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# USSR Report

## LIFE SCIENCES

## BIOMEDICAL AND BEHAVIORAL SCIENCES



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# USSR REPORT

## LIFE SCIENCES

## BIOMEDICAL AND BEHAVIORAL SCIENCES

## CONTENTS

AGROTECHNOLOGY

POTENTIALITIES OF GENETICS

Moscow IZVESTIYA in Russian 18 Oct 83 p 2

[Article by Academician D. Belyaev, deputy chairman of the Siberian Department of the USSR Academy of Sciences, director of the Institute of Cytology and Genetics: "Biologists of the Siberian Department, USSR Academy of Sciences Are Working on the Creation of a Reliable Scientific Basis for the Development of an Agroindustrial Complex in Siberia". Novosibirsk]

[Text] The productivity of agriculture depends in many respects on the level of scientific studies in the various fields of science and on the practical use of these developments. The personnel collectives of the Siberian department of the Academy of Sciences are concerned that their contribution to the successful development of a modern agroindustrial complex be adequately substantial.

Protection of large quantities of grain against insect pests, with minimal expenditures, is ensured by electron beam accelerators, created at the Institute of Nuclear Physics. Scientists of the Institute of Heat Physics designed and manufactured a highly efficient system for drying and sorting grain. The system has undergone production tests at the Iskitimsk sovkhoz. At the Institute of Catalysis original heat generators are being developed for drying the most varied types of grain production with maximal retention of nutrients in them.

New developments in biology are very important, primarily in genetics and the theory of selectivity. It is very important to understand clearly what the kolkhozes and sovkhozes need. Siberia is in great need of new, early ripening varieties of grain, vegetables, feed and other cultivated plants, which would be more resistant to the dry months and would produce high yields. Many years are being spent on the creation of new varieties, often--dozens of years. Selection of the original material for crossing is still accomplished, basically, by the method of empirical evaluations; a greater number of varieites are possible dur to sorting (often not very efficient!). This is what precious time is spent on. To increase the creation of new varieties, to improve their productivity--this may be accomplished only on the basis of utilizing fundamental scientific developments. For this reason the development of the theory of hybridization and selectivity is one of the most important problems of academic science.

The use of new genetic methods, such as radiation and chemical mutagenesis, is quite promising. In the short time since the birth of these methods in science,

they have already allowed creation of a number of varieties of different cultivated plants. A striking example of the successful use of the radiation mutagenesis method is the creation of a spring wheat variety, "Novosibirsk-67". Last year, in Western Siberia, it was planted on about three million hectares and it yielded two to three centners more per hectare.

It is hoped that, as the basic scientific search is intensified with the aid of the genetic methods of hybridization, such varieties of winter wheats, which will be winter-resistant at least in the subtaiga zone of Western Siberia, will be obtained.

Such wheats are the dream of the Siberian grain growers: they could use the moisture accumulated over winter much more efficiently, withstand more easily the dry summer period and mature long before the first snow. But, naturally, these varieties must have a high productivity potential--at least 60 to 70 centners per hectare. To obtain such a result it is essential to study thoroughly the genetic properties of many varieties and species of plants, including those that have been able to adapt to the extreme conditions of Siberia.

By using such types in selection, new, efficient varieties of feed cultivated plants may be created, specifically for the Kulundinsk steppe and Barabinsk lowlands--vast agricultural territories with complicated weather and soil conditions. Such a search is very promising. But, the studies on creating winter varieties of wheat in most selection institutions of Siberia have practically stopped now. This is the result of the selectionists having no faith in the possibility of a favorable outcome of such a scientific search. This scepticism is not justified, but understandable, because actually it is very difficult to obtain varieties of this type.

It is also very important in selection to use aboriginal, native Siberian species of animals, which have remarkable adaptibility to local conditions. In this matter, special importance is attached to the maintenance of gene banks of aboriginal species, such as the Yakut cow, and local Kundinsk, Transbaikal and Tuvin sheep.

An extensive experimental base is needed for this and, primarily, an adequate number of animals of different species. The Siberian department of the USSR Academy of Sciences is organizing such a genetic center in Gorno=Altay.

Animals breeders are awaiting from the scientists new species of animals, having high growth energy and capable of production with a reduced expenditure of feed per centner of weight increase, by a factor of at least 1.5 compared with that attained today. An effective direction for the solution of this problem is to breed hybrid masses of cattle on the basis of crossing interstrains and even interspecies.

The correctness of this direction is already confirmed today by the creation of a highly productive mass of crossbred sheep. The average yield weight of each sheep is 1.5-fold higher than the average in Novosibirsk Oblast. Reserves, deposited by nature in a live organism, are quite great. But, to uncover them is far from easy. This is precisely why it is very important to develop the genetic theory of selection.

The latest successes of modern genetics have made possible new, promising directions of scientific search. Chromosome engineering methods appear favorable for the directional design of genotypes essential for agriculture. Work on such a plan is already being conducted at the Institute of Cytology and Genetics.

The synthesis of genes and their transfer from cells of certain organisms to those of others make it feasible to give organisms new valuable qualities. This opens up tempting prospects--the possibility of target formation types of plants and animals in the interests of agriculture.

But, a well-grounded, extensive, comprehensive assimilation of the scientific achievements in agriculture is in need of serious provision--organizational, material-technical, personnel. Comrade Yu. V. Andropov, in a speech at the June (1983) Plenum of CPSU Central Committee, correctly remarked that the situation is bad as far as the introduction of the achievements of science and technology into practice is concerned. Here are specific examples of this. The scientific-technical base of attaining a stable yield of 20-25 centners per hectare and a productivity of 3,000-3,500 liters of milk from a foraging cow is found in most rayons of the country. The use of zoned varieties of plants and species of animals in the leading kolkhozes and sovkhozes would ensure such a level of productivity. Nevertheless, such a stable result is difficult to achieve universally. The reason for this is that at many farms the level of agrotechnology does not meet present day requirements.

Scientists and practical workers still have to think through to the end that "technological chain" according to which the results of scientific developments will be put into practice in agrotechnical associations. To improve production cultivation and, particularly, the effectiveness of scientific developments in the field of agriculture, the level of personnel training also has to be improved. The training of new type specialists has to be organized for work in the field of applied biology. The key problem should be integration of general biological and agricultural knowledge.

The urgent practical task is to utilize, as completely as possible, the already-approved results of scientific developments, and to achieve significantly-increased productivity of agricultural production on the basis of high level organization and strict technological discipline.

12525
CSO: 1840/103

UDC 633.1"321"631.524.822:631.524.84

# PROMISING DIRECTION IN SELECTION OF SPRING WHEAT

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 9, Sep 83 pp 9-10

BESALIYEV, I. N. and KRYUCHKOV, A. G., Orenburg Scientific Research Institute of Agriculture

[Abstract] An introductory discussion alludes to an apparent lack of interest in agricultural scientists of the steppe regions in the extent of sprouts on plants; the feeling is that if the ear of grain is good, the plant bushiness is of minor importance. Further, there is relatively little study of the effect of precursor plantings on secondary shoots. The authors became interested in the potential contribution of secondary sprouts of plants on harvest yields of spring wheat cultivated after various precursor plantings. After sowing Saratovskaya 42 and Orenburgskaya 1 at the experimental farm "Urozhaynoye" of the Orenburg Scientific Research Institute of Agriculture (in the middle of the Oblast) they found that the extent of double sprouting appeared to vary with the identity of the prior planting--secondary sprouts with Saratovskaya 42 were more numerous on fallow ground than on ground with prior crops. Orenburgskaya 1 had more productive secondary shoots than the Saratovskaya 42. There appeared to be present a wheat sort with an increased productivity of the secondary shoot and the possibility if breeding such a short in order to obtain a supplementary harvest. The productivity of the secondary shoot is said to be a sort trait. Also indicated is the need to search for the best precursor crop to realize higher secondary yields.
[018-8586]

UDC 633.11"324":631.524.86

CREATION OF WINTER WHEAT SORTS IMMUNE TO BROWN RUST

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 9, Sep 83 pp 21-23

VORONKOVA, A. A., Krasnodar Scientific Research Institute of Agriculture imeni P. P. Luk'yanenko

[Abstract] Resistance of wheat sorts to brown rust disease as a function of their genetic make-up and immunological nature was studied. Materials used were sorts regionalized for several years in the Krasnodar Kray and sorts insusceptible to the disease--as compared to initial forms and earlier regionalized sorts Rannyaya 12 and Bezostaya 1. A table lists the degree of artificially-induced infection of sorts of winter wheats by brown rust. Studies were done under field conditions (over the years 1979-1982) and in the laboratory (for 1981, 1982). Sorts produced at the author's institute by P. P. Luk'yanenko and his students, and, at other test institutions--the resistance of which was inherited from the sort Kleyn 33 and sorts derived from the latter--were found to be reliable sources of resistance to the rust. Gene-related resistance of various sorts is discussed.
[018-8586]

UDC 633.111"324":631.528.6:631.524.7

HIGH-LYSINE MUTANTS IN SELECTING WINTER SOFT WHEAT

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 7, Jul 83 pp 17-19

PUCHKOV, Yu. M., corresponding member VASKhNIL--All-Union Academy of Agricultural Sciences imeni V. I. Lenin--and ALFIMOV, V. A., senior scientific associate, Krasnodar Scientific Research Institute of Agriculture imeni P. P. Luk'yanenko

[Abstract] One aspect in realization of the Soviet Food Program has been the directed production of vegetable protein, improved so as to increase its nutritional value. In order to improve wheat protein quality, the Krasnodar title institute has been utilizing hybridization of induced mutants to select winter wheat lines with increased lysine content. Sources of high-content protein and lysine have included mutants of winter soft wheats KM 4480 and KM 4705-4. The mutants were crossed with Bezostaya 1, Krasnodarskaya 46, Rannyaya 47, Polukarlikovaya 49, Severokubanka, Zernogradka 2, Odesskaya 66 and others. Resistance to variable weather (over the study period 1979-1982) was an important criterion in selection of productive lines. A tabulation is presented of the characteristics of selected lines yielding high-content protein and lysine. Current studies involve crossing of high-protein sorts and new hybrid, high-lysine lines.
[016-8586]

UDC 576.312

DNA CONTENT IN SECRETORY CELLS OF THE PHEROMONE GLAND OF TURNIP MOTH AGROTIS SEGETUM SCHIFF

Moscow IZVESTIYA AKADEMII NAUK SSSR. SERIYA BIOLOGICHESKAYA in Russian No 5, Sep-Oct 83 (manuscript received 17 May 82) pp 777-780

ZAKHIDOV, S. T., ISMANOVA, A., URYVAYEVA, I. V. and TURDIYEV, A. A., Institute of Developmental Biology imeni N. K. Kol'tsov, USSR Academy of Sciences, Moscow; Institute of Zoology and Parasitology, UzSSR Academy of Sciences, Tashkent

[Abstract] Development of effective means to combat the turnup moth and other pests requires prevention of multiplication, which often involves manipulation of sexual attractant emissions of female pheromone glands. The present study assessed genome state of secretory cells of pupas and mature moths by DNA cytometric methods. The pupas were ca. one day from emerging, while mature moths were from 1/2 to 8 days old. Results showed that the pheromone gland developed at the late pupal stage, and that it consisted almost exclusively of polyploid cells in relation to DNA content. The actual manner of the cells' development requires further study. Figures 2; references 7: 2 Russian, 5 Western.
[054-12131]

UDC 633.11"321":631.524.65:631.521

SOME PHYSIOLOGICAL FEATURES OF DROUGHT RESISTANT SORTS OF SPRING WHEAT

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 6, Jun 83 pp 20-22

KOZHUSKO, N. N., VOLKOVA, A. M., KALININ, N. I. and CHERNYSHEVA, S. V.

