

106136

JPRS-ULS-88-004  
15 MARCH 1988



**FOREIGN  
BROADCAST  
INFORMATION  
SERVICE**

# *JPRS Report*

# Science & Technology

*USSR: Life Sciences*

DISTRIBUTION STATEMENT A  
Approved for public release;  
Distribution Unlimited

19980626 136

REPRODUCED BY  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL TECHNICAL  
INFORMATION SERVICE  
SPRINGFIELD, VA 22161

DTIC QUALITY INSPECTED 1

10  
36  
A03

# Science & Technology

## USSR: Life Sciences

JPRS-ULS-88-004

CONTENTS

15 MARCH 1988

### Biochemistry

- New Types of Restriction Endonucleases  
*[M. P. Pyatrushite et al.; DOKLADY AKADEMII NAUK SSSR Vol 295, No 5, Aug 87]* ..... 1
- Significance of Lipids in Firefly Luciferase Function: Kinetic Mechanism of Delipidation of the Enzyme  
*[A. F. Dukhovich et al.; BIOKHIMIYA No 8, Aug 87]* ..... 1

### Biophysics

- Molecular Model of Formation of Dibenzo-18-Crown-6 Complex With Potassium Ion  
 in Membrane-Water System *[V. Ye. Khutorskiy, A. V. Krupko; BIOFIZIKA No 3, May-Jun 87]* ..... 2
- Features of Propagation of Focused Ultrasound Through Eye Structures  
*[V. N. Dmitriyev et al.; BIOFIZIKA No 3, May-Jun 87]* ..... 2

### Biotechnology

- Soviet-CEMA Country Cooperation in Biotechnology  
*[Leonid Repin; EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV No 8, Aug 87]* ..... 3
- Construction of Vector Molecules for *Bacillus Amyloliquefaciens*  
*[Yu. V. Yomantas, T. I. Ulanova, et al; BIOTEKHNOLOGIYA No 4, Jul-Aug 87]* ..... 6
- Thermal Stability of Enzymes of Template-dependent Nucleic Acid Synthesis and Restriction  
 Endonucleases from Extremely Thermophilic Archaeobacteria  
*[D. A. Prangishvili, D. Z. Chinchaladze, et al; BIOTEKHNOLOGIYA No 4, Jul-Aug 87]* ..... 6

### Epidemiology

- Uzbek Officials Fight Recognition of Disease Problem ..... 7
- Doctor's Work Denied for 17 Years *[O. Lukyanchikov; PRAVDA VOSTOKA, 12 Dec 87]* ..... 7
- People's Control Committee Investigates *[U. Maksumova; PRAVDA VOSTOKA, 27 Dec 87]* ..... 12
- Malignant Melanoma of Skin in Estonia: Morbidity and Survival Rates  
*[M. A. Rakhu, T. P. Aarelyd; et al; VOPROSY ONKOLOGII No 9, Sep 87]* ..... 13
- Correlation Between Suspected Ischemic Heart Disease and Morality Among 40-59 Year Old Males  
 Over a 6.5 Year Period of Observation  
*[A. P. Gorbunov, G. S. Zhukovskiy, et al; KARDIOLOGIYA No 9, Sep 87]* ..... 13
- Epidemiological Features of Diphtheria Carrier Status in Azerbaijan SSR  
*[D. Ya. Kasimova; AZERBAYDZHANSKIY MEDITSINSKIY ZHURNAL No 8, Aug 87]* ..... 14

### Human Factors

- Methodical Approach to Study of Connection Between Fitness for Work and Direction  
 of Operators' Physical Training  
*[R.M. Kadyrov, TEORIYA I PRAKTIKA FIZICHESKOY KULTURY No 9, Sep 87]* ..... 15

### Immunology

- Study of Mechanism of Immune Recognition of Cytochrome c in Vivo and in Splenocyte Culture  
*[M. V. Skok, E. M. Kavun; DOKLADY AKADEMII NAUK SSSR, Oct 87]* ..... 16
- Effect of Calcium Ions on Activity of Natural Killer Soluble Cytotoxic Factor  
*[L. P. Sashchenko, N. V. Gnuchev, et al; DOKLADY AKADEMII NAUK SSSR No 5, Oct 87]* ..... 16

### Laser Bioeffects

- Status of Healthy Persons in Contact With Infrared Laser Radiation and Problems of Prevention  
*[Yu.K. Tokmachev, V.A. Kashuba; SOVETSKAYA MEDITSINA No 9, Sep 87]* ..... 17

Comparison of Thrombogenic Properties of Vascular Wall After Exposure to Various Lasers [S.E. Ragimov, A.A. Belyayev; KARDIOLOGIYA No 10, Oct 87] .....	17
Use of Lasers in Rehabilitation of Patients With Large Segments of Extremities That Have Been Reattached [R.O. Datiashvili, G.A. Stepanov; KHIRURGIYA No 10, Oct 87] .....	17
Use of Carbon Dioxide Laser Radiation to Treat Wounds in Children [L.M. Roshal, G.D. Litvin; VESTNIK KHIRURGIYA IMENI I. I. GREKOVA No 9, Sep 87] .....	18
Organ-Saving Operations on Lungs Using CO <sub>2</sub> Laser [L.N. Sidarenko, A.Yu. Sadow; KLINICHESKAYA KHIRURGIYA No 10, Oct 87] .....	18

## Medicine

Conventional and Cryopreservation of Blood Cells: Achievements and Advances [V. A. Agranenko, Yu. S. Sukhanov; GEMATOLOGIYA I TRANSFUZIOLOGIYA No 10, Oct 87] .....	19
Allosteric Regulation of Oxygen Affinity of Hemoglobin and of Human and Bovine Hemoglobin Polymers [L. V. Fetisov; GEMATOLOGIYA I TRANSFUZIOLOGIYA No 10, Oct 87] .....	19
Experimental Clinical Trials With Crystalloid Blood Substitute Polysol [Yu. A. Litvinenko, G. N. Kurbanova, et al; GEMATOLOGIYA I TRANSFUZIOLOGIYA No 10, Oct 87] .....	19
Artificial Heart Implantation [V. I. Shumakov, N. K. Zimin; MEDITSINSKAYA TEKHNICA No 5, Sep-Oct 87] .....	20
Hemodynamics of Emiks Disc-Type Artificial Heart Valves [M. L. Semenovskiy, V. Ye. Manukyan, et al; MEDITSINSKAYA TEKHNICA No 5, Sep-Oct 87] .....	20
Plasma- and Cytapheresis Devices for Extracorporeal Control of Aggregate Condition of Blood in Cardiovascular Diseases [A. O. Gavrilov, A. A. Pisarevskiy, et al; MEDITSINSKAYA TEKHNICA No 5, Sep-Oct 87] .....	20
Evaluation of Dip Hemodialyzer With Soviet and Foreign Membranes [A. R. Rudman, N. A. Vengerova, et al; MEDITSINSKAYA TEKHNICA No 5, Sep-Oct 87] .....	21

## Microbiology

Ecologic and Physiological Features of Micromycetes Contaminating Optical Glasses [E.Z.Koval, V.A. Sviderskiy; MIKOLOGIYA I FITOPATOLOGIYA No 4, Jul-Aug 87] .....	22
Early Stages in Development of Pyricularia Oryzae Cav. on Rice Leaves [V.P. Lapikova, V.G. Dzhavakhiya; MIKOLOGIYA I FITOPATOLOGIYA No 4, Jul-Aug 87] .....	22
Study of Interaction of Bacillus Subtilis With Colloidal Gold by IR Spectroscopy [F.D. Ovcharenko, N.V. Pertsov; KOLLOIDNYY ZHURNAL No 5, Sep-Oct 87] .....	22

## Molecular Biology

Vectors for Cloning and Determining Activity of Elements of Bacterial Transcription System. Cloning rRNA Operon Transcription Terminator of Archaeobacterium Halobacterium halobium [Ye.A. Skripkin, A.S. Mankin; BIOPOLIMERY I KLETKA No 5, Sep-Oct 87] .....	23
Cloning Sequences of Corn Genome DNA Capable of Autonomous Replication in Saccharomyces Cerevisiae [V.N. Shulzhenko, V.A. Kordyum; BIOPOLIMERY I KLETKA No 5, Sep-Oct 87] .....	23

## Pharmacology, Toxicology

Changes in Nervous System During Acute Malathion Poisoning [G.A. Akimov, I.P. Kolesnichenko; SOVETSKAYA MEDITSINA No 9, Sep 87] .....	24
Influence of Synthetic Leu-Enkephalin Analogue on Higher Mental Functions in Alcoholism [A.I. Belkin, L.I. Moskovichyute; SOVETSKAYA MEDITSINA No 10, Oct 87] .....	24
Isolation of Toxins From Pyricularia Oryzae Cav. Spores [G.K. Samokhvalova, N.V. Sobolevskaya; MIKOLOGIYA I FITOPATOLOGIYA No 4, Jul-Aug 87] .....	24
Facilitation of Memory Trace Reproduction upon Administration of Amfonelic Acid [R. Yu. Ilyuchenok et al.; FARMAKOLOGIYA I TOKSIKOLOGIYA No 4, Jul-Aug 87] .....	24
Comparative Study of Dose-Effect Dependence for Oral and Inhalation Administration of Organophosphorus Pesticides [G. A. Voytenko, Ye. I. Semchinskaya; GIGIYENA I SANITARIYA No 8, Aug 87] .....	25
Toxicologic-Hygienic Estimation of Relative Selectivity of Pesticide Effects [Ye. A. Yershova, Yu. S. Kagan; GIGIYENA I SANITARIYA No 8, Aug 87] .....	25

Influence of Microencapsulation on Euphilline Release Rate from Tablets [I. A. Murayev, I. N. Andreyeva; FARMATSIYA No 2, Mar-Apr 87] .....	25
Mechanism of Clonidine Release from Solid Dispersed Ethylcellulose-Based Systems [A. I. Tentsova et al.; FARMATSIYA No 2, Mar-Apr 87] .....	25

### Physiology

Individual Differences in Dynamics of Working Capacity and Functional Status of Operators as a Function of Constitution [G. A. Smirnova, B. V. Ovchinnikov; FIZIOLOGIYA CHELOVEKA No 3, May-Jun 87] .....	26
Increase in Influence of Oxygen on the Body in the Presence of Helium [M. M. Seredenko, Ye. V. Rozova; FIZIOLOGIYA CHELOVEKA No 3, May-Jun 87] .....	26
Regulation of Hemodynamics upon Imitation of the Transition to Weightlessness (Mathematical Modeling) [B. L. Palets et al.; FIZIOLOGIYA CHELOVEKA No 4, Jul-Aug 87] .....	26
Role of Individual Features of Autonomic Reactions to Adaptogens in Physical and Mental Efficiency [T. I. Shustova et al.; FIZIOLOGIYA CHELOVEKA No 4, Jul-Aug 87] .....	26
Study of Indices Defining Effectiveness of Occupational Activity of Divers [V. Ya. Apchel et al.; FIZIOLOGIYA CHELOVEKA No 4, Jul-Aug 87] .....	27
Change in Behavioral and Biochemical Effects of Caerulein, an Analog of Cholecystokinin Octapeptide (CCK-8) Following Long-term Administration of Haloperidol [E. E. Vasar et al.; ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA No 4, Jul-Aug 87] .....	27
Feeding Activity of Rats Following Microinjection of Enkephalin-Like Tetrapeptides in Various brain structures [T. V. Shurtakova, L. F. Kelesheva; ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA No 3, May-Jun 87] .....	27
Selective Vasopressin Stimulation of Exploratory Behavior in Rats [A. B. Nikonova et al.; ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA No 3, May-Jun 87] .....	27
Microionophoretic Study of Chemical Sensitivity of Medial Hypothalamic Neurons to Substance P in Rats [Ye. Yumatov, Ye. V. Bykova; FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA No 8, Aug 87] .....	28
Neurotic Reactions and Internal Inhibition Processes in Apes Receiving Beta-Endorphin Conjugate with Ox Serum Albumin [A. I. Karamyan et al.; DOKLADY AKADEMII NAUK SSSR No 6, Aug 87] .....	28

### Public Health

Eye Microsurgery Centers Open in Krasnodar and Cheboksary [V. Ovcharov, V. Udachin; SOVETSKAYA ROSSIYA 29 Oct 87] .....	29
Deputy Health Minister on Health Care Problems [S. Tutorskaya; IZVESTIYA 25 Aug 87] .....	29
Reasons for Lagging Medical Technology [MOSKOVSKAYA PRAVDA, 15 Oct 87] .....	29

### Miscellaneous

CEMA Countries' Joint Efforts in Making Medical Equipment [Larisa Popyonova; FOREIGN TRADE, No 10, Oct 87] .....	30
---	----

**New Types of Restriction Endonucleases**

18400017a Moscow *DOKLADY AKADEMII NAUK SSSR in Russian Vol 295, No 5, Aug 87 (manuscript received 20 Feb 87) pp 1250-1253*

[Article by M. P. Pyatrushite, Yu. B. Bitinayte, D. R. Kershulite, S. Yu. Menkyavichyus, V. V. Butkus and A. A. Yanulaytis, "Ferment" Scientific-Production Association, Vilnius]

[Abstract] This article presents data on two restrictases — GsuI and Eco57 I, which differ in a number of characteristics from all three known classification types of such enzymes. GsuI and Eco57 I are considered to be representatives of new classification types of restriction enzymes, differing from other enzymes studied in their requirements for ATP and S-adenosyl-L-methionine. Figures 2, references 11: Western.

6508

**Significance of Lipids in Firefly Luciferase Function: Kinetic Mechanism of Delipidation of the Enzyme**

18400017b Moscow *BIOKIMIYA in Russian Vol 52, No 8, Aug 87 (manuscript received 28 Jul 86) pp 1364-1372*

[Article by A. F. Dukhovich, N. N. Ugarova, S. V. Shvets, N. Yu. Filippova and I. V. Berezin, deceased, Department of Chemical Enzymology, Moscow State University imeni M. V. Lomonosov]

[Abstract] A study is presented of the functional role of lipids in firefly luciferase and of the changes in activity of the enzyme upon delipidation. It is demonstrated for the first time that highly purified firefly luciferase is a membrane lipoprotein. The data demonstrate the importance of hydrophobic and electrostatic interactions in insertion of luciferase into liposomes and strengthening of the native conformation of the enzyme macromolecules. Treatment of luciferase with a detergent which delipidizes membrane enzymes greatly decreases luciferase activity. Delipidation of luciferase is found to be a rapid process, with a half period of the reaction of 0.8 sec. Phospholipids are responsible for maintenance of the enzyme in aqueous solution in its catalytically active state by making the surface of the protein hydrophilic, preventing disordered aggregation of luciferase in aqueous solution and stabilizing the conformation of the active site. Figures 6, references 37: 15 Russian, 22 Western.

6508

**Molecular Model of Formation of  
Dibenzo-18-Crown-6 Complex With Potassium  
Ion in Membrane-Water System**

18400020b Moscow *BIOFIZIKA in Russian* Vol 32, No 3, May-Jun 87 (manuscript received 22 Jul 85; after revision 10 Apr 86) pp 482-487

[Article by V. Ye. Khutorskiy and A. V. Krupko, Institute of Organic Chemistry, Ukrainian Academy of Sciences, Kiev]

[Abstract] A Monte Carlo method study was performed of the formation of a dibenzo-18-crown-6-potassium ion complex at the interface between a membrane and water with the purpose of constructing a molecular model of this process. The algorithm used to model the crown ether-membrane-water system is described briefly: A monolayer consisting of 36 phospholipid molecules surrounding the crown ether in contact with 108 water molecules was analyzed. Interactions among water molecules were computed by a scheme in which water molecules were modeled as distorted tetrahedrons with charges located at the points. The molecular chain of the phospholipid monolayer was represented as a sequence of monomer links, each modeling a group of atoms. Phospholipid molecules were modeled as 11 solid spheres. The first two spheres modeling the polar head of the phospholipid carried positive and negative charges. Two molecular models are suggested for the formation of a dibenzo-18-crown-6-potassium ion complex. Figure 1, references 20: 9 Russian, 11 Western.

