

POLISH ACADEMY OF SCIENCES
MEDICAL RESEARCH CENTRE

REPORT
ON SCIENTIFIC ACTIVITIES
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POLISH ACADEMY OF SCIENCES

MEDICAL RESEARCH CENTRE

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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 the Respiratory and Cardiovascular System

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

In comparative studies on the basic mechanism of "memory" in the respiratory complex of the brain stem in monkeys, pigs and rabbits, it was shown that the neural control of breathing in monkeys is clearly different from that in the latter two species. Central and chemical mechanisms seem to dominate in monkeys over reflex influences from lungs and airways.

The "memory" phenomenon seems to be governed by the level of CNS excitability (increase in CNS excitability is paralleled by decrease in time constant of the post-stimulus effects and an increase in the rate of rise of inspiration).

New data were obtained showing that the activity of pulmonary stretch receptors is transformed in the CNS very much alike to a leaky integration, a term known in physics. The importance (weight of information reaching the CNS via the vagus nerves) depends on one side on the frequency pattern (positive correlation) and on the other, on factors modeling the extent of leakage (negative correlation).

It was shown that different types of phrenic motoneurons participate in building up the discharges of this nerve at different levels of the respiratory drive.

See the list of publications.

Neurohormonal Mechanisms
of Cardiovascular Regulation

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

The role of prostaglandins (PGs) in the control of cerebral circulation under physiological conditions and in certain pathological states was investigated. It was found that noxious conditions such as hypoxia, transient cerebral ischaemia or embolism, induce the release of prostaglandins into cerebral venous blood.

This may be considered as a nonspecific response to cerebral and/or cerebrovascular damage.

The role of PGs in the response of cerebral circulation to carbon dioxide has not been confirmed in our experiments, since pharmacological inhibition of prostaglandin synthesis has no effect on the cerebral vasodilator response to hypercapnia.

The results of these investigations do not support the view on the role of endogenous PGs in physiological regulation of cerebral blood flow, but indicate that enhanced release of PGs into the cerebral venous outflow is an early symptom of cerebral and/or cerebrovascular damage.

See the list of publications.

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

a.3. NEUROHORMONAL CONTROL OF ENERGY SUBSTRATE UTILIZATION
DURING PHYSICAL EXERCISE AND THE ROLE OF EMOTION IN
ADAPTATION MECHANISMS

In investigations on the glucostatic mechanism of the control of energy substrate utilization during physical work, the existence of which had been demonstrated previously, new experimental data were obtained indicating the importance of intracellular glucopenia detection during work as the indication of neurohormonal responses modifying the mobilization, synthesis and utilization of extramuscular energy substrates during work, and their importance for determining the working ability and fatigue tolerance.

The modification of carbohydrate stores in the organism, by prolonged physical work and isocaloric meals with different contents of carbohydrates and lipids, changed the pattern of the neurohormonal responses to physical exercise controlling mobilization, synthesis and utilization of energy substrates in muscles. The energy cost of exercise and the rate of development of fatigue-induced changes were also altered.

New data were obtained which shed light on the role played by thyroid hormones in the control of metabolism and body temperature during physical exercise, in model experiments on animals with hyper- or hypo-thyroidism. An unknown as yet relation between exercise-induced temperature changes and the thyroid state was demonstrated.

In the investigations aiming at determining the physiological strain during physical exercise performed by diabetics with varying duration of the disease, physiological criteria, of permissible work loads in professional work were elaborated. Suggestions were put forward concerning intensity and duration of exercise practised for diminishing of insulin demand in the treatment of diabetic patients.

Besides, a monograph (in typescript) on the physiological criteria of working ability evaluation in hypertensive subjects has been recommended for introduction in practice. The monograph is based mainly on the results of the authors' investigations carried out in cooperation with the Second Department of Internal Diseases, School of Medicine in Warsaw, and with the Industrial Health Service at Starachowice.

See the list of publications.

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

In the investigations carried out for explaining the effects of temperature changes on the renal excretory activity and haemodynamics data were obtained which point out, that the antidiuretic effect in pyrogen-induced fever is not directly related to changes in body temperature, but it may depend on increased synthesis of prostaglandins in the central nervous system, which stimulate the antidiuretic system.

A hypothesis has been put forward based on the results obtained in earlier investigations, according to which hepatic osmoreceptors play a role in the control of the water balance in the organism. This hypothesis takes into account the effect of impulses from these receptors on the mechanism of thirst, the antidiuretic system and the renal function.

The effects of general anaesthesia on the thermoinsulating properties of superficial tissues, heat production and heat elimination were also studied.

See the list of publications.

Intracellular Mechanism Regulating
the Metabolism of Nerve Cells

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

In studies on the interrelationships between the structure and metabolism of cell membrane constituents and, on the other hand, on the processes of transport and other biochemical activities of brain cells it was demonstrated that bivalent ions, adenine nucleotides and neurotransmitters change in vitro the activities of ethanolamine and choline phosphotransferases. Neurotransmitters regulate directly or through cAMP the synthesis of phospholipids in neurons and synaptosomes without any significant effect on the synthesis of phosphoglycerides, being less active in glial cells. Post-decapitation ischaemia of the brain results in a shift of the activity of marker enzymes and in changes of the protein and RNA levels in different subcellular fractions. Marked disturbances of protein and lipid components of microsomal membranes develop.

Ischaemia-induced changes in the structure of membranes are associated with disturbances in the activities and subcellular localization of certain membrane enzymes: glucose-6-phosphatase is released from the microsomes to cytosol, the specific activity of IDH-NADP is reduced in the mitochondria of adult rats, but is raised in the mitochondria of newborn ones.

In the brain like in the liver transport of citrate and malate across the mitochondrial membranes is mediated, by specific carriers of dicarboxylic and tricarboxylic acids. Hypoxia and nembutal anaesthesia reduced this transport by 60% and 40% of the initial value, respectively. In the animals subjected to hypoxia the activation of choline transport into synaptosomes was shown.

It was found that depolarization with high concentrations of potassium activated calcium transport in the cells

of astroglia and glioma but had no effect on calcium transport in isolated neuronal cell bodies and cultured neuroblastoma cells.

During hypoxia a fall of the energy charge was observed in brain mitochondria isolated from adult animals. Reduction of the levels of ATP and CrP in the brain appeared after 2 min of hypoxia, while after 30 min hypoxia with intermittent resuscitation the energy charge was normal.

A significant role of Mg^{++} and ATP in regulation of the activity of histone kinase was shown.

It was found that hypoxia in vitro inhibited incorporation of ^{14}C from U- ^{14}C -glucose into macromolecular fractions of brain tissue. Reoxygenation restored ^{14}C -incorporation into proteins and lipids, but was without effect on the labeling of nucleic acids.

It was demonstrated that hypoxia was of little effect on the levels of biogenic amines in different brain structures, but reduced significantly the rate of serotonin metabolism. This effect was intensified by barbiturate anaesthesia.

See the list of publications.

b. STUDIES ON THE STRUCTURE OF THE NERVOUS SYSTEM

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

In investigations on the pathomechanism of the central nervous system lesions in hepatic diseases, it was found that after prolonged intoxication with carbon tetrachloride leading to hepatic cirrhosis and hepatic encephalopathy, copper is accumulated in the brain and ammonia concentration rises there as well. These findings confirm the hypothesis that both these compounds play an essential role in the development of cerebral abnormalities.

In investigations on the mechanism of central nervous system damage in renal failure, it was demonstrated on the

model of experimental chronic serum sickness, that disturbances due to glomerulonephritis and uraemia are accompanied by disorders in the brain vascular system, due to deposition of IgG, C3 complement and fibrin complex, this leading to damage to the blood-brain barrier mechanism. This is followed by oedematous structural changes, non-specific degeneration and loss of neurons. Changes of similar character but less pronounced appear in the peripheral nerves. It has been demonstrated that nervous system lesions are the result of vascular disturbances and a direct toxic effect of chemical substances accumulating in the course of uraemia.

These observations have been confirmed by the results of in vitro culture of nervous tissue with addition of serum from patients with uraemia or with exogenous urea and creatine. It was shown that primary damage to oligodendroglia is the cause of abnormalities in the myelin sheaths.

See the list of publications.