[Abstract] This work describes the physiological properties and peculiarities of potentially-useful soft spring wheat under conditions which differ with respect to degree and duration of action of drought. Materials studied were obtained from the Scientific Research Institute (SRI) of Agriculture of the South East--steppe zone of Povolzh'ye (sorts Saratovskaya 46, Saratovskaya 52, Saratovskaya 48 and Yershovskaya 32)--from the Kuybyshev SRI of Agriculture, the Kinel'skaya State Selection Station for the central Povolzh'ye (sorts Olimp, Bezenchukskaya 129, Komsomolka, Kutulukskaya) and sorts from the Kurgan SRI of Grain--steppe zone of western Siberia (sorts Shadrinskaya, Vera, Zaural'skaya). The study covered two years, and the plants were observed under vegetation conditions, in vessels filled with appropriate soils. Features of the sorts under varied drought-like conditions are tabulated. Data collected can help to select sorts on the basis of their drought resistance, i.e., their ability to adapt to anticipated dry spells in the various territorial zones.
[015-8586]

BIOCHEMISTRY

BRIEF

BACTERIA MANUFACTURING PROTEIN--Bacteria which live in the stems and leaves of grasses can be put to useful work--secreting food protein. This idea of Latvian microbiologists has already been confirmed in practice on the Uzvara Kolkhoz in Bauskiy Rayon. On the grounds of the farm, a building of the [kolkhoz] complex has been constructed with resources of the farm and of the republic's Academy of Sciences. In summer, vehicles convey tons of clover and lucerne to its shops; when autumn days begin, beet greens are delivered. In tandem with this green's conveyor, mass-shredders are at work, and presses squeeze the juice from the mass. It then becomes the "field of activity" of invisible microorganisms which turning out protein in the form of paste--a valuable addition to animal fodder, significantly increasing animal weight-gains. [TASS report from Riga] [Text] [Moscow PRAVDA in Russian 17 Sep 83 p 3] 12255

UDC 615.355:577.152.34].03:617-001.4-002.3-08+617-001.4-002.3-085.355:577.152.34

# USE OF IMMOBILIZED ENZYMES AND THEIR NATURAL INHIBITORS IN SURGERY

Moscow KHIRURGIYA in Russian No 6, Jun 83 pp 94-98

TOLSTYKH, P. I., GOSTISHCHEV, V. K., VASIL'KOVA, Z. F., KAZANSKAYA, N. F., LARIONOVA, N. I., KIL'DEYEVA, N. R., SAKHAROV, I. Yu., ZHURAVLEV, A. G., VLADIMIROV, V. G., STRUCHKOV, Yu. V. and BERCHENKO, G. N., Chair of General Surgery, 1st Moscow Medical Institute imeni I. M. Sechenov; Laboratory of Molecular Biology and Bioorganic Chemistry imeni A. N. Belozerskiy, 2nd Moscow Medical Institute imeni N. I. Pirogov; Moscow Textile Institute

[Abstract] The effectiveness of immobilized trypsin in promoting wound healing was tested in rabbits with surgical wounds deliberately infected with Staphylococcus albus. In control (untreated) animals the time required for resolution of the purulent discharge was 29.6 days and complete healing required 36.1 days. The corresponding figures for animals treated with application of a water-soluble polymer film impregnated with 5% trypsin were 5.2 and 17.9 days; intermediate values were obtained for measures using native (soluble) trypsin and trypsin immobilized on an insoluble polymer. These observations underscore the greater therapeutic effectiveness of trypsin immobilized on a soluble polymer in the treatment of experimental pyogenic wounds. Treatment of dogs with experimentally induced pancreatitis with a natural pancreatic proteolytic enzyme inhibitor adsorbed on CM-dextran resulted in 80% overall survival, and prolonged the survival time of dogs that succumbed, to 14 days. The corresponding figures for untreated dogs were 0% and 0.5 days, and for those treated with native inhibitor 63% and 7 days, which demonstrate the usefulness of such preparations in surgical cases. References 15: 5 Russian, 10 Western.
[038-12172]

UDC 577.352.5

MECHANISMS OF CALCIUM TRANSPORT IN BRAIN SYNAPTOSOMES DURING DEPOLARIZATION

Moscow BIOKHIMIYA in Russian Vol 48, No 8, Aug 83 (manuscript received 12 Jul 82) pp 1249-1255

KRAVTSOV, G. M., POKUDIN, N. I., GULAK, P. V. and ORLOV, S. N., Fourth Main Administration, USSR Ministry of Health, Moscow

[Abstract] Brain preparations derived from male Wistar rats were employed in studies on the mechanisms of calcium transport in brain synaptosomes during depolarization. Depolarization mediated by veratrin, ouabain or 80 mM K+ was accompanied by synaptosomal increase in Ca++ due to Ca++ influx via potential-dependent channels, while the decrease in the Ca++ concentration in depolarized nerve endings was due largely to calmodulin-dependent Ca,Mg-ATPase of the synaptolemma and the mitochondria. In addition, the Ca++ transport mechanisms of the microsomes were found to be virtually identical with those of the intact synaptolemma, and, by comparing Ca++ accumulating systems of the microsomes and mitochondria, the contribution of plasma membranes and mitochondria to Ca++ transport regulation in depolarized synaptosomes could be estimated. In conjunction with the effects of rotenone (inhibitor of mitochondrial electron transfer) and oligomycin (mitochondrial ATPase inhibitor) in inhibiting Ca-45 uptake, it appears that mitochondria play a key role in regulating intrasynaptosomal Ca++ concentration during nerve impulse conduction. Figures 3; references 17: 3 Russian, 14 Western.
[026-12172]

UDC 577.322.23'576.311.347

IMMOBILIZED CYTOCHROME c AS AN EFFECTIVE LIGAND FOR AFFINE CHROMATOGRAPHY OF ELECTRON TRANSPORT PROTEINS

Moscow BIOORGANICHESKAYA KHIMIYA Vol 9, No 9, Sep 83 (manuscript received 11 Jan 83, after revision, 12 Apr 83) pp 1237-1247

SHKUMATOV, V. M., GILEVICH, S. N., CHASHCHIN, V. L. and AKHREM, A. A., Institute of Bioorganic Chemistry, BSSR Academy of Sciences, Minsk

[Abstract] Cytochrome c, involved in electron transfer in the final segment of the mitochondrial chain from cytochrome-c-reductase to cytochrome-c-oxidase, was obtained and studied to determine its usefulness in chromatographic applications. It was obtained by selective immobilization from horse blood through amino- and carboxyl-groups and residue of histidine or methionine. Free carboxyl groups in cytochrome c facilitated production of a sorbent with low concentration of bound protein. Such sorbents were tested for purifying adrenodoxin, cytochrome $b_5$ and for isolating the latter's hemo-containing triptych fragment. Lysine residue and imidazole groups characterized variant sorbents. The latter sorbent was found to have 2-3 times the affinity for

adrenoxin and hepatoredoxin. Its high affinity for ferrodoxins made it possible to purify them and produce homogeneous hepatoredoxin for the first time. Chemical procedures are summarized in the experimental section. Figures 4; references 34: 6 Russian, 28 Western.
[051-12131]

UDC 581.526.325

# EVALUATION OF RIVER WATER QUALITY BY SPECIES COMPOSITION OF PHYTOPLANKTON

Moscow IZVESTIYA AKADEMII NAUK SSSR. SERIYA BIOLOGICHESKAYA in Russian No 5, Sep-Oct 83 (manuscript received 27 Jun 80) pp 731-743

MAKSIMOV, V. N., GAN'SHINA, L. A. and ABAKUMOV, V. A., Moscow State University imeni M. V. Lomonosov; Institute of Applied Geophysics, Moscow

[Abstract] The authors review previous studies of river water quality in relation to number and species of plankton. They conducted a new study of the Moscow River divided into segments above the city of Moscow, within the city and below its direct influence, with five segments in all being identified. Some 232 species were identified and classified, including 81 green species, 85 diatoms, 16 Euglenoidina, 10 pyrrophytes, 6 gold and 24 assorted cyanobacteria. True plankton flora accounted for 62%, benthos 22% and epiphytes, 16% of the total. Further analysis indicated that the entire course of the river belonged to the beta-mesosaprobic zone, with some increase in saprobity within the city of Moscow itself. Since traditional ecological methods did not show clear differences in the five segments studied, the authors developed new rank distributions that were not based solely on weight of decaying material, in order to generate a "desirability index" for various stretches of the river. This approach made it possible to determine that the Moscow water supply should be drawn from the first segment, which was rated "good", and definitely not from the third segment, rated "bad". Other factors such as hydrochemical data and fish productivity were not taken into account. Figure 1; references 14: 12 Russian, 2 Western.
[054-12131]

UDC 581.526.323:577.170.49

FUCOID ALGAE AS BIOINDICATORS OF HEAVY METAL CONTAMINATION OF ATLANTIC AND WESTERN PACIFIC COASTAL WATERS

Vladivostok BIOLOGIYA MORYA in Russian No 1, Jan-Feb 83 (manuscript received 13 Jan 82) pp 3-11

KHRISTOFOROVA, N. K. and MASLOVA, L. M., Geochemistry Laboratory, Pacific Ocean Institute of Geography; Laboratory of Comparative Biochemistry, Institute of Marine Biology, Far Eastern Scientific Center, USSR Academy of Sciences, Vladivostok

[Abstract] Tabular data are presented on the heavy metal concentration in fucoid algae used as biological indicators of heavy metal (Fe, Mn, Cu, Zn, Pb, Cd) pollution of coastal waters in the Atlantic and Western Pacific areas. Studies showed that Zn appeared to be the most serious pollutant in the Maritime Province, with the seriousness of pollution increasing in going from the South to the North. In certain areas, zinc concentration in the fucoids approached 915.0 ug/g dry weight. These findings were compared with reports on the heavy metal content of fucoids and other algae in other regions of the Atlantic and Western Pacific to obtain an overall picture of such coastal pollution in the Northern Hemisphere. Evaluation of the various findings indicates that zinc is a convenient target metal since it largely reflects regional or local pollution (rather than global pollution, as do mercury, lead, or cadmium) and can be directly related to waste water discharge. References 31: 15 Russian, 16 Western.
[039-12172]

EKOLOGIYA OBRASTANIYA I BENTOSA V BASSEYNE ATLANTICHESKOGO OKEANA [Ecology of Overgrowth and Benthos in the Atlantic Ocean Basin], Moscow 10, USSR Academy of Sciences, 1980, 152 pp

Vladivostok BIOLOGIYA MORYA in Russian No 1, Jan-Feb 83 pp 71-72

SUSHCHENYA, L. M., Reviewer; Starostin, I.V. and Reznichenko, O.G., Editors

[Abstract] This book, edited by Starostin and Reznichenko, largely contains articles written by the staff of the Laboratory of Ecology of Marine Overgrowth of the Institute of Oceanology imeni P. P. Shirshov, USSR Academy of Sciences. Since overgrowth and benthos possess unique ecologic features, an attempt was made at parallel treatment of both problems by dividing the book into three sections on overgrowth ecology, benthic ecology, and comparative ecologic analysis of benthos and overgrowth. Much of the material is new and valuable, but certain technical shortcomings--such as incomplete tables and inadequate description of techniques--detract from the book as a whole. Although of considerable value as a first attempt to fill a void in marine ecology that has practical applications, it is also evident that more work will have to be done on seasonal dynamics of overgrowth and on the functional changes induced in the overgrowth organisms by environmental factors.
[03901172]

EPIDEMIOLOGY

UDC 579.843.95:579.252.55]:615.332

## BIOLOGICAL CHARACTERISTICS OF TULAREMIA PATHOGEN STRAINS RESISTANT TO SPECTINOMYCIN

Moscow ANTIBIOTIKI in Russian No 6, Jun 83 (manuscript received 16 Dec 82) pp 434-436

KORMILITSYNA, M. I. and MARAKUSHA, B. I., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Spectinomycin, an antibiotic containing 1/3 actinomin, with broad antimicrobial action, was tested for its effectiveness against tularemia microbe sub-species. Resistant mutants were produced and their biological properties also studied. The tested sub-species were strain 503/847 obtained in Moscow Oblast from Dermacentor pictus Herm., and A-Cole and Schu obtained from man in the United States. They were all virulent for white mice and guinea pigs, and the latter two for domestic rabbits as well. Sensitivity to the antibiotic was determined by a two-time series culturing method on an agar medium, spontaneous mutants were developed in an isotonic solution of sodium chloride. The mutants were found to be highly resistant to spectinomycin, while retaining their virulence for all test animals. References 11: 5 Russian, 6 Western. [050-12131]

UDC 567.8

## VEGETATION AND SPORE FORMATION OF ANTHRAX PATHOGEN (VACCINE STRAIN STI) WITH VARIOUS pH VALUES OF THE CULTIVATION MEDIUM

Moscow IZVESTIYA AKADEMII NAUK SSSR. SERIYA BIOLOGICHESKAYA in Russian No 5, Sep-Oct 83 (manuscript received 26 Nov 82) pp 686-692

SINYAK, K. M. and VERNER, O. M., Kiev Institute for the Advanced Training of Physicians

[Abstract] Previous studies had indicated that the anthrax pathogen appeared only in sick or deceased anthrax patients, while spores were found in the soil and other external locations, where they are subject to numerous chemical, biological and physical forces. The present study of anthrax epidemic sites

brings the pH factor into the picture, showing that only relatively neutral soils can be sites for the pathogen. This led to study of anthrax pathogen in Petri jars containing meat-peptone agar. After 20 hours the developing colonies were transplanted and the presence of spores verified microscopically with stained samples and growth of bacteria at 85 C for 10 minutes, followed by replanting. Results showed that there was a link between acidity or alkalinity of soils and anthrax spore formation, but precise values could not be determined within the period of one day's cultivation, as attempted in the study. Increased concentrations of $OH^-$ ions in the bacteria studied did apparently lead to spore formation. Stable pH of 8.0-9.0 brought spore formation, values from 6.0-7.2 were fess favorable, and at pH of 5.5 or, at the other end of the scale, 9.5, no spores were found. Figures 5; references 7: 4 Russian, 3 Western.
[054-12131]

UDC 579.843.1.253

## REVERSION TO VIRULENCE IN CHOLERA VIBRIOS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 1, Jan-Feb 83 (manuscript received 24 Dec 81) pp 50-53

PODOSINNIKOVA, L. S., LIBINZON, A. Ye., SHMERKEVICH, D. L., MARAMOVICH, A. S., ADAMOV, A. K., MEDINSKIY, G. M., GONCHAROVA, N. S., VEYDE, A. A. and BICHUL', K. G., Rostov-on-Don State Scientific Research Antiplague Institute; Saratov "Mikrob" Antiplague Institute; Siberian and Far Eastern Antiplague Institute

[Abstract] Studies were conducted on reversion to virulence in 57 strains of El Tor vibrios described as avirulent or weakly virulent following up to ten passages in 10-12 day old rabbits. Two strains acquired full cholerogenic characteristics after 6-7 passages, and four avirulent strains reverted to weak virulence. These observations demonstrated that passage of avirulent and weakly virulent El Tor vibrios via the GI tract of an appropriate host can lead to recovery of virulent properties that were lost in the natural course of events or under the influence of experimental manipulation. References 14: 7 Russian, 8 Western.
[102-12172]

## EPIDEMIOLOGY OF TULAREMIA IN KARAGANDA OBLAST

Alma Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 9, Sep 83 pp 37-38

RUBTSOV, N. S., KIM, A. A., AVERKIYEVA, R. S. and VDOVICHENKO, N. I., Karaganda Oblast Sanitary Epidemiologic Station

[Abstract] Massive vaccination campaign in 1958 in the Karaganda Oblast has virtually eliminated human cases of tularemia and has created a high index of herd immunity (80-92% or greater), that is monitored on an annual basis.

