and males) no differences were detected with thin layer chromatography method. The large quantities of 3-hydroxy-phenylacetic acid, 4-hydroxy-phenylacetic acid, vanillactic acid, the presence of 3-methoxy-4-hydroxyphenyl-glycol, the traces of homovanillic acid and the presence of vanilic acid, were established in each of the examined groups. These results give an approach of the pt-syndrome to the multi-systemic striato-nigral degeneration with the spastic motor deficit, optic and oculomotor disturbances beside the parkinsonian tremor, resistant to L-DOPA therapy.

b.10. ULTRASTRUCTURE OF THE BRAIN IN pt-RABBITS  
(USA-agreement, N.I.H., PL-480, 05-035-1)

The changes in the structure of nucleoli, nuclear chromatin and endoplasmic reticulum suggest that the damages observed in other organelles (mitochondria), synaptic vesicles and ribosomes are controlled by chromosomal substances. The pathognomic neuroaxonal calcifications are considered as an arrow pointing to the metabolic disorders developing as a result of pt-mutation. Besides, the results of four years (1973-1976) of investigation were summarized in a detailed report. The final paper is prepared for publication in wait of Project-Officer consultation whose visit is announced for September 1977.

c. STUDIES ON TRANSPLANTATION AND EXPERIMENTAL SURGERY

Studies on the immunologic differentiation of organisms

c.1. INVESTIGATIONS OF CIRCULATION OF LYMPHOCYTES  
AND THE FILTRATION RATE OF IMMUNE PROTEINS

The purpose of the studies was the quantitative assessment of the migration of lymphocytes and monocytes (macrophages) from the blood capillaries to the extracellular space and then to the lymphatic and non-lymphatic tissues under normal conditions.

Studies of lymph originating from the skin and subcutaneous tissue of the lower extremities in healthy humans showed that in these tissues there is a constant rate of migration of lymphocytes (and monocytes) to the lymph. The migration rate was not influenced by 24 hours changes of the number of circulating blood lymphocytes. The rate and velocity of migration of lymphocytes from the blood to the lymph depends on the factors influencing capillary filtration, e.g., temperature and the hydrostatic pressure. Elevation of capillary filtration value produced an increased lymphocytes migration despite the decrease of the lymphocytes concentration in the lymph. Decreased capillary filtration was accompanied by a decreased total amount of migrating lymphocytes and increased concentration of these cells in the lymph.

The distribution of intravenously injected lymphocytes derived from the thoracic duct, mesenteric lymph node or peripheral lymph nodes and labelled in syngeneic lymph with  $^{51}\text{Cr}$

was different depending on the origin of the cells. Thoracic duct lymphocytes were homing mainly in the spleen, liver, blood, bone marrow, skin and muscles. The lymph node lymphocytes went mainly to the liver, spleen and lymph nodes. 5-IUDR-labeled lymphocytes of the same origin accumulated mainly within the intestine and the skin. This observation indicates that DNA-synthesizing lymphocytes may have a special "affinity" to the skin and the gut.

Lymphatic drainage of the skin, subcutaneous tissue, muscles and the marrow cavity of the hind extremity of the dog was studied in order to find the origin of the afferent lymph of the extremity. Small lymphatic vessels draining the tibia and the femur and communicating with the regional lymph nodes were visualized radiologically. Confirmation of the presence of these anatomic channels supports the results of studies of other authors regarding the migration of bone marrow lymphocytes to the regional lymph nodes. Preliminary studies on blood to afferent lymph capillary filtration of immunoglobulins and complement proteins performed in the human volunteers showed that the concentration of IgM, IgG, IgA and complement components C1q, C4, C3 and C9 in the lymph amounted approximately to 1/4 of the concentration in the blood serum, and depends on the molecular size of different proteins and the rate of capillary protein filtration.

**o.2. STUDIES ON THE SPECIFIC SUPPRESSION OF THE IMMUNE REACTION  
TO ALLOGENEIC ORGAN TRANSPLANTS**

It has been previously shown that in rats the enhancement of organ graft survival can be achieved across the partial allo-antigenic difference by active or passive immunization of the recipient with the donor's antigen. The purpose of the present study was to find whether enhancement of the organ graft survival can be achieved in rats in spite of a strong histocompatibility difference and to establish the mechanism of this process.

Experiments were performed on inbred strains of rats differing in AgB locus (August - donor strain, Wistar - recipient strain) and in mongrel dogs. The preliminary results showed that pretreatment of the graft recipients with the donors cellular antigen and syngeneic immune serum containing antibodies against donor antigen 11 and 10 days before the transplantation, respectively, prolonged survival of the heterotopic heart graft to 12 days (the survival time of the untreated heart transplant in the same inbred strains of rats was  $7.2 \pm 0.7$  days). It has been shown that rabbit anti-rat lymphocyte serum prolongs the heart graft survival to the same extent (11.6 days).

Investigations on the protective effect of the osmolality on the function of the preserved organ showed that intravenous administration of hyperosmotic mannitol, saline and glucose solutions (1600 mOsm/l.) leads to an increase of the blood osmolality for several hours. The extra- and intra-vascular distribution of these solutions was different. The increase in osmolality of the lymph and tissue fluids appeared 20-40 min later



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than the peak of blood osmolality, An increase of plasma osmolality to 380-400 mOsm/l. caused elevation of the hepatic enzymes level in the blood. No renal changes were found after administration of the hyperosmotic solution.

The first part of the studies on the effect of hyperosmotic flush solutions on ischemic kidney damage was concerned with estimation of the kidney tissue water, tissue sodium and potassium, the activity of high energy compounds (adenine nucleotides) and renal cortex PAH-uptake in normal kidney and in that which was exposed for 2 h to ischemia.

It has been shown that, despite perfusion with hyperosmotic solution an increase of the tissue water and a decrease of potassium content, as well as a decrease of adenine nucleotides activity and depression of PAH uptake occurred.

Interaction between basic chemoregulatory  
and neuroregulatory processes in the respiratory  
and circulatory systems

c.3. NEUROREGULATION OF OXYGEN SUPPLY TO TISSUE IN RELATION  
TO THE PARTICIPATION OF ARTERIOVENOUS COMMUNICATIONS  
IN MICROCIRCULATION

New data have been obtained on the mechanism of development of trophic ulcers. Opening of arteriovenous communications and development of ulcerations were demonstrated after transection of sciatic nerves in rabbits, dogs and monkeys. Suggestions are made that the same mechanism is responsible for several types of what is called trophic ulcers occurring often in humans.

d. OTHER RESEARCH WORKS

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

The investigations demonstrated that the most gifted children among those selected by the schools had very good biological, psychological and social conditions for their intellectual development. The essential role in the development of abilities in children up to the age of 15 years was played, however, by the family's attitude favouring conscious stimulation of these abilities. The possibilities of the school in this field are limited, despite generally accepted directives of individualization and help to gifted students.

These results indicate the necessity of planned development of abilities of the children in family environment and of creating better conditions for their development in the school.

The intelligence level of the gifted children from the elementary school ranged from 136 to 156 (Wechsler scale). In most studied children theoretical abilities prevailed over practical ones. Many children showed, apart from general intellectual abilities, also special gifts often in several fields.

The studied children had a striking ability of defining notions and were extremely articulate, they had a wide range of knowledge and well developed ability of causative-logical reasoning. All had excellent memory, nearly all had a gift of observation and good attention. Besides high intelligence, these

children showed also such personality traits as: ambition, conscientiousness, initiative, inquisitiveness, avidity of knowledge, ability to organize work, endurance, assiduity and orderliness.

The quantity and quality of these traits differentiated the studied children into a group developing their abilities and a group not making use of their intellectual potential.

Contrary to the generally accepted views and practice of developing in the first place the intellectual abilities of gifted children our investigations point to the necessity of parallel development of extraintellectual personality traits in them.

The double corrective-therapeutic reeducation of children with reading and writing difficulties and with psychomotor hyperexcitability was continued in a group of 34 children from classes 2nd-4th of an elementary school. Reeducation was conducted by a psychologist and a kinesitherapist. In most children reading and writing was improved, similar improvement was observed in their concentration ability, memory, self-dependence in thinking, motivation. The children had better results in learning.