6508

**Features of Propagation of Focused Ultrasound  
Through Eye Structures**

18400020c Moscow *BIOFIZIKA in Russian* Vol 34, No 3, May-Jun 87 (manuscript received 11 Aug 86) pp 500-506

[Article by V. N. Dmitriyev, L. V. Solontsova and A. N. Gerchikov, Institute of Acoustics imeni Academician N. N. Andreyev, USSR Academy of Sciences; Scientific Research Institute of Eye Diseases imeni Helmholtz, RSFSR Ministry of Public Health]

[Abstract] Ultrasound at 0.8-10 MHz is widely used for diagnosis and treatment of eye diseases. Focused ultrasound can be used to create local coagulation necrosis foci on the fundus oculi and to break up intraophthalmic neoplasms. This article studies a method of remote measurement of the acoustical pressure created by focused ultrasonic radiation at various points within the eye, and presents quantitative estimates of the degree of defocusing of the ultrasound beam as a function of the mutual placement of the radiator and the specimen being studied. The method avoids damaging the eye and allows its anatomical characteristics to be maintained. The method is based on the use of a receiver with an angular aperture at least as great as that of the radiator. It is found that maximum expansion of the main lobe of the distribution function of acoustic pressure is observed at the exit from the lens, reaching 40-50% with a simultaneous decrease in peak intensity of 40%. As a result, the mean intensity across the focal spot falls by more than 3-fold. Figures 4, references 9: 4 Russian, 5 Western.

6508

### Soviet-CEMA Country Cooperation in Biotechnology

18400015 Moscow EKONOMICHESKOYE  
SOTRUDNICHESTVO STRAN-CHLENOV SEV in  
Russian No 8 Aug 87 pp 18-22

[Article by Leonid Repin, a Soviet journalist: "Horizons of Biotechnology"; published under the rubric "Scientific and Technological Progress: The Strategy of Acceleration"]

[Text] Among the priority areas on the cutting edge of science and technology, biotechnology occupies a special place; it is a science that is old and new at the same time.

#### Responsibility and Usefulness of Science

Lothar Klaus, the deputy director of the Leipzig Institute of Biotechnology of the GDR Academy of Sciences, told me, "Biotechnology is already becoming a working tool of the scientific and technological revolution.

"There is a tremendous burden of responsibility for this science which is closely linked with the practical needs of man. The methods of biotechnology and genetic engineering as an independent field of science have opened truly fantastic opportunities. An industry has been created that utilizes microorganisms to help produce drugs—antibiotics, amino acids, enzymes, various substances for plant protection and fodder yeast—and to produce an ecologically pure fuel—hydrogen. This list is far from complete!"

Back at the end of the last century Dmitriy Ivanovich Mendeleev, the brilliant Russian scientist, wrote that he was convinced that nutrients could be produced by combining elements of air, water and soil outside of ordinary crop growing at special factories; he believed that the first such factories of this kind would utilize the lower organisms, such as yeasts, to process water, air, minerals, air and solar heat. But generations of scientists had first to find their way along this hardly discernible vista....

This was the subject of our discussion with Dr Klaus, who radiates the conviction that nothing could be more important or interesting than the field of his endeavor—a science created to be practically valuable from its very first steps.

"Take, for example, this problem," noted Dr Klaus, "the production of nutrient protein from various kinds of raw materials. It is biotechnology that found a new solution to this problem."

Dr Klaus is on the staff of an institute that has been working on this problem for almost six years; as a result, high-quality feed protein has been produced, first from petroleum distillate and subsequently from other non-food products.

Related work by Soviet scientists is well known in the GDR. VNII Sintez-belok [All-Union Scientific Research Institute of Protein Synthesis] is producing a new nutrient product—a protein isolated from yeast. Enzyme preparations are used to disintegrate yeast cell membranes. The protein isolated from the cells is purified, concentrated and dried. Up to 250 kg of the isolate can be obtained from 1 metric ton of yeast. This colorless and odorless powder contains some 80 percent of protein, 5 percent of carbohydrates and about 2 percent of nucleic acids. It is a perfect additive for various products with a low protein content, such as bread and sausage. It has been estimated that by using 1 million metric tons of yeast per year it is possible to produce additionally the amount of protein contained in about 1 million metric tons of highest grade beef. Of course, no one is offering steaks and cutlets from yeast cells: the object is to produce protein as an additive.

Dr Klaus introduced us to Peter Kuschka, a young scientist working on environmental protection by biotechnological methods.

"The common method of treatment of sewage is to use aerobic bacteria," P. Kuschka explained. "Air is passed through treatment tanks for the bacteria to utilize the atmospheric oxygen and process organic matter. We decided, however, to treat certain types of sewage with anaerobic bacteria, which can find vital energy without oxygen."

This method offers huge advantages, mainly because one does not have to pump air through the tank. Energy is saved and various mechanisms and facilities are no longer needed. In addition, some 40 percent of carbon released as the result of the vital functions of the microorganisms is converted into fuel that can be used for factories and for heating buildings.

"What is the specific project your group is working on, aside from the global overall goal?" I asked Peter.

"We are working on biochemical reactions. We want to understand the essence of the processes we study by observing the parameters of these reactions. Before recommending a new method for practical use we must be absolutely certain about it." Hearing these words, I looked up at Dr Klaus, who a moment ago had expressed a similar view—that the scientist bears a grave responsibility to science, society and himself.

Dr Klaus added that one of the latest environmental projects of the institute is concerned with extraction of mercury from sewage by means of bacteria. The new method has already been made available to the chemical industry of the GDR.

Every department and laboratory of the institute is working on application projects, but about one-fourth of the scientists are also engaged in long-term basic research. Science cannot live by today's issues; it must

move faster than its surroundings and like a powerful floodlight show the way for the future. Otherwise, it would be like a train running into a dead end at full speed.

Dr Klaus described the contacts of his institute staff with Soviet colleagues. Young scientists are often sent for training at the Biology Center in Pushchino near Moscow. Dr Ioachim Engel, upon returning from the USSR, was assigned as the head of the new department of genetics. Cooperation of the institute staff with scientific organizations of CEMA member countries is extensive and fruitful. Joint workshops are held on biotechnology, genetics and other fields of research. Incidentally, in the CEMA framework the GDR is the coordinator country on a topic that is of tremendous practical significance: cellulose degradation. The Leipzig Institute has joint projects with the Institute of Microbiology in Riga, and the leading Soviet organization on these problems—the Institute of Microbiology of AN SSSR [USSR Academy of Sciences]. Pushchino scientists are helping their German colleagues with research aimed at removal of sulfur from brown coal. This problem is especially important for the GDR. Active business contacts have recently been set up with the Scientific Research Institute at Bratislava in genetic modification of a strain of cellulose-degrading fungi.

#### Search for Technical Tools

It is the rare scientists that does not augur an important future role for his science. Stoyan Tsonkov, doctor of technical sciences and director of the Central Laboratory of Biological Instrument-Making in Sofia, has every reason to describe biology as the science of the next generation.

Scientific forecasters increasingly predict that biological science will develop at an accelerated pace. One often hears that in the next century biology will make major breakthrough discoveries. There is every reason to expect that this will happen.

What did biology do in the preceding centuries? Mostly, it collected information. Scientists studied the various forms of life, admired its potentials and made first attempts to understand the essence and laws of vital processes. Today's biology is at a totally different level: it sets for itself entirely practical goals, learns how to control vital processes and harness them for the maximum benefit to man. This refers especially to molecular biology, genetics, biophysics, microbiology and certainly to biotechnology.

What is the object of Stoyan Tsonkov's preoccupation? The search for technical means needed in biotechnological experiments.

"The uses of biotechnology in various fields of the economy can become more vigorous," he said, "only provided an appropriate technical and technological level of biological engineering."

"What specifically do you have in mind?"

"Up-to-date manufacturing processes for the production of recording and control equipment, biotechnological automated equipment lines and modern engineering solutions. And, of course, we must develop efficient equipment where the biotechnological processes actually are conducted. Our laboratory is developing installations for pretreatment of raw materials, biological reactors or fermenters, control equipment, equipment for isolation of specific biological products, concentration and purification of these products, and various computer tools for process control and optimization."

We discussed the difficulties faced by the developers of new biotechnological equipment. The main challenge is the fact that one has to work with microorganisms. These organisms make the industrial processes particularly complicated and unsteady. For example, temperature has to be maintained with an accuracy of 0.1-0.2°C. One must be careful in maintaining the required concentration of nutrient solution, etc.

The development of cybernetic methods and their uses in biology and biological engineering helped create a scientific approach to problems of biological synthesis. In the past few years mathematical models have been developed of the various biological processes, allowing static and dynamic optimization of these processes.

S. Tsonkov said that in cooperation with specialists from Czechoslovakia and Soviet Union this laboratory has developed biological reactors with micro-processor control. This equipment is batch-produced in Bulgaria and exported to other socialist nations. Joint projects are conducted with specialists from Puschino Biological Center near Moscow, which has been successfully using in its work a number of devices built here in Bulgaria at the Central Laboratory, directed by Stoyan Tsonkov.

According to Tsonkov, the laboratory recently designed an automated biological reactor with a "more intelligent" computer. In particular, the history of an experiment is kept in the computer memory. The memory is also used to monitor the behavior of the parameters in time. The reactor is slightly superior to the best prototypes in terms of maintenance of conditions. Tanya Vladimirova and Georgi Vylevski, two young but already well-regarded scientists, participated in the development of this device.

Vylevski specializes in reliable and subtle sensors. His last project was sensors measuring the flow rate of fluids in gases and liquids. The device he is developing with a group of colleagues is a "quasimetric gas flow rate

meter." No such device exists in Bulgaria at present. After meeting Georgi I can say with confidence that such a device will exist in Bulgaria soon.

"These sensors," Vylevski explained, "are very expensive, and we cannot afford to buy them abroad. Difficulties? There are many. To begin with, the equipment will operate at very high temperature, up to 150°C. By comparison, similar equipment until recently could operate only at 50°C.

### With the Aid of Genetic Engineering

"Can we imagine the possible danger that might come from living beings that do not exist in nature and have been created artificially or by accident?" asks Dr Frantisek Kapralek, head of the Laboratory of Genetic Engineering of the Institute of Molecular Genetics of the Czechoslovak Academy of Sciences.

For some reason, I imagined a monster ant the size of a dog—not large, just a dog. If all the faculties of an ant were increased proportionally to its size, that monster would run much faster than a smooth-running Zhiguli automobile, would be much stronger than an elephant and could cut down an old tree with a single bite of its powerful jaws. No, we don't need that.

Dr Kapralek agreed, but said reassuringly. "When the first work in genetic engineering was begun, some people were saying that it was an extremely dangerous activity because introduction of microorganisms that do not exist in nature could have irreversible consequences. Now, after genetic engineering has accumulated much experience, we can say that those apprehensions were unfounded. We learned to operate so that we can guarantee complete reliability and safety."

As we were walking through the rooms of this unique laboratory—the only such laboratory in Czechoslovakia—Dr Kapralek told me that among the major problems they are working on is the extremely subtle operation of isolating enzymes from the virus of malignant tumors in poultry. The enzyme is used as a raw material for further research to find ways of fighting malignancies in birds. One could hardly expect to achieve any success without the fine tools provided by genetic engineering.

Iri Zadina, candidate of biological sciences, opens a heavy door, like one to a bank vault, then another such door, and we are in the main part of the laboratory where experiments on microorganisms are conducted. Now I understand why Dr Kapralek was so confident when he spoke of guaranteed safety of experiments for the surrounding world.

First, all instruments are thoroughly sterilized in autoclaves. Secondly, the atmospheric pressure in this room is below normal to prevent penetration of microorganisms into neighboring rooms, where the pressure is higher. Thirdly, a complicated network of special filters is installed along the ducts through which waste, air and water are removed.

One can only add that the work in this area has earned the group of Czechoslovak and Soviet scientists the State Prize of the USSR.

At the Institute of Microbiology of the Czechoslovak Academy of Sciences, Zdenek Gostalek, the deputy director, also described fine experiments aimed at producing artificial microorganisms useful to man. This is a new area of modern science that did not exist before, although generations of brilliant scholars starting from medieval alchemists had worked very hard to accomplish a similar goal: creating new materials with desired properties. The progress of genetic engineering brought biologists to a new level never achieved before.

In 1982 the government of the Czechoslovakia made a decision to develop biotechnology as an industry in which the capabilities of basic science would be linked with practical interests and benefit to industry. Several scientific research institutes across the country took part in this effort, one of them the Institute of Microbiology.

Dr Gostalek told me that new industrial processes are being developed at the department of molecular biology and genetics. Genetic engineering is used here to find new economically useful microorganisms. A portion of genetic material is transferred from one microorganism into another, producing living beings that did not exist previously in nature. Everything, of course, is done in a sterile environment similar to that demonstrated by Dr Kapralek.

For example, there are common microbes that isolate nitrogen from air but grow slowly. Other microbes grow rapidly. Theoretically, the goal is simple, but in practice problems are hard to solve: one has to isolate from the rapidly growing bacteria the growth gene and transplant it into the nitrogen-fixing bacteria. This is what the institute is working on: using genetic engineering to produce new, more active industrial strains.

Z. Gostalek noted that the institute is working successfully in other areas to meet specific requests from the industry. The following problem is an example: citric acid used in food products and detergents was previously obtained from mold fungi growing on sugar with a high production cost. The institute has developed a new technology for production of citric acid with bacteria grown in fermenters. The process has already been introduced into industry.

Another problem was to develop waste-free technologies by utilizing substances that used to be released into the atmosphere or into sewage and eventually found their way into rivers and reservoirs. The following question was posed: Could the waste products become useful and be utilized as a nutritive medium for some industrial microorganisms? Some of these water pollutants are alkalis. The Institute of Microbiology has developed a bacterial method for utilization of these alkalis to produce feed protein. The bacteria grow actively on the substance and form yeast that can be added as a protein to a compound cattle feed.

"The first factory that will operate according to this technology is already being built," said Dr Gostalek. "The next step is to produce pure food protein. We are working on that together with our Soviet colleagues."

I have heard that phrase many times at this institute. Virtually all large-scale projects are conducted in cooperation with Soviet specialists. There are particularly many joint projects with the Institute of Biochemistry and Physiology of Microorganisms of AN SSR.

Horizons of cooperation in biotechnology are broad, and it is yielding a growing number of practical results.

Leipzig—Sofia—Prague—Moscow

COPYRIGHT: Sovet Ekonomicheskoy Vzaimopomoshchi, Sekretariat, 1987

/9274

UDC 579.852.11.25

### **Construction of Vector Molecules for *Bacillus Amylolyquefaciens***

*18400084b Moscow BIOTEKHNOLOGIYA in Russian Vol 3, No 4 Jul-Aug 87 (manuscript received 2 Feb 87) pp 465-468*

[Article by Yu. V. Yomantas, T. I. Ulanova, N. F. Ryabchenko and Yu. I. Kozlov, All Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow]

[Abstract] An attempt was made to insert genetic information into a *B. amylolyquefaciens* strain which has a highly effective secretion system for a number of

enzymes and to search for possible vector molecules. In one strain of *B. amylolyquefaciens* H a cryptic plasmid, 72 kB in length, was isolated and marked with the stability determinant to erythromycin by inserting a Hind III DNA fragment carrying the methylase gene on it. The plasmid pBA930(Em<sup>r</sup>) was obtained and its physical map was determined. This plasmid transformed *B. amylolyquefaciens* protoplasts with low effectiveness but it could be used to clone genetic material in *B. amylolyquefaciens* cells. Figure 1; references 10: 3 Russian, 7 Western.