Nevertheless, natural foci of infection remain and are largely limited to reservoirs and wetlands, as well as alpine streams and brooks. The water mouse [vodyanyaya polevka] serves as the primary reservoir of tularemia infections which are usually transmitted by the Dermacentor ticks. In recent years an increase has been noted in infected rodents along the Irtysh-Karaganda canal track, and the appropriate control and monitoring measures have been instituted. [025-12172]

UDC 616.981.42-06:616-097

## CIRCULATING IMMUNE COMPLEXES FOLLOWING BRUCELLOSIS

Kishinev ZDRAVOOKHRANENIYE in Russian No 3, May-Jun 83 (manuscript received 13 Dec 82) pp 25-26

MAZUR, M. V., MOSHNYAGA, M. G., NASONOV, Ye. L. and TIMOFEYEVA, Ye. B., Chair of Therapy, Faculty for Advanced Training of Physicians, Kishinev Medical Institute

[Abstract] Studies were conducted on the determination of immune complexes in the sera of 34 male and female patients with a mean age of 46.2 years that had sustained a brucellosis. The determinations were conducted by precipitation with polyethylene glycol (PEG) and determination of the OD at 280 nm, and by PEG $C_{iq}$ immunodiffusion. PEG precipitation yielded 35.3% positive patients and 23.5% were positive by $PEG_{iq}$ immunodiffusion. An additional two patients were found to be positive by an indirect method involving antisera against igM, yielding a tota of 52.9% patients positive by at least one of the methods (4 patients were positive by both the PEG precipitation method and $PEG_{iq}$ immunodiffusion). A relationship was discovered between the presence of the immune complexes and the development of the joint syndrome, suggesting that the immune complexes may predispose or lead to the joint pathology as well as to the hepatosplenic syndrome. References 5: 1 Russian, 4 Western. [074-12172]

BRIEF

MILK DELIVERY NOT SATISFACTORY--P. V. Sosnovskiy, a resident of Leninskiy Village in Alamedinskiy Rayon, raised in a letter the issue of late milk delivery to a children's milk kitchen, and pointed to instances where milk which was not fresh was supplied. At the request of the editorial office, republic Ministry of Health workers investigated the distress signal. Indeed, it was discovered that due to a deficiency of refrigeration equipment, the Frunze City Milk Combine had frequently delivered its clients milk of increased acidity, and also had not kept to the established delivery time. Currently, an understanding has been reached with the leadership of the city milk combine concerning changing the time of milk delivery to the Leninskiy Milk Kitchen. In order to increase quality control of the milk received, workers in the kitchen are learning ways to determine acidity. If it exceeds the established COST norm, the milk will be returned to the supplier according to law. [Text] [Frunze SOVETSKAYA KIRGIZIYA in Russian 4 Sep 83 p 2] 12255

RESULTS OF STATE TESTING OF STRAINS IN 1982 AND TASKS OF STRAIN TESTERS IN FULFILLMENT OF FOOD PROGRAM

Moscow SELEKTSIYA I SEMONOVODSTVO in Russian No 6, Jun 83 pp 9-13

FEDIN, M. A.

[Abstract] (The source journal has an introductory passage which reveals that this article is a recapitulation of Fedin's speech at the March extended plenary session of the State Commission on Testing of Strains of Agricultural Plants, USSR Ministry of Agriculture. Fedin is Chairman of that Commission and is a doctor of agricultural sciences). This is an exhortative speech and stresses the task faced by agricultural workers in the execution of the Soviet Food Program. There are six state strain-testing stations and 40 state strain-testing districts, and scientific research establishments and test stations--640 units on kolkhozes and 757 on sovkhozes. Smooth organization of the network has not yet been achieved and close-downs and mergings have been made. In all (for 1982) 190308 strain trials have been made--this is 102.4% of the Plan--and, of these, 3943 have been tests on production. Several test stations have been cited for shortcomings, e.g., for not making seeds available for testing, for not making capital construction, for failure to use known technology. Improvements are noted for rye and wheats sorts, for better harvests in the northern Caucasus, central chernozem areas, western Siberia and northern Kazkhstan; a winter barley sort, Parallelyum 102, is called the best winter-resistant in the world. Efforts are being extended to adapt new strains to local conditions; successes are mentioned for sugar beets, peas, potatoes and sorts useful for industrial technology which are disease-resistant. Quality of production is monitored by 35 laboratories. Mutual cooperation by farms and businesses is explicitly encouraged. Strain testers are expected to fulfill the tasks set by the 1982 May and November Plenums of the CC CPSU. [015-8586]

UDC 575.1:576.851.48

# FACTORS LIMITING EXPRESSION OF ESCHERICHIA COLI GENES IN BACILLARY CELLS

Moscow GENETIKA in Russian Vol 19, No 5, May 83 (manuscript received 29 Sep 82) pp 693-707

LIDEMAN, L. F., All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow

[Abstract] Data on the features of transcription and translation apparatus organization involved in the barrier to expression of E. coli genes introduced into bacilli are reviewed. The transcription barrier is caused by differences in RNA polymerase form, heterogeneity, regulatory system, promoter multiplicity and enzyme selectivity, involving both sigma subunits and core enzyme. Polypeptide factors which increase the specificity of enzyme-promoter interaction in bacilli are also important. Construction of hybrid operons containing control sequences and genes ensuring effective initiation is necessary to overcome the transcription barrier. There is also a translation barrier, since bacillary ribosomes can not translate the mRNA of E. coli, coliphages and other Gram positive bacteria. This is due to differences in 16S rRNA and small protein particle S12, which participate in initiation, as well as the absence of protein S1 in the ribosomes of bacilli. Ribosomal initiation factors are less important in bacilli than in E. coli, but bacilli require a more extended Shine-Dalgarno sequence. Nonstandard initiation codons may be more frequent in bacilli. The differences in control DNA regions and enzyme structure make the use of bacilli as recipient cells for Gram positive genes improbably. The hybrid codon approach is more promising. References 85: 9 Russian, 76 Western. [685-12126]

UDC 575.1:576.851.48

MOLECULAR CLONING OF GENETIC DETERMINANTS RESPONSIBLE FOR ESCHERICHIA COLI ENTEROTOXIN PRODUCTION

Moscow GENETIKA in Russian Vol 19, No 5, May 83 (manuscript received 6 Jul 81, in revised form 30 Jun 82) pp 708-713

MARKOV, K. I. and B''IRDAROV, S. S., Institute of Molecular Biology, Bulgarian Academy of Sciences, Sofia

[Abstract] The molecular cloning method was used to obtain DNA fragments containing the genetic determinants responsible for the synthesis of heat-stable and heat-labile E. coli enterotoxin. Strains 711/P25, P16 and HB101 were used. The P16 plasmid was transferred to E. coli 711 by conjugation and plasmid DNA obtained from the transformants. The heat-stable toxin genetic determinant was found on the 3.2 MD fragment obtained from the plasmid with EcoR1 restrictase. Four larger fragments were also obtained. The rocombinant plasmid, designated pBM8, had a total molecular mass of 5.8 MD. Plasmid p25 was cleaved with restrictase BamH1, to give four fragments. The 12 MD fragment contained the genetic determinant for the heat labile enterotoxin. The vector was plasmid pBR322, while strain HB101 was the recipient. The hybrid plasmid, designated pBM300, had a molecular mass of 14.7 MD. Cell-culture testing demonstrated that strain p25 loses heat-labile toxin activity at a 1:80 dilution, while strain HB101/pBM 300 does so at a dilution of 1:200. Figures 4; references 26 (Western).
[685-12126]

UDC 575.24:576.851.48

CLONING OF GENE CONTROLLING CATABOLITE REPRESSION WITH PARTICIPATION OF CYCLIC ADENOSINE MONOPHOSPHATE IN ESCHERICHIA COLI K-12

Moscow GENETIKA in Russian Vol 19, No 5, May 83 (manuscript received 14 May 82, in revised form 2 Nov 82) pp 714-719

LISENKOV, A. F., SMIRNOV, Yu. V. and SUKHODOLETS, V. V., All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow

[Abstract] The crp gene, which codes for the catabolite sensitive c-AMP receptor protein, has been cloned using the pBR325 vector and descendants of the C600crp strain as recipient. The chromosomal DNA from strain CM107 was treated with restriction endonuclease PstI and the product mixed with the plasmid vector which was also treated with the restrictase. Out of 20,000 transformants obtained, seven, which formed large colonies on the tetracyclin-and-chloramphenicol-containing medium, were selected. Only one was able to use mannitol and clycerin while remaining sensitive to ampicillin. This clone had $Crp^+$ characteristics. The plasmid isolated from it, designated pCAP2, has no EcoR1 sites and

two BamHI sites, and a molecular mass of 7.0 MD. Introduction of this plasmid into strain AM245 and AM247 did not supress the $Cya^-$ phenotype, indicating the requirement for c-AMP in the $Crp^+$ phenotype. Addition of c-AMP to these cultures permitted growth. Using the weak effector fructose as a carbon source, introduction of plasmid pCAP2 into strain AM228IcyRcrp) increased the level of uridine phosphorylase activity by a factor of seven to nine. The data indicate that the pCAP2 plasmid contains a functionally active crp gene. Figures 2; references 18: 2 Russian, 16 Western.
[685-12126]

UDC 575.591

MEDICAL GENETIC STUDY OF POPULATION OF TURKMENIA. REPORT 2. POPULATION STRUCTURE OF IZGANT VILLAGE, GEOK-TEPINSK RAYON, ASHKHABAD OBLAST'

Moscow GENETIKA in Russian Vol 19, No 5, May 83 (manuscript received 3 May 82) pp 840-846

REVAZOV, A. A., KOSHECHKIN, V. A., GINTER, Ye. K. and TURAYEVA, Sh. M., Institute of Medical Genetics. USSR Academy of Medical Sciences, Moscow 115478

[Abstract] As part of a medical genetic population and hematological survey of the Turkmenian SSR, data were collected of Ashkhabad Oblast. This village contained 1595 people in approximately 275 nuclear families. The Subjects studied were 56% of the residents over age 11. About 88% of the people of Izgant are of the Turkmen-Tekints tribe. Half of the population belong to the Yusup subgroup, which is on the lowest hierarchial level. Demographic analysis showed that 42% of the population was 18-48 years old, considered the reproductive period of life, and 10% above 48. The large number of children is characteristic of a rapidly growing population. Average number of children per couple was 5.48. The average generational time was 33.5 years for women and 38.5 years for men. The effect of generation overlap is more marked than in the North European USSR or in Uzbekistan. Only 18% of the residents have mothers who were born in Izgant, which indicates an unusually high rate of bride migration. The inbreeding coefficient was 0.002267. A high degree of nuptial exchange between tribal subgroups was found. The low level of inbreeding results in a low rate of autosomal recessive pathology. Analysis of genetic markers indicates that the population of Izgant is typical of the Turkmen people in general. References 17: 15 Russian, 2 Western.
[685-12126]

UDC 633.11:631.523

CHROMOSOMAL ENGINEERING IN PLANT BREEDING

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 8, Aug 83 pp 8-11

TURKOV, V. D., candidate of agricultural sciences, SHELEPINA, G. A., candidate of biological sciences, LUSHNIKOVA, A. A., LIYANARACHCHI, S. Kh. and MAKAROVA, T. P.

[Abstract] A cursory review is presented of the importance of karyologic analysis in plant breeding in the selection of improved varieties of crop plants. Attention is given to the correlative analysis between various chromosomal abnormalities and resultant phenotypic characteristics, and the significance of amphiploidy and introgression in the establishment of desirable plant varieties. Chromosomal manipulation and analysis is most easily attained by using cells with a high mitotic index such as the root meristem. In recent years use of aneuploid lines has become very popular in identifying individual chromosomes responsible for certain phenotypic characteristics.
Figures 4.
[017-12172]

UDC 577.17:547.963.3

MULTIINDUCTIVE (POLYHORMONAL) CONTROL OF GENE EXPRESSION IN EUKARYOTES

Moscow USPEKHI SOVREMENNOY BIOLOGII in Russian Vol 95, No 2, Mar-Apr 83 pp 194-208

POKROVSKIY, B. V., Scientific Research Institute of Human Morphology, USSR Academy of Medical Sciences, Moscow

[Abstract] A review is presented of the last 5-7 years of research on multi-inductive or polyhormonal control of gene expression in eukaryotes, based on the existence in a given cell of individual receptor proteins for several remote regulators and the multi-component nature of induction of a given gene product. Examples are provided of multihormonal control of discrete genes which are responsible for the synthesis of casein, somatotropin, prolactin, $alpha_{2u}$-globulin, uteroglobin, ovalbumin, conalbumin, and ovomucoid. Current studies are being conducted on the definition of cellular specificity of the receptors, and on the mechanism of interaction of hormone-receptor complex with chromatin.
References 86: 7 Russian, 79 Western.
[043-12172]

UDC 577.214.625:577.217.52:577.113.6

# PLASMID VECTORS WITH SEMI-SYNTHETIC GENE FOR BETA-GALACTOSIDASE OF E. COLI

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 9, No 9, Sep 83
(manuscript received 5 May 83) pp 1285-1289