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

In the investigations on the pathological mechanisms of central nervous system damage caused by ischaemia it has been demonstrated, that unilateral ligation of the carotid artery in Mongolian gerbils was followed by profound microcirculatory disturbances in both cerebral hemispheres. Their character and intensity depended on the duration of ischaemia and the time of investigation after ischaemia. They were modified by regional characteristic features of angioarchitecture.

In the same experimental conditions a short-lasting decrease in the fluorescence of catecholamines in the nerve fibres in the meningeal vessels and their nervous plexuses was found, at the site of the ligated artery as well as contralaterally.

In the early post-ischaemic period increased micropinocytosis was found in the vascular endothelium, and vascular permeability for horse-radish peroxidase was raised.

These changes developed earlier than signs of brain oedema this indicating that cytotoxic oedema may be preceded by disturbances in the mechanism of the blood-brain barrier.

In the condition of hypoxic hypoxaemia it was shown that changes develop in the activity of the enzymes participating in the transport processes across the vascular wall in the elements of the vessel-tissue junction. These changes depended on the intensity of ischaemia and they differed in the structures containing or not containing the blood-brain barrier.

The biochemical abnormalities of the cerebral venous blood during ischaemia were studied and its significant arterIALIZATION was demonstrated after ischaemia.

Structural and metabolic differences were shown to develop in the brain capillaries growing in vitro cultures, as compared with the vessels of the leptomeninx, choroid plexus and other organs in which the blood-brain barrier does not exist.

It was found that the development of vasogenic brain oedema was associated with a rise in the level of lipid hydroxides and free radicals and a fall in the level of lipid antioxidants. Dexamethasone reduced the intensity of processes leading to free radicals formation in oedema development.

See the list of publications.

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

It was demonstrated that experimental hypoglycaemia leads to structural damage of central nervous system neurons of the type of microvacuolization and "ischaemic" changes. The intensity of these changes depended on the duration of hypoglycaemia. Absence of significant cerebral microcirculation disturbances indicates that these abnormalities may be regarded as an effect of pure metabolic anoxia.

Changes in the cAMP level in the brain and disturbances in the activity of enzymes participating in its metabolism

as well as protein kinases which mediate the metabolic functions of cAMP were observed in acute carbon monoxide poisoning. At the time of poisoning the cAMP level in the brain increased initially and then fell, the activity of adenyl cyclase was raised while the activity of cyclic-nucleotide phosphodiesterase remained unchanged and inhibition of the activity of protein kinases persisted until nearly complete clearance of carbon monoxide from the blood.

The effect of DDVP intoxication on the ultrastructure of rat brain was investigated. The processes of nervous cells were particularly damaged, as evidenced by abnormalities of the axoplasm, irregular distribution of neurofilaments and neurotubules, appearance of structures resembling elementary membranes, and widening of the spaces between the axon and the inner myelin lamellae. Damage to the myelin sheaths was less pronounced.

Similar changes were found in cultures of nervous tissue with addition to the medium of DDVP in doses causing only an anticholinesterase effect.

In ultrastructural investigations of the brain of the offspring of mice exposed during intrauterine life to ethylnitrosourea, damage to the neurons, axons and myelin sheaths was observed. The myelin sheaths showed disturbances of myelination associated with damage to the already formed myelin. Axonal changes manifested themselves as irregular distribution of neurofilaments and neurotubules, focal accumulation of abnormal structures and lesions of the presynaptic nerve endings. The observed abnormalities should be regarded as consequences of the toxic effects of ENU on the developing nervous tissue leading to disturbances in its maturation, and progressing neuroaxonal degeneration.

See the list of publications.

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

In investigations on the effects of organo-phosphorus pesticides on the central nervous system it was demonstrated that Dichlorvos administered to females in the last trimester of pregnancy passes across the placenta to the blood and brain of the fetus. In the central nervous system a decreased activity of acetylcholinesterase and certain mitochondrial enzymes, some delay in the maturation of various anatomical structures and delay in the maturation of synaptic endings were found.

Dichlorvos given to the newborn retarded the process of myelination in the central nervous system.

In studies on the effect of normobaric hyperoxia on the central nervous system and lungs of young rabbits the presence of lesions in the brain was demonstrated. They were caused by a direct toxic effect of oxygen, reduced blood flow in the brain caused by ischaemia, and then hypoxia due to impaired gas exchange in the lungs owing to their fibrosis.

See the list of publications.

Control of Neoplastic Diseases

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

Investigations were performed on the ultrastructure of tumours of the sympathetic nervous system of neuroblastoma type and tumours of the central nervous system in children aged up to 3 years.

Electron microscopic investigations were done in 22 cases of neuroblastoma. Most of them (18) were neoplasms of high degree of immaturity, and in only 4 cases they were well differentiated. In poorly differentiated neoplastic cell irregular nuclei, a narrow rim of cytoplasm around the peri-

karyon and poorly developed cellular organelles were observed. Only the Golgi apparatus was usually fairly well developed and in its vicinity catecholamine granules were present. These granules were found also in the neuronal fibres. In 4 cases with higher differentiation the electron microscopic appearance of the neoplastic cells was to a high extent similar to that of developing cells. Catecholamines were present in them also although in smaller number.

Among central nervous system neoplasms 11 cases of tumours were examined in the youngest children. Astrocytomas (5 cases) and medulloblastomas (3 cases) prevailed in this group. These two types of neoplasms are described in detail. Electron microscopic documentation was collected in the remaining isolated cases of other neoplasms (ependymoma, malignant ependymoma, sarcoma multiforme).

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

Electron microscopic investigations of hypothalamic nuclei, hypophysis and adrenal cortex were carried out in rats which were either completely immobilized or had a very restricted possibility of movements.

In the group of completely immobilized rats morphological evidence of an acute stress reaction was found.

In the animals incompletely immobilized changes in the organs were only discrete, this pointing to the adaptation ability of the organism to changing environmental conditions.

See the list of publications.

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

New methods of analysing intracranial pressure were applied to neurosurgical patients. Spectral analysis of the ICP signal was performed. The method of computerized elastance examination (CEE) was improved by introducing, among

other things, rheographic measurement as an indicator of blood volume changes in the brain. As a result of these investigations a complex of diagnostic-prognostic methods has been introduced for evaluating the volume-pressure relationship in the skull: CPERT (computerized pressure-elasticity resistance test) and FFT (fast Fourier Transform) method.

In studies on the effects of drugs strengthening the vascular wall (Ascorin) and polyvalent inhibitors of serine proteases (Trasylol) on brain oedema it was demonstrated that their effect varied depending on the pathogenesis of oedema. Ascorin was more effective in brain oedema after sudden decompression. The inhibitor of serine proteases inhibited the development of oedema associated with surgical lesion and cryogenic brain necrosis.

It was found that normovolaemic haemodilution decreases the effects of local brain compression, limiting the extent of oedema and the intensity of blood-brain barrier damage. At the time of developed brain oedema haemodilution reduced significantly the intensity and extent of oedema.

See the list of publications.

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

The purpose of these experiments was to establish whether exposure of lateral and medial parts of the retina to stimuli differs in the case of verbal and non-verbal signals.

The studies were performed with 15 healthy men and 10 patients with different focal lesions of the brain after neurosurgical operations. The subjects and patients were subjected to thorough ophthalmic examination.

The results of investigations of healthy subjects (time of signal recognition, number and type of mistakes) served as a reference standard for comparison with the results obtained in patients.

High-grade differences were found in the time and quality of perception between different patients. "Perception

instability" was observed also which permitted isolation of groups with certain features in common.

In this situation a typical case with a well localized lesion in the left frontal area was selected for presentation. It is suggested that there is no difference in the perception of words and senseless combinations of letters when they are addressed to the non-dominant hemisphere. These differences were, however, evident when they were addressed to the dominant hemisphere.

See the list of publications.

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

In studies on damage to the brain stem-cerebellum-spinal systems in "pt" rabbits it was demonstrated that in the acute phase of the disease demyelination and isomorphic gliosis develop in the lateral spinal funiculi, mainly in the cervical and lumbar segments, as well as rarefaction and damage to the neurons and nerve fibres. The intensity of these changes was related to the intensity of spastic paresis. The described findings confirm the role of the long spinal pathways in motor disturbances in rabbits, and differences in the anatomy of the spinal cord in the rabbit as compared with other animals, rodents as well as carnivores.