This method developing the retarded operative-motor functions and reducing psychomotor hyperexcitability has a favourable effect on improvement of these psychic features which are essential for the process of learning and is thus of considerable importance in the practice of school education.

## d.2. FACTORS DETERMINING MENTAL HEALTH OF ADOLESCENTS

### 1. The notion and criteria of mental health in different occupational groups

The notion of mental health and the notions connected with mental health were defined and their parameters determined in a space representing three main dimensions obtained by the method of factorial analysis (method of principal direction of Jacobi) of the results of examination of 750 subjects by the technique of semantic differential of Osgood. The notions of professional groups differed from those of laymen mostly with regard to factor II (personal engagement), while factor I (life dynamism) and factor III (social dominance) differentiated the group of mental and physical workers from the remaining groups designated as lay.

### 2. Mental health criteria in the opinions of different social and occupational groups

The functional model of mental health lays stress on functional efficiency in the evaluation of mental health of an individual. In the reported investigations it was tried to define the essential parameters of functional efficiency characterizing, in the opinion of 750 respondents from different occupational groups, a mentally healthy subject.

On the ground of the obtained results the criteria were arranged according to their rank in each of these 11 groups.

The first 4 characters in all groups were identical: knowledge of self, ability of getting on well with others, sense of responsibility and control of own emotions and drives. The remaining criteria showed greater differences between groups.

3. Study of the effects of neurotic signs in teachers on emotional disturbances and scholastic progress of their students

In the studies on the influence of neurosis in teachers on emotional disturbances and progress in education of their students the authors tested 175 children from the 3rd class, 87 of them were taught by teachers without evidence of neurosis (group A) and 88 had neurotic teachers (group B). The children in group A had a greater amount of general knowledge and their behaviour in school was estimated as more correct. No differences were found between both groups with regard to behaviour disturbances outside school.

4. Addiction to dependence-forming drugs (other than alcohol) by young people in the City of Łódź

Seventy-three individuals aged 15-21 years taking drugs were examined. In 84.9% of cases other psychic abnormalities were found, mainly personality disorders, in 74.9% of cases adaptation difficulties were present already in childhood. Abnormal personality features were accentuated in them by physio-

logical peculiarities of the period of adolescence, especially in cases with abnormal family conditions.

A considerable rise in the anxiety level and divergencies between aspirations and the possibilities of their realization were observed. Neurotic individuals were more prone to development of authentic drug-dependence while psychopathic individuals showed usually features of what is called social dependence.

Offences against law were perpetrated by 25.3% of the examined individuals for obtaining drugs (receipt forging, breaking into pharmacies).

#### d.3. STUDIES - CONSTRUCTION OF BIOMEDICAL APPARATUS

The activities of Medipan Laboratories included in 1976 research and designing of new biomedical apparatus, construction of apparatus for research and repair services of equipment of own production and that supplied by the Swedish firm L.K.B.

The programme of production in 1976 included:

	Type	No of produced apparatus
Infusion pumps	353	30
Pullers for pulling glass microelectrodes	GPM-1	1
Pneumotachometers	351	1
Cameras for oscilloscope photography	KO-3	3
Drop counters	-	1
Recorders	XT-352	16
Classic pumps	CLR-1	15

Besides, small auxiliary apparatus and equipment were produced.

Most produced apparatus were made at the request of Polish research centres, e.g.

- laboratories of medical academies in Białystok, Gdańsk, Poznań and Warszawa;
- laboratories of universities in Gdańsk, Poznań, Toruń and Warszawa;
- laboratories of Experimental Biology and Tuberculosis Research Institutes - in Warsaw.

About 11% of the production was ordered by the laboratories of the Medical Research Centre.

One apparatus - the puller for pulling microelectrodes - was made at the request of a foreign institution - DESPRED, Sofia, Bulgaria.

e. NEW METHODS AND TECHNIQUES IN RESEARCH

In 1976 in the Department of Neurophysiology the following new methods and techniques were introduced:

- (1) Non-valvular method of separating inspiratory from expiratory airflow elaborated by drs A. Huszczuk and M. Ryba.
- (2) The method of recording integrated activity of pulmonary stretch receptors without cutting the vagus nerve, developed by drs A. Huszczuk and M. Ryba.
- (3) Modification of  $SO_2$  blocking method, developed by drs A. Huszczuk and M. Ryba.
- (4) A simple method of diagnosis of nasal and nasopharyngeal resistances in children, developed by dr A. Huszczuk and dr Hanna Siedlecka from the Institute of Mother and Child in Warsaw.
- (5) Method of simultaneous intravenous infusion of acid and bicarbonate, elaborated by P. Grieb (MRC) and dr J. Ponte from the Laboratory of Physiology of Bristol University.



**LIST OF PUBLICATIONS**

**Notice:**

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

aa. Original papers

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Carbon monoxide intoxication and protein synthesis in the rat brain.

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**PART II**  
**INFORMATION**

**Notice:**

**Abbreviations used - P.A.S. - Polish Academy of Sciences**  
**- M.R.C. - Medical Research Centre**



COOPERATION WITH FOREIGN COUNTRIES

DEPARTMENT OF NEUROPHYSIOLOGY

**W.A. KARCZEWSKI, M.D., D.Sc., professor of Physiology**

Member of: Polish Physiological Society

British Physiological Society

(Associate Member)

Societas Europea Physiologiae Clinicae

Respiratoriae

International Brain Research Organization

P.A.S. Committee for Physiological Sciences

(V-President)

**K. BUDZIŃSKA, M.Pharm.**

**M. GŁOGOWSKA, M.D.**

Member of: Polish Physiological Society

**P. GRIEB, M.Biolog.**

**H. GROMYSZ, D.Nat.Sc.,**

Member of: Polish Physiological Society

**A. HUSZCZUK, M.E.Eng., D.Nat.Sc.,**

**J. KULESZA, M.Phys.**

**M. POKORSKI, M.D.**

Member of: Polish Physiological Society

Deutsche Physiologische Gesellschaft

**A. PRZYBYLSKI, D.Mat., Ph.D.,**

Member of: Polish Cybernetics Society

**M. ROMANIUK, M.Biophys.**

**M. RYBA, M.D.**

**M. SZEREDA-PRZESTASZEWSKA, M.D.**

Member of: Polish Physiological Society

Societas Europea Physiologiae Clinicae

Respiratoriae

1. Polish Academy of Sciences - Czechoslovak Academy of Sciences agreement:

Doctor A. STRANSKY -

- from the Department of Physiology of Comenius University in Martin
- stayed 10 days in the Department of Neurophysiology. The aim of his visit was to discuss the research on the neural control of the airway calibre in experimental pathological conditions of the respiratory tract - the topic which both Departments work on.

2. Wellcome Trust Foundation - Medical Section of the Polish Academy of Sciences agreement:

Doctor HRENDÁ CROSS -

- from the Department of Medicine Charing Cross Hospital, Medical School, London
- spent one week in the Department of Neurophysiology. She discussed her own results concerning the influence of the characteristics of lung inflation on the respiratory rhythm.

Doctor J. PONTE -

- from the Department of Physiology of Bristol University, England
- stayed 26 days in the Department of Neurophysiology. During his stay he contributed to the experiments elucidating the influence of blood pressure and heart minute output changes on respiration. Dr Ponte participated in the International Symposium "CO<sub>2</sub> and breathing".

Professor M.J. PURVES -

- head of the Laboratory of Physiology at Bristol University, England
- spent one week in the Department of Neurophysiology. In the course of his visit he discussed further plans of bilateral collaboration and participated in the Symposium "CO<sub>2</sub> and breathing".

Polish Academy of Sciences - Swedish Royal Academy of Sciences agreement:

Doctor M. GLOGOWSKA -

- received an 8 months' grant and she spent this time at the Nobel Institute of Neurophysiology, Karolinska Institutet Stockholm, Sweden. She performed a series of experiments on the deflation reflex in cats. The results will be published in three full papers.

Professor C. von EULER -

- Nobel Institute of Neurophysiology, Karolinska Institutet Stockholm
- stayed one week in the Department of Neurophysiology. During his stay the results of experiments run in both Departments were discussed in detail, as well as the projects of further cooperation. Prof. von Euler took part in the Symposium "CO<sub>2</sub> and breathing".