7813/9274

UDC 577.152.277.088.5

### **Thermal Stability of Enzymes of Template-dependent Nucleic Acid Synthesis and Restriction Endonucleases from Extremely Thermophilic Archaeobacteria**

*18400084a Moscow BIOTEKHNOLOGIYA in Russian Vol 3, No 4 Jul-Aug 87 (manuscript received 8 Jul 86) pp 440-446*

[Article by D. A. Prangishvili, D. Z. Chinchaladze and M. G. Chelidze, Institute of Molecular Biology and Biological Physics, GSSR Academy of Sciences, Tbilisi]

[Abstract] The thermal stability of some important enzymes was investigated: DNA-dependent RNA-polymerases and DNA-polymerases and restriction endonucleases from extremely thermophilic, acidophilic archaeobacteria: *Desulfurococcus mocosus*, *Thermoproteus tenax*, *Sulfolobus acidocaldarius* and *Thermoplasma acidophilum*. It was concluded that the thermal stability of these enzymes is directly correlated with the organism growth temperature. The temperature of maximum activity is in the range of optimal bacterial growth temperature. Complete loss of enzyme activity takes place rapidly only at temperatures 10-20° above the maximum growth temperature. Preservation of enzyme activity is due solely to high thermal stability and not to various mechanisms based on protective factors or rapid resynthesis. Figures 5; references 12: 3 Russian, 9 Western (1 by Russian authors).

7813/9274

## Uzbek Officials Fight Recognition of Disease Problem

### Doctor's Work Denied for 17 Years

18300120a Tashkent PRAVDA VOSTOKA in Russian  
12 Dec 87 pp 3-4

[Article by PRAVDA VOSTOKA correspondent O. Lukyanchikov, under rubric "Let's Speak Frankly: "The Fungus of Bureaucratism""]

[Text]A rather large number of problems have accumulated in the job of health protection in our republic. One such problem that stands out sharply here is the problem of the disease and mortality rate among children. Judged on the basis of this indicator, individual rayons in Uzbekistan have been equated with the poorly developed countries. Hundreds of physicians have come to our republic to render emergency aid to children.

Today we shall discuss a story which, against that background, looks strange...

"A previously unknown disease has been detected," Professor N. A. Dekhkan-Khodzhayeva asserts. "Its widespread development in the republic is one of the reasons why the disease and mortality rate among children has risen."

"Nothing of the sort!", people at UzSSR Minzdrav [Ministry of Health deny.

This confrontation has lasted for many years, and continues to this day.

Exactly who is this Professor N. A. Dekhkan-Khodzhayeva?

A student of the eminent Soviet parasitologist, Academician N. I. Khodukin, Nazima Abdullayevna Dekhkan-Khodzhayeva devoted her candidate and doctoral dissertations to a study of *Lamblia*. Her path to recognition was not a smooth one, since the research by the young scientist from Uzbekistan refuted a point of view that prevailed at that time, to the effect that *Lamblia* are not pathogens. She emerged as the victor from that dispute and received a license certifying her discovery, and the World Health Organization bases itself on it in its recommendations dealing with lambliaiasis.

But this argument has lasted, all told, 18 years (the license was issued in 1977, with discovery priority in 1959). The first to recognize the worldwide importance of N. Dekhkan-Khodzhayeva's research were scientists from the United States.

It was precisely then, in 1971, that USSR State Committee for Science and Technology organized the Protozoal Diseases Department of the NII of Medical Parasitology imeni L. M. Isayev, of Uzbek Minzdrav, which Nazima Abdullayevna has headed since that time.

It should also be added that N. Dekhkan-Khodzhayeva has engaged, and continues to engage, in science in the clinic, deep in the midst of medical practice, and that during the past 15 years she has trained nine candidates of sciences and two doctors of sciences in parasitology.

What else should one say about a person at the mention of whose name the associates at UzSSR Minzdrav immediately advice "be a bit cautious," "don't rely on her words," etc.? Probably the only thing that one should add is that it is difficult to suspect Nazima Abdullayevna of being mercenary. She is a person who is materially well provided for and she is a scientist with a world name.

"Since the beginning of the 1970's," N. Dekhkan-Khodzhayeva says, "there has been a noticeable increase in the number of patients with anemia, and more frequent occurrences of acute respiratory diseases and pneumonia, especially among children — and practically from birth itself. For a long time they failed to recover and continued to have a high temperature — the body's defense mechanisms had dropped. As a parasitologist, I was interested in finding out whether this could have been caused by a protozoal pathogen. In 1972 I discovered in patients' blood some structures that were unknown to me.

"Soon physician A. Tashmatova came from Zaamin. She too had detected strange structures in her patients' blood. After we compared notes, we were convinced that we were dealing with one and the same structures."

On 22 November 1972, after listening to a report by N. Dekhkan-Khodzhayeva and her associates at a united conference of several laboratories at the institute, O. V. Baroyan, the director of the Institute of Epidemiology and Microbiology, USSR Academy of Medical Sciences [AMN], USSR AMN Academician, and chairman of the Committee to Eliminate Infections, under USSR AMN, wrote to K. Zairov, the then UzSSR Minister of Health, "The Institute of Epidemiology and Microbiology feels that this research deserves a large amount of attention, and she needs assistance in continuing and deepening this research..."

The republic's Minzdrav, by its written order, created a staff to combat and to expand the research. A special 50-bed department was opened at the hospital in Zaamin.

"The research confirmed the hypothesis concerning the existence of a new pathogen," N. Dekhkan-Khodzhayeva recalls, "and then the Uzbek minister of health chose the position, 'We've got enough diseases in our republic already — we don't need a new one!'"

But the researchers worked and informed the scientific public about their finds. Some supported the researchers, but others did not see any necessity to do this. Thus, a commission under the leadership of N. Plotnikov, professor at the NII of Medical Parasitology and Tropical Medicine, which commission had been invited by the republic's Minzdrav, felt that the structures that had been detected by N. Dekhkan-Khodzhayeva were "remnants of erythrocytes." Giving this conclusion as its reason, the ministry abolished the expedition and reduced the number of beds at the Zaamin hospital to ten.

Nazima Abdullayevna and her associates did not agree with the conclusions of the commission, the members of which did not even include a person specializing in hematology. They got in touch with the Central Institute of Blood Transfusion, where G. I. Kozinets, then a scientist and now professor, gave his conclusion: "'remnants of erythrocytes' have nothing to do with this."

UzSSR Minzdrav became feverish. First they renewed the expedition and increased the number of beds back to 30. After half a year, referring to the same prior decision by the commission, they issued another order that suspended the research. Once again N. Dekhkan-Khodzhayeva and her associates went to Zaamin and continued the job that they had begun, except that now it was at their own risk.

Then the year 1974 brought the researchers important results. Inoculations of patients' blood on an especially sensitive material, which had been made at Nazima Abdullayevna's request at the NII of Pediatrics, UzSSR Minzdrav, had yielded fungal cultures. But what kind were they?

An electronic microscope which had been obtained at one time by the department with the aid of the USSR Committee for Science and Technology made it possible to photograph the "stranger" and even the moment that that fungus emerged from the envelope which incompletely dissolves in the blood. And these, then, were those very "structures."

When the enemy had been recognized, it proved to be possible to cure the first patient.

The therapeutic effect confirmed the fungal nature of the pathogen. It was now necessary to identify it.

The finding that was made by U. Belukha, chief of the Mycology Department, Uzbek NII of Skin and Venereological Diseases, and doctor of medical sciences, states,

"In these patients one suspects the presence of the pathogen of a rarely encountered disease of systemic mycosis — histoplasmosis."

The search for qualified specialists in mycology led Nazima Abdullayevna to Leningrad, to Professor P. Kashkin, RSFSR Honored Scientist, and State Prize winner, who at that time headed the Systemic Mycoses Department at the Leningrad State Institute for Physician Refresher Courses.

After becoming acquainted with the materials that had been brought from Uzbekistan, he convoked a combined session of the associates at the Systemic Mycosis Department, the Microbiology Department, the Mycology Department, the Pathological Anatomy Department, and the Histology Department of Leningrad State Institute for Physician Refresher Courses [LENGIDUV], and members of the Mycotic Section of the Leningrad Society of Dermatologists. At that meeting Nazima Abdullayevna gave a report, showed electronic photographs, and answered questions. The scientists evaluated the entire seriousness of the situation. They recommended that she extend the study of the disease that had been discovered, and requested UzSSR Minzdrav to allocate funds for the necessary research.

At the ministry, this decision was felt to be erroneous. The person who was sent to the city on the Neva with the assignment of persuading the Leningrad mycologists to change their conclusions was... U. Belukha, who, it would seem, understood his "blunder."

The Leningraders remained firm on their principles, confirmed the previous decision, and sent a memorandum to P. Burgasov, USSR deputy minister of health. He proposed having the scientist from Uzbekistan give a report at USSR AMN. That did not occur — once again because of the interference by the republic's Minzdrav — but USSR Minzdrav sent Professor N. Dekhkan-Khodzhayeva's materials to the NII of Epidemiology and Microbiology, USSR AMN.

"N. A. Dekhkan-Khodzhayeva has detected a previously unknown pathogen of a new disease," was the finding made by Professor D. Zasukhin, chief of the Toxicoplasmosis Laboratory, and the World Health Organization expert, and by Professor A. Avakyan, chief of the Department of Morphology of Pathogenic Microorganisms and Electronic Microscopy. Another person who, after analyzing the new experimental data, gave his finding was Professor O. Khmelniitskiy, chief of the Pathological Anatomy Department of LenGIDUV, currently corresponding member of USSR AMN. "The 'devastated' forms of the pathogen cells do not have anything in common with erythrocytes and are, more likely, the result of the degeneration of the tissue forms of the fungus (their capsules). The pathogen resembles one of the pathogenic fungi — histoplasma." O. Baroyan, director of the Institute of Epidemiology and Microbiology, USSR AMN, sent the following letter to the

UzSSR minister of health: "If it is deemed at the ministry to be desirable, the question can be posed before the presidium of the USSR AMN either concerning joint research with the NII of Medical Parasitology, UzSSR Minzdrav, or even the creation of a branch of one of the academy's institutes in Tashkent, including the Institute of Epidemiology and Microbiology, USSR AMN."

The republic's Minzdrav flatly refused to consider the opinion of the country's leading scientists.

Suddenly a communique was issued: USSR State Committee for Inventions and Discoveries had registered a discovery by Professor N. Dekhkan-Khodzhayeva dealing with *Lambliæ*!

By now it was difficult to disregard this. Decisions were made concerning the ways to improve the work performed by the department headed by N. Dekhkan-Khodzhayeva. By official order of UzSSR Minzdrav, the research projects were officially "renewed." True, it was basically at the expense of the department's own internal fund, that is, the research "eroded" the money from State Committee for Science and Technology that had been released for research on parasitology. Thirty-five beds were allocated for research on the new disease at the NII of Regional Medicine, and a special laboratory was organized there. And immediately a flood of commissions and inspectors from UzSSR Minzdrav poured into the new department. By their fault-finding badgerings they exasperated the associates and tried to persuade the patients not to continue treatment there.

The work proceeded with the researchers feeling nervous, but their confidence in their rightness grew stronger. Z. Bekker, MGU [Moscow State University] professor, doctor of biological sciences, and honorary doctor of the Agricultural School in Vienna, wrote in June 1976: "One can say without exaggeration that this research has discovered the etiology of an acute and global disease that is caused by a pathogen of fungal nature. The disease of this type has been apparently encountered for the first time."

But the Minzdrav leadership, by "power" pressure, kept striving and hoping to obtain the specialists' negative finding. They put their "stakes" on scientific workers from Volgograd, but the findings were the very same: the new disease existed, and it was desirable to continue to develop the study of that disease.

That did not suit UzSSR Minzdrav. It sent to higher administrative levels a "collective letter" which quoted the findings of the 1973 Moscow commission, but did not mention the fact that those findings had already been refuted. Once again references were made to the Tashkent specialists who supported UzSSR Minzdrav's point of view, particularly Doctor of Medical Sciences U. Belukha. But the findings that were unfavorable for

UzSSR Minzdrav were qualified only as "partial" ones, which were allegedly "not official documents"; or absolutely nothing was said about them.

It is quite easy to guess the conclusions: "The disease does not exist, and further research is undesirable."

That letter, reproduced many times, went flying to USSR Minzdrav, to medical institutions throughout the country, and to USSR State Committee for Inventions and Discoveries. Getting slightly ahead of ourselves, we might mention that it was because of this fact that N. Dekhkan-Khodzhayeva's application for a second discovery was postponed and has not yet been considered to this day.

In June 1977 the "campaign" against N. Dekhkan-Khodzhayeva ended with an official order canceling the scientific research.

The department at the NII of Regional Medicine was closed. With some difficulty it proved to be possible to save from destruction the results of the laboratory research and to transfer them to the Protozoal Disease Department, NII of Medical Parasitology. However, from that time the UzSSR Minzdrav commissions were "registered" there...

This story also included such "scientific arguments" as telephone calls to the scientists who had given findings concerning the existence of the new disease, and visits made to those scientists by people who tried to persuade them to renounce their statements.

The ministry administrators, "hiding" the new pathogen, attempted to prove that the scientist who had discovered it also did not exist. For example, PRAVDA VOSTOKA at that time was preparing material about the discovery involving *Lambliæ*. Learning about this, practically the entire Minzdrav leadership arrived at the editorial office with a "ban." In June 1977 the article "Discovery of a Secret," concerning Professor N. Dekhkan-Khodzhayeva, nevertheless was published. And Nazima Abdullayevna reported about the opening up of a department and laboratory to USSR State Committee for Science and Technology, and sent there material pertaining to her research. That material was sent to USSR Minzdrav.

Despite the "pressure" from the republic, the presidium of USSR AMN recommended to USSR Minzdrav that it "organize the study of fungi with the purpose of refining their identification by species." This instruction was sent to various scientific institutions. But UzSSR Minzdrav continued to send inquiries to the scientists who had previously considered N. Dekhkan-Khodzhayeva's materials, and to tell them, "Check this once again to see whether your conclusions might change." L. Belyakova, senior scientific associate, Institute of Microbiology, USSR Academy of Sciences, answered S. Aripov, why by now was the new UzSSR minister of health, "It can be

assumed that are dealing with a new variety of the fungus *Pecilamidis variotti*." T. Sizova, assistant professor, Department of Lower Plants, MGU, and MGU professor Z. Bekker came to a similar conclusion. "The data obtained by Professor N. Dekhkan-Khodzhayeva and her associates confirm the opinion expressed by us relative to the existence in the Central Asian and Caucasian zone of systemic mycoses which, on the basis of their clinical course, are close to histoplasmosis." Professor A. Ariyevich, scientific director of the Moscow City Mycological Center, wrote to S. Aripov.

After listening to a report by N. Dekhkan-Khodzhayeva, the buro of the Biological Sciences Department, UzSSR Academy of Sciences, requested the republic's Ministry of Health to render financial assistance to her in developing the problem. Everything was in vain.

Z. Karayev, the new chief of the Systemic Mycoses Department of LenGIDUV, who himself had refused to instruct USSR AMN to identify the fungus, giving as his reason for this the fact that "the laboratory does not have the necessary conditions for working with cultures of pathogenic fungi or with experiments on animals," soon went to Tashkent at the head of a commission to verify N. Dekhkan-Khodzhayeva's materials.

The trip expenses for this commission, by UzSSR Minzdrav order No. 278, dated 31 March 1981, were paid for from the epidemiological fund of Uzbek Republic Sanitary and Epidemiological Station.

What the commission decided was not made known to N. Dekhkan-Khodzhayeva. But the feeling was that a threat was hanging over her and that the results of her research would be destroyed. Nazima Abdullayevna once again requested the USSR State Committee for Science and Technology to become acquainted with her materials. Once again the materials were sent for editing to USSR Minzdrav. Then Nazima Abdullayevna herself, with the results of the research and the documents, went to Moscow.

"I went to USSR State Committee for Science and Technology," she states, "to I. Golubev, deputy chief of the Scientific Organizational Administration. He is a physician. After looking attentively at the materials, I. Golubev exclaimed, 'What if you hadn't come here? We would have believed Minzdrav!'"

So USSR State Committee for Science and Technology took the initiative in its hands. "The Committee, jointly with specialists from USSR Academy of Sciences, USSR AMN, and VASKhNIL [All-Union Academy of Agricultural Sciences], has reviewed the materials submitted by Professor N. Dekhkan-Khodzhayeva and deems the work that is being carried out by her scientific collective to be extremely pertinent. The high scientific level of the work that has been conducted allows one to agree with the originator's opinion concerning the desirability of introducing the obtained results into the practice of

public health," K. Dyumayev, deputy chairman of USSR State Committee for Science and Technology, wrote to the former chairman of the UzSSR Council of Ministers and the former USSR minister of health. He requested an attempt "to find a method for supporting the valuable scientific research."