An electron microscopic study on the spinal cord of the "pt" rabbit in the symptomatic period of the disease revealed parallel changes in the myelin sheaths and axon cylinders. The myelin abnormalities consisted in retarded and deficient myelination. Typical Wallerian degeneration was seldom observed. Various types of axonal degeneration could be the result of multifocal damage to the axon in progressive nerve cell degeneration.

It was found that snuffles in laboratory rabbit caused two types of cerebral complications: purulent encephalitis and encephalopathy which develops in the course of damage to the internal organs.

See the list of publications.

c. STUDIES ON TRANSPLANTATION AND EXPERIMENTAL SURGERY

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

The studies on immunoglobulins and complement component transport rate into the interstitial fluid and lymph were performed in 8 men under standard hospital conditions.

The mean concentrations obtained under normal hydrostatic pressure during rest (expressed as the lymph/serum ratio) were for IgG 0.17, IgA 0.16, IgM 0.074, C1q 0.12, C1s 0.21, C4 0.22, C3 0.14, C9 0.24, C1s INA 0.165 and C3 PA 0.19. At constant low venous pressures these concentrations rose gradually up to 0.5 for IgG and 0.4 for IgM. An increase of venous pressure resulted in a decrease in immunoglobulins concentration. Under high venous pressures, the total Ig and complement proteins transport increased, but it was two times lower for IgM and C1q than for IgG.

Hemolytic activity of complement components was studied in leg lymph collected for 5 days in two groups of volunteers. Each group consisted of 4 persons. The hemolytic activity of the complement was expressed as the lymph/serum ratio. The hemolytic activity of C1 and C3 was particularly low. The conversion of native C3 to C3c in the lymph was faster than in serum. The immunoadherence titer for C3 was 1:640 for serum and 1:160 for lymph.

The pilot studies of cell populations in the afferent lymph in healthy men revealed 16-60% E-rosette-forming lymphocytes, 38-44% of rosette 37°C forming lymphocytes and 0.5-4.8% EA-rosette-forming lymphocytes.

Lymphocyte blastic autotransformation, response to PHA and ConA as well as in MCL were assessed in dog afferent lymph under normal and lymphoedema conditions. The autotransformation rate of lymphocytes from lymph was higher than from blood, being remarkably high when lymphoedema was present.

The lymph lymphocyte response to ConA exceeded the response to PHA, in contrast to the blood lymphocytes. In

MLC with allogeneic lymphocytes the lymphoedema lymphocytes showed a two times higher response as compared to the blood lymphocytes of the same dog.

The 24 h distribution of i.v. injected ^{125}I DUR-labeled lymphoblasts originating from different lymphatic organs was investigated in rats. The mean percentage of the injected dose of radioactivity found in organs, irrespective of the lymphoblast source, was 5% in the blood, 16% in the liver, 26% in gut, 1.5% in mesenteric lymph nodes, 2% in peripheral lymph nodes, 7% in lungs, 16% in skin and 12% in bones. The time-dependent distribution of the lymphoblasts revealed that homing in the skin and bone marrow reached the peak value in the first 8 h and in gut it increased gradually up to 24 h. It seems that lymphoblasts accumulate mainly in the tissues which possess on their surface what is called "environmental antigens".

The humoral and cellular immune response was investigated in 20 patients before and after abdominal surgery. C4, C3, C3PA, IgG and IgM serum levels as well as total complement hemolytic activity were not significantly altered in comparison to the preoperative period. The percent of NBT positive granulocytes was found to be 40-70%. Slight lymphopenia was present in the first two postoperative days, PHA lymphocyte response was diminished and the "active" rosette-forming lymphocyte count was lowered.

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

The serum of Wistar rats sensitized with cellular allo-antigen from August rats revealed a high lymphocytotoxic titer and opsonic activity against August rats antigen. In addition the activity of lymphocyte dependent antibodies was within 28-35% of ^{51}Cr specific release. Administration of the donor antigen (August) and syngeneic immune serum to the heart graft recipient (Wistar) eleven and ten days before transplantation significantly prolonged heterotopic heart graft survival (18.4 ± 2.6 days).

A marked prolongation of renal allogeneic graft survival in dogs has been obtained by using horse-anti-dog ALG for three days before and seven days after transplantation, with donor cell antigen-thrombocytes, 3×10^8 per kg of body weight injected i.v. on the 11-th day after transplantation. The mean survival time in untreated dogs was 9.3 days and 16.6 days in dogs treated with serum only.

Polyvalent immune serum containing antibodies against dog histocompatibility antigens was prepared. A high lymphocytotoxic titer, opsonic activity and blocking activity of the rosette-forming property were found in the serum.

It has been shown that two-hour normothermic renal ischaemia in dogs leads to a decrease in the adenic nucleotides reserve in the renal cortex, a decrease in PAH uptake and tissue potassium concentration. Flushing of the dog kidney with hyperosmotic ($430 \text{ m Osm/kg H}_2\text{O}$) solution, irrespective of its ionic content, was found to be beneficial by limiting the development of ischaemic changes in dissociated cells, but it preserved the integrity of the whole organ.

All animals whose kidneys underwent the 2 h normothermic ischaemia died notwithstanding whether the organ had been perfused with hyperosmotic solution before ischaemia or not.

See the list of publications.

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

It has been demonstrated in previous works that trophic ulcers after denervation develop as a result of permanent opening of arteriovenous communications causing disturbances in nutritional circulation.

These experiments have been repeated on monkeys and the same results were obtained confirming the previous observations, that permanent opening of arteriovenous communications following denervation leads to trophic ulcer development.

Recently a series of acute experiments on monkeys were done in an attempt to shut the open arteriovenous communications in the denervated area by using specially selected stimulators. The results obtained open new prospects for treatment of trophic ulcers in denervated areas.

Trials of chronic stimulation of damaged nerves in monkeys gave in preliminary observation very encouraging results in treatment and prevention of trophic ulcers in areas with innervation disturbances.

See the list of publications.

d. OTHER RESEARCH WORKS

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

In the year 1977 the Research Group of School Mental Hygiene continued the second stage of work on the biological, psychological and social conditions of development of secondary-school exceptionally gifted students, aged 16-19 years.

The results were as follows -

the characteristic features of personality of secondary-school students included very strong cognitive needs and high independence and initiative in their fulfilling, as well as a high activity level as evidenced by the multiplicity of interests, mainly intellectual.

This multiplicity of interests and activities contributed, however, to excessive psychic overloading of these students. Stimulation of this activity by the parents in fields disagreeing with the interests and abilities of these youths was in a considerable number of cases an additional factor in development or intensification of emotional tension.

On the other hand, high abilities and successes led not infrequently to the development of negative personality traits such as egocentrism, excessive self-reliance, disregard for the accepted principles of social relations.

The following conclusions are drawn from these observations:

- (1) The intellectual activity of adolescents should be directed in accordance with their abilities and interests.
- (2) In bringing up these adolescents much more attention should be given to prevention of negative personality traits from the point of view of social life.
- (3) In developing the mental powers of these adolescents overloading with an excess of duties and work should be avoided.

Realization of these suggestions is a factor indispensable for maintenance of the mental health of young people.

Analysis of the results of these investigations on the biological and social conditions of development, of secondary-school uncommonly gifted students, showed that the biological conditions of development were good in about 75% of cases. In the remaining 25% they were insufficient.

The psychosocial conditions of development of these abilities were very good in only 25% of these students, while in the greater group of 75% students the milieu, in which they were being brought up, failed to ensure these conditions in a degree corresponding to their possibilities.

The following suggestions are advanced:

- (1) The parents should have a sufficient knowledge concerning education of their uncommonly gifted children and play a greater role in their bringing up.
- (2) In all cases when the family fails to secure adequate conditions for development of uncommonly able students the school and social organizations should take care of them, to prevent wasting of their talents.
- (3) The selection of candidates to different types of secondary-schools should be made according to their mental powers and interests, and not only according to the marks for disciplines taught at primary-schools.

See the list of publications.

d.2. FACTORS DETERMINING MENTAL HEALTH OF ADOLESCENTS

In investigations on neuroticism levels in a heterogeneous group of 185 students of the 1st and 3rd classes of secondary schools a high level of neuroticism was found in 19.46%, a moderate level in 44.32 and a low one in 36.22% of the group. Analysis of distribution of the frequency of high, medium and low levels of neuroticism in student of vocational and technical schools, showed no statistically significant differences, but a significant difference was noticed between students of vocational schools, technical schools and grammar schools. Statistically significant differences in the distribution of different neuroticism levels were observed between girls from the 1st class of grammar schools and boys from vocational and technical schools, and between girls from the 3rd classes of grammar schools, and technical and vocational schools.