Polish Academy of Sciences - Centre National de Recherches Scientifiques agreement:

Doctor H. GROMYSZ -

- is staying at Laboratoire de Physiologie, Faculté de Médecine Saint-Antoine in Paris, where he takes part in experiments on the central respiratory complex organization.

5. Individual visits of scientific workers:

Doctor C. PASCUAL -

- from the Centro Nacional de Investigaciones Cientificas, Cuba
- visited the Department of Neurophysiology. He discussed the problems of neural control of breathing in experimental asthma.

Doctor A. PRZYBYLSKI -

- from the M.R.C. Department of Neurophysiology
- spent one week in the Institute of Physiology of Helsinki University, Finland. He participated there in the conference on "Interrelationship between energy and information in a biological system" and together with Prof. Bergström prepared a paper on the same topic. He discussed the possibilities of future collaboration between the Institute of Physiology (Helsinki) and the Medical Research Centre.

6. On September 13-15th 1976 an International Symposium "CO<sub>2</sub> and breathing" was organized by the Department of Neurophysiology on behalf of the European Society of Clinical Respiratory Physiology. The scientific programme was established by Professor W.A. Karczewski - head of the Department and Professor J.G. Widdicombe (London). From 130 participants of the Symposium 103 came from Austria, Belgium, West Berlin, Bulgaria, Czechoslovakia, France, German Democratic Republic, Federal Republic of Germany, Great Britain, Holland, Hungary, Italy, Spain, Sweden, Turkey and USA. The Symposium consisted of three sessions with 13 lectures and 33 communications; 4 communications were delivered by research assistants from M.R.C. The symposium was a successful combination of experimental and clinical aspects of the control of breathing in hypo- and hypercapnic conditions. The latter appears an important factor from the practical point of view in coal mine disasters.

CARDIOVASCULAR LABORATORY

L. SEMERAU-SIEMIANOWSKI, M.D., professor of Medical Sciences

Member of: Polish Physiology Society

K. HERBACZYŃSKA-CEDRO, M.D., Ph.D., assoc. professor of  
Medical Sciences

Member of: Polish Physiological Society

Society of Polish Internists

V-President of the European Society for  
Clinical Investigation

P. RUSZCZEWSKI, M.P., predoctoral fellow

P. TRUSKOLASKI, M.D., predoctoral fellow

1. Agreement between the Medical Research Centre and the A. Miasnikov Institute of Cardiology, USSR Medical Academy of Sciences - Moscow.

Assoc. professor K. HERBACZYŃSKA-CEDRO and technician I. HUSZCZUK,

- spent one week in Moscow at the Institute in order to establish in one of the laboratories the biological method of measuring blood catecholamine level.

2. Individual visits of foreign scientists to the Cardiovascular Laboratory.

Doctor M. OLIVER -

- from the Royal Infirmary, Dept. of Cardiology in Edinburgh, G. Britain,
- wished to discuss the results of studies on the humoral reaction in myocardial infarction and to outline the project for common research.

Doctor O. MAJØS -

- Head of the Dept. of Physiology, University in Tromsø, Norway.
- During 4 days of his stay Doctor Majø's was acquainted with the research carried out in the Laboratory and discussed the programme of cooperation in experimental investigations on the role of adrenergic response in myocardial infarction.

3. Individual visits of scientific workers of the Laboratory abroad:

Assoc. professor K. HERBACZYŃSKA-CEDRO -

- was invited to the Dept. of Neurology, University of Siena, Italy, to lead in October 1976 a seminar on prostaglandins in cerebrovascular pathology, based upon experimental work performed in the Cardiovascular Laboratory;
- As V-President of the European Society for Clinical Investigation, she participated also in the Meeting of this Society, London, G. Britain, 1976, October 22-30.
- During her stay in Great Britain she visited Midhurst Medical Research Institute to continue the joint project of research on the effect of catecholamines on the distribution of myocardial blood flow.
- A visit to Wellcome Research Laboratories in Beckenham was concerned with the field of prostaglandin research and helped her to become acquainted with the most recent studies on the role of these substances in intravascular thrombosis.

DEPARTMENT OF APPLIED PHYSIOLOGY

- S. KOZŁOWSKI, M.D., D.Sc., professor of Physiology  
Member of: Research Council - Institute of Food and  
Nutrition  
Research Council - Institute of Protection  
of Labour  
P.A.S. Committee on Physiological Sciences  
Polish Physiological Society  
International Working Group on Biological  
and Cosmic Medicine "Intercosmos",  
Polish National Committee on the International  
Programme (Subcommittee of Human Adaptability)  
Co-Editor of "Acta Physiologica Polonica"
- J. CHWAŁBIŃSKA-MONETA, M.D., D.Sc.
- Z. BRZEZIŃSKA, M.Biochem., D.Pharm.  
Member of: Polish Physiological Society
- R. JASIŃSKA, M.Pharm.
- H. KACIUBA-UŚCILKO, M.Agr., D.Agr.Sc., D.Nat.Sc.,  
Assoc. professor of Natural Sciences  
Member of: Polish Physiological Society  
Associate Editor of "Acta Physiologica Polonica"
- B. KRUK, M.Biol., D.Nat.Sc.  
Member of: Polish Physiological Society
- J. LYSZCZARZ, M.D., D.Sc., Assoc. professor of Medical Sciences  
Member of: Polish Physiological Society  
European Soc. of Clinical Respiratory Physiology
- K. NAZAR, M.D., D.Sc.  
Member of: Polish Physiological Society  
European Society for Clinical Investigation



- B. SADOWSKI, M.Biol., D.Nat.Sc., Assoc. professor of  
Natural Sciences  
Member of: Polish Physiological Society
- J. SADOWSKI, M.D., D.So., Assoc. professor of Medical Sciences  
Member of: Polish Physiological Society
- E. TURLEJSKA, M.Vet., D.Nat.Sc.  
Member of: Polish Physiological Society
- A. ZIEMBA, M.Biol.  
Member of: Polish Physiological Society

Multilateral cooperation between the Academies of Sciences of the socialist countries

### I n t e r c o s m o s

The Medical Research Centre participates in the following investigations:

- Physiological consequences of gravitation changes (with model experiments under conditions of restricted physical activity).
- Organism adaptation to thermal stress (including adaptation to changes in gaseous environment).

Within this programme of investigations Professor S. KOZŁOWSKI from the M.R.C., participated in the Conference and Symposium of the Standing Working Group of socialist countries, dealing with problems of Space Biology and Medicine in Budapest, Hungary, 1976, May 4-10, where he presented three papers:

1. Boruta A., Kozłowski S.: "Changes in body temperature during exercise performed by human subjects under conditions of dehydration of the organism".
2. Pohoska E., Kaciuba-Uściłko H., Kozłowski S.: "The effect of prolonged restriction of physical activity on the ability to perform exercise".
3. Pohoska E., Kozłowski S., Kaciuba-Uściłko H.: "A decreased lipolytic effect of noradrenaline under conditions of prolonged restriction of physical activity in dog".

Professor S. KOZŁOWSKI participated also in the Inter-cosmos Symposium, Moscow, USSR, 1976, September 15-21, analysing the results of investigations of the material obtained from the "Cosmos 282" biological satellite.

2. Under the agreement between the Polish Academy of Sciences and the Czechoslovak Academy of Sciences:

Professor L. NOVAK -

- from the Institute of Biophysics of the Czechoslovak Academy of Sciences
- visited the Department for several days, demonstrating a device designed by himself for measuring the "cooling power" of the environment and carrying out common investigations on the thermoinsulating properties of the skin under different environmental conditions.

3. Under the agreement between the Polish Academy of Sciences and the Hungarian Academy of Sciences:

Associate professor J. LYSZCZARZ -

- visited the Institute of Pathology of the Pécs University, Hungary for 3 weeks. He became acquainted with the methods used there and discussed the problem of thermoregulation in hypoxia.

4. Visits of foreign scientists to the Department:

Doctor DO SUNG -

- Head of the Department of Physiology, Medical Faculty of the University in Hanoi, Vietnam
- stayed at the Department for one week discussing the methods of evaluating exercise adaptation of the organism.

**Doctor J. KARVONEN -**

- from the Department of Clinical Physiology, Tampere University in Finland
- visited the Department for several days to study the methods of evaluating adaptation of the organism to exercise and discuss the trends in studies on this problem.