KOROBKO, V. G., DOBRYNIN, V. N., NGUEN QUANG VINH, PODLADCHIKOV, O. N., SEVERTSOV, I. V., BYSTROV, N. S., BOLDYREVA, Ye. F., CHUVPILO, S. A. and KOLOSOV, M. N., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] In the course of their study of bacterial promoters and ribosome bonds, the authors achieved partial synthesis of the E. coli gene lacZ. The gene lacked a promoter and/or the translation initiation segment. This result was confirmed by gene bla. The vectors were designed by synthesizing 14 desoxyoligonucleotides with 9-14 links, which were linked using T4-DNA-ligase. Details of synthesis and isolation of lacZ and the EcoRI fragment are given. Comparison of the natural lacZ gene with the synthesized variant showed four mutations. The plasmids of the pLZ series which carried the partially synthesized beta-galactosidase gene made it possible to isolate the gene in vivo for evaluation of its bacterial promoters. Figures 3; references 11: 6 Russian, 5 Western.
[051-12131]

UDC 612.824

## ARTERIAL BLOOD PRESSURE AND AUTONOMIC CONTROL OF THE HEART IN MODELS OF INTENSE OPERATIONAL ACTIVITY

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 9, No 5, Sep-Oct 83
(manuscript received 20 Sep 82) pp 723-728

BAYEVSKIY, R. M., BARSUKOVA, Zh. V., IOSELIANI, K. K. and SEMENOVA, T. D., Moscow

[Abstract] Ten male subjects, 25-35 years old, were subjected to physiological evaluation while engaged in intense operational activity, in order to select criteria useful in predicting physiological condition and mental fitness. The physiological parameters under study were arterial blood pressure and autonomic regulation of cardiac function over a 1.5 h period while performing counting tasks according to the K.K. Ioseliani method [Kosmich. Biol. i Meditsina, No 1, p. 76, 1971]. Evaulation of autonomic control of the heart in terms of R-R intervals using a cybernetic (mathematical) approach demonstrated that inter-group differences between highly efficient and relatively inefficient operators were statistically insignificant. However, individual differences in relation to efficiency were quite distinct when based on analysis of the heart rate and reflective of the interplay of sympathetic and parasympathetic control mechanisms. Figures 2; references 15: 14 Russian, 1 Western.
[058-12172]

UDC 612.8:621

## DISTRIBUTION PARAMETERS OF ECG R-R INTERVALS AS PREDICTORS OF WORK FITNESS OF HUMAN OPERATORS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 9, No 5, Sep-Oct 83
(manuscript received 26 May 82) pp 748-752

TROSHKIN, A. V., Institute of Cybernetics, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] Distribution parameters of R-R intervals on ECG tracings were investigated in the case of 32 male subjects, 19-24 years old, as possible predictors for work fitness as operators, based on correlation with error-free

tracking tasks in relation to emotional status. In terms of responsiveness to stress factors the subjects were divided into two (ca. 50/50) groups: in one group a linear relationship prevailed between the probability of correct performance and the statistical parameters of R-R intervals, while significant correlation coefficients did not apply to the other group and a non-linear relationship was assumed. A satisfactory regression equation was derived for both groups, and should serve to predict proper task performance, i.e., work fitness, on the basis of R-R interval distribution parameters. Figures 1; references 7 (Russian).
[058-12172]

# MEDICAL APPLICATIONS OF LASERS

Moscow SOVIET EXPORT in English 4(145), 1983 pp 54-56

[Article by V. A. Milyushenko, candidate of technical sciences: "Laser Beam Heals"]

[Text] Soviet scientists have developed a new trend in medicine--laser surgery. Medical applications of lasers rely on the effect of biological tissue vaporization under high-intensity radiation. Depending on the nature of intervention and the characteristic features of the organs being operated, recourse is made to either continuous-wave lasers or pulsed lasers having a pulse duration as short as a few nanoseconds. Several laser units for medical applications have been developed and are being produced in quantity.

## Skalpel-1--Versatile Surgical Unit

The continuous-wave laser surgical unit, Skalpel-1, is used to advantage in many fields of surgery. As compared to its foreign counterparts, Skalpel-1 is noted for its smaller size and greater mobility in operating rooms, is actuated at once on being plugged into the mains, has a lower power consumption, and is simpler to handle and service. The mirror wavebeam guide possesses six degrees of freedom of movement and is furnished with a detachable endpiece and focusable germanium optics. Provision is made for a system of sucking away the degradation products. It is feasible to perform operations with a conventional operating knife while using simultaneously the laser beam to coagulate the incision. To simplify the technique of surgical intervention, MEDEXPORT delivers the Skalpel-1 laser unit complete with a set of instruments for carrying out diverse operations.

"The laser beam paved the way for bloodless surgery," emphasized an exponent of laser applications in medicine Prof. O. K. Skobelkin, Head of Surgical Clinic at the 51st Moscow City Hospital. "While incising soft tissues, the light beam scalpel simultaneously sterilizes and welds the tissue surface and seals the dissected small blood vessels, so that the operative field becomes dry, with a resultant reduction in blood losses and operation duration.

"Where blood vessels exceeding 2 mm in diameter in the pathway of the laser beam are transected, their sealing is attained by exerting, during a specified period of time, slight pressure (clamping) on relevant organs or tissues in order to minimize the blood flow and make possible the application of a single-row suture in the surgery of gastrointestinal tract hollow organs.

"This technique," Prof. O. K. Skobelkin pointed out, "provides superior short-term and remote results compared with traditional surgical methods. Complete hemostasis is particularly essential in the case of surgical intervention on organs with abundant blood flow, such as brain, lungs, gastrointestinal tract organs, uterus, and parenchymatous organs, as well as when the patients undergoing operations suffer from blood coagulability disorders."

The employment of laser technique in endoscopy holds great promise. For example, a laser beam directed via an endoscope is capable of bleeding arrest inside a hollow organ without opening the organ or of pus vaporization from the maxillary or frontal sinus. The lasers are likewise effective for performing purulent operations. Here the duration of treating the suppurating wounds, abscesses and carbunculi is cut by half thanks to the sterilization of suppurating foci.

Basic Specifications of Skalpel-1 Unit

| | |
|---|---|
| Radiation wavelength, μm | 10.6 |
| Laser operating mode | continuous |
| Power output, W | 20 |
| Luminous spot diameter, mm | 1-20 |
| Operative field size, mm | 200X500X500 |
| Power supply | 220 V, 50 Hz |
| Power consumption, kW | max. 1.4 |
| Overall dimensions, mm | 600X900X1,800 |
| Weight, kg | 225 |

According to E. I. Brekhov, Dr. Sc. (Med.), Head of Laser Surgery Laboratory at the 51st Moscow City Hospital, "in the past four years the Skalpel-1 unit was used to perform more than 1,000 operations, predominantly on the gastrointestinal tract (over 430 operations). In about 300 cases, the resection of soft tissue tumors was carried out, while the number of purulent operations exceeded 230. Operations on bile ducts, parenchymatous organs and esophagus and trophic ulcer excisions were likewise performed. The success of various operations substantiate our firm belief in the potentialities inherent in laser surgery."

V. I. Korepanov, Dr. Sc. (Med.), lent support to these conclusions by citing several cases of laser surgery:

A 55-year-old male patient. Carcinoma of the stomach with metastases into the pancreas. Stomach resection to the extent of 80 percent and subtotal resection of the pancreas. Recovery. Followup period, 5 years.

A 49-year-old female patient. Hemangioma of the liver. Right-hand anatomical hemihepatectomy. Recovery.

A 61-year-old male patient. Sigmoid colon cancer. Resection of the sigmoid colon. Recovery. Followup period, 6 years.

A 27-year-old male patient. Third degree burns of 18 percent of the body surface area. Debridement by the laser beam. Skin autografting. Recovery.

Yatagan--A Reliable Ophthalmologist's Aid

The Yatagan unit employs a Q-switched ("cool") laser. In the zone of laser beam direct action, tissue vaporization occurs so rapidly that the resultant effect is similar to microexplosion. During so short a period of time the heat evolved fails to propagate into the surrounding tissues whereby the danger of tissue burns is avoided.

Basic Specifications of Yatagan Unit

| | |
|---|---|
| Radiation wavelength, μm | 0.69 |
| Laser operating mode | Q-switched pulse |
| Range of pulse energy control, J | 0.08-0.15 |
| Minimal diameter of luminous spot, mm | max. 0.5 |
| Power supply | 3X380 V, 50 Hz |
| Power consumption, kW | max. 1.0 |
| Overall dimensions, mm | 1,300X1,250X1,450 |
| Weight, kg | 400 |

A ruby laser with a wavelength of 0.69 μm is the core of the Yatagan unit which incorporates an ophthalmological slit lamp and a stage capable of travelling in four directions. Provision is also made for surgeon's eyewear to afford reliable eye protection from the effect of laser pulses at the moment of emission. The energy of emission is monitored by a measuring unit and a pointer indicator in the control desk.

The Yatagan unit has been patented in Canada, France, the FRG, Great Britain, the GDR, Switzerland and the USA.

At the USSR Research Institute of Eye Diseases, a wealth of experience has been accumulated in the employment of the Yatagan unit for carrying out various operations on the eye, notably in the treatment of glaucoma. Senior researcher V. S. Akopyan, Cand. Sc. (Med.), gives due credit to the potentialities of the Yatagan unit in the surgery of the eye anterior segment, viz., for treating primary glaucoma in the initial stage, some varieties of "soft" cataracts in children and young people, different types of secondary cataracts, and iris cysts.

The results of glaucoma treatment are particularly representative. The employment of "cool" pulses involves minimal coagulation and inflammatory processes, thereby providing for prolonged functioning of the punctures made in the eyeball. Steady normalization of intraocular pressure persists for a period ranging from several months to two years or longer.

Outpatient laser treatment is, of course, a method that attracts patients and physicians alike, inasmuch as it requires neither eyeball opening, nor anesthesia, and eliminates the possibility of complications.

"In the past ten years," V. S. Akopyan notes, "the contingent of patients treated at our institute had, for the most part, direct or even absolute indications for surgical intervention, and lasing was their last chance of avoiding the surgery knife. In 60 percent of the cases we succeeded in doing so. The tendency of employing the Yatagan unit preferably at an early stage of glaucoma has resulted in that at present, for example, laser iridectomy yields beneficial results in nearly 100 percent of the cases. In the next few years, laser treatment will be in a position to compete with pharmacotherapy.

CSO: 1852/03

BRIEF

LASER ENDOSCOPE IN CLINICAL USE--When Prof Yu. M. Pantsyrev, doctor of medical sciences, department head at the 2d Moscow Order of Lenin State Medical Institute, suggested to the young scientist, Mikhail Polivoda, that he investigate the possibility of using laser beams for effective arrest of bleeding and treatment of gastric diseases without surgical intervention, he immediately thought about his friends. And they did not make him wait. The theoretical physicians from FIAN [Physics Institute imeni P. N. Lebedev] had long dreamed of doing something practical for medicine. And the staff of the laboratory of O. K. Skobelkin (professor, doctor of medical sciences, recipient of USSR State Prize), who was directly concerned with the project of "Medicine and Laser Technology," supported the idea with joy. What is an endoscope? A thin flexible tube with a light guide on one end and an ocular on the other. One can look inside of man with an endoscope and see what is going on in, for example, his stomach, esophagus or intestine. Let me cite only one figure: up to 60,000 operations are performed in our country each year for peptic ulcer. 60,000! Well, the laser endoscope developed by young scientists makes it possible not only to examine the site of the ulcer most carefully, but to stop bleeding and coagulate tissue. The endoscope does not rule out surgical intervention, but by stopping the bleeding it enables the patient to get stronger, collect strength and prepare for the operation, and endure it with fewer complications. Thus, the bleeding is stopped, But this is not all. The same endoscope applies a special biological adhesive, which is instantly polymerized under the laser beam, to the surface of the ulcer. The formed film protects the wound. Another innovation: the endoscope operates without touching damaged tissues. All this makes it possible to perform more conservative surgery on the stomach. Thus, the problem has been solved. A total of 200 patients have already experienced the beneficial effect of the laser endoscope. Now, it is up to clinicians and engineers. The most urgent task is to introduce this new technique on a broad scale. [By L. Zagal'skiy] [Text] [Moscow KOMSOMOL'SKAYA PRAVDA in Russian 3 Nov 83 p 2] 10,657

CSO: 1840/101

UDC 616.37-089.87-06-085.849.19

PATHOMORPHOLOGIC ASPECTS OF HEALING OF LASER-INDUCED SURGICAL WOUNDS IN PANCREAS

Moscow ARKHIV PATOLOGII in Russian No 9, Sep 83 (manuscript received 14 Jan 83) pp 30-35

PARKHOMENKO, Yu. G., Central Pathoanatomic Laboratory, Institute of Human Morphology, USSR Academy of Medical Sciences, Moscow

[Abstract] Studies on Wistar rats showed that $CO_2$ laser-induced surgical wounds in the pancreas underwent uncomplicated healing underneath the scab, terminating in scar formation. Laser-induced, parenchymal hyperthermia leads to hemostatis and inhibits autolysis. The healing process was accompanied by compensatory activation of the exo- and endocrine cells manifested as marked cellular proliferation and hypertrophy. Figures 2; references 9: 8 Russian, 1 Western.
[020-12172]

UDC 618.31-085.849.19

LASER TREATMENT OF ORAL MUCOSA DISEASES

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 9, Sep 83 (manuscript received 5 Nov 82) pp 36-38

SOSNIN, G. P., MOSTOVNIKOV, V. A., ORDA, V. N., ASTAPENKO, Ya. P., KHOKHLOV, I. V. and LOBAZOV, A. F., Chair of Therapeutic Stomatology, Minsk Medical Institute; Laser Systems and Instruments Laboratory, Institute of Physics, Belorussian SSR Academy of Sciences