The State Committee decided to organize a provisional scientific-technical commission to elaborate the recommendations for developing mycological research in the USSR. One of the members of that commission was Professor N. Dekhkan-Khodzhayeva.

The preparation of the recommendations, modifications, and coordination took more than two years.

In January 1984 USSR State Committee for Science and Technology sent the following statement to A. Khudaybergenov, who by now was the new UzSSR minister of health: "In conformity with the findings of the provisional scientific-technical commission of GKNT [State Committee for Science and Technology], the recommendation has been made to organize, on the basis of the Protozoal Diseases Department of NII of Medical Parasitology, UzSSR Minzdrav, the Central Asian NII of Medical Mycology and Protozoology, of USSR Minzdrav." The GKNT recommended to UzSSR Minzdrav that it submit all the necessary information concerning the proposed structure of the institute. Nazima Abdullayevna sent the appropriate documents to UMS [scientific medical council] of UzSSR Minzdrav.

And it is there that all the documents have remained.

N. Dekhkan-Khodzhayeva had to contact the Standing Deputy Commission for the Protection of Motherhood and Childhood, USSR Supreme Soviet, and Z. Pukhova, deputy to USSR Supreme Soviet, since the persons who are chiefly affected by the disease are children. Z. Pukhova sent a query to USSR Minzdrav. Then N. Dekhkan-Khodzhayeva's materials were sent for review to the presidium of the scientific medical council, USSR Minzdrav.

The presidium of UMS, USSR Minzdrav instructed UMS, UzSSR Minzdrav to develop and submit a program of the scientific-research projects of N. Dekhkan-Khodzhayeva's department for 1985 and the 12th Five-Year Plan.

Once again the basic development was carried out by N. Dekhkan-Khodzhayeva herself. The only part of the plan that went to Moscow was the part dealing with parasitology. "But what about the mycosis?", USSR Minzdrav asked. "Dekhkan-Khodzhayeva is being refused," was the report from the republic. But, as the saying goes, "murder will out." And what became obvious was that

the crux of the matter dealt not with Dekhkan-Khodzhayeva, but with UzSSR Minzdrav. At that time Moscow authorized Nazima Abdullayevna to send the plan without going through her ministry. And that is what she did.

In July 1985 UMS, USSR Minzdrav, reviewed the plan and noted that, after being reworked with a consideration of the comments and statements that had been made by UzSSR Minzdrav, it "can become the basis for the department's work in the 12th Five-Year Plan." That plan, after being returned to Tashkent, was approved by UzSSR Minzdrav. But UzSSR Minzdrav did not allocate a single kopeck to implement it. Naturally, the plan remained only as a stack of paper.

Well, then, what about S. M. Bakhrarov, the current UzSSR minister of health. Is he completely informed about this story?

"Yes, he is, just as all three of his predecessors were," Nazima Abdullayevna says. "And he has been so informed for a long time, since 1972. Back then, when he was the deputy director of the Uzbek NII of Blood Transfusion, he arrived in Zaamin on an assignment from the minister. He carried out laboratory research which isolated in the blood of 40 percent of the examined patients the 'structures' that were at that time still unknown. However, he reported to UMS that this was a completely random situation. And, as the head of the republic's Minzdrav, S. M. Bakhrarov had also seen the findings of A. D. Ado, the country's leading allergologist, academician and active member of USSR AMN.

Academician A. D. Ado, at the request of N. Dekhkan-Khodzhayeva, last year carried out research on patients' blood at the NII of Immunology, USSR Minzdrav, on high-precision apparatus. And he wrote that the pathology caused by the fungus is among the most severe types and definitely requires further study.

January 1987. Excerpt from a letter from USSR GKNT, addressed to S. M. Bakhrarov, UzSSR minister of health: "Please report the progress of research on strains of the new unregistered species of fungi with very high biological aggressiveness, and also report specifically what kind of assistance is being rendered to the department on the part of the ministry in developing the search-initiative topic 'New Disease of Fungal Etiology in Uzbekistan.'"

What kind of assistance are we talking about?

Only one kind is tangible: for the past three or four years, UzSSR Minzdrav commissions have stopped exasperating people. But for three years the researchers have not been able to use the electronic microscope — the number of specialists has been reduced by seven...

"There is no new disease, and therefore all these worries are needless," the people at UzSSR Minzdrav continue to state.

Let us assume that no new disease exists. But what if it did?

Patients exist. The very same ones who come every day to Professor N. Dekhkan-Khodzhayeva and her scientific associations for consultation, with a suspicion concerning the fungal nature of a disease such as pneumonia. They are sent there by physicians from the most varied medical institutions. And some of those patients have also been sent there by UzSSR Minzdrav — isn't that paradoxical?

The diagnoses are confirmed in the laboratory. An entire "collection" of cultures of the fungus has been isolated from the patients' blood.

The department headed by Professor N. Dekhkan-Khodzhayeva has become a place where people who have obtained no results from trying many types of medicine, start to recover after the treatment has been carried out. During these 15 years Nazima Abdullayevna and her associates have rendered assistance to 5000 patients, of whom 4000 were children. (This is in addition to the patients with protozoal diseases.) It proves to be possible to "knock" the fungus out of the organism in approximately 80 percent of the cases. But neglected forms of the disease are also encountered, since every physician does not yet know about the disease or is able to recognize it.

In a department with 60 beds (20 for adults and 40 for children) that are intended primarily for patients with protozoal diseases, it is necessary to squeeze out some space for persons suffering from mycosis. They are forced to wait their turn for months at a time.

In 1983 USSR Minzdrav issued order No. 750, concerning the rendering of medical assistance to persons suffering from systemic mycoses, in which mention was made of the creation of consultative sessions and inpatient assistance. There appeared yet another reason for UzSSR Minzdrav to engage in some deep thinking, because it is precisely among the systemic mycoses that affect the internal organs that the specialists include the disease that was discovered by Professor N. Dekhkan-Khodzhayeva. But it has happened that, until the present time, that order has been fulfilled only by the professor herself, and even that has been on her personal initiative.

On 17 August a visiting session of the board of governors of USSR Minzdrav arrived in Tashkent under the chairmanship of Ye. I. Chazov, USSR minister of health. The agenda included the question: "Serious shortcomings in organizing therapeutic and prophylactic aid to mothers and young children in Uzbek SSR, and the measures to

eliminate them." There was a discussion about the high indicators of the disease and mortality rate among children, and about the incompletely ascertained reasons for them.

"According to data from the World Health Organization, one can observe the spread of fungal diseases," Nazima Abdullayevna says. "In England more than a hundred scientific medical institutes are working on the problem, and more than 200 in the United States. Diseases with fungal etiology are already being well diagnosed there, but, as the statistics indicate, the mortality rate from those diseases has been rising. Soviet science is lagging seriously behind in the field of medical mycology, and practical public health is lagging behind immeasurably. It would be criminal to slow down."

And so the scientist is working to improve the diagnostic methods. She and her associates are thinking about the creation of a vaccine. But, for the time being, she simply does not have enough manpower.

All this time she had also had to wage a struggle against the fungus of stagnation, the fear of assuming responsibility.

Editor's note: Is it possible to wave away the problem that has been raised by Professor N. Dekhkan-Khodzhayeva? We have answered that question unambiguously — by publishing this article.

UzSSR Minzdrav has also answered unambiguously — by its reply to the official query made by the editorial office of PRAVDA VOSTOKA before the article was printed. That reply did not leave any hope that the position of UzSSR Ministry of Health would change today in any way.

That position, as it has for the entire 15 years, does not permit any dialogue, any comparison of opinions. It is intolerant of the facts that contradict the only opinion — "there is no disease." Thus, the ministry completely ignores patients who suffer from it, and ignores the vast amount of clinical and laboratory material and the numerous authoritative findings of specialists who have analyzed it and have come to the conclusion that "yes, it does exist." Among the specialists themselves, there are also opinions "no," and in this regard we naturally cannot act as arbitrators. But we also cannot agree with the situation when this "no" alone is elevated to the rank of indisputable truth. (An indisputable fact is that the positive findings are obviously in the majority — we did not quote all of them.)

It is startling that the position taken by UzSSR Minzdrav does not allow a question that would seem to be such a natural one in such a serious matter: "But what if..."

During these years documents of a purely organizational nature, such as USSR Minzdrav order No. 750 concerning the rendering of medical assistance to persons suffering from systemic mycoses, have already been enacted. It is only today, four years after that order was published, and also after the query by the editorial office, that UzSSR Minzdrav has enacted a similar order. According to that order, the NII

of Dermatology and Venerology, UzSSR Minzdrav, has been established as the consultative and diagnostic center for systemic mycoses. But what about the letter from USSR GKNT concerning the creation in Tashkent of the Central Asian NII of Medical Mycology and Parasitology, of USSR Minzdrav, which letter was based on the findings of the provisional scientific-technical commission that included the country's leading specialists? Their conclusions, which have been supported by USSR GKNT, have been ignored. And the plan for the department's scientific-research work in the 12th Five-Year Plan remains just a meaningless piece of paper.

Meanwhile the years keep passing...

#### People's Control Committee Investigates

18300120b Tashkent PRAVDA VOSTOKA in Russian  
27 Dec 87 p 3

[Article by U. Maksumova, inspector, Science, Culture, and Public Health Department, Tashkent People's Control Committee, under rubric "Response": "The Fungus of Bureaucratism"]

[Text]"The Fungus of Bureaucratism" — that was the name of the article published on 12 December 1987. The article dealt with the research and therapeutic work of Doctor of Medical Sciences, Professor N. Dekhkan-Khodzhayeva, and with the obstacles that had been put in the scientist's path over a period of many years.

The editorial office received a large number of responses to the article: the authors have been persons who have been cured by Professor N. Dekhkan-Khodzhayeva, and physicians who have become convinced of the effectiveness of her treatment.

This letter is from the people's control agencies. A year and a half ago the Tashkent City People's Control Committee, in response to a letter written by V. Stulova, one of Professor N. Dekhkan-Khodzhayeva's patients, check to see the extent to which beds and medicines were being provided to the Protozoal Diseases Department of the NII of Medical Parasitology, UzSSR Minzdrav. The people's controllers came to the same conclusions that the editorial office had. But even after the commission's decision had been sent to UzSSR Minzdrav, everything remained unchanged...

In order to check the facts reported by V. Stulova, the city people's control committee created a commission consisting of medical workers. It included, in particular, specialists from the NII of Obstetrics and Gynecology, UzSSR Minzdrav, and NII of Blood Transfusion.

After visiting the Protozoal Diseases Department headed by Professor N. Dekhkan-Khodzhayeva, the commission members analyzed the medical documentation, chatted with the patients and physicians, and were present at consultative sessions.

It became obvious that the department was actually too small to accept everyone who requires treatment, because, in addition to patients with protozoal diseases, physicians send her everyone whom they suspect of having fungal diseases of the internal organs — systemic mycoses. People come from various oblasts in Uzbekistan and many cities throughout the country.

As the commission noted, the large influx of patients is caused by the fact that in the republic the systemic mycoses are diagnosed and treated only in Professor N. Dekhkan-Khodzhayeva's department, despite official order No. 750 of USSR Minzdrav, according to which a network of consultative services was supposed to be created.

Because of the lack of beds, many patients have to be assigned to outpatient treatment, although they actually require inpatient treatment. According to data for 1985 and the first half of 1986, the number of beds in the department (60) made it possible to place less than 30 percent of the patients who had come for assistance. On the inspection day, 200 persons were on the hospitalization waiting list, and some of them had been on that list for half a year.

The problem of antifungal preparations is acute. The requisitions for some of them are satisfied by the Main Pharmaceutical Administration of UzSSR Minzdrav only partially, and the department is unable, because of the shortage of money, to buy expensive medicines in the necessary quantity. Patients told the commission members that frequently they are forced to purchase the antifungal preparations on the outside.

The commission was convinced that, despite the letter of USSR State Committee for Science and Technology concerning the creation in Tashkent of the NII of Medical Mycology and Parasitology, of USSR Minzdrav, on the basis of the Protozoal Diseases Department of the NII of Medical Parasitology imeni L. Isayev, despite USSR Minzdrav Order No. 750 concerning the rendering of medical assistance to persons suffering from systemic mycoses, and despite the frequent requests made by Professor N. Dekhkan-Khodzhayeva to the administrators of UzSSR Minzdrav, the department has not been allocated even a single kopeck of additional funds and not a single personnel billet has been added.

The Tashkent People's Control Committee sent the results of the inspection to UzSSR Minzdrav. It was recommended to the ministry that it study and review the questions of expanding the department, the more complete providing of it with medicines and funds to purchase them, and the improvement of the scientific-research base, because, as the inspection showed, there is a large number of persons suffering from fungal diseases and, consequently, it is necessary to develop new diagnostic and treatment methods.

UzSSR Minzdrav was also informed of the need to "take the load off" the department by creating a consultative-diagnostic service to locate persons suffering from systemic mycoses in the oblasts.

However, it is obvious from the article "The Fungus of Bureaucratism" that the shortcomings revealed by us have not yet been eliminated.

5075

UDC 616.5-006.81.04-07[474.2]

**Malignant Melanoma of Skin in Estonia:  
Morbidity and Survival Rates**

*18400098a Moscow VOPROSY ONKOLOGII in  
Russian Vol 33, No 9*

*Sep 87 (manuscript received 28 Feb 86) pp 10-14*

[Article by M. A. Rakhu, T. P. Aareleyd and M. L. Niyn, Institute of Experimental and Clinical Medicine, Estonian SSR Ministry of Health, Tallin]

[Abstract] An analysis was conducted of the statistics on malignant melanoma of the skin in Estonia, which demonstrated that in the period 1968-1982 the increase in incidence for males stood at 6.0 percent, and for females at 7.2 percent. In the 1963-1982 period the risk of developing malignant melanoma of the skin by the age of 75 was 1:357 for males and 1:345 for females. Sites of localization among males were as follows: head and neck—21.2 percent, trunk—48.9 percent, upper extremities—5.3 percent, and lower extremities—19.7 percent. The corresponding localization figures for females were 18.4, 26.1, 11.7, and 41.7 percent. Finally, the 1, 5, 10, and 14 years relative survival rates for males were 71.6, 33.2, 35.3, and 16.4 percent, and for females 84.2, 55.6, 43.2, and 42 percent. The differences in the survival figures for men and women were probably due to variation in the nature of the tumor and, perhaps, endocrine factors. In comparison with the Scandinavian countries, the incidence for males and females was 4.4- and 4.0-fold lower than in Norway, the country with the highest morbidity, and, respectively, 2.3- and 1.7-fold lower than in Finland, the country with the lowest morbidity among the Scandinavian countries. Figures 3; references 18: 1 Russian, 17 Western.

12172/9274

UDC 616.127-005.4-036.88:313.141

**Correlation Between Suspected Ischemic Heart  
Disease and Morality Among 40-59 Year Old  
Males Over a 6.5 Year Period of Observation**

*Moscow KARDIOLOGIYA in Russian Vol 27, No 9  
Sep 87 (manuscript received 23 Oct 85) pp 39-43*

[Article by A. P. Gorbunov, G. S. Zhukovskiy, D. V. Nebiyeridze, T. A. Varlamova and R. G. Oganov, Institute of Preventive Cardiology, All-Union Cardiological Research Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] A statistical analysis was conducted on the EKG indicators of ischemic heart disease (IHD) and subsequent mortality patterns over a 6.5 year period.

The screening was conducted on 3908 men, 40-59 years old, in the Oktyabr Rayon in Moscow: 270 men were identified as possibly suffering from IHD. The monitoring study demonstrated that the overall mortality figure for the cohort with possible IHD was twice as great as that of the control group (27/1000 vs. 12/1000; p 0.01). The mortality figure attributed to various cardiovascular diseases was three-fold higher in the at-risk group than in the control group. Mortality due to IHD in that at-risk of IHD group was twice as high as in the control group, while mortality due to cerebrovascular diseases was four-fold higher. This study demonstrated the high prognostic value of EKG analysis in correlating IHD and subsequent mortality enabling the implementation of appropriate preventive measures. References 6: 5 Russian, 1 Western.