**Doctor K. GAAL -**

- from the Department of Physiology, Budapest University, Hungary
- stayed at the Department for 5 days, to become acquainted with some methods of investigations of the water-electrolyte balance and thermo-regulation.

**Professor V.N. ALISCHEV -**

- from the Department of Physiology of Work, Institute of Vocational Education in Leningrad, USSR
- visited the Department for one day for consultations on the methods of fatigue evaluation under different working conditions.

**Professor O. GAUER -**

- from the Department of Physiology, West Berlin University
- visited during one week the Department discussing mechanisms of water-electrolyte balance regulation. He participated also in the discussion on the role of volume regulation in the control of water metabolism in the organism.

Professor Y. HOUDAS -

- Head of the Department of Physiology of the Lille University, France
- stayed at the Department for 2 weeks. During his visit collaborative investigations were started on the role of hyperthermia as a factor restricting the working ability, and a programme of further common studies was accepted.

5. Individual visits of scientific worker of the Department to foreign scientific centres.

Associate professor J. SADOWSKI -

- stayed for six months at the Laboratory of Experimental Medicine, Université de Bruxelles, Belgium
- studying the methods of investigating water-electrolyte metabolism and renal function. He took part in the Meeting of the French Nephrological Society reading a paper by: J. Sadowski and P. Lambert "An experimental model of massive proteinuria in the dog".

DEPARTMENT OF NEUROPATHOLOGY

M.J. MOSSAKOWSKI, M.D., D.Sc.,

professor of Neuropathology

Corresponding member of the Polish Academy of Sciences

Member of P.A.S. Committee on Neurological Sciences

President of the Polish Association of Neuropathologists

Vice-president of the International Society

of Neuropathology

Corresponding member of the American Association

of Neuropathologists

Corresponding member of the Neuropathological Society

of the G.D.R.

Member of: International Brain Research Organization (IBRO)

Polish Society of Anatomopathologists

Polish Society of Cyto- and Histochemists

Polish Society of Neurologists

Polish Society for Radiation Research

J. ALBRECHT, M.Biol., D.Nat.Sc.

Member of: Polish Biochemical Society

Polish Association of Neuropathologists

International Society of Neuropathology

Z. BAŃKOWSKI, M.D., D.Sc., professor of Medical Sciences

R. GADAMSKI, D.Vet.Sc.

Member of: Polish Society of Anatomy

Polish Association of Neuropathologists

International Society of Neuropathology

W. HILGIER, M.Pharm.

A. KAPUŚCIŃSKI, M.D.

Member of: Polish Radiological Society

S. KRAJEWSKI, M.D.

- Z. KRAŚNICKA, M.D., D.Sc., assoc. professor of Neuropathology**  
Member of: Polish Association of Neuropathologists  
Polish Society of Neurologists  
Tissue Culture Association (USA)  
International Society of Neuropathology
- H. KROH, M.D., D.Sc.**  
Member of: Polish Society of Cyto- and Histochemists  
Polish Association of Neuropathologists  
Polish Society of Neurosurgeons  
International Society of Neuropathology
- A. MARCINIEC, M.D.**
- M. OSTENDA, M.D.**  
Member of: Polish Association of Neuropathologists  
Polish Society of Neurologists  
Polish Society of Cyto- and Histochemists  
International Society of Neuropathology
- A. PRONASZKO-KURCZYŃSKA, M.Biol., D.Nat.Sc.**  
Member of: Polish Endocrinological Society
- Z. RAP, M.D.**  
Member of: Polish Association of Neuropathologists  
International Society of Neuropathology
- K. RENKAWEK, M.D.**  
Member of: Polish Society of Cyto- and Histochemists  
Polish Association of Neuropathologists  
International Society of Neuropathology
- M. SIKORSKA, M.Chem.Eng.**  
Member of: Polish Association of Neuropathologists  
International Society of Neuropathology
- M. ŚMIAŁEK, M.Pharm., M.D.**  
Member of: Polish Biochemical Society  
Polish Association of Neuropathologists  
International Society of Neuropathology

S. SZUMAŃSKA, M.Biol., D.Nat.Sc.

Member of: Polish Society of Cyto- and Histochemists  
Polish Association of Neuropathologists  
International Society of Neuropathology

E. WEINRAUDER, M.Biol., D.Nat.Sc.

Member of: Polish Association of Neuropathologists  
International Society of Neuropathology

T. WIERZBA, M.D.

I.B. ZELMAN, M.D., D.Sc., associate professor of Neuropathology

Member of: Polish Association of Neuropathologists  
Polish Society of Neurologists  
International Society of Neuropathology  
Editor in Chief of "Neuropatologia Polska".



1. Polish-American Scientific Agreement (PL-480):

Professor D. JOHNS -

- from the National Institute of Health, Bethesda, USA
- visited the Department of Neuropathology and the Laboratory of Developmental Neuropathology of the Medical Research Centre. The aim of this visit was to discuss the possibility of renewing the Polish-American Agreement for studies on myelination of the nervous system.

2. Under the Agreement between the Polish Academy of Sciences and the Austrian Academy of Sciences:

Associate professor I. ZELMAN -

- visited for 3 weeks the Institute of Neurology, Vienna University to study materials concerning metabolic diseases of the central nervous system and to discuss the results of experimental investigations on anoxic nervous tissue damage.

3. Under the Agreement between the Polish Academy of Sciences and the Bulgarian Academy of Sciences:

Doctor V. RADEVA -

- from the Department of Anatomy, Histology and Embryology, Medical Academy in Sofia
- stayed at our Department for 2 months. During that time she took part in training in the field of investigations on spinal cord embryogenesis including the action of embryo-active substances and the problems of tissue culture.

4. Under the Agreement between the Polish Academy of Sciences and the Finnish Academy of Sciences:

Doctor J. ALBRECHT -

- stayed during 3 months at the Department of Medical Chemistry, Helsinki University, where he continued his research begun in 1975 on the proteins of nuclear chromatin of nervous and glial cells of chick brain. The results were presented in a paper written in collaboration with Doctor HEMMIKI on: "Protein composition of chromatin subfractions prepared from chick embryo".

Doctor M. OSTENDA -

- stayed during 6 weeks at the Department of Anatomy, Helsinki University and Department of Neurology, Turku University, where she investigated the histochemistry of synaptic transmission and ultrastructural changes in synapses caused by exogenous and endogenous factors.

5. Under the Agreement between the Polish Academy of Sciences and the Academy of Sciences of the German Democratic Republic:

Professor P. SCHRÖTER -

- Head of the Department of Neurology, University in Rostock
- paid us a visit of 5 days, discussing electron microscopic changes in the central nervous system in different types of hypoxia, delivered a lecture on: "Neuropathies in Industrial Poisonings" and participated in the Polish-German Symposium on: "Chemical Brain Injuries and Brain Tumours", Warsaw, 1976, April 26-30.

Professor A. ARENDT -

- Head of the Department of Neuropathology, Institute of Pathology, Karl Marx University in Leipzig
- stayed in our Department for 5 days delivering a lecture. He took part in consultations on disturbances of cerebral circulation and blood flow in ischaemia, and in the Polish-German Symposium on: "Chemical Brain Injuries and Brain Tumours",

Professor W. JÄNISCH -

- Director of the Institute of Pathology Martin Luther University in Halle
- stayed for several days in our Department, delivered a lecture on brain changes in the precancerous period caused by the chemical action of carcinogens and discussed the problem of experimental demyelination in mice and their offspring, following the action of ethylnitrosourea. Professor Janisch participated also in the Polish-German Symposium on: "Chemical Brain Injuries and Brain Tumours".

Professor H. GÜTHERT -

- Head of the Department of Pathology, Medical Academy in Erfurt
- delivered during his 5-day stay a lecture on central nervous system changes caused by hypoglycaemia, and participated in the discussion on the model of hypoglycaemia. He participated also in the Polish-German Symposium on: "Chemical Brain Injuries and Brain Tumours".

Professor J. QUANDT -

- Director of the Institute of Neurology and Psychiatry in Bernburg
- came for a visit of 5 days delivering a lecture on the pathological mechanism of central nervous system damage caused by dopamine. He discussed also the results of investigations on central nervous system changes and participated in the Polish-German Symposium.