[Abstract] Studies were conducted on the use of laser-combination radiation in conjunction with chemotherapy in the treatment of diseases of the oral mucosa, based on the observation that the effects of helium-neon (633 nm emission) and helium-cadmium (442 nm emission) lasers were cumulative in increasing the mitotic index of human embryonal tissue culture cells. A group of 126 patients with desquamative glossitis, exudative erythema, Stevens Johnson syndrome, chronic aphthous stomatitis, exfoliative cheilitis

and certain other disorders of the oral mucosa were divided into five groups on the basis of treatment. The results showed that excellent therapeutic results were obtained in the group treated with a combination of both lasers and chemotherapy in 82.8% of the cases (vs. 48.4-63.2% with the other therapeutic regimens), satisfactory results were obtained in 13.8% of the cases (vs. 26.3-34.5%), and unsatisfactory results in 3.4% of the patients (vs. 13-8-19.5%). These observations indicate that induction of mitotic activity by low intensity lasers was a key factor in potentiating the effects of conventional chemotherapy in the management of some co-mon diseases of the oral mucosa. References 6 (Russian).
[029-12172]

FIRST THERAPEUTIC USE OF A LASER SCALPEL IN PARAPROCTITIS

Ashkhabad ZDRAVOOKHRANENIYE TURKMENISTANA in Russian No 7, Jul 82 pp 7-9

BABAYEV, O. G. and KADAMOV, K. K., Chair of Elective Surgery, Turkmen Order of People's Friendship State Medical Institute, Ashkhabad Oblast Hospital imeni N. A. Semashko

[Abstract] A group of 23 male and female patients with acute or chronic paraproctitis were treated with defocused low-power helium-neon laser (Skal'pel'-1) at sites pretreated with methylene blue for greater absorption of the blue light. All of the patients tolerated the procedure well and there were no complications. Postoperative pain disappeared on the second day and the patients became ambulatory; body temperature normalized on the third postoperative day. The total period of hospitalization for patients with acute paraproctitis was 13 days, and for those with the chronic lesions 15 days. This represents the first published report of laser treatment of paraproctitis and the observations indicate that this approach constitutes a viable alternative to standard surgical management. Figures 2; references 5 (Russian).
[034-12172]

UDC 618.19-006.6-036.87-08

TREATMENT OF RECURRENT BREAST CANCER BY LASER PULSES

Leningrad VOPROSY ONKOLOGII in Russian Vol 29, No 8, Aug 83 (manuscript received 16 Feb 83) pp 25-28

MOSKALIK, K. G., DYMARSKIY, L. Yu., KOZLOV, A. P. and RZHANKOV, S. V., Order of the Red Banner of Labor Scientific Research Institute of Oncology imeni Prof. N. N. Petrov, USSR Ministry of Health, Leningrad

[Abstract] Effectiveness of laser therapy (1060 nm, 1 msec pulse, 300-450 $J/cm^2$) in the treatment of cutaneous and subcutaneous recurrences of breast malignancies was investigated in the case of 31 patients with 87 recurrences

(30 had previously undergone radical mastectomy, 1 was limited to chemotherapy because of extensive spread). Followup on the patients subjected to laser therapy for a period of 6 months to three years showed no evidence of relapse at the treated site, indicating that, in combination with appropriate chemo- and/or hormonal therapy, laser therapy is an effective adjunct modality. During the period of observation 5 patients succumbed from widespread cancer, 4 with distant metastases are stabilized, 19 are free of any sign of malignancy, and the fate of 3 patients is unknown. References 11: 6 Russian, 5 Western.
[023-12172]

UDC 615.849.19.03

SEMICONDUCTOR LASERS IN EXPERIMENTAL AND CLINICAL MEDICINE

Moscow VOPROSY KURORTOLOGII FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY in Russian No 4, Jul-Aug 83 (manuscript received 28 Jan 83) pp 66-67

POLONSKIY, A. K. and CHERKASOV, A. V., Moscow Medical Stomatological Institute imeni N. A. Semashko

[Abstract] A brief review is presented of the advantages of semiconductor lasers over standard gas lasers as they pertain to experimental and clinical medicine. The features of gallium arsenide-based semiconductor lasers developed in the USSR that are of particular importance are their small size, 60° divergence which obviates the need for defocusing, 30-100% efficiency (vs. 1-30% for common gas lasers), and ca. 1000 h working time. Further technical improvements are to be expected which will lead to very extensive clinical use in the near future. References 2 (Russian).
[024-12172]

## DOLPHIN DOMESTICATION

Moscow IZVESTIYA in Russian 21 Oct 83 p 4

[Article by R. Armeev, special correspondent: "Man and His Work"]

[Text] Batumi, is known to be a large city--the capital of Adzhariya, a port, a resort, various plants and enterprises. Here is the situation: all Batumi knows this man. Gogi Iosava is a trainer of the only dolphinarium in Batumi. Of course, there are other trainers who are also well known, skillful and experienced, but Gogi, that is Georgiy, and full name--Georgiy Otarovich--is the first Batumi trainer.

He started this work with his brother Roin. They were the ones who originated the idea of a dolphinarium, thought it out, and participated in its design. If Gogi goes to a movie and stands in line to buy a ticket, no self-respecting Batumi resident will allow this, and will say: "My dear Gogi, don't insult me, get in front of me." When his charming wife, her name is Nunu, came to enroll her small son, also named Gogi, in a kindergarten and was just ready to give the boy's last name, the directress beat her to it: "Why, of course we know, this is little Gogi who with big Gogi rides the dolphins..." And, the conversation continued in this spirit.

Once I asked Gogi (the elder) which of the dolphins was his favorite. He did not hesitate and answered immediately, "My favorite is the one who is ailing now". This reply indisputably confirmed my long established conclusion: Georgiy is a compassionate man.

And, this past summer, when I was in Sukhumi in a monkey nursery among playful baboons, I learned the sad news. I was told that all the dolphins in the Batumi dolphinarium died and the dolphinarium was closed. Apparently, all this started with the death of the old leader of the school, Perseus, and following him as a sign of solidarity the agitated female dolphin died and then the "ordinary" ones, one after the other.

The news was terrible. But, what came to mind first were not the dolphins, but their shepherd, caretaker of their health, Georgiy Iosava. How was he coping? How was he--he who usually took the least ailment, the smallest scratch on any of his wards to heart?...

As I was walking to the intercity phone, I recalled that with these incomprehensible dolphins there has already taken place a number of still unexplainable

incidents. At one time they threw themselves into the shallows and died in whole schools, and even man trying to help them did not succeed--a dolphin, removed from the shallows and taken to the open sea, swam back and throwing himself into the shallows died. Dolphins removed from the waves and delivered to the dolphinarium refused to eat, they announced a hunger strike and, also, died. I recalled, too, quite a bit from the book "Nesuchshie veter" [Wind Carriers] which was written by Karen Pryor, a woman dolphin trainer, from the Hawaiian Islands (the publisher "Mir" translated it and recently published it here). Pryor writes that in captivity dolphins easily become victims of diseases and specifically, strange as it may seem, pneumonia. Dolphins rarely come into contact with microbes in the open sea, and this is why their body defense systems are weakened.

I could not make phone contact with Batumi for a long time, and so I sat recalling different episodes from the lives of dolphins.

Interest in these enigmatic creatures was not born suddenly. The dolphin is depicted on tiles of the first half of the 16th c. Their shards were found during excavations in the Moscow Kremlin, and in the Medvezhaya Desert near Dimitrov such tiles can be seen...A dolphin appears in the state seal of Ivan the Terrible--in the Belozersk coat of arms. The historians are now trying to explain how it got there.

Well, Georgiy Iosava has nothing in common with Ivan the Terrible. By birth Georgiy is a Batumi lad and, of course, as all such boys, he dreamed of the sea. He learned to swim as early as he learned to walk and was attracted to different animals. For a long time there were dogs, cats, porcupines, snakes, and sea gulls living in his home...As Gogi was growing up he gradually mastered different marine and land professions. He became a lathe operator, diver, press operator. He entered navigation. As a seaman he sailed on the vessel "Tovarishch". Generally, on sea and on land, he was an indispensable man. And, one day (everything important in life starts with "one day") he understood what he was born for: to unite within himself two passions--animals and the sea. As an unskilled worker he entered the Georgian department of the All Union Scientific Research Institute of Marine Fishing Management and Oceanography. Then, from unskilled worker he became a technician, senior technician and then left with an expedition for the Sea of Japan, whose unusual denizens he studied with great interest. And, finally, the long wished word "dolphinarium" was heard. This was really for him. He, of course, already knew much about dolphins, had read about them and saw them out at sea, frolicking in the sunlit sprays. Already secretly, without admitting to himself, he loved them, these mysterious dwellers of the Pacific Ocean.

The collective fishery "Chernomorets" undertook to catch the first dolphins for the dolphinarium. From that time onward, Iosava participated in all catching and transporting of dolphins; now Iosava is recognized as their fellow traveller, expert and nursemaid. I remember his showing me a photo: a crane lifting a very unusual load to the very high deck of a vessel--huge canvas litters, on which captured dolphins were lying, and Georgiy bending over them. "You understand," he said, "they started lifting us and I could see, as the distance from the water became greater, the eyes of the dolphins becoming wider and wider, and their fear was like that of a human!"

Incidentally, after this, dolphins have been transported on high speed vessels in specially made metal or canvas tanks with a wood framework. The tanks are lined with a plastic material and filled with sea water.

But, to catch them and bring them "home"--this is not even half the job or a quarter of the job, only a hundredth of a percent. The main job of training, "domesticating" the sea animal is ahead. It is a hellish job that requires all of one's patience. I once asked Georgiy's wife if she is not somewhat afraid to meet her husband after work, where he has left all his patience and may not have any left for her. She laughed. "But, I have loads of it". His wife is not only beautiful, but wise.

When starting the first performances, Georgiy rejoiced like a child and worried like an actor about his premiere. He ran to his job with joy. But, this is only half of one's happiness (the other half is well known: if you are rushing home and to your family, you do not feel your legs). After a year and a half, it was decided to test two trained dolphins, Moryak and Botsman, in the open sea. No sooner said than done, they left for a "point" near Gelendzhik. The dolphins swam alongside the vessel in a large capron-metal cage on pontoons. But, the weather soon started to become foul. It became stormy. The dolphins became worried. Generally, they leave the waves for the deep. Georgiy put on his water suit and jumped into the floating cage to calm the frightened "animals". But, there were more waves. Moryak had already become entangled in the capron mesh of the net, and Gogi lunged to free him. Botsman was thrown against an iron bar and Gogi swam toward him to pity him, "to blow on his injury", and to comfort him.

And the waves and wind became stronger! For three hours Gogi swam together with the dolphins in a stormy cage while the captain of the vessel ordered: get out or else I am not responsible for your life! With difficulty Iosava was pulled out of the waves. At this time the waves were even bigger. They tore the net. The dolphins left for the open sea. They were seen from the deck: they swam in circles, often appearing on the surface. Then night fell. To avoid the foul weather the vessel sought shelter, in a harbor, where it was moored. When the storm had passed, Georgiy gazed at the azure sea: no one was there! Not a single splash like that of the dolphins. A phone call was received from a distant beach: two dolphins had swum close and were trying to play with the swimmers. Georgiy rushed there. By the time he got there the dolphins were gone. Two days later a call was received from another beach. When they arrived there were no dolphins. Thus, the paths of Botsman, Moryak and Gogi did not cross. Everything had to be started over again, from zero...

He started. Apparently, he had great determination to succeed and had already found somewhere new strength and new faith.

Sitting in the stand and watching how,--with one barely perceptible movement on the part of the dolphin trainer, skillful acts are put together--is enjoyable. But, even more enjoyable is to see their daily work--general training. During one of the training sessions Georgiy came up to me, as if ordering the animals, and started to enlighten me: "Our main skill is the skill of swimming well. Swimming well in dolphin terms means: not making any extra strokes, as they do. They do not like commotion. Second--exercise

a feeling of tactfulness: do not impose on a "first grader" that which he should master only in third grade. And, third: learn to understand each one, because each one of them is an individual. Even cattle in a herd have their own temperaments and here we are dealing with dolphins! Creatures of a higher order".

I pulled out a notebook to write down this "lecture".

"Let's take Perseus," continued Gogi, "this is our patriarch, master. His character is male. He works differently depending on which females are with him at the time. And, if you are with him one-on-one, then he is sensible and compliant; he tries to understand what it is you want from him and carries out everything conscientiously. Inga is stable, reliable in her work, can do the same thing all year round, as if she were the mother of a large family. Masha likes to touch, is always trying to find an excuse to be sociable with you, she prefers man to dolphins".

"Who called Batumi," the voice of the telephone operator brought me out of my revery. Nunu was on the phone: "Yes, that is right, misfortune has befallen us. Georgiy is very pale, I do not leave him..." Now, Iosava is on the phone himself, "No. no, Perseus was one of the last to die, so no beautiful story can be made of this. Simply some unknown disease attached itself to him. At least we succeeded in saving Perseus' son--David, remember that happy little one who was born in captivity? We also saved "unsociable" Krasavitsa, she always stayed away from everyone..."

And, does one have to start everything from the beginning? From zero? Of course from zero, but not from absolute zero, not from a "round" zero. The experiments, the knowledge, remain as well as the desire to understand these marvelous animals. The dream remains. If man is helped by deer in the tundra, says Iosava, in the desert by camels, in the jungles by trained elephants, then let us be helped at sea by domesticated dolphins.

Recently I called Batumi. I can tell by Georgiy's voice that he is happier. "We have received three freshmen--Zeus, Rona and Lada. The dolphinarium has been opened to the public: two performances a day. Many new worries: have to build an isolation tank, put in filters for sea water".

"How about the book, are you writing the book," I asked.

"Well, of course, not. There's no time--Some people from Kiev want me to screen some filmed material, they want to make a three-part film, "People and Dolphins". Whom do I play? Don't laugh--I play myself. And, in some places in difficult situations I double for the main hero--that means I'm an actor..."