The self-acceptance level was defined as the degree of agreement between the actual self-image and the ideal self-image. On the basis of a sequence of differential scales the probability of frequency of occurrence of different parameters concerning self-description, self-estimation imputed to other partners and estimates made by important persons was established.

For revealing the causative relationships between the level of self-acceptance and certain individual predispositions, the results obtained for 177 students aged 16 and 18 years selected randomly from 6 secondary schools in the City of Łódź, were analysed statistically.

It was found that the investigated groups of boys and girls exhibited a higher frequency and intensity of those features which are connected with interpersonal attitudes and a lower one of these features which are connected with the character. Self-estimation depends, on awareness of the possessed features, agreement of one's own opinion with that imputed to partners, and it is one of the premisses for developing relations with other people. The greatest differentiation of these parameters was disclosed in subjects

with a low self-acceptance level, who also showed a much higher incidence of disfunctional behaviour.

By way of an anonymous auditory enquiry investigations were performed using the value system on 354 students of secondary schools in Łódź. The students attended different types of schools, and differed from each other as regards numerous social-demographic features. The curriculum and forms of teaching differed also in these schools.

A considerable agreement was found between the notions of the students from all types of schools concerning individual happiness. The attitudes of students from vocational schools and technical schools were more practical, while students from grammar schools has a broader outlook on the world.

See the list of publications.

d.3. STUDIES AND CONSTRUCTION OF BIOMEDICAL APPARATUS

The activities of Medipan Laboratories in 1977 included investigations, designing and construction of biomedical apparatus, services in the repair and maintenance of apparatus of their own production, as well of scientific apparatus produced by the Swedish firm L.K.B.

The new prototype design include a 3-channel recorder, type "xt-352", with very favourable technical parameters. It is the first of a type-series of "xt" recorders in a rectangular arrangement, and "xy" recorders. A prototype series of 5 recorders was made.

Another prototype series is a prototype of dispenser/diluter which will meet the ever increasing requirements for dosimeters in scientific-research laboratories.

The production programme in 1977 included:

	Type	Number of apparatus produced
Dispenser/diluter	461/462	105
3-channel recorder	xt 325	5
Infusion pump (new type)	453	10
Infusion pump	353	10
Camera for oscilloscope photography	KO-3	10

Moreover many small, auxiliary laboratory instruments and other equipment were made. Nearly 14% of the production went to the laboratories of the Medical Research Centre.

Most customers were Polish research centres, such as:

- institutes of the Universities in Warsaw, Poznań, Gdańsk and Łódź,
- laboratories of the Technical Universities in Warsaw, Gdańsk, and Łódź,
- laboratories and departments of Medical Academies in: Warsaw, Gdańsk, Katowice and Cracow.

At the request of foreign research centres the following instruments and apparatus were sent to:

- Bulgaria - an infusion pump and a camera for oscilloscope photography,
- German Democratic Republic - a camera for oscilloscope photography,
- Yugoslavia - a camera for oscilloscope photography.

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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(Effect of sudden decompression on tissue pressure
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2. BERTRAND F., CAILLE D., GROMYSZ H., HUGELIN A.,
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Electron-microscopic changes in rat hypophysis
induced by morphine.

I. Adenohypophysis.

Neuropat. Pol., 1977, 15, 1.

4. BOROWICZ J. W., DANIELEWICZ A., MARYNIAK R.

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induced by morphine.

II. Neurohypophysis.

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9. COOPER H. K., ZALEWSKA T. M., KAWAKAMI S., HOSSMANN K. A., KLEIHUES P.

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11. CZERNICKI Z.

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(Effect of agents increasing the resistance of the vascular wall and proteases inhibitor - trasylool - on experimental brain oedema).

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12. CZERNICKI Z., JURKIEWICZ J., STĘPIŃSKA G., KWIATKOWSKI A.

Stężenie mleczanów sodu i potasu w czasie operacji neurochirurgicznych.

(Sodium lactate and potassium concentration during neurosurgical operations).

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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

I. Polish Academy of Sciences - The Royal Society,
England, agreement.

In 1977 The Department of Neurophysiology cooperated with
the:

- Department of Physiology, St. George's Hospital,
Medical School, London,
- Department of Physiology, Oxford University,
- Midhurst Research Institute, Sussex,
- Department of Medicine, Charing Cross Hospital,
Medical School, London.

The joint subject of research in cooperation was the
neural control of breathing. The results of studies in the
Department of Neurophysiology were presented in the above
mentioned English research units. The mechanisms of "short-
term memory" in the respiratory complex were discussed in
detail at meetings and seminars; this gave new suggestions
to the future research plans.

II. Long-term visits of scientific workers of the
Department abroad:

Doctor H. GROMYSZ -

- spent 10 months in the Laboratoire de Physiolo-
gie Nerveuse CRNS, Gif-sur-Yvette, France,
where he took part in studies on the influence
of pentobarbitone on the activity of respira-
tory neurones of the cat. He became acquainted
with methods of localising and mapping the
recorded respiratory neurones on special dia-
grams. He mastered histological technics ap-
plied now in the Department of Neurophysiology.

Doctor A. PRZYBYLSKI -

- is staying at the Doner Laboratory, University, of California, Berkeley, USA. He takes part in experiments on the influence of hypoxia on the isolated neurons and studies methods of computer analysis of the activity of a single neurone.

III. Individual visits of foreign scientific workers to the Department:

Professor T. MAREN -

- Head of the Department of Physiology at Gainesville University, USA. During his one-week stay he discussed the mechanism of production of cerebro-spinal fluid and the function of carbonic anhydrase in the acid-base balance.

Doctor R. PORTER -

- from the CIBA Foundation, London, stayed for several days at the Centre for discussions on the cooperation with our institution.

IV. At the XXVI Congress of the International Union of Physiological Sciences (Paris, 1977, July 18-23) 6 scientific workers of MRC presented papers. Prof. Karczewski (Head of the Dept. of Neurophysiology) was entrusted with the organization and chairmanship of the congressional symposium: "Ventilatory and laryngeal coordination and interaction".

CARDIOVASCULAR LABORATORY

I. Scientific cooperation based on direct contacts of research centres.

1. Between Cardiovascular Laboratory, M.R.C., and -
Laboratoire de Radioimmunologie Analytique,
Institut Pasteur, Paris, France.

Doctor P. TRUSKOLASKI -

- stayed for one month at the French centre for studying the method of radioimmunological determination of prostaglandins in blood. As a result of this training it has been possible to perform radioimmunological determinations of prostaglandins in blood in the experiments carried out in the Cardiovascular Laboratory.

2. Between the Cardiovascular Laboratory and the Miasnikov Institute of Cardiology, Academy of Medical Sciences, in Moscow, USSR.

Cooperation started with an adaptation at the Laboratory in Moscow, of the continuous biological method for determination of catecholamines in blood.

I. HUSZCZUK M.B. - and

I. FALECKA M.B. -

- During a two-week stay at the Institute in Moscow a bioassay method for blood catecholamine determination was introduced.

Doctor L. PODOLSKI -

- from the Institute of Cardiology - stayed for three weeks at the Cardiovascular Laboratory studying all the methods currently used in experiments carried out at the Laboratory.

3. Between the Medical Research Centre and -
the Midhurst Medical Research Institute, Great
Britain.

Assoc. professor K. HERBACZYŃSKA-CEDRO -

- stayed for one week at the Midhurst Institute.
The common project was started by the experiments
designed to investigate the effect of catecholamine
upon myocardial blood flow with radioactive
microspheres.

II. Visits of foreign scientists at the Cardiovascular Laboratory:

Doctor V. PINIELIS -

- from the Pediatric Research Institute, Academy
of Medical Sciences in Moscow, USSR.
Dr Pinielis spent two weeks at the Laboratory
studying the methods used for the detection of
prostaglandins in the blood.

Doctor J. VANE -

- Head of the Wellcome Research Laboratories,
Beckenham, Kent, England.
Dr Vane during a one-week visit became acquainted
with the investigations carried out in the Labo-
ratory. He also gave a lecture on - "Prostaglan-
dins, platelets and vascular thrombosis".