12172/9274

UDC 616.931:576-093.2-036.2(479.24)

**Epidemiological Features of Diphtheria Carrier Status in Azerbaijan SSR**

18400098c Baku AZERBAYDZHANSKIY  
MEDITSINSKIY ZHURNAL in Russian No 8,  
Aug 87 pp 73-76

[Article by D. Ya. Kasimova, Laboratory of Children's Droplet Infections, Azerbaijan Order of Red Banner of Labor Scientific Research Institute of Virology, Microbiology and Hygiene imeni G. M. Musabekov]

[Abstract] A ten year survey (1975-1984) was conducted on the diphtheria carrier status among urban and rural children in Azerbaijan. The epidemiologic data, based on examination of 23,219 children, showed that two bio-types were routinely isolated, with the gravis form (60 percent) predominating over mitis isolates. On the average, only 10.1 percent of the isolates were toxigenic. Clinical cases of diphtheria were noted only in years in which the percentage of toxigenic isolates exceeded 23.5-32.7 percent (in 1976 and 1975). The highest carrier rate was observed among the 8-12 year olds (4.1 percent), and the lowest in the 1-3 year olds (0.13 percent), for an average ten-years figure of 2.3 percent. Over two-thirds of the cases were found to be transitory, with the highest incidence of carriers (65 percent) occurring in the winter months, and the lowest (1.5 percent) in summertime.

12172/9274

**Methodical Approach to Study of Connection  
Between Fitness for Work and Direction of  
Operators' Physical Training**

18400099 Moscow *TEORIYA I PRAKTIKA  
FIZICHESKOY KULTURY in Russian No 9, Sep 87*  
pp 8-9

[Article by Candidate of Pedagogic Sciences R. M. Kadyrov, Twice Red Banner Military Institute of Physical Training]

[Abstract] The problem of increasing and preserving operators' fitness for work by providing them with optimum physical training is becoming increasingly important because of the increasing number of operator specialists utilized in the Armed Forces. There are three aspects to fitness for work—informational, functional, and motor fitness. The physical training provided to operators must be tailored to the main mental, functional, and motor tasks entailed in the work performed by a specific operator. These may be identified by a preliminary professiographic analysis and later refined through

factor analysis. The tasks identified may then be used to determine the direction of the physical training provided to ensure fitness for work. This training will entail three stages: activating the operator's central nervous system, optimizing his or her psychophysiologic condition and increasing his or her functional reserves, and expanding his or her motor potential. The specific details and relative proportion of physical training provided to individual operators will vary depending on the specific nature of the operator's job. Tests to determine the components entailed in operators' fitness for work should cover all the general structural fitness for work, but in a precisely defined quantitative relationship. A methodical approach to studying the connection between fitness for work and the direction of physical training will make it possible to select the optimum amount of training methods and tests needed to evaluate the components of physical training and to vary the content and relative proportions of training provided to operators. References 5: Russian.

06508

**Study of Mechanism of Immune Recognition of Cytochrome c in Vivo and in Splenocyte Culture**  
18400100 Moscow DOKLADY AKADEMII NAUK  
SSSR in Russian Vol 296, No 6, Oct 87 (manuscript  
received 1 Apr 87) pp 1505-1508

[Article by M.V. Skok, E.M. Kavun, S.V. Komissarenko, and R.P. Yevstigneyeva, corresponding member, USSR Academy of Sciences, Institute of Biochemistry imeni A.V. Palladin, Ukrainian Academy of Sciences, Kiev; Moscow Institute of Precision Chemical Technology imeni M.V. Lomonosov]

[Abstract] The authors selected cytochrome c as a model for investigation of the antigen structure of protein since its primary and spatial structures are well known. The immunodominant areas, against which antibodies are formed in rabbits and mice, are also known. The goal of this study was to determine how the spectrum of recognizable determinants of cytochrome c varies from the primary to the secondary response and to find out what causes the variation. The specificity of serum antibodies was therefore studied in individual mice in the primary and secondary response, as was the immunogenicity of cytochrome c and its peptides in a splenocyte culture. The optimal quantities of cytochrome c and its peptides for stimulation of antibody formation were determined. It was found that peptides 1-13, 14-22, and 92-104 were immunogenic in the lowest molar concentrations. During the primary entry into the organism, the response is formed in the most accessible and conformation-mobile N- and C-terminal fragments of 1-13 and 92-104. In the secondary response in the C57BL/6 mice, antibodies appear against peptides 46-56 and 61-69 as these sections of the cytochrome c molecule become more accessible for recognition. Formation of antibodies to individual cytochrome c determinants is regulated independently and differs in mice of different haplotypes. Peptide sequences containing between 9 and 13

amino acid groups are sufficient for immunogenicity. Figures 2; references 12: 3 Russian, 9 Western.

06508

UDC 612.036.576.314.6.547.915.5

**Effect of Calcium Ions on Activity of Natural Killer Soluble Cytotoxic Factor**  
18400071 Moscow DOKLADY AKADEMII NAUK  
SSSR in Russian Vol 296, No 5, Oct 87 pp 1278-1280

[Article by L. P. Sashchenko, N. V. Gnuchev, M. A. Kirillova, T. V. Rebizova, T. I. Lukyanova and Ye. M. Lukanidin, Institute of Molecular Biology, USSR Academy of Sciences, Moscow]

[Text] A recently developed methodology for studying mechanism of action of cytotoxic lymphocytes has been based on isolation and study of cytotoxic mediators secreted by effector cells. Natural killer cytotoxic factor (NKCF) is such a mediator and so far it has not been adequately studied. In previous work it was determined that NKCF is not a homogeneous protein but a mixture of at least six proteins. In some ways NKCF resembles perforin, which forms pores in cell membranes in the presence of  $Ca^{++}$  ions. In the present work, the effect of  $Ca^{++}$  ions on the cytotoxic activity of NKCF was investigated. A dose-dependent activity was observed: incubation of cells in a Ca-free medium, in the presence of NKCF, had no effect; addition of 1 mM  $Ca^{++}$  ions led to maximum activity in 48 hrs; a 2 mM concentration doubled this effect. In the presence of 5 mM  $Ca^{++}$ , two peaks in activity were observed: one maximum in 20-25 min followed by a drop at 45 min and then another maximum at 24 hrs when 90 percent of the cells were killed. The possible reasons for this double effect were considered. Figure 1; references 11 (Western).

7813/9274

**Status of Healthy Persons in Contact With Infrared Laser Radiation and Problems of Prevention**

18400101a Moscow *SOVETSKAYA MEDITSINA* in Russian No 9, Sep 87 (manuscript received 21 Apr 86) pp 76-80

[Article by Yu.K. Tokmachev, V.A. Kashuba, L.E. Shumilova, N.P. Ivanov, and T.V. Kats, Department of Internal Medicine Propedeutics (headed by Professor Yu.K. Tokmachev), Scientific Research Sector (directed by Candidate of Medical Sciences V.A. Kashuba), Moscow Medical Stomatologic Institute imeni N.A. Semashko]

[Abstract] Infrared lasers generating radiation at 10.6 gmm can cause industrial injuries with loss of working time. This article reports a study of the health status of persons servicing laser installations operating at 10.6 gmm and the development of preventive measures to improve working conditions for such persons. The work was performed at an industrial plant in the Moscow oblast that uses gas lasers that generate pulses at a wavelength of 10.6 gmm, a frequency between 35 and 100 Hz, and an energy up to 0.32 J. The studies showed that the type UPR laser units used did not protect personnel. Diffuse reflected laser IR radiation at flux density  $8 \times 10^{-4} \text{W/cm}^2$  acts on the hands, arms, and faces of the operators (up to 9,300 flashes per working shift), with a background light level lower than the standards require. Sound levels were also excessive. A general tendency toward lower blood pressure was observed, with blood pressure falling during the course of the working day and week for persons operating laser units. There was a verifiable decrease in muscular strength in workers' hands during the course of the working shift and week. Laser units should be redesigned to prevent exposure of operators to infrared radiation.

06508

**Comparison of Thrombogenic Properties of Vascular Wall After Exposure to Various Lasers**

18400101 Moscow *KARDIOLOGIYA* in Russian Vol 27, No 10, Oct 87 (manuscript received 17 Oct 86) pp 96-99

[Article by S.E. Ragimov, A.A. Belyayev, I.A. Vertepa, V.V. Dolgov, N.P. Furzikov, R.S. Akchyrin, V.S. Repin, and A.V. Tubetskoy, All-Union Cardiologic Research Center, USSR Academy of Medical Sciences; Central Institute for Advanced Training of Physicians, USSR Ministry of Public Health; and Scientific Research Center for Solid-State Lasers, USSR Academy of Sciences, Moscow]

[Abstract] The thrombogenic properties of vascular walls were quantitatively compared after laser angioplasty using various types of laser radiation. Experiments were performed on segments of the carotid or femoral arteries of 19 mongrel dogs using neodymium-doped YAG,

argon, and XeCl lasers operating at 400  $\mu\text{m}$ , 514 nm, and 308 nm wavelength, with power ratings of 4W, 1W, and 30 mJ (pulse mode, frequency 100 Hz). Photographs of the treated artery surfaces are presented. The studies found that the walls of the laser channel were highly thrombogenic regardless of whether primarily photochemical (UV laser), photothermic (IR and visible lasers), or purely thermic (heated metal body) effects were used. The laser radiation and heated metal body caused similar increases in thrombogenicity, the T index remaining high regardless of which type of instrument was used or whether a continuous or pulse mode was used. Laser radiation uncovered the internal layers of the vessel wall, thereby allowing the collagen contained in the vessel wall to interact with the thrombocytes. Laser angioplasty should therefore be accompanied by protective measures to prevent thrombus formation. Figure 1; references 14: 4 Russian, 10 Western.

06508

**Use of Lasers in Rehabilitation of Patients With Large Segments of Extremities That Have Been Reattached**

18400101c Moscow *KHIRURGIYA* in Russian No 10, Oct 87 (manuscript received 10 Mar 87) pp 14-18

[Article by R.O. Datiashvili, candidate of medical sciences, G.A. Stepanov, doctor of medical sciences, and G.D. Litvin, V.A. Buylin, and B.Ye. Mordkovich, All-Union Scientific Center of Surgery (directed by Academician D.V. Petrovskiy); Scientific Research Institute of Laser Surgery (directed by Professor O.K. Skobelkin); and City Clinical Hospital No. 51, Moscow]

[Abstract] Functional rehabilitation of patients following reattachment of large segments of extremities following traumatic amputations is quite difficult. Laser therapy was tested in the rehabilitation process by using the stimulating effect of the red light of helium-neon lasers on energoplastic metabolism in the tissues as a part of the complex rehabilitation of such patients. Treatment was performed in a special room by using two helium-neon lasers operating at 0.63  $\mu\text{m}$ , a powers of 12 and 18 mW, yielding a dose power at the skin surface of 0.5-10 mW/cm<sup>2</sup>. Two to three pairs of areas of the postsurgical scars were treated with exposures of 1 to 2 minutes each in sessions lasting between 3 and 6 minutes. Laser therapy at 10 mW/cm<sup>2</sup> was also used at acupuncture points (exposure 10-20 sec) to restore the organism's general tone and immune potential of the body. Postoperative edema was significantly reduced and patients felt subjectively better when treatment was begun within 1 month after surgery. Treatment should be continued for 15 sessions in the early postoperative period, followed by 25 additional procedures. Figure 1, References 5: 3 Russian, 2 Western.

06508

**Use of Carbon Dioxide Laser Radiation to Treat Wounds in Children**

18400101d Leningrad VESTNIK KHIRURGIYA  
IMENI I. I. GREKOVA in Russian Vol 139, No 9, Sep  
87 (manuscript received 9 Jul 86) pp 70-72

[Article by Professor L.M. Roshal, Doctor of Medical Sciences G.D. Litvin, Yu.L. Livshits, N.Ye. Gorbatova, and Candidate of Physical and Mathematical Sciences A.V. Sidorin, Emergency Surgery Clinic, Scientific Research Institute of Pediatrics, USSR Academy of Medical Sciences (directed by Academician, M.Ya. Studenikin, USSR Academy of Medical Sciences); Institute of General Physics, USSR Academy of Sciences (directed by Academician A.M. Prokhorov)]

[Abstract] A study was conducted to develop a proper method of using a carbon dioxide laser to treat traumatic and purulent wounds in children. The Skalpel-1 domestic carbon dioxide laser unit, which operates at a wavelength of 10.6  $\mu\text{m}$  with a radiating power of 25 W, was used to treat 84 children. The laser was studied from the standpoint of its effectiveness both in primary surgical treatment of contaminated wounds and in treatment of developing purulent complications in wounds. Both focused and defocused beams were used. Those children who were treated with the carbon dioxide required shorter hospital stays than their conventionally treated counterparts and experienced fewer complications. The bacteriocidal effect of the Skalpel-1 was confirmed in an experimental microbiologic study. References 3: Russian.

06508

**Organ-Saving Operations on Lungs Using CO<sub>2</sub> Laser**

18400101e Kiev KLINICHESKAYA KHIRURGIYA  
in Russian No 10, Oct 87 (manuscript received 27 Apr  
87) pp 42-43

[Article by L.N. Sidarenko and A.Yu. Sadov, Department of Surgery No. 1 (headed by Professor L.N. Sidarenko), Kalinin State Medical Institute; Sixth City Hospital, Kalinin]

[Abstract] Economical resections were performed on 48 patients with lung pathology in the Thoracic Surgery Clinic between 1984 and 1986. The method used was developed by the authors. It consists of a layer-by-layer dissection of the visceral pleura and pulmonary parenchyma from the periphery toward the center by using the focused beam of a CO<sub>2</sub> laser with a power rating of 25 W. After removal of the pathologic focus, the resection line was treated with defocused laser radiation to achieve final hemostasis and aerostasis and was not sutured. A sterile coagulation film was thus formed on the surface of the pulmonary wound. The laser technique has made it possible to develop new, economical methods of performing lung operations. Precision resection was accompanied by a minimum number of complications and improved the results of surgery. The use of the CO<sub>2</sub> laser allowed organ-saving surgery to be performed in patients with suppurative processes in their lungs.

06508

UDC 615.385.1/.3.014.413

**Conventional and Cryopreservation of Blood Cells: Achievements and Advances**

18400111a Moscow GEMATOLOGIYA I  
TRANSFUZIOLOGIYA in Russian Vol 32, No 10  
Oct 87 pp 10-14

[Article by V. A. Agranenkov and Yu. S. Sukhanov, professors, Central Scientific Research Institute of Hematology and Blood Transfusion, USSR Ministry of Health, Moscow]

[Abstract] A brief review is presented of advances and achievements in conventional and cryopreservation of blood cells. Emphasis is placed on the use of 2,3-DPG in maintaining viability and clinical usefulness of erythrocytes, and the development of a Soviet preservative (CGPA) that contains 0.5 mM adenine and also differs from the analogous American product CPDA-I by containing glucose (33 mM) in a much higher concentration. More recent findings have also demonstrated the advantages of polymeric flasks that extend the storage life of red cells by 42-49 days in comparison with glass vessels. Recently, a novel solution designated Eritronaf has been formulated for preserving and resuspending the red cell mass. Eritronaf contains adenine, nicotinamide, sodium phosphate, and sodium chloride, and makes possible red cell storage for 35 days with retention of 80% ATP, 82% cell viability, and only 0.4% hemolysis. Two freezing methods are currently employed in the USSR, one relying on rapid freezing and storage at  $-196^{\circ}\text{C}$ , and the other using slow freezing and storage at  $-30$  to  $-80^{\circ}\text{C}$ . Recent developments have also included the formulation of a universal preservative solution based on dimethyl acetamide for the preservation of red cells, thrombocytes, and leukocytes. The blood cells may be preserved for up to 6 years at  $-196^{\circ}\text{C}$ , and require no special treatment prior to transfusion. References 13 (Russian).