And, I am waiting for it all, when Gogi will find the time and write a book--he talks about his job in such an interesting way! He draws his favorite charges so artfully on the crest of a wave. He gives them his whole life.

He is not Gogi, but the dolphin-man.

A photo by the author shows his pupils [two dolphins].

UDC 612.126.46/612.71

## AGE-RELATED RESPONSES TO DE- AND HYPERHYDRATION

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 9, No 3, May-Jun 83 (manuscript received 7 May 82) pp 454-460

AYZMAN, R. I., Novosibirsk Pedagogical Institute

[Abstract] Age-related responses to water deprivation (38-42 h) and water loading (2.2% of body weight) were studied in children (4-11 years old) and young adults (18-22 years) on the basis of blood chemistries and urinalysis. Evaluation of the urinary output and plasma electrolytes indicated that, in the older age-groups, osmoregulation was the dominant factor during the first 16-18 h of water deprivation, while in the younger age group (4-6 years) volume regulation was the predominant physiologic response. Eventually, volume regulation also became the dominant controlling factor in the other age groups in the late stages of deprivation (38th to 42nd h). Following water loading the osmo- and volume-regulating mechanisms interact in an age-related fashion: the former predominates in the younger (4-6 years) group throughout the entire 210 min period of observation, while in the other groups the early response (120 min) consisted of volume regulation followed by osmoregulatory adjustments in the later stage. Plasma aldosterone increased in all groups in response to water deprivation and loading in direct proportion to age. However, in the youngest group (4-6 years) aldosterone levels decreased toward the end of deprivation, indicating functional exhaustion of the endocrine system. Figures 2; references 30: 1 Czech (in English), 22 Russian, 7 Western. [013-12172]

UDC 612.111-06:612.592]-083

## EFFECTS OF WHOLE-BODY COLD EXPOSURE ON ERYTHROCYTE MORPHOLOGY

Moscow ARKHIV PATOLOGII in Russian No 9, Sep 83 (manuscript received 25 Jan 83) pp 11-18

MARACHEV, A. G. and KORNEV, A. V., Laboratory of Geographic Pathology, Institute of Human Morphology, USSR Academy of Medical Sciences, Moscow

[Abstract] Studies were conducted on erythrocyte morphology of 3000 residents of the Soviet Far North, ranging in age from 17 to 52 years. The group included

natives and non-natives with variable periods of residence; for control purposes analogous studies were conducted in Moscow and its environs. Blood chemistries and scanning electron micrographs showed that the hemoglobin concentration and erythrocyte counts remain within the normal range as long as hypothermia does not develop; however, both parameters show reduction whenever cold is exacerbated. The latter conditions involve the appearance of many young and immature forms of erythrocytes and accelerated destruction of the mature forms, as well as the appearance of abnormal forms. These changes apparently reflect the hypochromic anemia aspects of cold sickness, and can be reproduced experimentally in outbred rats. Figures 3; references 21: 19 Russian, 2 Western.
[020-12172]

UDC 577.169.575.2(062)(083.75

EFFECTS OF CLIMATE ON KININOGEN LEVELS IN HEALTHY HUMAN SUBJECTS

Ashkhabad ZDRAVOOKHRANENIYE TURKMENISTATA in Russian No 7, Jul 83 pp 16-20

BERKELIYEVA, S. Ch., Chair of Elective Therapy, Turkmen Order of People's Friendship State Medical Institute

[Abstract] Effects of geophysical factors on kininogen levels in healthy human subjects were investigated in an arid region (Ashkhabad) and in an area with a temperate climate (Kharkov), and correlated with published findings on the effects of latitude and geomagnetic field on the same parameter. The consensus of the findings is that kininogen concentration increases in going from arid to temperate zones and also shows a positive correlation with increased amplitudes of short periodic variations in the horizontal components of the geomagnetic field in going from low (ca. 30°N) to polar (60-70°N) latitudes. In view of the vasoactive role of the kinins it is postulated that they are involved in the adaptation of the cardiovascular system to ambient geophysical conditions. Figures 1; references 14 (Russian).
@034-12172]

UDC 612.822:3:616-003.725

PHARMACOLOGICAL ANALYSIS OF GATING CURRENTS IN NERVE MEMBRANES

Moscow USPEKHI FIZIOLOGICHESKIKH NAUK in Russian No 3, Jul-Sep 83 pp 68-97

KHODOROV, B. I., Institute of Surgery imeni A. V. Vishnevskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] Largely Western literature is reviewed on current knowledge of gating currents in nerve fibers using various pharmacological agents to modify electrical events in such membranes and influence ionic fluxes. For example, specific blockers of sodium channels (tetrodotoxin, saxitoxin) have been found

to have no significant effect on gating currents, while local anesthetics (Novocaine, trimecaine) depress both ionic and gating currents. Other chemical agents have also been shown to have variable effects on ionic and gating currents, and studies with heavy water and zinc ions have contributed to the identification of "ballast" components and uncoupling in the kinetics of ionic and gating currents. Figures 9; references 79: 10 Russian, 69 Western.
[042-12172]

UDC 612.178.2

HEART RHYTHM CHANGES IN RESPONSE TO SENSORIMOTOR LOAD OF VARYING COMPLEXITY

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 9, No 5, Sep-Oct 83
(manuscript received 13 May 82) pp 757-761

SHUL'MAN, Ye. I., GEL'TSEL, M. Yu. and SHPARK, M. B., Institute of Clinical and Experimental Medicine, Siberian Department, USSR Academy of Medical Sciences, Novosibirsk

[Abstract] Fifty university students were subjects of a study dealing with heart rhythm changes in response to sensorimotor load of varying complexity while carrying out a push-button motor response. In a semi-reclining position the subjects were exposed to one or two auditory stimuli (60-70 dB, 400-800 Hz) and, depending on the quantity, quality, and time interval were required to carry out the appropriate response as instructed. Prior to sensorimotor stimuli the heart rate response to the auditory signal(s) consisted of a slight elongation of the first post-stimulation R-R interval on the ECG, and recovery of normal R-R intervals at the expense of a shortened third R-R interval. In situations in which decision-making was required, a statistically significant prolongation was seen in that R-R interval during which a decision to institute a motor response was made. The fact that the second and third R-R intervals were also subject to prolongation may indicate that the start-up of the response did not coincide with the decision-making process itself, but with the final acceptance of the decision. Figures 4; references 10: 5 Russian, 5 Western.
[058-12172]

UDC 612.822.3

NEURONAL CORRELATES OF VISUAL STIMULUS IDENTIFICATION. PART 1. DYNAMICS OF MEAN VALUES AND DISPERSION OF MAINTAINED FIRING RATE OF HUMAN CEREBRAL NEURONS IN TESTS ON VISUAL STIMULUS IDENTIFICATION

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 9, No 5, Sep-Oct 83
(manuscript received 4 Dec 82) pp 778-786

KROPOTOV, Yu. D., Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad

[Abstract] Studies were conducted on neuronal correlates of visual stimulus identification (digits or letters presented at identification threshold) in

patients with parkinsonism or epilepsy with implanted electrodes for diagnostic purposes. Analysis of the electrical activity of 53 neuronal populations revealed components with short and long (over 300 msec) latent periods in the optic thalamus and striopallidar system. Components with long latencies were either absent or poorly expressed in the posterior ventral and lateral nuclei, the midcenter of the optic thalamus, and in the corpus callosum whenever the stimuli could not be iednetified. Visual stimuli elicited a significant attenuation of firing rate dispersion in the midcenter of the optic thalamus; this form of attenuation was prolonged in these neuronal populations if the stimulus was unidentified. Such a course of events may reflect an active search of the brain memory bank for information, a search that is prolonged when the patient is incapable of identifying the visual stimulus. Figures 5; references 13: 8 Russian, 5 Western.
[058-12172]

UDC 612.822.3

NEURONAL CORRELATES OF VISUAL STIMULUS IDENTIFICATION. PART 2. SPATIOTEMPORAL CORRELATION IN MAINTAINED FIRING RATE OF HUMAN CEREBRAL NEURONS IN VISUAL STIMULUS IDENTIFICATION

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 9, No 5, Sep-Oct 83
(manuscript received 4 Dec 82) pp 787-792

KROPOTOV, Yu. D., Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad

[Abstract] Electrophysiological studies were conducted on the spatiotemporal correlations in maintained firing rate of different populations of cerebral neurons in visual stimulus identification tests carried out on parkinsonism or epilepsy patients with electrodes implanted for diagnostic purposes. In a number of paired neuronal populations in the optic thalamus and the striopallidar system, a correct identification was accompanied by an initial decrease in the correlation coefficient, followed by an increase in the correlation coefficient 500 msec after stimulus presentation. Furthermore, the latter phenomenon coincided temporally with the generation of the long-latency component @Kropotov, Yu. D., Fiziologiya Cheloveka, 9(5):778, 1983]. The increase in the correlation coefficient relative to the firing rate was observed in less than ten percent of the paired neuronal populations that are spatially distinct. This fact suggests that certain neuronal populations in the human brain form a definite functional system concerned with identification of visual stimuli. Figures 3; references 4: 2 Russian, 2 Western.
[058-12172]

UDC 612.825

DEPENDENCE OF RECOGNITION TIME OF MEANINGFUL LIGHT STIMULI ON SPATIOTEMPORAL ORGANIZATION OF EEG

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 9, No 5, Sep-Oct 83
(manuscript received 24 Jun 82) pp 793-798

POTULOVA, L. A. and VASIL'YEV, Ya. A., Institute of Higher Nervous Activity and Neurophysiology, USSR Academy of Sciences, Moscow

[Abstract] The dependence of the recognition time of meaningful light stimulii (letters of the Russian alphabet) in relation to brain biopotentials was investigated on five male and female subjects, relying on cross-correlation analyses of intra- and interhemispheric activities of the frontal lobe, motor cortex, and visual cortex. During actual identification of the stimulus, the cross-correlation coefficients in the right hemisphere between the paired structures that were compared were higher than in the symmetrical zones in the left hemisphere. Furthermore, the coefficients during rapid identification were greater than during slow identification, with divergent changes occurring in the left and right hemispheres. All of the spectral and coherent changes applied only to the rapid and slow waves, while changes in the alpha rhythm were statistically insignificant. These observations point to the functional significance of interrelationships of the individual frequency bands of EEG in image recognition. Figures 3; references 11: 10 Russian, 1 Western. [058-12172]

UDC 612.821

EFFECTS OF ARGININE-VASOPRESSIN NEUROPEPTIDE ON HUMAN TOLERANCE OF HOT ARID ENVIRONMENTS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 9, No 5, Sep-Oct 83
(manuscript received 24 Apr 82) pp 819-827

BAKHAREV, V. D., MAR'YANOVICH, A. T., SLYUSAR, I. B., LEVKIN, L. A., PAPSUYEVICH, O. S. and CHIPENS, G. I., Military Medical Academy imeni S. M. Kirov, Leningrad

[Abstract] Eight male subjects, 29-35 years old, were employed in a microclimate chamber (+49°C for 2 h/day for 5 days; 20% relative humidity; 0.5 m/sec air currents) study to determine the effects of arginine$^{8}$-vasopressin (AVP) on human tolerance of hot arid environments as reflected in physiological status and performance on psychological tests. Administration of 10 U (60 μg) of AVP reduced the heart rate of the subjects to a statistically significant extent in the chamber, but had no significant effect on other physiological parameters (body temperature, heat balance, oxygen consumption at rest or during exercise (50 watts), perspiration). However, the AVP-treated subjects reported subjective improvement which was accompanied by some decrease in psychomotor

efficiency which persisted into the next day. These observations indicate that AVP can be used to alleviate mental and physical stress induced by hot arid environments, and it is to be expected that the negative effects of AVP can be compensated by other pharmacologic agents. Figures 2; references 20: 8 Russian, 12 Western.
[058-12172]

UDC 612.822

CORRELATION BETWEEN INDIVIDUAL ALPHA-RHYTHM PARAMETERS AND OPERATOR'S PERFORMANCE WHILE SUBJECTED TO MAXIMUM INFORMATION INPUT

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 9, No 5, Sep-Oct 83 (manuscript received 18 Mar 83) pp 865-866

POPOV, S. Ye., MIROLYUBOV, A. V. and SOLOMIN, I. L., Military Medical Academy imeni S. M. Kirov, Leningrad

[Abstract] A mathematical analysis was conducted on the correlation between alpha-rhythms obtained by unipolar recordings from the right and left occipital areas and the performance of 12 male subjects, 23 to 30 years old, in a psychological adding test complicated by maximum information input to the subjects. A positive correlation prevailed between the mean period of the alpha waves in the right hemisphere and between the duration of the ascending positive phase with an increase in the frequency of errors, and with a decrease in the time required for onset of mental block. These two alpha-rhythm parameters, therefore, appeared to determine or reflect performance accuracy and immunity to acute mental fatigue. The duration of the descending negative phase and the mean period of the alpha waves in both hemispheres showed negative correlation with fluctuations in the error frequency, and were interpreted to reflect the degree of performance instability. References 3: 2 Russian, 1 Western.
[058-12172]

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UDC 612.822.3

DYNAMICS OF MAINTAINED FIRING RATE OF HUMAN CEREBRAL NEURONAL POPULATIONS DURING PERCEPTION OF HOMONYMS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 9, No 5, Sep-Oct 83 (manuscript received 2 Aug 82) pp 870-871