6. Under the Agreement between the Polish Academy of Sciences and the German Service for Scientific Exchange, G.F.R. (DAAD):

Professor W. MÜLLER -

- Head of the Department of Neuropathology Institute of Pathology, Köln University,
- stayed at the Medical Research Centre for 6 days. He held consultations at the Department of Neuropathology concerning the tumours and degenerative diseases of the central nervous system in the aspect of their pathomorphology, and delivered a lecture on scanning microscope investigations of central nervous system calcifications.

7. Under the Agreement between the Medical Research Centre and the Laboratory of Experimental Physiology and Resuscitation, Academy of Medical Sciences in Moscow, USSR:

Doctor R. GADAMSKI -

- stayed for 3 weeks at this Laboratory studying the method of experimental cardiac arrest and resuscitation indispensable for the investigations conducted at the Department of Neuropathology. He delivered also a lecture on: "Disturbances of the microcirculation in the spinal cord of dogs following temporary

occlusion of the thoracic part of the aorta", and discussed the results of experiments carried out jointly.

During his visit to the USSR Dr Gadamski visited also the Institute of Neurosurgery, Academy of Medical Sciences in Moscow, where he was acquainted with histological methods of demonstration of blood vessels. He visited also the Institute of Physiology, Georgian Academy of Sciences in Tbilisi.

8. Under the Bilateral Agreement between the Medical Research Centre and the Institute of Neurology, Academy of Medical Sciences in Moscow:

Doctor H. WEINRAUDER-SEMKOW -

- studied during her two-week visit to the Institute the methods of investigations of antigenic properties of nervous tissue under normal and pathological conditions. The Institute supplied us with sera which will be used for immunological tests to extend the scope of our investigations and to apply them in clinical practice.

Doctor Z. RAP -

- stayed also for 10 days at this Institute investigating cerebral circulation. A programme of collaborative investigations under the agreement between both scientific centres has been accepted.

9. Under the Bilateral Agreement between the Medical Research Centre and the Institute of Physiology, Georgian SSR Academy of Sciences:

In the period August 30 - September 7, 1976, a Working Symposium on: "Comprehensive Investigations of Brain Ischaemia" was held in Tbilisi, Georgian SSR. Results of collaborative investigations were presented and discussed.

10. Individual visits of foreign scientists to the Department of Neuropathology

Professor A. SABIN -

- from the Medical University of South Carolina, USA
- stayed at the Department for 4 days and discussed the problems of demyelination in the central nervous system.

11. Individual visits abroad of scientific workers of the Department

Doctor H. KROH -

- took part in consultations during a short visit to the Institute of Neuropathology, Steglitz Clinic, in West Berlin, concerning the methods of investigating the effects of experimental demyelination in the electron microscope.

Doctor J. ALBRECHT -

- is staying under a one-year fellowship at the Neurochemistry Research Unit, Mayo Clinic, Rochester, USA, where he is doing collaborative research on the effects of experimental hypoxia and ischaemia on different stages of protein and RNA biosynthesis in the central nervous system.

Doctor M. SMIALEK -

- is staying under a one-year fellowship at the Laboratory of Neuropathology and Neuroanatomical Sciences NIH, Bethesda, USA, where he is doing research on the high-energy compounds of respiratory metabolism, and active transport across biological membranes.

**Professor M.J. MOSSAKOWSKI -**

- who is Vice-President of the International Society of Neuropathology participated in the session of the Executive Board of this Society, April 1-5, 1976, in Cambridge, G. Britain.

**Doctor K. RENKAWEK -**

- participated as chairman in the session of the Tissue Culture Association Meeting in Philadelphia, USA, June 7-10, 1976.

LABORATORY OF DEVELOPMENTAL NEUROPATHOLOGY

M. DAMBSKA, M.D., D.Sc. assoc. professor of Neuropathology

Member of: Polish Association of Neuropathologists  
Polish Society of Neurologists  
International Society of Neuropathology

L. DYDYK, M.D.

Member of: Polish Association of Neuropathologists  
International Society of Neuropathology

L. IWANOWSKI, M.D.

Member of: Polish Association of Neuropathologists  
Polish Society of Neurologists  
International Society of Neuropathology

P. KOZŁOWSKI, M.D.

D. MAŚLIŃSKA, M.D.

Member of: Polish Association of Neuropathologists  
International Society of Neuropathology



Under the agreement between the Polish Academy of Sciences  
and the Centre National des Recherches Scientifiques, France:

Doctor R. RIBLERÉ -

- Director of the Centre d'Etudes et de Recherche  
d'Anthropologie Fondamentale, Paris
- stayed at the Laboratory for one week discussing  
collaborative investigations on morphological-  
-clinical correlations of nervous system development  
in man. The morphological material collected up  
till now was evaluated.

DEPARTMENT OF COMPARATIVE NEUROLOGY

E. OSETOWSKA, M.D., professor of Neurological Sciences

Member of: Polish Society of Neuropathologists  
International Society of Neuropathology  
(Executive Committee 1972-1976)

Membre-Fondateur du Groupe de Travail  
de Neuropathologie (Paris 1959) de  
la Fédération Mondiale de Neurologie

Société Belge de Neurologie

Deutsche Vereinigung der Neuropathologen  
und Neuroanatomien

F. LUSZAWSKI, zootechn.Eng.

J. SAWICKI, M.B.vet.

A. TARASZEWSKA, M.D.

Member of: Polish Society of Neuropathologists  
International Society of Neuropathology

In 1976 the Department cooperated with following foreign research centres:

1. Brussels Free University (Belgium) Dept. of Pathophysiology

Professor A. LOEWETHAL, M.D. -

- The subject: Metabolites of the catecholamines in the urine of the pt-rabbits.

2. National Institutes of Health, U.S.A.

Within the Polish-American Scientific Agreement (PL-480, 05-035-1)

- The subject: Brain fine structure of pt-rabbits.

3. Under the agreement between Polish Academy of Sciences and the German Service for Scientists Exchange, G.F.R. (DAAD):

Professor W. MÜLLER -

- Head of the Department of Neuropathology, from the Institute of Pathology, Köln University -
- stayed for some days at the Department for consultation of the neuroaxonal calcification. He visited also other Departments of M.R.C. in Warsaw, and Neuropathological Laboratories in Kraków (P.A.S.) and in Poznań (University).

4. Visit of foreign scientist at the Department:

Professor M.C. SMITH -

- General Secretary of the International Society of Neuropathology
- visited the Department for several days for consultation of anatomical substrate of tremors. He visited also other Departments of M.R.C. in Warsaw and the Neuropathological Laboratories P.A.S. in Kraków.

5. Individual visit of scientific worker of the Department to foreign scientific centre:

Doctor A. TARASZEWSKA -

- stayed further 3 months (together with 1975-15 months) at the Neuropathological Department of Max-Planck Institute, Frankfurt a/M, G.F.R. During this stay she studied electron microscopic techniques in relation with cerebral investigation of pt-rabbits.

DEPARTMENT OF NEUROCHEMISTRY

A. GROMEK, M.Biol., D.Nat.Sc.

Member of: Polish Biochemical Society  
Polish Physiological Society

B. HRONISZEWSKA-ARDELT, M.Biol., D.Nat.Sci.,

Member of: Polish Biochemical Society

L. CHACZATRIAN, D.Biol.Sc.

Z. DĄBROWIECKI, M.Chem., postgrad.assis.

K. DOMAŃSKA-JANIK, M.D.

Member of: Polish Biochemical Society  
Polish Association of Neuropathologists

H. KSIĘŻAK, M.Biol.

Member of: Polish Biochemical Society

J.W. LAZAREWICZ, M.D.

Member of: Polish Biochemical Society

M. MAJEWSKA, M.Biol.

Member of: Polish Biological Society

A. PASTUSZKO, M.Biol.

U. RAFAŁOWSKA, M.Biol., D.Nat.Sc.

Member of: Polish Biochemical Society

J. STROSZNAJDER, M.D.

Member of: Polish Biochemical Society  
Polish Neurological Society

J. WIDEMAN, M.Biol., D.Nat.Sc.

Member of: Polish Association of Neuropathologists

J. WRÓBLEWSKI, M.Biol., postgrad.assis.

M. ZALESKA, M.Biol.

Member of: Polish Biological Society

T. ZALEWSKA, M.Pharm., D.Pharm.Sc.,

Member of: Polish Biochemical Society

Polish Association of Neuropathologists

International Society of Neuropathology

Multilateral cooperation between  
Academies of Sciences of socialist  
countries

Molecular Biology

Doctor L. CHACZATRIAN -

- from the M.R.C., took part in the 2nd Session of the Committees participating in the programme: Molecular Biology, Szeged, Hungary, 1976, Sept. 7-10.