12172/9174

UDC 615.384:615.385.16]:[612.111.11:612.261

**Allosteric Regulation of Oxygen Affinity of Hemoglobin and of Human and Bovine Hemoglobin Polymers**

18400111b Moscow GEMATOLOGIYA I  
TRANSFUZIOLOGIYA in Russian Vol 32, No 10  
Oct 87 pp 34-37

[Article by L. V. Fetisov, Central Scientific Research Institute of Hematology and Blood Transfusion, USSR Ministry of Health, Moscow]

[Abstract] A comparative analysis was conducted on oxygen binding characteristics of human and bovine hemoglobins ( $\text{Hb}_h$  and  $\text{Hb}_b$ ) and their polymeric forms. Evaluation of the binding data demonstrated that affinity for oxygen did not alter with polymerization of  $\text{Hb}_h$  and  $\text{Hb}_b$ . Evaluation of the effects of  $[\text{H}^+]$  showed that the Bohr effect for  $\text{Hb}_h$  and  $\text{Hb}_b$  was quite similar and

was not affected by polymerization in either case. The latter indicated that polymerization did not involve amino groups on Hb responsible for the alkaline Bohr effect. The effects of  $[\text{Cl}^-]$  on  $\text{Hb}_b$  were more pronounced than for  $\text{Hb}_h$ , indicating that during deoxygenation  $\text{Cl}^-$  bound more effectively to  $\text{Hb}_b$  than to  $\text{Hb}_h$ . Identical effects of  $\text{Cl}^-$  were evident in the case of the two polymer species of Hb. Thus,  $\text{Cl}^-$  was shown to be a more potent regulator of oxygen affinity in the case of  $\text{Hb}_b$  and the  $\text{Hb}_b$  polymer than in the case of  $\text{Hb}_h$  and its polymer, thereby facilitating more efficient oxygen transport. Furthermore, binding of pyridoxal-5'-phosphate, an analog of 2,3-DPG, to  $\text{Hb}_b$  and its polymeric form exerted a regulatory effect and could be used to set oxygen affinities in the  $P_{50}$  range of 32-52 mm Hg for  $\text{Hb}_b$  and its polymeric forms. These findings suggest that polymeric  $\text{Hb}_b$  may have possible clinical applications as an artificial oxygen carrier. Figures 3, references 11: 3 Russian, 8 Western.

12172/9274

UDC 615.384,036.8.076.9

**Experimental Clinical Trials With Crystalloid Blood Substitute Polysol**

18400111c Moscow GEMATOLOGIYA I  
TRANSFUZIOLOGIYA in Russian Vol 32, No 10  
Oct 87 pp 40-44

[Article by Yu. A. Litvinenko, G. N. Kurbanova and I. R. Kolonina, Central Scientific Research Institute of Hematology and Blood Transfusion, USSR Ministry of Health, Moscow]

[Abstract] Therapeutic trials were conducted with outbred dogs to assess the efficacy of replacement therapy with the crystalloid blood substitute Polysol in acute hemorrhage (55 ml/kg). The composition of Polysol is supplemented with sodium acetate as an alkaline reserve component. The results of 3.5-fold volume replacement with Polysol were monitored by conventional blood chemistries and compared with the effects obtained with the Lactasol blood substituent containing sodium lactate. The results showed that the results obtained with Polysol did not differ significantly from those obtained with Lactasol in terms of extracellular fluid volume, minute circulatory volume, BP, or heart rate. However, Polysol elicited immediate correction of the acid-base balance of the blood due to maintenance of a much higher bicarbonate concentration. In the Polysol-treated animals  $[\text{HCO}_3^-]$  reached 26.59 mM within 10 min and remained at ca. 20 mM for 4 h, whereas in Lactasol-treated animals  $[\text{HCO}_3^-]$  remained at ca. 16 mM during

that time period. The efficacy of Polysol in early correction of the acid-based equilibrium may be expected to be a key factor in enhancing the survival rate. Figures; references 5: 4 Russian, 1 Western.

12162/9274

UDC 616.12-089.29-089.843

### Artificial Heart Implantation

Moscow *MEDITSINSKAYA TEKHNKA* in Russian No 5, Sep-Oct 87 (manuscript received 23 Jan 87) pp 8-13

[Article by V. I. Shumakov and N. K. Zimin, Scientific Research Institute of Transplantation and Artificial Organs, USSR Ministry of Health, Moscow]

[Abstract] Beginning with 1975, studies were commenced with the POISK series of artificial hearts, representing a semirigid polyurethane diaphragmatic-type pump that is ellipsoid in shape. The POISK-10M device (210-220 gm; 70-80 cm 'retrodorsal' length) was successfully implanted and well-tolerated in 60+ kg calves where the artificial heart performed in a satisfactory manner for an average of 55 days, exceeding 3 months as a maximum survival figure. The stroke volume could be varied from 90 to 100 ml. With normal anticoagulant control measures, the postoperative level of plasma hemolysis was usually low, at no more than 6 mg. Intrapericardial implantation into male and female cadavers ranging from 67 to 88 kg was not accompanied by any difficulties in accommodation, indicating the clinical promise of the POISK-10M series. Further refinements in the artificial heart will depend on advances in polymer technology, biocompatibility, and precision machining. Figures 7, references 13: 2 Russian, 11 Western.

12172/9174

UDC 615.477.2:616.126.3-77].036.8

### Hemodynamics of Emiks Disc-Type Artificial Heart Valves

Moscow *MEDITSINSKAYA TEKHNKA* in Russian No 5, Sep-Oct 87 pp 13-16

[Article by M. L. Semenovskiy, V. Ye. Manukyan and V. V. Chestukhin, Scientific Research Institute of Transplantation and Artificial Organs, USSR Ministry of Health, Moscow]

[Abstract] Hemodynamic monitoring studies were conducted on 16 recipients (37.75 ± or - 1.48 years old) of an Emiks disc-type artificial mitral valve. Preoperative values were compared with postoperative obtained 8.3 ± or - 0.4 months later, including data obtained at rest (heart rate 75-85 bpm) and during drug-induced stress (150-175 bpm). Prior to surgery the mean pulmonary artery pressure was recorded as 41.06 mmHg, the mean pulmonary capillary wedge pressure was 22.22 mmHg, the mean left atrial pressure was 23.83 mmHg, the pressure gradient on the mitral valve was 8.20 mmHg, the

cardiac minute volume was 3.58 L/min, and the pulmonary resistance stood at 806.26 dyne/sec·cm<sup>-5</sup>. After surgery the corresponding figures at rest and in stress were as follows: 24.87 and 26.66 mmHg, 15.53 and 16.50 mmHg, 13.81 and 13.58 mmHg, 3.33 and 4.50 mmHg, 5.61 and 8.01 L/min, 3.16 and 4.87 L/min·m<sup>2</sup>, and 285.35 and 217.25 dyne/sec·cm<sup>-5</sup>. The study also demonstrated that at rest the effective opening of the heart valve was 2.62 ± or - 0.08 cm<sup>2</sup>, increasing to 4.02 ± or - 0.27 cm<sup>2</sup> in stress. The findings confirmed the suitability of the Emiks artificial valve for the mitral position. References 12: 4 Russian, 8 Western.

12172/9174

UDC 615.473.03:616.151.4/5-089.816.015.2:615.246.2

### Plasma- and Cytapheresis Devices for Extracorporeal Control of Aggregate Condition of Blood in Cardiovascular Diseases

18400109c Moscow *MEDITSINSKAYA TEKHNKA* in Russian No 5, Sep-Oct 87 pp 26-30

[Article by A. O. Gavrilov, A. A. Pisarevskiy, G. Ye. Tsimarkina and M. G. Pavlyutenkov, Scientific Research Institute of Transplantation and Artificial Organs, USSR Ministry of Health, Moscow; Special Design Bureau of Biophysical Instruments, USSR Ministry of Instruments, Moscow]

[Abstract] A review is presented of the use of four types of gravity and centrifugal blood fractionators of Soviet manufacture—RK-05, Pf-05, FK-3.5 and FKU-5000—in the management of several conditions that could benefit from extracorporeal alterations in blood composition. Such an approach makes possible removal of pathogenic and toxic factors from the circulation, and control of the concentration of unstable elements and of viscosity. In ischemic heart disease removal of 30-40% of the circulating plasma and its replacement by rheopolyglucine, albumin, and physiological saline is indicated. The primary benefits are optimization of blood composition, decrease in viscosity, and improved central hemodynamics. In cases of progressive angina pectoris reduction in thrombocyte counts and in large plasma components such as fibrinogen, lipids, etc., and their replacement with rheologically active components has been shown to have clinical benefits and facilitate drug efficacy. Other modalities that have been found useful consist of continuous oxygenation of fractionated erythrocytes and hypoxic and hypoxemic conditions, plasma-sorption for lipid removal in hyperlipidemias, incorporation of cellular substrates in extracorporeal perfusion in a given type of organ failure, and preoperative plasma- and thrombocytapheresis followed by reinfusion after heart surgery. Figures 1; references 3 (Russian).

12172/9174

UDC 615.47:616.61-78].036.8

**Evaluation of Dip Hemodialyzer With Soviet and Foreign Membranes**

18400109d Moscow *MEDITSINSKAYA TEKHNIKA* in Russian No 5, Sep-Oct 87 pp 34-38

[Article by A. R. Rudman, N. A. Vengerova, T. A. Vysotina, B. S. Eltsefon, N. N. Begichev, A. N. Demidov, N. N. Fomicheva, L. B. Bayeva, E. R. Levitskiy and A. V. Overchenko, All-Union Scientific Research Institute of Medical Polymers, USSR Ministry of Biomedical Industry; All-Union Scientific Research Institute of Medical Instrument Construction, USSR Ministry of Instruments; Scientific Research Institute of Transplantation and Artificial Organs, USSR Ministry of Health, Moscow]

[Abstract] Comparative determinations were made of the clearance characteristics of two Soviet (Diatsell, Ultratsell) and foreign (Kuprofan 150M, Kuprofan 280 HDF) hemodialysis membranes. The in vitro and in vivo

studies were conducted at 38°C, with in vitro flow rates of 50-300 ml/min under pressures of 0-40 kPa. The tabulated data demonstrated that the clearance rates of the Soviet membranes for urea, creatinine, phenylalanine, vitamin B-12, and inulin were greater than for the foreign membranes. In both cases the clearance rates for Ultratsell and Kuprofan 280 HDF exceeded those of the conventional membranes Diatsell and Kuprofan 150M. Assessment of the filtration rates as a factor of pressure yielded rectilinear plots, indicating lack of structural and functional changes in the course of the experiment. In vivo studies made after a 2 h hemodialysis session on a DIP demodializer showed that the clearance values for urea, creatinine, uric acid, phosphate and glucose for Diatsell were, respectively, 106, 83.0, 81.0, 79.4 and 84.5 ml/min. The Soviet membranes were thus demonstrated to be suitable for use in DIP hemodialyzers. Figures 2; tables 3; references 8: 2 Russian, 6 Western.

12172/9174

**Ecologic and Physiological Features of  
Micromycetes Contaminating Optical Glasses**

*18400103a Leningrad MIKOLOGIYA I  
FITOPATOLOGIYA*

*in Russian Vol 21, No 4, Jul-Aug 87 (manuscript  
received 12 Dec 85) pp 325-330*

[Article by E.Z. Koval, V.A. Sviderskiy, I.V. Arshinnikov, and P.S. Borsuk, Institute of Microbiology and Virology imeni D.K. Zabolotnyy, Ukrainian Academy of Sciences, Kiev, and Kiev Polytechnical Institute]

[Abstract] A systematic observation was made of more than 20 types of optical glasses that were exposed under natural conditions for 2-2.5 years and spontaneously and intentionally implanted with mycelial fungi. The glasses were contaminated with vegetative and reproductive structures of many species of phytopathogenic and saprotrophic fungi belonging to the genera *Septoria*, *Cytospora*, *Fusarium*, *Pestalozzia*, *Helminthosporium*, *Alternaria*, *Puccinia*, *Botrytis*, *Cladosporium*, *Penicillium*, and *Ustilago*. The relationship between the survivability of the bacteria and the glasses' surface structure, surface moisture, and position (relative to the horizontal and vertical axes) were all examined. The wavelength of the light transformed on the polished surfaces of the optical glass and its spatial position were found to be important. All the micromycetes studied were heterotrophs, apparently breaking the siloxane bond with metabolites and transferring electrons from the silicate system (which has a lower potential) to the microorganism (which has a higher potential). Further studies will be required to determine the physiological and ecologic peculiarities of the micromycetes in order to develop protective coatings. References 29: 20 Russian, 9 Western.

06508

**Early Stages in Development of *Pyricularia  
Oryzae* Cav. on Rice Leaves**

*18400103b Leningrad MIKOLOGIYA I  
FITOPATOLOGIYA*

*in Russian, Vol 21, No 4, Jul-Aug 87 (manuscript  
received 21 May 86) pp 358-365*

[Article by V.P. Lapikova and V.G. Dzhavakhiya, All-Union Scientific Research Institute of Phytopathology, Moscow oblast]

[Abstract] Pigmented mutants of the fungus *P. oryzae* with disorders in the melanin synthesis chain, in contrast to the normally pigmented initial strain, do not cause disease. This article studies the blocked stage in the development of the pigmented mutants of the fungus on the surface of a leaf of a wild variety of rice that is susceptible to the fungal strain. The protective reactions

of various resistant varieties of rice that interact with the wild strain were also studied. The pigmented mutants, in contrast to the initial strain, are more strongly inhibited on the surface of the leaves and stop their development within the epidermal cells as a result of a supersensitivity reaction. The study did not exclude the possibility that the disruption of melanin formation in *P. oryzae* increases the fungus' capability of inducing protective host reactions and/or the sensitivity of the fungus to these reactions. The avirulence of the pigmented strains is probably explained by the effects of several factors such as reduction in rigidity of the infectious parasitic fungus and stronger suppression of development of the fungus by protective host plant substances. Figures 2; references 15: 3 Russian, 12 Western.

06508

**Study of Interaction of *Bacillus Subtilis* With  
Colloidal Gold by IR Spectroscopy**

*18400102 Moscow KOLLOIDNYY ZHURNAL in  
Russian Vol 49, No 5, Sep-Oct 87  
(manuscript received 24 Jun 85) pp 898-902*

[Article by F.D. Ovcharenko, N.V. Pertsov, Z. R. Ulberg, V.A. Khranovskiy, L.G. Marochko, S.V. Garbara, and O.V. Chopik, Department of Natural Dispersed Systems, IKKhKhV [Expansion not given] Ukrainian Academy of Sciences, Kiev; Chemistry Department, Moscow University; High-Molecular Compounds Institute, Ukrainian Academy of Sciences, Kiev]

[Abstract] A study examined the specific interactions of *Bacillus subtilis* cells and their metabolites with particles of colloidal gold to determine the activity of the cells in the process of heterocoagulation. Studies were performed on two strains of *B. subtilis*. Only one strain, the one that had been adapted to gold sol, was shown to be capable of heterocoagulation and specific interaction with gold particles, thus indicating that metabolites are required if these processes are to occur. It was found that gold particles accumulate on the surface of the cells belonging to this strain, whereas the other strain did not interact with the metal particles. IR spectrometric studies indicated that the ability of the bacterial cells to accumulate gold particles resulted from the formation of coordination bonds between the gold sol particles and carboxyl groups, which are located primarily in the metabolic products. The phenomenon of colloidal-biogenic selective aggregation of living microorganisms with colloidal gold particles in the hydrosphere that has been discovered may be a powerful and universal factor supporting its concentration in nature as in the formation of lateral zones in ancient sediment. Figures 3, References 8: 7 Russian, 1 Western.