DEPARTMENT OF APPLIED PHYSIOLOGY

- I. Within the cooperation with Intercosmos, investiga-
tions were carried out on the physiological con-
sequences of restriction of physical activity and
on the effects of hypercapnia on thermoregulation.
A new model of hypokinesia was elaborated in dogs
and some effects of restriction of physical acti-
vity on exercise-metabolism and thermoregulation
were studied.

II. Multilateral cooperation between the Polish Academy of Sciences and Foreign Academies of Sciences.

Doctor B. KRUK -

- stayed for 3-months at the Laboratory of Thermo-regulation, Pavlov's Institute in Leningrad, USSR. During this visit she carried out investigations in common on the relationship between the thermo-regulatory reactions (from the central and peripheral thermoreceptors) and the hypothalamic temperature.

Professor IVANOV -

- from Pavlov's Institute, visited the Department for a few days discussing the results of common investigations and plans of further cooperation.

III. Within the Agreement between the Polish Academy of Sciences and the British Council

Professor S. KOZŁOWSKI -

- Head of the Department visited several scientific centres in Great Britain becoming acquainted with current methods of investigation on adaptation to exercise and thermal environment. He was particularly interested in a method of 24-hour recording of physiological functions, and in the investigations on the adaptation to low ambient temperatures.

Asso. professor H. KACIUBA-UŚCILKO -

- stayed during 2 months at the Dept. of Applied Biology, A.R.C., Institute of Animal Physiology, Babraham, Cambridge (Great Britain), where she carried out investigations in common on hormonal regulation of thermogenesis, and on the influence of nutrition on thyroxine metabolism in relation to environmental temperature.

IV. Direct scientific relations of the Department with the Department of Physiology III, Karolinska Institutet in Stockholm, Sweden, and the scientific Centres in Oslo and Copenhagen.

Professor S. KOZŁOWSKI -

- visited for several days the centres in Stockholm, Oslo and Copenhagen delivering lectures, which presented the main results of investigations carried out in the Department. He became acquainted with the current studies on the haemodynamic and metabolic adaptation to physical work, carried out in the above mentioned centres.

Doctor K. NAZAR -

- stayed during 2 months at the Danish Institute of August Krogh in Copenhagen carrying out investigations on the effect of physical training in diabetic patients. These investigations will be continued in both Institutions. She learned also some new methods of metabolite determination in bioptic muscle samples obtained from men, and the method of radio immunological determination of blood glucagon level.

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

Professor S. KOZŁOWSKI -

- visited during 10 days some physiological centres in Köln and Freiburg, where he became acquainted with current approach concerning physical activity and prophylactics of the so-called "civilization diseases", and with non-invasive methods applied in haemodynamic investigations during physical exercise.

Doctor J. CHVALBIŃSKA-MONETA -

- stayed for 2 months at the Dept. of Labour Medicine, of the University Clinic in Freiburg. She became acquainted with the application of ultrasonography in physiological investigations of the cardiovascular system and learned a method of anaerobic-aerobic threshold estimation in human subjects, used for physiological evaluation of their adaptation to physical work, as well as for evaluation of the effects of training and rehabilitation.

VI. Visits of foreign scientists to the Department in 1977.

Doctor P. FABRY -

- from the Institute of Experimental and Clinical Medicine in Prague, Czechoslovakia, visited the Department for a few days.
Dr Fabry became acquainted with the investigations carried out at the Department on the regulation of lipid-carbohydrate metabolism and delivered a lecture on the pathophysiology of obesity.

Doctor J. FEW -

- from the MRC Unit, London School of Hygiene and Tropical Medicine, University of London, stayed at the Department during several days discussing problems concerning hormonal responses to exercise and thermal stress.

Doctor J. GREENLEAF -

- from the NASA Ames Research Center, California, USA, stayed at the Department for 2 months, participating in experimental studies on the effects of electrolyte and osmotic changes on thermoregulation during exercise and on the effects of different levels of physical activity on adaptation to exercise.

DEPARTMENT OF NEUROPATHOLOGY

- I. Bilateral cooperation between the Polish Academy of Sciences - and - Centre National des Recherches Scientifiques, France.

Doctor H. WEINRAUDER-SEMKOW -

- during a two-month stay in France visited the Centre Hospitalier Saint Anne, Service d'Anatomie Pathologique - in Paris and the Centre Henri Becquerel, Laboratoire d'Immunochemie - in Rouen.

In the course of those visits she became acquainted with the technics of trypsinised cultures of normal human brain and brain tumours, with the technics of their passages, and with the immunochemical methods of isolation and localization of specific nervous system antigens.

She learned also a new method of determination of immunoperoxidase which will be used in the investigations conducted in our Department.

During joint investigations many tests were performed with reference sera on preparations from tumour cultures, which after confrontation with specific sera prepared at the Department will serve as material for a publication written in cooperation. A reagent - gamma globulin - against rabbit gamma globulins conjugated with peroxidase - was obtained which is unavallable in this country.

The establishment of continuous scientific contacts between M.R.C. and the French research centres was discussed.

- II. On the basis of an agreement between the Medical Research Centre and the Academy of Medical Sciences, USSR, the following direct cooperation was realized:

1. Dept. of Neuropathology, M.R.C. -
Institute of Neuropathology, Moscow.

The topic of collaborative investigations was the detection of binding sites of brain antibodies present in the sera of patients with neurological diseases.

Doctor S. KRAJEWSKI -

- stayed for 2 weeks at the Institute in Moscow where he studied the methods on detection of brain antigens in the serum.

Professor J. GANUSHKINA - and

Doctor I. SHIROVA -

- during a 3 weeks stay at the Department participated in investigations on the detection of antibodies against specific brain antigens in patients with various neurological diseases.

2. Dept. of Neuropathology, M.R.C. -
Laboratory of Experimental Physiology
and Resuscitation, Moscow.

The purpose of collaborative investigations was improvement of the model of regulated circulatory arrest in the cat with the use of a standard method of resuscitation.

Professor V. NEGOVSKI - and -

Professor A. GURVITCH -

- stayed for several days at the Department and were acquainted with the investigations conducted on central nervous system ischaemia and hypoxia. The results of the present cooperation and the programme of its continuation were discussed.

Doctor S. TOLOVA -

- stayed at the Department for three weeks, participating in the elaboration of a model of experimental brain ischaemia induced by a transient rise of intracranial pressure.

3. Dept. of Neuropathology, M.R.C. -
Institute of Experimental Medicine, Leningrad.

The cooperation in 1977 included completion of investigations on the effects of short-term anoxia on nervous tissue cultured in vitro.

Doctor G. V. KONOVALOV -

- stayed for 4 weeks at the Department for completion of investigations on the effect of anoxia on the nervous tissue cultured in vitro. The results of these studies have been prepared for publication in the Archiv. Patol.

III. Within the agreement between the Medical Research Centre and the Georgian Academy of Sciences:

Dept. of Neuropathology, M.R.C. -
Institute of Physiology, Tbilisi, USSR.

Collaborative investigations are conducted in the pathophysiology of brain vessels during circulatory hypoxia.

Professor G. J. MCHEDLISHVILI -

- stayed for several days at the Department for consultation on the problem of the pathological mechanism of brain oedema after severe ischaemia.

A multidirectional research programme concerning brain ischaemia was elaborated and discussed. The detailed programme of further scientific cooperation in the years 1978-1980 was discussed.

During his visit Professor Mchedlishvili delivered a lecture on the effect of haemodynamic disturbances on the development of postischaemic oedema.

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

Doctor G. SZUMAŃSKA -

- stayed for 15 days at the Institute of Biophysics, Experimental Biology Centre, Laboratory of Neurobiology, Hungarian Academy of Sciences in Szeged.

The aim of this visit was to study the histochemical methods used in the Laboratory for demonstration of enzymatic activity in the cerebral blood vessels, in barrier areas and without brain barriers, and to discuss her own results of investigations. During her stay there Doctor Szumańska studied also histochemical methods in the Anatomical Laboratory, Medical Faculty, Szeged University.

V. Individual scientific visits of workers from the Department in foreign research centres.

Doctor J. ALBRECHT -

- is continuing his scientific training at the Neurochemistry Research Units, Mayo Clinic, Rochester, USA.

The purpose of his stay there is to study the mechanisms of protein biosynthesis in the brain during hypoxia and ischaemia.