Bilateral cooperation between  
Academies of Sciences:

1. Agreement between the Section of Medical Sciences, Polish  
Academy of Sciences and the USSR Academy of Sciences:

Doctor J. STROSZNAJDER -

- stayed at the Institute of Evolution of Physiology and Biochemistry in Leningrad and at the II-nd Moscow Institute of Medicine.  
During this two-week stay Dr Strosznajder was acquainted with the studies on the biochemistry of lipids in connection with the function and structure of membranes in the central nervous system.

Doctor L. CHACZATRIAN -

- stayed for six weeks at the Institute of Molecular Biology in Moscow.  
During her stay there Dr Chaczatrian carried out studies on the methods of cAMP and cGMP determination in the brain and methods of obtaining cAMP-dependent protein kinase from the brain and determination of its activity.

2. Agreement between the Polish Academy of Sciences and the Hungarian Academy of Sciences

Miss M. ZALESKA -

- stayed during 3 months at the Experimental Research Department, Semmelweis University, Medical School, Budapest.  
The purpose of her stay there was the study of the metabolism of biogenic amines in the central nervous system.

3. Individual visits of scientific workers from the Department to scientific centres abroad.

Doctor T. ZALEWSKA,-

- stayed for 16 months at the Max-Planck Institut für Hirnforschung in ~~Köln~~, G.F.R., investigating the biosynthesis of protein in the central nervous system during ischaemia. Two papers containing the results of these investigations are ready for publication.

Doctor J. WIDEMAN -

- is presently staying at the Roche Institute of Molecular Biology, Nutley, USA.  
Doctor Wideman is conducting research there, among other things, on the peptide content in the central nervous system of animals.



LABORATORY OF THE ULTRASTRUCTURE OF THE NERVOUS SYSTEM

J.W. BOROWICZ, M.D., D.Sc. assoc. professor of Medical Sciences

Member of: Polish Pathologists Society  
Polish Association of Neuropathologists  
European Society of Pathology  
European Cell Biology Organization

A. DANIELEWICZ-KOTOWICZ, M.D.

B. GAJKOWSKA, M.Biol., D.Nat.Sc.,

K. OLSZEWSKA, M.Biol.

Under the agreement between the Polish Academy of Sciences and the Centre National des Recherches Scientifiques, France:

Doctor B. GAJKOWSKA -

- stayed during one year under a fellowship at the Institut de Recherche Scientifique sur le Cancer CNRS, Villejuif, France.

She studied morphological and histochemical methods used in electron microscopy, especially in the aspect of investigations of nerve and glial cells in vivo and in vitro.

Visits of foreign scientist to the Laboratory.

Professor A. FUKAMI -

- from the Nippon University Tokyo, paid a two days visit to the Laboratory and delivered a lecture on the methods of investigation of biological material under the electron microscope without dehydration.

DEPARTMENT OF NEUROSURGERY

E. MEMPEL, M.D., D.Sc., assoc. professor of Neurosurgery

Member of: Polish Neurosurgical Society

Chairman of Warsaw Section of Polish  
Neurosurgical Society

Hon. Member of the Purkinje Czechoslovak  
Medical Society

J. ADYNOWSKI, M.D.

Member of: Polish Radiological Society

B. AUGUSTYNIAK, M.D.

Member of: Polish Neurosurgical Society

Z. CZERNICKI, M.D.

Member of: Polish Neurosurgical Society

P. DYTKO, B.Sc., (hon.) P.G.Dip.

J. DZIDUSZKO, M.D.

Member of: Polish Neurosurgical Society

W. GROCHOWSKI, M.D.

Member of: Polish Neurosurgical Society

J. JURKIEWICZ, M.D.

Member of: Polish Neurosurgical Society

J. KORSAK-ŚLIWKA, M.Sc., (eng.)

A. KWIATKOWSKI, M.D.

L. KUCZYŃSKI, M.D.

E. LUCZYWEK, M.Psych.

R. STADNICKI, M.Psych.

G. STEMPIŃSKA, M.D.

J. SZEWCZYKOWSKI, M.D.

Member of: Polish Neurological Society

J. SZUMSKA, D.Psych., D.Neuropsych.Sc.,  
assoc. professor of Neurosurgery

Member of: Polish Neurosurgical Society

S. ŚLIWKA, M.Sc. (eng.)

E. FERSTEN, M.Psych.

B. WITKIEWICZ, M.D.

Member of: Polish Neurological Society

1. Cooperation Agreement between the Polish Academy of Sciences and the Hungarian Academy of Sciences:

Doctor J. SZEWCZYKOWSKI -

- spent a week at the National Institute of Neurosurgery, Budapest, Hungary, where he gave a series of lectures on the pathomechanisms of intracranial pressure disturbances.

2. Bilateral Cooperation Agreement between the Medical Research Centre, P.A.S., and the Burdenko Institute of Neurosurgery, Moscow, USSR:

Mrs J. KORSAK-ŚLIVKA -

- spent two weeks at the Burdenko Institute becoming acquainted with the Institute's computer systems for analysis of patient data.

Mr P. DYTKO -

- spent two weeks at the Institute to become acquainted with methods and apparatus for the study of the relationship between intracranial pressure levels and consciousness in neurosurgical patients. In accordance with the Bilateral Agreement, a specialized system for the measurement of intracranial pressure and elastance was jointly implemented.

Doctor A. SZACHNOWICZ and Doctor W. BIEŻANOV -

- from the Burdenko Institute, Moscow, spent two weeks at the Department of Neurosurgery, M.R.C., to become acquainted with the problem of intracranial pressure analysis and elastance and elasticity. During his stay in Warsaw Dr Szachnowicz lectured on the measurement of regional cerebral blood flow.

3. During 1976 the following foreign scientists visited the Department of Neurosurgery, M.R.C.,

Doctor A. HARTMANN -

- from the Neurosurgical Clinic, Heidelberg, GFR, paid a short visit to the Department. He became acquainted with the Department's research programme and consulted several patients.

Professor D. ZIEMNOWICZ -

- from the National Institutes of Health, Bethesda, USA. During his one-day visit Professor Ziemnowicz became acquainted with the Department's research programme and presented a lecture on rheoencephalography.

Professor P. TOFOWICZ -

- Head of the Neurosurgical Clinic of Skopje University, Yugoslavia;

Professor E. PASZTOR -

- Director of the Institute of Neurosurgery, Budapest, Hungary;

During their one-day visit at the Department profs. Tofowicz and Pasztor became acquainted with the Department's research programme and took part in consulting sessions.

Professor A. PIMENTA -

- Director of Departamento de Neurologia e Neurochirurgia Escola Paulista de Medicina, Sao Paulo, Brasil.

During his three-day visit at the Department prof. Pimenta discussed the results of research work on intracranial pressure and cerebral blood flow and gave a lecture on laminar flow.

4. Individual visit of scientists from the Department  
to foreign research centres and clinics

Assoo. professor J. SZUMSKA -

- spent three months at the Neurological Clinic at Bonn, GFR, to become acquainted with methods of investigating speech disorders. The supplementary material on rehabilitation of speech disorders, which doctor Szumska collected there will be included in her book devoted to this problem (to be published in Polish and German). During her stay at the Bonn clinic, dr Szumska also visited similar clinics at Aachen and Dusseldorf (G.F.R.).

Professor A. KUNICKI -

- President of the Scientific Council of M.R.C., and Consultant at the Department of Neurosurgery, took part in the WHO Conference on Classification of Intracranial Tumours, 1976, October 19-26, (Geneve, Switzerland).