06508

**Vectors for Cloning and Determining Activity of Elements of Bacterial Transcription System. Cloning rRNA Operon Transcription Terminator of Archaeobacterium Halobacterium halobium**

18400104a Kiev BIOPOLIMERY I KLETKA  
in Russian Vol 3, No 5, Sep-Oct 87 (manuscript received 8 Apr 86) pp 263-269

[Article by Ye.A. Skripkin, A.S. Mankin, A.M. Kopylov, and Yu.Ye. Khudyakov, Moscow State University imeni M.V. Lomonosov; Institute of Virology imeni D.I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] The quantity of protein formed in cloning experiments depends on a number of factors, including the effectiveness of transcription and translation and the stability of the mRNA and hybrid protein produced. This article presents vector systems containing a strong promoter and strong transcription terminator, which allows for direct observation of the expression of short hybrid mRNA in *Escherichia coli* cells. The use of such vectors makes it possible to answer questions related to the effectiveness of the operation of promoters and transcription terminators and the stability of the mRNA formed in the cell. The vectors constructed and the system for their expression based on *E. coli* allow direct investigation of the transcription process and the effectiveness of the operation of genes' regulator areas. They also make it possible to study the correlation between transcription and translation. Figures 5; references 12: 1 Russian, 11 Western.

06508

**Cloning Sequences of Corn Genome DNA Capable of Autonomous Replication in *Saccharomyces Cerevisiae***

18400104b Kiev BIOPOLIMERY I KLETKA  
in Russian Vol 3, No 5, Sep-Oct 87 (manuscript received 21 Jan 86) pp 270-274

[Article by V.N. Shulzhenko and V.A. Kordyum, Institute of Molecular Biology and Genetics, Ukrainian Academy of Sciences, Kiev]

[Abstract] The possibility of cloning autonomously replicating sequences (ARS) has been mentioned in the literature in connection with their possible application in the design of vector systems for eukaryotes. The purpose of this study was to clone DNA fragments from the corn genome capable of autonomous replication in yeasts. The DNA fragments were inserted at the *EcoRI* site of the plasmid pYF40 that contained the His3 marker of *Saccharomyces cerevisiae*. Two plasmids were selected that transformed the His<sup>-</sup> strain to a His<sup>+</sup> strain at 100-300 transforms per 3 µg of plasmid DNA. The technique of cloning ARS segments can be used to study the possibility of replication of hybrid plasmids in systems of plant protoplasts. Figures 3; references 10: 1 Russian, 9 Western.

06508

**Changes in Nervous System During Acute Malathion Poisoning**

18400105a Moscow *SOVETSKAYA MEDITSINA* in Russian No 9, Sep 87 (manuscript received 8 Oct 86) pp 21-24

[Article by G.A. Akimov, I.P. Kolesnichenko, and N.V. Viadeyeva, Department of Nerve Diseases (headed by Professor G.A. Akimov), Military Medical Academy imeni S.M. Kirov; Institute of Toxicology (directed by V.I. Kuleshov), USSR Ministry of Health, Leningrad]

[Abstract] Malathion (Soviet name, Karbofos) is a dithiophosphoric acid derivative with anticholinesterase properties that is widely used as an insecticide, acaricide, and fungicide in the home and on the farm. The authors studied the nature of the neurologic disorders caused by acute malathion poisoning, observing 438 patients 19 to 70 years in age with acute peroral and inhalation malathion poisoning of varying degrees of severity (mortality rate, 33.7

). Clinical observation revealed a variety of neurologic manifestations. These included bulbar myasthenia-like symptoms; coma; psychosis; convulsions; and cerebellar, extrapyramidal, meningeal, and synaptogenic myoneural pareses and paralyses. Neurologic complications included neurogenic central and peripheral respiratory complications, cerebral edema, epileptiform attacks, autonomic-trophic disorders, polyneuropathy, and purulent meningoencephalitis. In nonfatal cases, neurologic symptoms began to regress after 5 to 7 days in mild cases, 2 to 3 weeks in moderate cases, and 4 to 7 weeks in severe and very severe cases. Figures 2; references 16: 11 Russian, 5 Western.

06508

**Influence of Synthetic Leu-Enkephalin Analogue on Higher Mental Functions in Alcoholism**

18400105b Moscow *SOVETSKAYA MEDITSINA* in Russian No 10, Oct 87 (manuscript received 24 Jun 86) pp 33-36

[Article by A.I. Belkin, L.I. Moskovichyute, V.V. Belyayeva, and M.M. Adigamov, Department of Psychiatric Endocrinology (headed by Professor A. I. Belkin), Moscow Scientific Research Institute of Psychiatry (directed by Professor V.V. Kovalev), RSFSR Ministry of Health, Moscow]

[Abstract] A study compared the influence of leu-enkephalin on the status of higher mental functions in alcoholism patients and healthy persons. The materials used were the results of neuropsychological studies of 40 subjects who received a synthetic leu-enkephalin analogue, dalargin. Twenty of the subjects were alcoholics undergoing therapy and 20 were normal healthy individuals. Dalargin was administered intravenously (slowly) at a dose of 1 mg/10 ml saline solution. The test scores of

the alcoholics who received dalargin improved on both both the verbal and nonverbal tests. The numbers of errors made by healthy subjects decreased by 33% and those made by alcoholics decreased by 62%. The greatest selective effect of dalargin on the pathologic elements of mental processes was observed in tactile gnosis tests. In these tests, dalargin improved the performance of the alcoholics to equal that of the healthy subjects. References 12: 11 Russian, 1 Western.

06508

**Isolation of Toxins From *Pyricularia Oryze* Cav. Spores**

18400105c Leningrad *MIKOLOGIYA I FITOPATOLOGIYA* in Russian Vol 21, No 4, Jul-Aug 87 (manuscript received 11 Mar 85) pp 336-339

[Article by G.K. Samokhvalova and N.V. Sobolevskaya, All-Union Scientific Research Institute of Phytopathology, Moscow oblast]

[Abstract] Previous studies have shown that certain strains of fungus liberate high yields of toxins. Toxic tenuazonic acid was isolated from subsurface and surface cultures of *P. oryzae*. This article studies the isolation of toxic substances contained in *P. oryzae* spores that were obtained on mycelia that were grown by subsurface cultivation. The data showed that the ethyl acetate fractions of freshly collected *P. oryzae* spores formed six zones with different chromatographic mobility [R<sub>f</sub>] values in thin-layer chromatography on Silufol plates and differed in fluorescence spectra. The sorbent used was found to have no influence on the spectrum of the substance studied. The chemical nature of the toxins formed varied from strain to strain. The growth-regulating substances isolated could not be identified. They had a maximum wavelength  $\lambda_{max}$  similar to that of a pyriculariol derivative, C<sub>10</sub>H<sub>10</sub>O<sub>4</sub>. The results suggest that the chemical nature of the toxins formed depends on the strain of fungus. Figures 2; references 10: 1 Russian, 9 Western.

06508

**Facilitation of Memory Trace Reproduction upon Administration of Amfonelic Acid**

18400027c Moscow *FARMAKOLOGIYA I TOKSIKOLOGIYA* in Russian Vol 50, No 4, Jul-Aug 87 (manuscript received 30 Apr 85) pp 22-25

[Article by R. Yu. Ilyuchenok, N. I. Dubrovina and I. M. Vinit'skiy, Institute of Physiology, Siberian Department, USSR Academy of Medical Sciences, Novosibirsk]

[Abstract] Amfonelic acid (7-benzyl-1-ethyl-1,4-dihydro-4-oxo-1,8-naphthyridine-3-carboxylic acid) is a motor activity stimulant for various animals, causing in man

hallucinations, paranoid delirium and aggravation of schizophrenic syndrome. The authors studied the effects of amfonelic acid on reproduction of the conditioned passive avoidance reaction in mice under conditions of amnesia and natural forgetting. Amfonelic acid was found to have a clear anti-amnesic effect and improved recall of the avoidance reaction after natural forgetting. The activating influence of amfonelic acid predominated after 26 and 35 days of natural forgetting, but decreased after 68 and 82 days, probably as a result of the reduction in significance of the dopaminergic system in mechanisms of forgetting. Figure 1, references 16: 4 Russian, 12 Western.

6508

**Comparative Study of Dose-Effect Dependence for Oral and Inhalation Administration of Organophosphorus Pesticides**

18400029a Moscow GIGIYENA I SANITARIYA in Russian No 8, Aug 87 (manuscript received 15 Oct 86) pp 71-72

[Article by G. A. Voytenko and Ye. I. Semchinskaya, All-Union Scientific Research Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics, USSR Ministry of Public Health, Kiev]

[Abstract] The purpose of this work was to develop a method for determining the theoretical variation of the oral-inhalation coefficient (the ratio of isoeffective doses for oral vs inhalation paths of entry) as a function of concentration of organophosphorus pesticides. Experiments were performed on white rats exposed to orthophosphoric acid esters by catheter injection into the stomach in an aqueous emulsion and inhalation of aerosols and vapors. The data indicate the need to consider differences between oral and inhalation toxicity for hygienic standardization of exposure to toxic preparations. Figures 3, references 9: 8 Russian, 1 Western.

6508

**Toxicologic-Hygienic Estimation of Relative Selectivity of Pesticide Effects**

18400029b Moscow GIGIYENA I SANITARIYA in Russian No 8, Aug 87 (manuscript received 27 Jun 86) pp 92-93

[Article by Ye. A. Yershova and Yu. S. Kagan, All-Union Scientific Research Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics, Kiev]

[Abstract] A two-stage method has been developed for estimating the selectivity of pesticide action. In the first stage of selection of new pesticides, the acute index of relative selectivity is computed; in the second stage, the

integral selectivity index is calculated. These relative selectivity indices are suitable for evaluation of organophosphorus compounds, as well as other groups of pesticides, yielding toxicologic-hygienic estimates of the relative selectivity of the pesticides, relating their danger for homiotherms in comparison to their effectiveness against pests. Reference 1: Russian.

6508

**Influence of Microencapsulation on Euphilline Release Rate from Tablets**

18400028b Moscow FARMATSIYA in Russian Vol 36, No 2, Mar-Apr 87 (manuscript received 12 Nov 85) pp 19-21

[Article by I. A. Murayev and I. N. Andreyeva, Pyatigorsk Pharmaceutical Institute]

[Abstract] Results are presented from microencapsulation and tableting of euphilline. Microencapsulation isolates euphilline particles from the mucosa and assures gradual liberation of the preparation. Microencapsulation was performed by evaporation of an organic solvent from an emulsion. Ethylcellulose was used as the polymer shell. Technological parameters of the tableting process were selected and it was found that tablets of microencapsulated euphilline provide more uniform liberation of the preparation than tablets currently produced industrially and can be recommended as a more effective dose form. References 3: Russian.

6508

**Mechanism of Clonidine Release from Solid Dispersed Ethylcellulose-Based Systems**

18400028a Moscow FARMATSIYA in Russian Vol 36, No 2, Mar-Apr 87 (manuscript received 25 Dec 85) pp 16-19

[Article by A. I. Tentsova, Ye. A. Amirkhanyan, S. N. Yegorova and A. Ye. Dobrotvorskii, First Moscow Medical Institute imeni I. M. Sechenov, Institute of Developmental Biology imeni N. K. Koltsov, USSR Academy of Sciences, All-Union Scientific Research Institute of Pharmacy, Moscow]

[Abstract] The purpose of this work was to produce and study solid dispersed clonidine systems with prolonged liberation of medication, using ethylcellulose as the matrix. Experiments in vitro indicated that clonidine in a solid dispersed system based on ethylcellulose supported prolonged liberation of the medication by diffusion through the pores in the ethylcellulose material. Figures 6, references 10: 2 Russian, 8 Western.

6508

**Individual Differences in Dynamics of Working Capacity and Functional Status of Operators as a Function of Constitution**

18400032a Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 13, No 3, May-Jun 87 (manuscript received 5 Jul 85) pp 419-424

[Article by G. A. Smirnova and B. V. Ovchinnikov, Military-Medical Academy imeni S. M. Kirov, Leningrad]

[Abstract] The purpose of this work was to determine if there is any relationship between the psychogenic effects of psychopharmacological substances and certain constitutional specifics of the human body. Studies were performed on 40 volunteers 18 to 20 years of age who were given piracetam 1.2 g bid for three weeks. The effect of the preparation was evaluated by comparing working efficiency before and during its administration in a task involving perception of sets of numbers. Subjects whose performance improved were found to be more likely to have an asthenic constitution, while those whose performance deteriorated were more likely to have a hypersthenic constitution. However, hypersthenics had better results in the tests before administration of the preparation. References 21: 6 Russian, 15 Western.

6508

**Increase in Influence of Oxygen on the Body in the Presence of Helium**

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 13, No 3, May-Jun 87 (manuscript received 16 Jan 85) pp 463-468

[Article by M. M. Seredenko and Ye. V. Rozova, Institute of Physiology imeni A. A. Bogomolets, Kiev]

[Abstract] An attempt is made to estimate the combined influence of oxygen and helium on the body over a broad range of oxygen concentrations in the gas mixture breathed, using 105 healthy volunteers and 78 subjects with chronic pulmonary insufficiency. The subjects breathed mixtures containing 40, 21, 14.5 and 11

oxygen in nitrogen or helium. Subjects with pulmonary insufficiency were given mixtures containing 40 and 21

oxygen only. Exposure time was 20 minutes. Helium increased the hyperoxic effect, decreasing the level of gas metabolism. Systems supporting the body with oxygen function normally with reduced oxygen concentrations when mixed with helium, and hyperoxia is increased at higher oxygen concentrations. Figures 3, references 18: 13 Russian, 5 Western

6508

**Regulation of Hemodynamics upon Imitation of the Transition to Weightlessness (Mathematical Modeling)**

18400032c Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 13, No 4, Jul-Aug 87 (manuscript received 10 Mar 86) pp 627-632

[Article by B. L. Palets, A. A. Popov, M. A. Tikhonov and V. S. Panchenko, Institute of Cybernetics, Ukrainian Academy of Sciences, Kiev]

[Abstract] The rapid reactions of the cardiovascular system to the transition to the weightless state, as well as the effect of certain methods of limiting the negative influence of weightlessness based on decreasing the volume of blood which moves to the central area, were mathematically modeled using a model of the human circulatory system which is a development of a previously published model. This model represents the cardiovascular system as a network of sections with localized parameters reflecting the pumping function of the right and left ventricles and the resistive-capacitive properties of the pulmonary and general circulation. Weightlessness was modeled by "switching off" the gravitational component of pressure and increasing the total blood volume by 2.5%. The mathematical model adequately describes the fast reactions of central human hemodynamics. The right ventricle is found to function on a plateau of the pumping function curve. Hypovolemia, negative pressure on the lower half of the body and occlusion collars were found to decrease the volume loading of the left ventricle only beginning at the moment when the overload of volume in the right ventricle was relieved and its pumping function curve passed the plateau. Negative pressure on the lower half of the body is the most effective method of decreasing the central blood volume. Figures 4, references 7: 4 Russian, 3 Western.

6508

**Role of Individual Features of Autonomic Reactions to Adaptogens in Physical and Mental Efficiency**

18400032d Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 13, No 4, Jul-Aug 87 (manuscript received 7 May 86) pp 696-698

[Article by T. I. Shustova, F. V. Osminin, V. A. Nibush, A. F. Yershov and A. P. Pisanko, Scientific Research Institute of Biology and Biophysics, Tomsk State University imeni V. V. Kuybyshev, Tomsk]

[Abstract] A study was made of the influence of eleuthero-coccus extract on persons with various types of autonomic reactions. The subjects received 1 ml eleuthero-coccus extract in 10 ml distilled water and two doses of multivitamin each day before breakfast for 14 days. The adaptogenic effect of the preparations was most effective when they were combined with a training process and

depended significantly on individual autonomic reaction. The best correcting effect for mental and physical working efficiency was observed in persons with a parasympathetic type of reaction. Figures 2, references 2: Russian.

6508

**Study of Indices Defining Effectiveness of Occupational Activity of Divers**

18400032e Moscow *FIZIOLOGIYA CHELOVEKA in Russian* Vol 13, No 4, Jul-Aug 87 (manuscript received 4 Nov 85) pp 698-701

[Article by V. Ya. Apchel, V. I. Balandin, and O. V. Novoseltsev, Military Institute of Physical Culture, Leningrad]

[Abstract] A study was made of 164 divers 19-21 years of age. An index of physical development was computed for each diver. Psychophysiological qualities were evaluated, as was the functional status of the cardiorespiratory system and results of divers training. Training results correlated slightly with the degree of physical conditioning prior to the beginning of training. Psychophysiological qualities were also significant. Considering the good physical condition of all diver trainees, occupational selection of divers should be more strongly based on psychophysiological selection. References 10: Russian.