MEL'NICHUK, K. V., Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad

[Abstract] Two patients with parkinsonism and medically-indicated implantation of electrodes in the left hemisphere were analyzed for firing patterns of ten neuronal populations following presentation of homonymic nouns used in different

contexts. Histograms constructed for the firing rates revealed two neural populations (corona radiata and posterior region of internal capsule) that responded with altered firing patterns in relation to different semantic combinations. These observations on meaning-induced changes in the discharge patterns of spatially distinct neuronal populations indicate that processing of verbal information involves spatially different perceptive mechanisms. Figures 1; references 10: 7 Russian, 3 Western.
[058-12172]

STABILITY OF PHYSIOLOGICAL AND PSYCHOLOGICAL HUMAN FUNCTIONS UNDER EXTREME ENVIRONMENTAL CONDITIONS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 9, No 5, Sep-Oct 83 pp 873-875

SLONIM, A. (Reviewer of book by V. I. Medvedev, Nauka, Leningrad (1982), 103 pp)

[Abstract] This small book by Medvedev does not represent an all-encompassing compendium of human adaptation to extreme environments; rather it covers individual elements of physiological adaptation. The latter topics include increased resistance to environmental changes ranging from the molecular to the population-wide level, an analysis of specific and nonspecific elements of adaptation, and an evaluation of adaptational limitations. Considerable use is made of ecological and evolutionary comparisons. A unique feature of this book is the consideration of both the regulating and the regulated systems. The author's attempt at a hierarchic consideration of adaptational mechanisms is less successful since it is hard to classify energetic components, sensory components, information analysis, decision making, and motivational mechanisms on that basis. Considerable space is devoted to behavioral adaptation, and in conclusion the interaction of adaptation and pathology is given coverage. This book represents the first attempt in Soviet literature to provide a theoretical unifying concept for human adaptation.
[058-12172]

UDC 616-006.04-082(470)

CURRENT STATUS AND PERSPECTIVES OF ONCOLOGIC SERVICES IN RSFSR

Moscow SOVETSKAYA MEDITSINA in Russian No 8, Aug 83 pp 3-7

CHISSOV, V. I., DEMIDOV, V. P. and STARINSKIY, V. V., Moscow Scientific Research Oncology Institute

[Abstract] A brief review is provided of the historical background and current status of the various oncological services in the RSFSR, and perspectives for the future which anticipate improvements in the clinical implementation of research findings. The Moscow Scientific Research Oncology Institute [MNIOI] imeni P. A. Herzen is the oldest research establishment of its kind in Europe,

and is the parent organization of the network of oncological services established in the RSFSR in the thirties. At the present time, there are 118 oncologic preventive dispensaries in the RSFSR and, in the last decade, the number of oncologic beds increased by 27% to 30,646. Although there are 5512 oncologists and radiologists in the RSFSR within the oncology service network, a shortage of specialists is still felt. The number of cases discovered on routine medical examinations during the last decade increased insignificantly (from 0.03% in 1970 to 0.04% in 1980), due largely to poor administration and inadequate use of available data resources, while the number of actively uncovered cases rose almost two-fold from 5.5% in 1970 to 9.6% in 1980. Five year survival figures have improved from 44.3% in 1980 to 51.7% in 1980, and the ten year figures, from 19.5% to 29.0%. In addition to active experimental and clinical research programs, expansion of educational opportunities and implementation of the latest diagnostic and therapeutic technologies will render the oncologic services in the RSFSR even more effective in the future. [040-12172]

BRIEF

MICROBIOLOGY INDUSTRY UPDATE--The workers in the microbiological industry have overfulfilled the plan for 7 months of this year in volume of production, growth of labor productivity and profit. According to preliminary data, the production increase constituted 16.8%, as compared to the same period last year. Labor productivity increased by 12.5%. About 9000 tons of feed protein over and above the plan for January to July have been shipped to livestock farmers in our country. The workers of the Bobruyskgidrolizprom [Bobruysk Hydrolysis Industry] Association, the Berdsk and Omutninsk chemical plants, Yefremov and Kirov biochemical plants and Svetloyarsk plant, which produces protein and vitamin concentrates, are in the fore in the All-Union competition. The achievements of microbiologists are obvious. But the reserves are far from having been exhausted. The capabilities in this sector are not fully used, and the norms for target dates to assimilate new production are not being met. In particular, in the subsector of hydrolysis, the existing capabilities are not being used to full capacity. None of the six major hydrolysis plants built in recent years (Volga, Kirishi, Manturovo and others) reached the planned indicators for feed protein output. Nine enterprises failed to fulfill the production plan for feed yeast derived from wood raw material, the shortfall constituted 8,600 tons of product for the livestock industry. The situation did not improve in 7 months. The plan for output of the principal product of the Soyuzgidrolizprom [Union Hydrolysis Industry] All-Union Production Association was not fulfilled. The problem is not only to fulfill the 1983 plan, but to make up for the product deliveries owed by the microbiological industry for the 2 prior years. Persistent and highly efficient work in this sector depends largely on a number of allied enterprises, and first of all the suppliers of raw materials. In 1981-1982, the USSR Ministry of the Petrochemical Industry was about 200,000 tons short in delivery of liquid petroleum paraffin, from which 175,000 tons of protein could have been produced. Enterprises under the USSR Ministry of the Timber, Pulp and Paper, and Wood Processing Industry and other suppliers delivered 5 million cubic meters less chips, sawdust and technological logs to microbiologists than stipulated in the plan. There are considerable interruptions in delivery of raw material to enterprises specially constructed in Central Asia, Moldavia and Northern Caucasus for processing the waste from sunflower and rice husks and corn cobs. The USSR Ministry of the Petroleum Refining and Petrochemical Industry has recently taken some steps to improve delivery of liquid paraffin and improve its quality. The results were not slow in being felt: in 7 months, the plants producing protein and vitamin concentrates overfulfilled the plan by more than 16,000

tons of this product, which is valuable to the livestock industry. The increment constituted 34%, in comparison to the same period last year. But the suppliers of wood raw material have not yet derived definitive conclusions from the criticism addressed at them. Such raw material is still being delivered irregularly, it is of low quality and in insufficient quantity. There are realistic opportunities to delivery the raw material regularly, the only thing that is needed is to increase the responsibility of the executors and planned discipline at enterprises under the USSR Ministry of Timber, Pulp and Paper, and Wood Processing Industry. Glavmikrobioprom [Main Administration of the Microbiological Industry], All-Union industrial associations and the business managers of enterprises are called upon to make an in-depth analysis of the achievements over the 7-month period, paying special attention to eradication of flaws and concetrate on fuller use of the existing reserves [By V. Ignat'yev] [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 33, Aug 83, p 5] 10,657

CSO: 1840/101

UDC 615.014.45.07

PREPARING BIOINDICATORS FOR MONITORING EFFECTIVENESS OF STERILIZATION PROCESSES

Moscow ANTIBIOTIKI in Russian No 8, Aug 83 (manuscript received 24 Feb 82) pp 600-605

KALININA, N. M., TIKHONOVA, A. S., MOTINA, G. L., CHAYKOVSKAYA, S. M., SEMENOV, S. M. and SHILOVA, S. V., All-Union Scientific Research Institute for Antibiotics, Moscow

[Abstract] Recent innovative sterilization monitoring has used bioindicators such as heat-resistant fungus spores and pH indicators. The present study sought to develop domestic Soviet bioindicators and test their suitability for monitoring a live-steam sterilization processes, using Bac stearothermophilus ATCC 7953, previously tested for heat resistance (ANTIBIOTIKI, 1982, pp 117-120). Various media were used to culture the bacteria. Both the accuracy and the storing qualities of the test bacteria were measured. Of several carbohydrates tested for culturing, only saccharose and raddinose were found to be suitable for preparing the bioindicator. A 0.25% solution of bromcresol purple resin as the pH indicator, and a meat peptone broth as the medium, were selected. The test bioindicator was recommended for sterilization monitoring at 121°C in autoclaves for 5 and 15 minute processes, followed by checks at 55°C. References 13: 2 Russian, 11 Western.
[049-12131]

UDC 579.695

MICROBIAL DEGRADATION OF ACTIVE BRIGHT RED 5CX DYE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 4, Jul-Aug 83 (manuscript received 26 Feb 82) pp 36-39

UDOD, V. M., NESYNOVA, L. I. and DMITRENKO, G. N., Institute of Colloid and Water Chemistry, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] Studies were conducted on microbial degradation of active bright-red 5CX azo dye by Bacillus sp. 1/7, isolated from natural sources, in a situation in which 5 CX served as the sole source of carbon, nitrogen, and

energy. Evaluation of the metabolic mechanisms showed that biodegradation was achieved by splitting of the azo bond (indicated by disappearance of absorption at 520-560 nm), depression of the redox potential of the medium, reduction in the biochemical oxygen demand, and elevation of the medium pH to 8.6. Spectrophometric analysis indicated formation of aniline and, on prolonged cultivation, its disappearance from the medium via metabolism into simpler compounds. Figures 2; references 13: 12 Russian, 1 Western.
[007-12172]

UDC 579.262

BACTERIAL COMPONENTS IN MIXED CULTURES WITH HALOPHILIC UNICELLULAR ALGAE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 4, Jul-Aug 83
(manuscript received 12 Apr 82) pp 39-44

LENOVA, L. I. and BORISOVA, Ye. V., Institute of Botany, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] Species identification was conducted on the bacterial components in mixed cultures of halophilic unicellular algae (Dunaliella, Pedinomonas, Naphrochloris). The studies involved evaluation of culture type collections and samples collected from natural sources. The most frequently isolated bacterial species were Pseudomonas, Micrococcus, and Halobacterium, with less-frequent isolates yielding Xanthomonas, Arthobacter, Rhodococcus, and Flavobacterium. In general, Pseudomonas, Halobacterium, and Micrococcus were associated with Dunaliella spp., Flavobacterium and Arthrobacter tended to be isolated with Nephrochloris, and Rhodococcus, Pseudomonas, Halobacterium and Micrococcus with Pedinomonas. References 12: 10 Russian, 2 Western.
[007-12172]

UDC 579.222

CONTROL OF EXOPOLYSACCHARIDE SYNTHESIS IN OBLIGATE METHYLOTROPH METHYLOCOCCUS SP.

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 4, Jul-Aug 83
(manuscript received 6 Apr 82) pp 44-47

GRINBERG, T. A., SHCHUROVA, Z. P., ROMANOVSKAYA, V. A. and MALASHENKO, Yu. R., Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] The obligate methylotroph Methylococcus sp. was grown in batch and continuous culture to determine factors that could be used to control exopolysaccharide biosynthesis. Under batch and chemostat conditions the bacteria were grown in a mineral medium with methane as the sole carbon source. In the batch cultures, exopolysaccharide synthesis commenced in the exponential

phase of growth and reached a maximum in the stationary phase; in addition, high polysaccharide yields were favored by low nitrogen concentrations in the medium. Maximum synthesis in the chemostat was obtained when the rate (D) of culture medium dilution was in the 0.025 to 0.05 $h^{-1}$ range, and exceeded eight to ten times that seen when D = 0.1 to 0.15 $h^{-1}$. Variation of the nitrogen concentration in the chemostat culture had no effect on exopolysaccharide production, but did alter intracellular nitrogen concentration. The exopolysaccharide produced by the Methylococcus under investigation was soluble in water, formed a viscous solution, and included mannose, galactose, fucose, and uronic acid. Figures 3; references 9: 1 Polish, 6 Russian, 2 Western.
[007-12172]

UDC 579.222'114:622.276.43

## CHARACTERISTICS OF MICROBIAL WATER THICKENERS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 49, No 4, Jul-Aug 83 (manuscript received 14 Apr 82) pp 47-51

GAREYSHINA, A. Z., GVOZDYAK, R. I., MATYSHEVSKAYA, M. S., MAVZYUTOVA, I. P., TAVRIN, A. Ye., GRISHAGIN, Ye. V., LITVINCHUK, O. A. and PASICHNIK, L. A., Scientific Industrial Association "Soyuznefteprom khim", Kazan; Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] Studies were conducted on the suitability of heteropolysaccharides (HPS) produced by Xanthomonas campestris (HPS-1) and Cryptococcus laurentii (HPS-21) to function as thickening agents in stratal and fresh waters, with a view toward the possible utilization of such water for raising crude oil from its bed. The results showed that the greater viscosity in stratal water was due to the greater salt concentration. Maximum viscosities were seen in the pH 5-10 region, while a temperature range of 20-100°C did not affect viscosity, presumably due to a lack of change in the structural organization of HPS. Under identical concentrations the viscosity obtained with HPS-1 was twice as great as with HPS-21, which may be a significant cost-effectiveness advantage for a product to be used in increasing productivity of oil fields. Figures 3; references 5 (Russian).
[007-12172]

UDC 616-074/.74

## ACCIDENTAL SPREAD OF PATHOGENS WITHIN A MICROBIOLOGICAL HOODBOX

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 9, Sep 83 (manuscript received 27 Oct 82) pp 56-60

VOTYAKOV, V. I. and BORTKEVICH, V. S., Belorussian Scientific Research Institute of Epidemiology and Microbiology

[Abstract] Studies were conducted on the conditions that may result in adventitious spread of pathogenic microorganisms within a gloved hood in

laboratory work, as well as accidental contamination of the laboratory itself and adjacent areas. Seven such eventualities are outlined that may occur in the course of normal microbiological work, and the seriousness of the situation is analyzed both with respect to the quantity (titer) of the microorganisms that are released in an uncontrolled manner, and their virulence. A further factor to be considered in the analysis of the public health hazard is the capacity of the pathogenic agent to survive in the unvironment and to undergo multiplication. References 1 (Russian).
[029-12172]

UDC 579.841.11.044+579.695:628.35

EFFECTS OF SODIUM DODECYL SULFATE ON OPTICAL DENSITY AND VIABILITY OF ALKYL SULFATE UTILIZING PSEUDOMONAS AERUGINOSA 1C

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 1, Jan-Feb 83 (manuscript received 20 Nov 81) pp 12-15