Doctor M. ŚMIAŁEK -

- is continuing his scientific scholarship at the Laboratory of Neuropathology and Neuroanatomical Sciences, NIH, Bethesda, USA, conducting research on prevention of central nervous system damage, caused by ischaemia.

VI. Short-term trips of scientists from the Department to foreign countries.

Professor M. J. MOSSAKOWSKI -

- Head of the Department -
- participated as Vice-President of the International Society of Neuropathology, in the session of the Board of this Society in Vienna, Austria, 1977, April 17-20.

Assoc. professor A. KAPUŚCIŃSKI -

- participated in the meeting of the Planning Committee of the World Federation of Nuclear Medicine and Biology, Chicago, USA, 1977, June 20-23.

VII. Visits of foreign scientists to the Department.

Doctor K. KRISTENSSON -

- from the Dept. of Neuropathology, Institute of Pathology, Linköping University, Sweden -
- during a short, three-day's visit became acquainted with the investigations conducted at the Department and delivered a lecture on: "Some aspects of retrograde axonal transport".

Doctor I. KLATZO - and

Doctor M. SPATZ -

- from the Laboratory of Neuropathology and Neuro-anatomical Sciences, NIH, Bethesda, USA -
- stayed for a week getting acquainted with the works conducted in our Department and for discussing problems conducted with central nervous system ischaemia and hypoxia.

LABORATORY OF DEVELOPMENTAL NEUROPATHOLOGY

I. Scientific cooperation based on direct contacts between research centres:

1. **Laboratory of Developmental Neuropathology and - Centre d'Etudes et de Recherches d'Anthropologie Fondamentale, Laboratoire d'Histologie Normale et Pathologique du Systeme Nerveux, Paris, France.**

The field of cooperation were investigations on hypoxaemic brain damage at the time of development with the use of electron microscopic technics.

Assoc. professor M. DAMBSKA -

- Head of the Laboratory -
- stayed for one month at the French centre for comparing the results of investigations on the development of nervous system elements (glia, neurons, myelin sheats), based on electron microscopic technics, with the results obtained in the French centre. The results of this comparative analysis have been prepared for a collaborative publication.

Doctor A. PRIVAT -

- from the French Centre - stayed for several days at the Laboratory for studying the electron-microscopic method of investigation of the immature nervous system.

The results obtained in electron microscopic investigations in experimental models applied in the Polish and French centres were compared.

II. Long-term visits of scientists from the Laboratory in foreign research centres:

Doctor L. IWANOWSKI -

- is staying for one year at the Institute of Pathology, Maryland University, USA, studying brain hypoxia and post-traumatic changes, especially vascular lesions in the ultrastructural and histochemical aspects.

Doctor D. MAŚLIŃSKA -

- stayed for 3 months at the Laboratory of Electron Microscopy, Institute of Pathology in Tubingen, GFR, carrying out histoenzymatic investigations with the use of the electron microscope on experimental material and human brains in autopsy material.

DEPARTMENT OF COMPARATIVE NEUROLOGY

Within the Polish-American Scientific Agreement (PL-480, 05-030), professor L. ROZZIN from the National Institute of Neurological Diseases and Stroke, Bethesda, USA, visited in September the Department. During his three-days visit he discussed the future program of joint research of both Centres.

Professor Rozzin delivered also a lecture on: "Comparative electron-microscopic and histochemical studies in Huntington's chorea".

DEPARTMENT OF NEUROCHEMISTRY

- I. Under the agreement on scientific cooperation between the Polish Academy of Sciences and the Italian Council for Scientific Research for the years 1977-1979:

Doctor A. PASTUSZKO -

- from the Department, stayed for 3 months at the Istituto di Biochimica, Facolta di Medicina, Ancona, Italy, for studying the physicochemical methods used for isolation and determination of lipid-protein structures of cell membranes and subcellular elements. A series of experiments were carried out for explaining the effect of anaesthetics on the kinetics of membrane enzymes with the use of an apparatus for paramagnetic resonance determination which helped in speeding up the investigations conducted parallelly at our Department.

II. As part of the long-term scientific fellowships in foreign research centres:

Doctor J. WIDEMAN -

- from the Department, has completed a two-year fellowship at the Roche Institute of Molecular Biology, Nutley, New Jersey, USA. During his stay Dr Wideman conducted investigations on the application of a new fluorescent reagent MDOF used for determination of primary amines in fluid chromatography. The method resulted in designing an apparatus for automatic analysis of 20 samples for the present of carnosine in olfactory lobes, which is to be constructed. This methods will be used for isolation of all primary amines even those present in trace amounts in the tissue. The obtained results were presented by Doctor Wideman at the Vth American Peptide Symposium, San Diego 1977, and have been prepared for publication in the form of 4 papers.

III. Visit of foreign scientist at the Department.

Professor L. HORROCKS -

- Head of the Dept. of Lipid Metabolism, Institute of Physiological Chemistry, University of Columbia, USA -
- paid a several-days' visit to the Department, consulting the investigations on the metabolism of phospholipids in the central nervous system, under normal and pathological conditions.

LABORATORY OF THE ULTRASTRUCTURE OF THE NERVOUS SYSTEM

I. Long-term fellowships at foreign research centres

Doctor B. GAJKOWSKA -

- stayed for 15 months at the Laboratory of Electron Microscopy, Institut de Cancer, Villejuif, France. She studied there the effect of camptothecin on RNA transport from the nucleolus to the cytoplasm in isolated rat hepatocytes. The results of these investigations have been prepared for publication in J. Ultrastruc. Res., 1977, 60: 335-347. "Unusual perinucleolar accumulation of ribonucleoprotein granules induced by camptothecin in isolated liver cells".

DEPARTMENT OF NEUROSURGERY

Cooperation with foreign countries

- I. Under the agreement between the Polish Academy of Sciences and the Austrian Academy of Sciences:

Assoc. professor J. SZUMSKA -

- stayed for 3 weeks at the Institute of Neurology, Vienna University, for studying the rehabilitation methods in cases of brain injury, especially the methods of speech teaching or re-education in children. Professor Szumska delivered a series of lectures on speech mechanism according to the theories of the Polish school, and on the pathophysiology of frontal lobes in man. The methods used by the Vienna school will be checked and used for treatment of patients at the Department of Neurosurgery M.R.C. Preliminary talks were undertaken for planned cooperation of both centres.

II. In direct cooperation between the Department of Neurosurgery M.R.C. - and the Burdenko Institute of Neurosurgery, Academy of Medical Sciences in Moscow, USSR:

Doctor J. SZEWCZYKOWSKI - and

Engineer S. ŚLIWKA -

- stayed for 3 weeks at the Institute in Moscow. Studies were performed on elastance in neurosurgical patients.

Doctor L. MILOVANOVA - and

Doctor V. SALADYKIN -

- from the Institute studied during 3 weeks at the Department the methods of measurement and computer analysis of intracranial pressure and intracranial elastance. Numerous experimental and instructional measurements and analysis were done.

III. Long-term scholarship.

Doctor Z. CZERNICKI -

- is staying at the Division of Neurosurgery, University of Pennsylvania, USA, investigating brain oedema in different experimental models.

DEPARTMENT FOR SURGICAL RESEARCH AND TRANSPLANTATION

I. According to the CMEA agreement -

the Medical Research Centre coordinates joint investigations carried out in the socialist countries under problem 8.5. - "Transplantation of other organs" - a part of the main problem 8 - "Transplantation of organs and tissue and problems of transplantation immunology".

The main purpose of coordination for 1977 has been the evaluation of results of studies on experimental and clinical liver transplantation, performed in the scientific medical centres of CMEA member countries.

The first meeting of the Coordinating Committee took place in Prague, Czechoslovakia, in 1977. At that meeting the following items were proposed for the joint scientific research programme:

- studies on improvement of liver preservation methods,
- studies on assessment of liver phagocytic function,
- studies on improvement of the immunosuppressive treatment protocol used in liver transplantation,
- studies on indications for clinical liver transplantation.

II. Basing on the agreement between -

the Department for Surgical Res. and Transplantology, M.R.C. and the Transplantation Laboratory of the Academy of Sciences USSR in Moscow -

studies of the methods of kidney preservation and toxic factors released from ischaemic guts were continued.

The Department was visited by the following scientists from the Laboratory in Moscow:

Doctor M. BILENKO -

- spent 4 months in M.R.C., investigating on lymphocyte and granulocyte activation during their passage through the xenogeneic renal transplant. The results of investigations will be published.