DEPARTMENT FOR SURGICAL RESEARCH AND TRANSPLANTATION

W. OLSZEWSKI, M.D., D.Sc., assoc. professor of Surgery

Member of: Polish Surgeons Society  
V-President of the European Society  
for Surgical Research  
International Lymphological Society  
(Editorial Board)  
International Transplantation Society  
Brazilian Vascular Society (Hon. Member)

M. DĄBROWSKI, M.D.

A. DESZKIEWICZ, M.D.

M. GALKOWSKA, M.Biol.

J. KŁOS, M.D.

A. KOSSAKOWSKI, M.D.

J. KUPIEC-WEGLIŃSKI, M.D.

E. LUKASIEWICZ, M.Pharm., D.Pharm.

J. PŁACHTA, M.Pharm.

J. ROWIŃSKI, M.D.

Member of: Polish Surgeons Society  
European Dialysis and Transplantation  
Association  
European Society for Surgical Research  
International Transplantation Society

M. RUKA, M.Vet.Sc.



1. Scientific exchange and cooperation under Agreement between the Medical Research Centre, P.A.S. and the Laboratory for Organ and Tissue Transplantation of the Academy of Medical Sciences, Moscow, USSR:

Mr J. PLACHTA -

- paid a 2 weeks visit to the Laboratory for Organ and Tissue Transplantation Ac. M. Sc. USSR, where he carried out biochemical investigations on carbohydrate-energetic metabolism in liver cells.

2. Scientific exchange and cooperation under Agreement between the Norway Radium Institute, Oslo, and the Medical Research Centre:

Assoc. Professor W. OLSZEWSKI -

- head of the Department
- visited several times the Laboratory in Oslo taking part in investigations on filtration of immunoglobulins and complement and lymphocyte migration into the tissues. Four papers were prepared for publication.

Technician Mrs A. ZIÓLKOWSKA -

- stayed for 2 months in the Norway Radium Institute to learn the method of determination of complement inhibitors. In addition she took part in studies concerned with determination of the inhibitor of the 3rd Component of the complement in the tissue fluid in healthy humans as well as in patients with neoplasms.

Senior Technicians Mr A. NESHEIM and Mrs B. NESHEIM -

- from the Norway Radium Institute
- stayed for 1 week at the Department. They demonstrated a method of fixation of lymphatic tissue stains as well as a method of preparation of lymphocyte stains and tissue stains for autoradiography.

Professor K. POLLEN -

- Director of the Norway Radium Institute visited the Medical Research Centre for one week. During his visit he gave a lecture on problems related to cancer immunology. He also discussed with the Director of the Medical Research Centre problems of bilateral cooperation and its perspectives in the future.

3. In 1976 Department for Transplantation Research was visited by:

Professor R. WILSON -

- of Peter Bent Brigham Hospital, Harvard Medical School, Boston, USA. During his one-week stay professor Wilson presented the results of his studies on experimental and clinical kidney transplantation. He gave lectures on new trends in clinical and experimental kidney transplantation and on immunological monitoring of the patient after the transplantation.

Professor M. SLAPAK -

- of the Department for Organ Preservation of Cambridge University, England,

visited the Department for one week. During his stay he consulted the results of studies on kidney and liver preservation and presented his own results of studies on biological problems in organ preservation and the applicability of various preservation methods.

4. Individual grants and visits of Department scientific workers to foreign medical centres:

Doctor A. KOSSAKOWSKI -

- worked for one year in the Biochemistry Department of the State University in Buffalo, USA.  
The purpose of his studies was to examine the immunogenicity of the peripheral nerves used for transplantation and to learn new laboratory methods, e.g., preparation of the biological material for electron-microscopy studies, in vitro and in vivo labelling, thin-layer autoradiography and others.

Assoc. Professor W. OLSZEWSKI -

- took part in the Tripartite Meeting of the European Surgical Research Society, British Surgical Research Society and the American Society for University Surgeons, which took place in Philadelphia (USA), 1976, September 27-29.  
At the meeting he presented the paper: "On the mechanism of local immune deficiency after interruption of lymphatic pathways".

Doctor J. KUPIEC-WEGLIŃSKI -

- stayed during 2 weeks at the Institute of Diabetes Research in Karlsburg, G.F.R.
- where he studied the experimental method of isolation and transplantation of pancreatic islets in rats.

LABORATORY OF EXPERIMENTAL SURGERY

J. NIELUBOWICZ, M.D., B.Sc., professor of Surgery

Corresponding Member of the Polish Academy of Sciences

President of the Polish Surgeons Society

President-Elect of the European Cardiovascular  
Surgical Society

Corresponding Member of Lyon's Surgical Soc. (France)

Corresponding Member of Surgeons Society  
of Great Britain and Ireland

Corresponding Member of American College of Cardiology

Hon. Member of Surgeons Society of Italy

Hon. Member of Lombardy Surgeons Soc. (Italy)

Hon. Member of Bulgarian Surgeons Soc.

Member of: The Executive Committee of the Societe  
Internationale de Chirurgie

M. BORKOWSKI, M.D., D.Sc., assoc. professor of Surgery

Member of: Polish Surgeons Society

1. Under the Agreement between the Polish Academy of Sciences and the Royal Society in England, the Laboratory was visited by:

Doctor P. MARTIN -

- Head of the Surgical Department, Chelmsford Hospital, Essex, England.

During his one-week visit Doctor Martin discussed the treatment of aneurysms on peripheral arteries and delivered a lecture on aortic aneurysms. He also examined the patients.

Doctor A. BIRT -

- Head of the Surgical Department, Norwich Hospital, Norfolk, England.

During his one-week visit Doctor Birt participated in the discussion on surgical treatment of peripheral arterial occlusion and wound infections.

2. Individual visits of foreign scientists to the Laboratory of Experimental Surgery:

• Professor C. NARDI -

- from the Harvard Medical School, Massachusetts, USA, General Hospital in Boston.

Professor Nardi stayed for several days at the Laboratory consulting patients and delivering a lecture on advances in the diagnosis of acute pancreatitis and pancreatic tumours.

Professor J. van GEERTRUYDEN -

- General Secretary of Societé Internationale de Chirurgie, Brussels, Belgium.  
During his one-week visit Professor van Geertruyden became acquainted with the results of investigations on renal transplantation. He read a lecture on - hypoparathyroidism in patients with transplanted kidneys.

Professor C. GRASSI -

- Head of the Department of Surgery of the Rome University, Italy.  
During his one-week visit Professor Grassi discussed the methods of surgical treatment of gastric and duodenal ulcer and read a lecture on - superselective vagotomy in treatment of gastric and duodenal diseases.

Professor S. BENGMARK -

- Head of the Department of Surgery, of Lund University, Sweden.  
Professor Bengmark stayed for several days at the Laboratory discussing the methods of treatment of acute gastrointestinal haemorrhage and therapeutic methods in primary and secondary liver tumours and liver cirrhosis.

Individual visits of the Head of the Laboratory to foreign scientific centres

Professor J. NIELUBOWICZ -

- Head of the Laboratory - participated twice in sessions of the Executive Committee of the Societé Internationale de Chirurgie as a member of this Committee (Brussels, Belgium, Feb. 6-9 and Nov. 12-14, 1976).

As Vice-President of the European Cardiovascular Society he participated in the XXVth Meeting of the Europ. Cardiovasc. Surg. Soc., which took place at Belgrade, Yugoslavia, on Aug. 31-Sept. 5, 1976. During this Meeting Professor Nielubowicz was elected President-Elect of this Society (for the years 1978-1980). He presented a paper on surgical treatment of the postphlebotic syndrome, accepted for publication as: Nielubowicz J., Szostak M.: "Liuton flap operation in postthrombotic ulceration of lower extremity".

On the invitation of the Bulgarian Universities (May 10-14) Professor Nielubowicz delivered lectures at:

- the Plovdiv University - on surgical treatment of portal hypertension,
- the Sofia University - he spoke on complications in portal hypertension.

During his visit in Bulgaria, the Society of Bulgarian Surgeons elected Professor Nielubowicz Honorary Member of this Society.

At the University in Halle, G.D.R., - Professor Nielubowicz gave a lecture on June 3rd, 1976, on:  
- differential diagnosis and indications to surgical treatment of mechanical and paralytic ileus.

4. On September 23-25, 1976, the 48th Congress of the Polish Surgeons' Society convened in Warsaw.

Its scientific organization was entrusted to Professor Nielubowicz, who was also the President of the Congress. He delivered an opening address on "Some problems in the history of Polish Surgery". He was also moderator of the final discussion on Hospital Infections.