6508

**Change in Behavioral and Biochemical Effects of Caerulein, an Analog of Cholecystokinin Octapeptide (CCK-8) Following Long-term Administration of Haloperidol**

18400031e Moscow *ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA in Russian* Vol 37, No 4, Jul-Aug 87 (manuscript 30 Jun 86) pp 696-702

[Article by E. E. Vasar, L. Kh. Allikmets, A. Kh. Soosaar and A. E. Lang, Laboratory of Psychopharmacology, Tartu State University]

[Abstract] A study is presented of the influence of long-term dopamine receptor block with haloperidol on the behavioral effects of caerulein, a CCK-8 receptor agonist, as well as the influence of possible mechanisms of change in behavioral effects of caerulein under the influence of haloperidol. In control mice, 15 mg/kg of caerulein caused inhibition of motor activity. However, after long-term administration of haloperidol, caerulein did not change motor activity of the experimental animals. The antagonistic effect of caerulein on picrotoxin convulsions was also reduced after administration of haloperidol. Long-term administration of haloperidol changes all the main effects of caerulein, weakening or reversing them. Only the antiphenamine effect of caerulein is strengthened. The data indicate that the sedative

and anticonvulsive effects of caerulein occur primarily through a central mechanism rather than the afferent system of the vagus nerve as has been previously suggested. Strengthening of antagonism of caerulein to phenamine excitation results from increased suppression of liberation of dopamine from presynaptic dopaminergic terminals after long-term administration of haloperidol. Figures 3, references 23: 3 Russian, 20 Western.

6508

**Feeding Activity of Rats Following Microinjection of Enkephalin-Like Tetrapeptides in Various brain structures**

18400031d Moscow *ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA in Russian*, Vol 37, No 3, May-Jun 87 (manuscript received 10 Apr 86) pp 573-574

[Article by T. V. Shurtakova and L. F. Kelesheva, Laboratory of Motivational Physiology, Institute of Normal Physiology imeni P. K. Anokhin, USSR Academy of Medical Sciences, Moscow]

[Abstract] In order to determine the role of "hunger centers" in the implementation of the effects of enkephalin-like tetrapeptides on feeding behavior, a comparative study was performed of the influence of the tetrapeptide on feeding and food-obtaining activity of rats following microinjections into the lateral area of the hypothalamus and the corpus callosum. Enkephalin-like tetrapeptide caused a reliable decrease in the frequency of feeding with both methods of administration, less so in trained than in untrained animals. The data indicate that the influence of the enkephalin-like tetrapeptide on rat motor activity resulted from preferential action on the extrapyramidal nigrostriate system, influencing primarily the feeding motivation zones of the hypothalamus. Figures 2, references 4: 2 Russian, 2 Western.

6508

**Selective Vasopressin Stimulation of Exploratory Behavior in Rats**

18400031c Moscow *ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA in Russian*, Vol 37, No 3, May-Jun 87 (manuscript received 9 Jul 86) pp 570-572

[Article by A. B. Nikonova, N. V. Makarova and S. A. Titov, Combined Laboratory for Study of Means and Methods to Control Harmful Animals and Plant Diseases, Moscow State University imeni M. V. Lomonosov]

[Abstract] Previous studies by the authors have shown that administration of low doses of vasopressin sufficient for modification of the learning process does not influence motor activity in the short term. This work studies the behavior at later stages following administration of vasopressin. Experiments were performed on male white rats, which received 0.001 mg/kg vasopressin

intraperitoneally in aqueous solution. Within one hour after administration of vasopressin, the horizontal and vertical activity of the animals which received the hormone did not differ from control rats which received the solvent only. No significant difference was found in the amount of vertical activity or emotional (grooming) activity. However, exploratory activity increased reliably (among animals receiving vasopressin, the effect being retained for 1 to 1.5 hours after administration of the hormone. The influence of vasopressin on exploratory activity did not coincide in time with its effect on learning processes nor with the suppression of motor activity it has been observed to cause at larger doses. The influence of vasopressin on behavior is thus a multicomponent effect, each component arising in a given range of doses and having its own unique time characteristics. References 5: 2 Russian, 3 Western.

6508

**Microionophoretic Study of Chemical Sensitivity of Medial Hypothalamic Neurons to Substance P in Rats**

18400031b Leningrad *FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA* in Russian Vol 73, No 8, Aug 87 (manuscript received 19 Sep 86) pp 1052-1056

[Article by Ye. A. Yumatov and Ye. V. Bykova, Laboratory of Physiology of Emotions (Headed by K. V. Sudakov), Scientific Research Institute of Normal Physiology imeni P. K. Anokhin, USSR Academy of Medical Sciences, Moscow]

[Abstract] A microionophoretic analysis was performed of the chemical sensitivity of medial hypothalamus neurons to substance P in rats exposed to immobilization stress. Slightly over 50

of neurons tested were found to be chemically sensitive to substance P, responding to microionophoretic injection of the neuropeptide either by inhibition or excitation of pulse activity. Excitation was found to predominate slightly. The results demonstrate changes in chemical sensitivity of medial hypothalamus neurons to substance P in rats under immobilization stress conditions. Emotional stress is thus found to change the chemical sensitivity of the neurons in emotigenic zones of the brain not only to classical neuro-mediators, but also to neuropeptides. Figure 1, references 17: 7 Russian, 10 Western.

6508

**Neurotic Reactions and Internal Inhibition Processes in Apes Receiving Beta-Endorphin Conjugate with Ox Serum Albumin**

18400031a Moscow *DOKLADY AKADEMII NAUK SSSR in Russian* Vol 295, No 6, Aug 87 (manuscript received 12 Jan 87) pp 1505-1509

[Article by A. I. Karamyan, Corresponding Member, USSR Academy of Sciences, T. N. Sollertinskaya, V. A. Ilyukha, K. V. Sudakov and I. P. Ashmarin, Active Members, USSR Academy of Medical Sciences, A. V. Kotov, Ye. I. Ivanov, Yu. A. Pankov, Active Member, USSR Academy of Sciences, I. L. Kofman, M. Ye. Vartanyan and G. Sh. Burbayeva, Institute of Evolutionary Physiology and Biochemistry imeni I. M. Sechenov, USSR Academy of Sciences, Leningrad; Scientific Research Institute of Normal Physiology imeni P. K. Anokhin, USSR Academy of Medical Sciences; Institute of Experimental Endocrinology and Hormone Chemistry, USSR Academy of Medical Sciences; and All-Union Mental Health Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] Nine apes were used in a study of the dynamics of change in behavior and of neurotic disorders after administration of conjugates of beta-endorphin with proteins together with an immunostimulator. The method of conditioned reflexes with multiparameter recording of various cardiac, respiratory and motor components and observation of the free behavior of the animals by photography and cinematography was used. The studies showed that administration of the conjugate to apes in a neurotic state resulted in significant changes in their behavior in three periods: a slight increase in the number of intersignal reactions with an increase in motor reactions for one to three days, followed by a prodromal phase with gradual general quieting and normalization of background EKG and respiration frequency from day three through day ten, and a final third period from day ten to day thirty of maximum changes with full recovery of conditioned reflex activity. Neurotic states were relieved for extended periods of time, with a significant increase in processes of internal inhibition. Figure 1, references 14: 13 Russian, 1 Western.

6508

**Eye Microsurgery Centers Open in Krasnodar and Cheboksary**

18400086 Moscow *SOVETSKAYA ROSSIYA* in Russian 29 Oct 87 pp 4

[Article by V. Ovcharov and V. Udachin, Special Correspondents]

[Abstract] Two branches of the Eye Microsurgery MNTK have opened in Krasnodar and Cheboksary. According to the Kuban Kray health department, 37

of all complaints concerning health services in the area mention unsatisfactory ophthalmologic services. It is now possible to help these patients. Moscow, Leningrad, Cheboksary, and Krasnodar are the first four cities where eye microsurgery offices are now in operation; they are being directed by Professor S.N. Fedorov, a Hero of Socialist Labor and corresponding member of the USSR Academy of Medical Sciences. In these centers, a conveyer line method is used to perform microsurgery on patients' eyes to relieve myopia. The conveyer line method will make it possible to perform up to 20,000 operations annually at the Cheboksary microsurgery center at half of what the operations cost previously. The new method will also result in a fivefold increase in surgeons' labor productivity.

06508

**Deputy Health Minister on Health Care Problems**

18400046 Moscow *IZVESTIYA* in Russian 25 Aug 87 pp 3

[Article by S. Tutorskaya]

[Abstract] After noting that evaluation of health care organizations on the basis of total visits, the practice in the past, has made a fetish of numbers and forced organizations to seek quantity over quality, the article reports on a discussion held with A. Moskvichev, Deputy Minister of Public Health, USSR, concerning numerous letters of complaint written to the newspaper following a series of articles published last March. It is noted that new quality criteria for evaluating physicians' labor will soon be introduced, borrowing valuable foreign experience and evaluating a physician's labor on the basis of the health of his patients. Problems noted

include a shortage of medicine, with no standard inventory list for emergency hospitals. Small hospitals need to have treatment departments which can be used to develop continuing long-term treatment sections. Specialized medical treatment should be given in large central hospitals. Hospitals are also short of equipment as well as medications. The chief physicians of regional hospitals sometimes do not show sufficient initiative in such matters as assuring that local health organizations are provided with required equipment, even telephones. Defibrillators are in short supply, Soviet industry being unable to manufacture even the insufficient number ordered. Portable defibrillators have now been developed, which can be battery powered. The devices will be manufactured beginning in 1989.

6508

**Reasons for Lagging Medical Technology**

18400090a Moscow *MOSKOVSKAYA PRAVDA* in Russian 15 Oct 87 p 4

[Article by PRAVDA correspondent: "What is at the Exhibit and What is in the Hospital"]

[Abstract] An interview was reported with the director of the All Union Scientific Research and Evaluation Institute of Medical Technology, USSR Ministry of Health, Professor Boris Ivanovich Leonov covering the lag of Soviet medical technology behind that of the foreign countries. Leonov stated that Soviet medicine is behind western medicine because not enough attention was being paid in the past to the development of medical technology. Development of future cadres is very unsatisfactory. Medicine does not have a high enough priority in the Soviet system. Too many Ministries are involved in production of most of the necessary equipment and reagents and in each one the priority is uniformly low. It takes 8-10 years to get some of the "innovative" equipment from the concept to production stage. Some developments have actually been licensed to foreign countries so that now the Soviets will have to buy back the finished product for hard currency, even though it was originally developed in the USSR. The USSR spends 100 times less than Americans for development of laboratory technology. In the Soviet Union, only 25 percent of the potential in various surgical equipment is being produced in contrast to the Western countries.

7813/12913

### **CEMA Countries' Joint Efforts in Making Medical Equipment**

*18400134 Moscow FOREIGN TRADE in English  
No 10, Oct 87 pp 25-26*

[Article by Larisa Popyonova]

[Text] The USSR's international cooperation in designing medical equipment is expanding year by year, it is especially intensively developing with the fraternal socialist countries. The socialist countries' scientific and technical advancements and their social system predetermine further improvement of the public health system. The main tasks now are to comprehensively supply outpatient and clinical departments with high-quality medical apparatus and equipment and raise the automation level through the use of computer facilities, as this will substantially improve the quality of medical service and accelerate the transfer to the annual medical examination of all the population.

To realize the CMEA Member-Countries' Comprehensive Program for Scientific and Technological Progress up to the Year 2000, it was decided to use the socialist community countries' scientific and technological potential to solve the problem, Development and Manufacture of Medical Equipment Using Microelectronics. This task is especially pressing considering the fact that the CMEA member-countries' public health institutions are equipped with facilities based on a microprocessor structure which lacks a compatible circuit engineering and elemental base, software, periphery devices, etc. Due to this there are large unjustified operation costs.

The All-Union Medical Instrument-Making Research Institute is a head organization realizing this part of the Comprehensive Program. Taking into account the high technical level of the developing medical equipment and great demands for it, the Institute is maintaining close direct ties with partners in the CMEA countries. Among them are: the Institute of Medical Equipment (Bulgaria), the state firm Medicor (Hungary), the concern Chirana (Czechoslovakia), an integrated plant manufacturing medical laboratory equipment and a factory making measuring instruments (GDR), the Famed-1 factory manufacturing electrical medical equipment, the Ormed Centre of Research and Development of Medical Equipment, and the Temed factory (Poland). Organizations in the Republic of Cuba, Romania and Yugoslavia also participate in this work.

The cooperation program envisages the creation of specialized and cooperated manufacture of 80 new products, sub-assemblies and blocks of medical equipment with the total output volume worth nearly 300 million rubles. A functionally finished complex of standardized microprocessor modules, software, designing, adjustment and testing facilities will form a unified elemental base.

The program, Development and Manufacture of Medical Equipment Using Microelectronics, is being realized in line with the Agreement on Multilateral Cooperation in Creating and Organizing Specialized and Cooperated Production of Modern Medical Equipment Using Microelectronics, signed by corresponding ministries and departments in the CMEA member-countries—Bulgaria, Hungary, the GDR, the Republic of Cuba, Poland, Czechoslovakia, Romania and Yugoslavia on June 19, 1986. The Agreement includes a wide multilateral cooperation program for creating and organizing specialized and cooperated production of medical equipment using microelectronics for the period up to 1990. It also covers specialization in manufacturing completing units, blocks and fully manufactured medical devices and will fulfill the CMEA countries' demands for these products up to the year 1995.

The cooperation program envisages the design and introduction during the period up to 1990 of sets of devices and apparatus for mass medical examinations, in particular:

Three types of electrocardiographic equipment, including express-analyzers of cardiograms, complexes for recording and processing electrocardiograms to diagnose the main types of diseases, and automated cardiological complexes for multifunctional cardiological examination;

Sets of technical facilities for multiparametric assessment of the state of various systems and organs of the body to equip preliminary reception and examination rooms which will substantially increase the polyclinics' patient-handling capacity thanks to the use of computers and determine risk factors for the most vital diseases of social consequence;

Three types of devices for evaluating the state of a patient's central nervous system thanks to which qualitative characteristics of various analyzers of the body and the level of attention, memory, decision making and sensomotor activity can be determined;

Complexes of technical facilities for nonrenal purification of blood and artificial lung ventilation for patients' rehabilitation and temporary substitution of lost functions;

A reanimation complex for newborn babies.

Organizations coordinating their activities according to the subjects and organizations realizing all the problematic tasks of the Program have concluded bilateral economic agreements and contracts on R&D. At present the All-Union Medical Instrument-Making Research Institute has concluded nine economic agreements and nine contracts with Czechoslovak, Hungarian, Polish, Bulgarian and GDR organizations.

In April 1987 the Soviet-Hungarian Micromed joint venture for designing, manufacturing and servicing new medical equipment and systems based on microprocessors began functioning in Hungary.

Agreements on setting up two temporary Soviet-Czechoslovak groups of specialists for designing an artificial kidney universal-modular apparatus and artificial lung ventilation apparatus were signed between the All-Union Medical Instrument-Making Research Institute and the concern Chirana. These groups' activity is based on coordinated working plans of cooperation and technical assignments. Czechoslovak partners manufactured prototypes of electrocardiographs with microprocessor control and data-processing means using the designed power supply unit and a tape drive that the Institute will test.

A prototype of an automated complex for recording and processing electrocardiograms giving syndromic conclusions, which uses the Hungarian MOD-81M modular system for retrieving and processing medical data and the Czechoslovak Kirastar-32V electrocardiograph, was designed specially for medical institutions.

An automated diagnostic cardiological complex, based on a microprocessor with fixed data-processing algorithms using the GDR's BIOSET-3000 electrocardiograph and the Hungarian MOD-81M system, was constructed.

The supply of polyclinics and outpatient departments with qualitatively new medical equipment and the updating of the automation and reliability level will substantially increase the medical institutions' patient-handling capacity, release paramedical personnel from manual routine operations (decoding of cardiograms, measurement of indicators of physiological functions, etc.) and open greater opportunities for creating a new type of public health system.

COPYRIGHT: "Vneshnyaya trgovlya" 1987  
COPYRIGHT: English translation, "Foreign Trade", 1987

/06091