Doctor N. N. GOLUBILIEVA -

- spent 3 weeks in M.R.C. She carried out a histochemical study of lymphocytes activated by interaction with xenogeneic antigens. The results will be published.

III. The scientific exchange and cooperation under the agreement signed by the Norwegian Radium Institute and the Medical Research Centre - in 1977 studies were devoted to:

- the capillary permeability for different molecular weight proteins, and assessment of the activity of complement inactivators in lymph;
- classification of cell populations in leg lymph of healthy man and preliminary investigations on the chemotactic factor for lymphocytes.

The Norwegian Radium Institute was visited by:

Assoc. professor W. OLSZEWSKI -

- Head of the Department -
- spent 3 months in the Hematology and Lymphology Laboratory, taking part in the investigations on filtration of immune protein and lymphocyte migration to the peripheral tissue. Results of these studies were presented in three publications and three communications read at the congresses.

Mr T. RYFFA -

- senior technician - spent 3 months in the same Laboratory, where he learned technics of lymph and interstitial fluid collection, as well as methods of isotopic investigations in patients with pathology of the lymphatic system.

In 1977, the Dept. of Surgical Research and Transplantation was visited by:

Professor A. ENGESET -

- who spent 10 days, taking part in the investigations on a new chemotactic method and working on statistical analysis of the previous common studies. The new chemotactic method, which was developed in the Department, proved to be a useful technic in clinical studies on phagocytic insufficiency in man.

Doctor G. D. SAUGSTAD -

- spent 3 weeks, taking part in developing a method of hypoxanthine level determination in body fluids. This method will be introduced for monitoring the degree of renal damage developing during organ preservation for transplantation.

Mr A. ANDERSEN -

- technician - spent 3 weeks learning methods of lymphocytes collection from the different lymphatic tissues and methods of labelling them with different isotopes.

Mrs M. ROSEFF -

- technician - spent 3 weeks learning techniques of macrophage migration, lymphocytes labelling, and immunoglobulin and complement level determination by the radial immunodiffusion method.

IV. The individual visits of scientists from the Department to foreign scientific centres:

Doctor A. DESZKIEWICZ -

- spent 14 weeks in the Dept. of Anaesthesia, Karolinska Institute, Stockholm, Sweden, learning new methods of hepatic coma therapy and methods of patient monitoring.

V. On the invitation of the Medical Research Centre the Dept. for Surgical Research and Transplantation was visited by:

Professor G. STEWARD -

- from the Specialized Center for Thrombosis Research, Dept. of Medicine, Philadelphia, USA. She spent one week in the Department, consulting studies on thrombocytes interaction. She gave a lecture: "The experimental studies of the pathogenesis of venous thrombosis".

VI. In April 23-27, 1977 - the XIII Congress of the European Society for Surgical Research was held in Warsaw. The organizer was the Dept. for Surgical Research and Transplantation, M.R.C. The Congress was held in cooperation with the British Surgical Research Society and the American Society for University Surgeons. Professor W. Olszewski, head of the Department, was appointed the chairman of the Scientific Programme Committee. 550 persons took part in the Congress. Among them were 320 persons from foreign scientific centres, from almost all European countries, as well as from USA, Canada, South America and Japan.

187 lectures were given: 19 from Poland, 11 from socialistic countries, 19 from Sweden, 20 from Great Britain, 27 from West German Republic and 20 from USA. In the Poster Session 96 works were presented.

The main items of the Congress were: biological and clinical problems of transplantation and pathophysiology of shock.

Also 2 symposia devoted to research policy were organized. They were:

1. The efficacy of scientific research in modern medicine
2. The role of scientific research in the educational programme for young clinicians.

It was for first time that the Congress of the ESSF was held in a socialist country. This allowed the Polish scientists to get directly acquainted with recent results of studies on transplantation, shock pathogenesis, cancer immunology and also, to present the results on an international forum.

The Congress was organized under the patronage of the Prime Minister of Poland - Mr Piotr Jaroszewicz.

Professor Trzebiatowski, President of the Polish Academy of Sciences, was President of the Honorary Committee. Prominent representatives of Polish medicine, among them the Minister of Health - Professor Dr M. Śliwiński, and the Secretary of the Section of Medical Sciences of the Polish Academy of Sciences - Professor Dr J. Kostrzewski were members of the Honorary Committee.

Assoc. professor W. Olszewski was elected President of the European Society for Surgical Research.

On May 1-5, 1977, an International Microsurgery Course was organized in Warsaw by the Dept. for Surgical Research and Transplantology, M.R.C. It was attended by 26 persons, among them by 8 persons representing foreign research centres.

The course was devoted to microtechnics in organ transplantation and physiological models in small animals.

In September 5-8, 1977, in Jablonna near Warsaw, the International Symposium on Tissue and Organ Preservation was held. The Symposium was organized under the auspices of the Transplantation Society. The scientific program of the Symposium was prepared by Assoc. professor W. Olszewski from the Dept. for Surgical Research and Transplantation, M.R.C., and Professor K. Ostrowski, the Director of the Institute of Biostructure, Medical Academy in Warsaw. This working conference was devoted to recent problems of kidney and liver preservation, and storage of lymphocytes, macrophages and supporting tissues.

About 57 persons took part in the Symposium, among them 37 from European and USA centres. Thirty-seven papers (7 from Poland) were presented.

LABORATORY OF EXPERIMENTAL SURGERY

Professor J. BURKE -

- Head of the Department at the Harvard Medical School Massachusetts, General Hospital Boston, USA-
- stayed for several days at the Laboratory for consultation on the investigations of microcirculation in free skin grafts.

Professor J. NIELUBOWICZ -

- Head of the Laboratory - participated in the meeting of the Executive Committee of the Société Internationale de Chirurgie, Bruxelles, Belgium, 1977, March 6-9, as a member of this Committee. He participated also in the Meeting of this Society in Tokyo-Kyoto, Japan, 1977, August 26-September 9.

ANNEX

In 1977 the following research workers of the Medical Research Centre took an active part in the scientific meetings and conferences, as listed below.

April

- V Annual Meeting of the G.D.R. Neuropathologists Society on "Neuropathology of the Nervous System in Interior Organs". Rostock, G.D.R., April 21-23.
Prof. M. J. Mossakowski, Dr L. Iwanowski (2 papers presented).
- Meeting of the Central Board of the International Society of Neuropathologists.
Vienna, Austria, April 17-20.
Prof. M. J. Mossakowski, Vice-President of the Society.

May

- Round Table Conference of the Czechoslovak and Polish Neurosurgical Societies.
Ostrava, Czechoslovakia, May 5-6.
Prof. A. Kunicki, Dr J. Szewczykowski (1 paper presented).
- II European Seminar on Renal Physiology
Balatonfüred, Hungary, May 15-19.
Assoc. prof. B. Sadowski (2 papers presented).
- II International Meeting of Morphologists and Pathologists
Bucharest, Roumania, May 25-27.
Dr J. Kupiec-Węgliński (1 paper presented)
- Congress of the European Dialysis and Transplantation Association.
Helsinki, Finland, May 31-June 3.
Dr W. Rowiński (1 paper presented)

June

- XXIII International Conference on Prevention and Treatment of Alcoholism.
Dresden, G.D.R., June 6-10.
Dr Z. Poseł, Dr P. Zakrzewski (2 papers presented)
- VI Congress of the World Federation of Neurosurgical Societies
São-Paulo, Brasil, June 16-23.
Prof. A. Kunicki (2 papers presented)
- International Congress on Prevention of Suicides and Intervention in Crises.
Helsinki, Finland, June 19-23.
Dr L. Wiercioch (1 paper presented)
- Meeting of the Planning Committee of the World Federation of Nuclear Medicine and Biology.
Chicago, USA, June 22-23.
Assoc. prof. A. Kapuściński.
- VIII International Symposium on Cerebral Function, Metabolism and Circulation.
Copenhagen, Denmark, June 26-July 1
Dr J. Szewczykowski.
- V European Nuclear Workshop
Salamanca, Spain, June 27-July 1
Dr B. Gajkowska (1 paper presented)
- V Czechoslovak-Polish Psychiatric Conference
Martin, Czechoslovakia, June 28-July 2
Dr L. Wiercioch (1 paper presented)