RESEARCH GROUP OF SCHOOL MENTAL HYGIENE

H. OSIŃSKI, M.Psych., M.D.

Member of: Polish Society of Mental Hygiene  
Orton Society (U.S.A.)

J. MARKIEWICZ, M.Physic.Ed.

S. ORŁOWSKI, M.Ph.

Member of: Polish Society of Mental Hygiene  
Polish Society for Rehabilitation  
of the Disabled

J. SIWKIEWICZ, M.Psych.

Member of: Polish Society of Mental Hygiene  
Orton Society (U.S.A.)

S. SZMUKLER, M.A.

Member of: Polish Society of Mental Hygiene  
Orton Society (U.S.A.)

B. ZAKRZEWSKA, M.Psych.

Member of: Polish Society of Mental Hygiene  
Polish Psychological Society  
Orton Society (U.S.A.)



MENTAL HEALTH DEPARTMENT

Z. POSEL, M.D.

Member of: Polish Medical Association  
Polish Psychiatric Association  
Polish Society of Mental Hygiene

B. BAZYLEWICZ-WALCZAK, M.Psych.Clin.

Member of: Polish Psychiatric Association  
(Section of Psychotherapy)

U. GODLEWSKA, M.D.

Member of: Polish Medical Association  
Society of Polish Internists

Z. JUGHA, M.A., D.Ph.Sc.

Member of: Polish Psychological Society  
Polish Society of Mental Hygiene

A. KLIMOWICZ, M.L.

Member of: Polish Society of Mental Hygiene  
Polish Society of Lawyers

M.D. PELKA-SŁUGOCKA, M.L., D.C.L.

Member of: Polish Sociological Society  
Polish Society of Lawyers  
Polish Society of Mental Hygiene

R. PRZYBYSZ, M.Soc.Sc.

A. RENDECKA, M.Ph., M.Psych.Sc.

Member of: Polish Psychological Society

E.M. ROGOZIŃSKA, M.Ph.

Member of: Polish Psychiatric Association  
(Section of Psychotherapy)

M. SZAFRAŃSKA, M.D.

Member of: Polish Psychiatric Association  
Polish Society of Mental Hygiene  
Polish Medical Association

J.W. TOMACZAK, M.D.

Member of: Polish Psychiatric Association  
Polish Society of Mental Hygiene  
Polish Medical Association

L.R. WIERCIOCH, M.D.

Member of: Polish Psychiatric Association  
Polish Medical Association

S. WIŚNIEWSKI, M.A., M.Ph.

P. ZAKRZEWSKI, D.C.L., D.A.Sc.

Member of: Polish Sociological Society  
Polish Society of Mental Hygiene

J. ŻURAW, M.A.

MEDIPAN - Scientific Instruments Laboratories

- S. KARALOW, M. So., M. Eng.
- J. GONSTAL, M. So., M. Eng.
- R. GRUCZA, E. Eng.
- S. JABLŹYŃSKI, M. So., E. Eng.
- M. JĘDRASZEK, M. So., M. Eng.
- A. KLOBUKOWSKI, M. So., M. Eng.
- A. KWAPISZ, M. So., M. Eng.
- P. MAMONT, M. So., E. Eng.
- L. TOMKOWICZ, M. So., M. Eng.

MI SCIELANEA

#### AWARDS OF SCIENTIFIC DEGREES

The following research workers after completing their postgraduate studies at the Departments of Medical Research Centre, defending their theses in a public discussion, obtained in 1976 the degree - Doctor of Sciences:

Mrs B. AUGUSTYNIAK, M.D. -

Doctor of Medical Sciences, from the Department of Neurosurgery, for the thesis:

"ICP gradients and CBF during local brain compression and decompression".

Mrs J. CHWAŁBIŃSKA-MONETA, M.D.

Doctor of Medical Sciences, from the Department of Applied Physiology, for the thesis:

"Participation of osmoreceptor portal system in the liver in the control of antidiuretic hormone secretion".

Mr J. CZAJKOWSKI, physician -

Doctor of Medical Sciences, from the Department for Surgical Research and Transplantation, for the thesis:

"The effect of massive transfusion of stored blood on the respiratory system".

Mr A. DESZKIEWICZ, physician -

Doctor of Medical Sciences, from the Department for Surgical Research and Transplantation, for the thesis:

"The effect of massive infusion of electrolytes solution, glucose or dextran on pulmonary intestinal tissue pressure".

Mr J. DZIDUSZKO, M.D. -

Doctor of Medical Sciences, from the Department  
of Neurosurgery, for the thesis:

"Comparative studies on the behaviour of spongo-  
stand and oxycel in the CNS and the effect of these  
substances on intracranial pressure".

Mrs K. HERBACZYŃSKA-CEDRO -

on the basis of the thesis:

"Studies on the role of endogenous prostaglandins  
in blood flow regulation in certain regions of  
vascular bed",

was granted the degree of Doctor Medicinae Habilitatus.

#### SCIENTIFIC AWARDS

##### I.

The 1976 annual awards of the Scientific Secretary,  
Polish Academy of Sciences, were granted to the following  
research workers of the Medical Research Centre:

##### 1. The team from the Department of Applied Physiology -

Mrs H. KACIUBA-UŚCILKO, assoc. professor of Natural Sciences,  
D.Agr., D.Nat.Sc.

Mr S. KOZŁOWSKI, M.D., D.Sc., professor of Physiology,

Mrs K. NAZAR, M.D., D.Sc.,

Mrs Z. BRZEZIŃSKA, M.B., D.Pharm.

with technical assistance of:

Mrs W. RADZISZEWSKA

Mrs A. GAJOWCZYK

Mr R. SZOSTAK

for a series of studies on the effect of thyroid hormones  
on the metabolism and thermoregulation during exercise.

2. The team from the Mental Health Department -

(The 1st grade collective award in Social Sciences)

Mrs M.D. PELKA-SŁUGOCKA, D.C.L.

Mr L. SŁUGOCKI, D.L.

Mr K. GOSTKOWSKI, Ph.D., professor of Sociology

Mr J. LUTYŃSKI, Ph.D., professor of Sociology

Mrs K. LUTYŃSKA, Ph. D., assoc. professor of Sociology

- and others -

for a series of studies on analysis of conformity of factual answers obtained in questionnaire interviews with the documents.

The work entitled:

"Analyses and tests of research techniques in Sociology"  
(in Polish)(Vol. V: Pilot studies and verification analyses)

Edit.: Z. Gostkowski, J. Lutyński.

Ossolineum, Wrocław-Warszawa-Kraków-Gdańsk, 1975.

3. The team from the Department of Neuropathology -

Mrs H. WEINRAUDER-SEMKOW, M.Biol., D.Nat.Sc.

Mr Z. ŚMIAŁEK, M.Pharm., M.D.

with technical assistance of:

Mrs T. BOK

Mrs J. DYBKOWSKA

Mr B. LACH

for investigations on localization of specific glial antigen in the nervous system.

II.

The 1976 individual awards of Polish Scientific Societies granted to the following research workers of Medical Research Centre:

1. Of the Polish Anatomico-Pathological Society

Mr W. OLSZEWSKI, M.D., D.Sc. assoc. professor of Surgery

Mr J. KAÇKI, M.D.

Mr A. WASIUTYŃSKI, M.D.

for studies on the changes in lymphatic system in experimental pulmonary oedema.

2. Of the Polish Association of Neuropathologists

Mr A. KAPUŚCIŃSKI, M.D.

for his investigations on ischaemic-hypoxic brain oedema with radioisotope methods.

Mrs H. KROH, M.D., D.Sc.

for her studies on morphological and histochemical features of experimental gliomas in mice.

3. Of the Polish Physiological Society

(IIInd grade individual award)

Mrs M. GLOGOWSKA, M.D.

for her paper:

"The significance of afferent vagal information in the control of breathing in guinea pigs".

(IIIrd grade individual award)

Mrs M. SZEREDA-PRZESTASZEWSKA, M.D.

for her paper:

"The effect of anaphylactic shock on laryngeal calibre in rabbits"



ELECTION TO EXECUTIVE BOARD OF FOREIGN SOCIETY

Mr W. OLSZEWSKI, M.D., D.Sc., assoc. professor of Surgical Sciences, was honoured with the function of V-President of the European Society for Surgical Research.