July

- XXVII Congress of Physiological Sciences
Paris, France, July 18-23
Prof. W. A. Karozewski, Dr M. Glogowska, Dr P. Grieb,
Dr M. Pokorski, Dr B. Szereda-Przestaszewska,
Dr J. R. Romaniuk
Prof. Z. Semerau-Siemianowski, Assoc. prof. B. Sadowski
(6 papers presented)

August

- XI FEBS Meeting
Copenhagen, Denmark, August 14-20.
Dr M. Rossowska, Dr T. Zalewska (1 paper presented)
- International Meeting of Neurochemistry
Copenhagen, Denmark, August 20-27
Dr J. Lazarewicz, Dr K. Domańska-Janik, Dr H. Książak,
Dr T. Zalewska (3 papers presented)
- XI Meeting of the European Societies for Clinical
Investigation
Rotterdam, Netherlands, August 26.
Assoc. prof. K. Herbaczyńska-Cedro
(1 communication presented)
- Meeting of the Societe Internationale de Chirurgie
Tokyo-Kioto, Japan, August 26-September 9
Prof. J. Nielubowicz

September

- Seminar devoted to Prof. W. Steinhausen's memory
Greifswald, G.D.R., September 1-2
Prof. S. Kozłowski (1 communication presented)
- XX Conference on Biochemistry of Lipids
Aberdeen, Scotland, U.K., September 3-11
Dr J. Strosznajder (1 paper presented)
- International Symposium on Pathology of Cerebrospinal
Microcirculation
West Berlin, September 7-10
Prof. M. J. Mossakowski, Assoc. prof. A. Kapuściński,
Dr Z. Rap
- Symposium on the Neural Control of Breathing
Martin, Czechoslovakia, September 13-15
Dr A. Huszczuk, Dr B. Szereda-Przestaszewska,
Dr M. Pokorski (4 communications presented)

- I Congress of Socialist Countries on Prevention and Therapy of Alcoholism and Other Drug Dependencies. Prague, Czechoslovakia, September 13-16
Dr Z. Jucha, Dr L. Wiercioch (2 papers presented)
- II International Symposium on Prostaglandins Halle, G.D.R., September 19-21
Assoc. prof. K. Herbaczyńska-Cedro, Dr P. Truskolaski (1 paper presented)
- II World Congress on the Intensive Care in Surgery Paris, France, September 19-23
Dr J. Jurkiewicz (1 paper presented)
- Congress on "Corso Pratico di Aggiornamento in Chirurgia Vascolare". Trieste, Italy, September 24
Assoc. prof. W. L. Olszewski (1 paper presented)

November

- Hungarian-Polish Neuropathological Symposium on Encephalitis Budapest, Hungary, November 2-4
Prof. M. J. Mossakowski, Assoc. prof. M. Dąbka, Assoc. prof. I. B. Zelman, Dr K. Renkawek (4 papers presented)
- X Donau Symposium on Neurological Sciences Vienna, Austria, November 16-20
Assoc. prof. M. Dąbka (1 paper presented)
- VI International Symposium on Acute Care, Current Topics in Critical Care Medicine, Rio de Janeiro, Brasil, November 20-26
Dr J. Szewczykowski (1 paper presented)

MISCELLANEA

AWARDS OF SCIENTIFIC DEGREES

I. The following research workers after completing their postgraduate studies at the Departments of the Medical Research Centre and defending their theses in a public discussion, obtained in 1977 the degrees of -
Doctor of Science:

Mr P. GRIEB, M.Biol.So. -

- from the Dept. of Neurophysiology -
- Doctor of Natural Sciences - for the thesis:
"Carbon dioxide and the control of respiration in tissue hypermetabolism-like conditions".

Mr J. ROMANIUK, M.Biophys.So. -

- from the Dept. of Neurophysiology -
- Doctor of Natural Sciences - for the thesis:
"Central summation of vagal information from the lungs".

Mr M. RYBA, M.D. -

- from the Dept. of Neurophysiology -
- Doctor of Medical Sciences - for the thesis:
"Properties of vagal feedback from the pulmonary stretch receptors".

Mr P. RUSZCZEWSKI, M.D. -

- from the Cardiovascular Laboratory -
- Doctor of Medical Sciences - for the thesis:
"Investigations on the level of endogenous prostaglandins in cerebral venous blood during hypocapnia, hypoxia and acute cerebral ischemia in the dog".

Miss H. KSIĘŻAK, M.Biol.Sc. -

- from the Dept. of Neurochemistry -

- Doctor of Natural Sciences - for the thesis:

"The metabolism of acetylcholine in the rat and guinea pig brains during oxygen deprivation and pentobarbital anaesthesia".

Mrs A. PASTUSZKO, M.Biol.Sc. -

- from the Dept. of Neurochemistry -

- Doctor of Natural Sciences - for the thesis:

"Disturbances of activity and location of NADP-dependent isocitrate dehydrogenase and lipid-protein structure of mitochondrial membranes in brain of young and adult animals during post-decapitation ischaemia".

Mr W. GROCHOWSKI, M.D. -

- from the Dept. of Neurosurgery -

- Doctor of Medical Sciences - for the thesis:

"Causes of therapeutic failure in lumbosacral vertebral disc diseases".

Mrs E. POHOSKA-KAMIŃSKA, M.Biol.Sc. -

- from the Dept. of Applied Physiology -

- Doctor of Natural Sciences - for the thesis:

"The effect of restriction of physical activity on the ability to perform prolonged physical exercise in dogs".

II. The following research workers after defending their theses in a public discussion, were granted in 1977 the degrees of -

Doctor Habilitatus of Sciences:

Mr A. KAPUŚCIŃSKI, M.D. -

- from the Dept. of Neuropathology -
- Doctor Hab. of Nuclear Medicine - for the thesis:
"Studies on ischaemic hypoxic brain oedema by means
of isotope methods".

Mrs H. KROH, M.D. -

- from the Dept. of Neuropathology -
- Doctor Hab. of Neurooncology - for the thesis:
"Morphological and histochemical features of
experimental gliomas in mice".

Mrs M. OSTENDA, M.D. -

- from the Dept. of Neuropathology -
- Doctor Hab. of Medical Sciences - for the thesis:
"Relationship between glia and blood vessels in
irradiated cerebral tissue".

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

- from the Dept. of Neurochemistry -
- Doctor Hab. of Natural Sciences - for the thesis:
- "Disturbances of cell metabolism in the brain
under conditions of oxygen debt".

Mr J. SZEWCZYKOWSKI, M.D. -

- from the Dept. of Neurosurgery -
- Doctor Hab. of Neurology - for the thesis:
"Studies on intracranial volume compensation".

SCIENTIFIC AWARDS

I. The 1977 annual award of the Scientific Secretary, Polish Academy of Sciences, were granted to the following scientific workers of M.R.C.:

Mr J. ALBRECHT, M.D.,

Mrs E. OHDE, M.D. -

- for a series of studies on:

"The mechanism of impairment of brain protein biosynthesis following carbon monoxide poisoning".

II. The 1977 awards of the Polish Scientific Societies were granted to the following workers of M.R.C.:

1. Of the Polish Association of Neuropathologists:
(Ist grade individual award)

Mrs L. DYDYK, M.D. -

- for her series of studies on:

"The effect of normobaric hyperoxia on the central nervous system in the newborn".

(IIInd individual award)

Mrs T. WIERZBA, M.D. -

- for her paper:

"Cerebral microcirculation disturbances during hypoxic hypoxia".

2. Of the Polish Physiological Society
(IIInd grade individual award)

Mrs B. KRUK, M.D. -

- for her work:

"Effect of ambient temperature on thermal sensitivity of the POAH area in the rabbit".

(IIInd grade collective award)

Mr J. ROMANIUK, D.Nat.Sc. - and

Mr M. RYBA, D.M.Sc -

- for their work:

"The effect of CO₂ on the components of breathing patterns".

(IIIrd grade individual award)

Mr M. POKORSKI, D.M.Sc. -

- for his studies on:

"Neurophysiological studies on the central chemosensor in medullary ventrolateral areas".

III. A Foreign Society Award

Mr W. L. OLSZEWSKI, M.D., D.Sc., assoc. professor of Surgery, was honoured in 1977 by the Purkinje Award, from the Czechoslovak Medical Association, for the whole of his work on the physiology and immunology of the lymphatic system.