UDILOVA, O. F. and KRIVETS, I. A., Institute of Colloid Chemistry and Water Chemistry, Ukrainian SSR Academy of Sciences

[Abstract] Studies were conducted on the susceptibility of alkyl-sulfate-metabolizing Pseudomonas aeruginosa 1C to sodium dodecyl sulfate (SDS) in relation to various growth phases. The results demonstrated that the 1C strain, capable of using SDS as the sole carbon source, was much more resistant to the destructive effects of SDS than a mutant strain, 1C-16, incapable of using SDS as a carbon source. 1C cells in the stationary phase of growth showed greater loss of viability and decrease in the optical density of the solution than cells in the logarithmic phase of growth on complete media. The greater tolerance of SDS demonstrated by the alkyl-sulfate-utilizing strain vis-a-vis the 1C-16 strain is attributable not only the metabolism of SDS, but also to differences in the chemical composition of the cell walls. Figures 3; references 13: 12 Russian, 1 Western.
[102-12172]

UDC 579.841.11.044+579.695:628.35

EFFECTS OF CERTAIN FACTORS ON SOLUBILIZATION OF PSEUDOMONAS AERUGINOSA 1C BY SODIUM DODECYL SULFATE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 1, Jan-Feb 83 (manuscript received 20 Nov 81) pp 16-20

UDILOVA, O. F. and KRIVETS, I. A., Institute of Colloid Chemistry and Water Chemistry, Ukrainian SSR Academy of Sciences

[Abstract] Studies were conducted on the effects of pH, previous freezing, growth and incubation temperatures on the solubilization of Pseudomonas aeruginois 1C by sodium dodecyl sulfate (SDS). At pH 5.0 0.2% SDS reduced the

optical density of a suspension of Ps. aeruginosa 1C by 82% in 20 min, by ca. 50% at pH 8.7 in ca. 40 min, and by 10% at pH 7.0 in 20 min; furthermore, at pH 7.0 the decrease in optical density gradually decreased by ca. 20% after 120 min. Preliminary freezing of the cells at -10°C for 10-12 h rendered them much more susceptible to lysis by SDS when in the logarithmic phase during subsequent growth under standard conditions. Further observations demonstrated that cells grown at 20°C were more susceptible to destruction than cells grown at 30°C, and that solubilization was more pronounced at 35°C than at 20°C. These observations demonstrate that a number of factors determine the susceptibility to lysis by SDS of bacterial cells capable to utilizing SDS as the sole source of carbon. Figures 4; references 15: 9 Russian, 6 Western.
[102-12172]

UDC 578:620.193.8

CORROSIVE ACTIVITY OF CERTAIN HETEROTROPHIC BACTERIA IN SEA WATER

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 1, Jan-Feb 83
(manuscript received 8 Feb 82) pp 26-29

ANDREYUK, Ye. I., YANOVER, S. B., KOPTEVA, Zh. P., STEPANOV, S. I., PETROV, V. G. and BELOYVANENKO, L. V., Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences

[Abstract] Determinations were made of the rate of corrosion of 10KhSND steel in sea water with or without heterotrophic bacteria in a concentration of $2.5 \times 10^6$ cells/ml. Evaluation of the effects of Micrococcus halophilus 47/3, Bacterium agile 72/2, B. stutzeri 19, Pseudomonas coadunata 30/4, and Chromobacterium aurantiacum 7 showed that the first two species were most active in promoting corrosion and increased the rate of corrosion by 36.7 and 42.04%, respectively. Ch. aurantiacum 7, however, decreased the rate of corrosion and the other species were intermediate in terms of promoting corrosion. Addition of peptone as an organic substrate decreased the rate of corrosion and reduced the concentration of dissolved oxygen in the sea water to virtually zero. The effects of peptone may have been due to alternations in the physicochemical status of the water + bacteria medium and, at least in part, to disappearance of oxygen, a potent corrosive agent. Figures 3; references 9: 7 Russian, 2 Western.
[102-12172]

UDC 582.288-11

EFFECTS OF ALANINE AND CYSTEINE ON FORMATION OF BIOLOGICALLY ACTIVE SUBSTANCES BY FUSARIUM SP.

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 3, Jan-Feb 83
(manuscript received 11 Jan 82) pp 39-43

ZAKORDONETS, L. A. and SUPRUN, S. M., Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences

[Abstract] A synthetically-active atoxic Fusarium strain was tested for the production of biologically-active substances in the presence of 1.5 g/liters of alanine or of 60 mg/liter of cysteine added to Czapek's medium. Addition of either amino acid had variable effects on production of amino acids; however, tryptophan synthesis was increased 2.5-fold in both cases. Both amino acids also increased the biomass yield 1.5- to 3-fold. Addition of alanine had no effect on riboflavin or biotin synthesis, but increased production of pantothenic acid slightly. Addition of alanine to a concentration of 3 g/liter promoted a more pronounced increase in pantothenic acid synthesis. Cysteine in a concentration of 60 mg/liter had no effect on vitamin synthesis; in a concentration of 120 mg/liter vitamin synthesis was inhibited by 50%, and the formation of FAD was reduced. Figures 2; references 21: 1 Ukrainian, 13 Russian, 7 Western.
[102-12172]

UDC 579:621.9.079

MICROBIAL STABILITY OF SYNTHETIC CUTTING FLUID COMPONENTS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 1, Jan-Feb 83
(manuscript received 13 May 81) pp 66-71

KACHAN, V. I., STULIY, A. A., ALPAT'YEVA, T. A. and SHAPOVAL, B. S., All-Union Scientific Research and Planning Construction Institute of Petroleum Processing and Petrochemical Industry

[Abstract] Tabular data are presented on the susceptibility of the various components of synthetic cutting fluids to microbial biodegradation. In terms of their susceptibility such components can be divided into three categories as (a) highly susceptible, (b) moderately susceptible, and (c) resistant. Aerobic heterotrophic bacteria constitute the single most important class of microorganisms responsible for the biodegradation of these components; however, the greatest activity in this respect was displayed by the anaerobic sulfur-reducing bacteria. Considerable further research will have to be conducted to define and select those components that show maximum resistance to biodegradation. References 16: 10 Russian, 6 Western.
[102-12172]

UDC 579.841.4.22

METABOLISM OF METHANE-OXIDIZING BACTERIA ISOLATED FROM VARIOUS ECOLOGICAL NICHES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 2, Mar-Apr 83 (manuscript received 12 Mar 82) pp 3-9

MALASHENKO, Yu. R., HAYER*, Yu., SOKOLOV, I. G., VOTSELKO, S. K. and ROMANOVSKAYA, V. A., Institute of Microbiology and Virsology, UkSSR Academy of Sciences; Central Institute of Microbiology and Experimental Therapy*, East German Academy of Sciences

[Abstract] A study of metabolic pathways of methane incorporation into constructive metabolism of methane-oxidizing bacteria of various physiological groups isolated from different ecological niches and represented by various species showed the great diversity of metabolic pathways of methane in bacteria and confirmed the appropriateness of differentiating Methylomonas, Methylocystis and Methylococcus genera on the basis of the functioning of this or that pathway of methane assimilation. It was found that determination of oxypyruvate reductase and seringlioxylate-aminotransferase may be used to differentiate some species of Methylomonas and Methylococci. It was found that specific conditions of various ecological niches did not affect the basic stages of metabolic processes in methane-oxidizing bacteria and it was assumed that the evolution of metabolic pathways in them followed similar pathways under different geochemical conditions. This may be confirmed or refuted by further ecological and enzymological studies. Figures 2; references 19: 5 Russian, 14 Western.
[041-2791]

UDC 579.852.11.253

VARIABILITY OF BACILLUS GENUS BACTERIA UNDER INFLUENCE OF XENOBIOTIC HEXAMETHYLENDIAMINE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 2, Mar-Apr 83 (manuscript received 25 Feb 82) pp 10-14

VASILEVSKAYA, I. A., ROY, A. A. and SERGEYCHUK, M. G., Kiev State University; Institute of Colloid Chemistry and the Chemistry of Water, UkSSR Academy of Sciences, Kiev

[Abstract] Variability of representatives of various species of bacteria of the Bacillus genus capable of causing destruction of hexamethylenediamine (the basic contaminant of anide production) after culturing on a medium with this xenobiotic was studied. Strains (9) of Bacillus genus bacteria from collections of typical cultures from different Soviet institutes and one strain isolated earlier and identified at the Microbial Purification of Water department of the Institute of Colloid Chemistry and the Chemistry of Water were studied. Cultivation of these bacteria on a medium with hexamethylenediamine

change the nature of g rowth, cell morphology, capacity to form acetylmethylcarbinol, to ferment some carbon sources and to reduce nitrates and manifest aminolytic and proteolytic properties. The variability of morphological-cultural and some biochemical properties of aerobic spore-forming bacteria under the effect of xenobiotics may explain the difficulties encountered in trying to establish the species of bacilli isolated from effluents containing the xenobiotics. The variability may be due to adaptation caused by allergenic compounds for the cell. References 12: 9 Russian, 3 Western.
[041-2791]

UDC 582.288-11

TOXIN-FORMING CAPACITY OF ENTOMOPATHOGENIC FUNGUS ASCHERSONIA ALEYRODIS WEBBER UNDER VARIOUS CONDITIONS OF CULTIVATION

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 2, Mar-Apr 83
(manuscript received 30 Jul 81) pp 37-40

KURBATSKAYA, Z. A., KOVAL', E. Z. and FESENKO, V. D., Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev; Uzhgorod State University

[Abstract] Toxin-forming capacity of entomopathogenic fungus A aleyrodis under various conditions of cultivation was studied by growing the fungus on a liquid Czapek nutrient medium and beer wort by an immersion method and by a surface method. It was found that the vital activity of A. aleyrodis produces toxicants which create a toxic effect and biological effect on Protozoa and animals. Surface cultivation on Czapek medium can produce exotoxins which possess pronounced dermonecrotic and antibiotic activity. Figure 1; references 19: 14 Russian, 5 Western.
[041-2791]

UDC 579.873.71.25

RESTRICTION ANALYSIS OF HYBRID pESO1-2 and pESG1-2 PLASMIDS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 2, Mar-Apr 83
(manuscript received 22 Mar 82) pp 40-43

STEFANISHIN, Ye. Ye., DEKHTYARENKO, T. D., POLISHCHUK, L. V. and POLEVODA, B. V., Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev

[Abstract] Restriction analysis was used to identify Streptomycetes DNA fragments in the composition of hybrid plasmids of E. coli transformants. Plasmid DNA from 16 E. coli transformants were isolated by the Birnboim and Doly method. Restriction of plasmids by endonucleases Hind III and Sma1 were performed under standard conditions. The constructed hybrid pESO1 and pESG1 plasmids differed in size. The molecular mass of pESG1 plasmid is twice as great and that of

pES)1 is 1-1/2 times as great as the molecular mass of pBR322 DNA. Restriction analysis showed that pESO2 and pESG2 are not restriction sites for SmaI while pESO2 and pESG2 plasmids DNA acquire a site for SmaI simultaneously with the Strepotomycetes plasmid fragment. The data indicated the hybrid nature of pESO1 and pESG1 plasmids. Figures 4; references 8: 1 Russian, 7 Western.
[041-2791]

UDC 579.842.23.086.6

INCORPORATION OF RADIOACTIVE PRECURSORS INTO LIPOPOLYSACCHARDIDE-PROTEIN COMPLEX OF YERSINIA PSEUDOTUBERCULOSIS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 2, Mar-Apr 83
(manuscript received 24 Mar 81) pp 53-58

FEDOREYEVA, L. I., SOLOV'YEVA, T. F. and OVODOV, Yu. S., Pacific Ocean Institute of Bioorganic Chemistry, Far Eastern Scientific Center, USSR Academy of Sciences

[Abstract] Incorporation of $^{14}C$ into the lipopolysaccharide-protein (LPST) complex as a function of conditions of cultivation of a pseudotuberculosis microbe in the presence of a radioactive precursor, its nature and the distribution of the label among the LPST components was studied. The nature of the precursor, isotope concentration, time and introduction of it into the microbe population and the composition of the nutrient medium influence the effectiveness of $^{14}C$ incorporation into LPST. Maximum radiocarbon incorporation into LPST is achieved during growing of the microorganisms on the nutrient medium in the presence of $^{14}C$-sodium acetate. Incorporation of $^{14}C$ into fatty acids of lipid A depended on the nature of the radioactive substrate and the duration of contact of the microbe population and the labelled substrates. Figures 2; references 16: 2 Russian, 14 Western.
[041-2791]

UDC 579.873.71.25

PLASMIDS AND CLONING OF STREPTOMYCETES DNA

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 2, Mar-Apr 83
(manuscript received 26 Jan 82) pp 96-107

DEKHTYARENKO, T. D., Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev

[Abstract] A review of the literature showed that streptomycete plasmids may be used to clone DNA of various origin. Bireplicon vectors have been prepared on the basis of plasmids or of streptomycete phage. Expression of some genes of E. coli (chloramphenicol-resistant and kanamycin-resistant) was seen for

streptomycetes. It has been found that individual streptomycetes promoters are recognized by RNA-polymerase of E. coli and individual codons of E. coli transcription are used for translation into S. lividans. The data presented suggest the possibility of wider use of streptomycetes plasmids for cloning desired genes on them. Cloning exogenous fragments in hybrid plasmids of streptomycetes may modify existing or synthesize new antibiotics and the use of multicopy plasmids as vectors will increase their production. References 64: 10 Russian, 54 Western.
[041-2791]

MICROORGANISMS, PETROLEUM DEGRADERS IN WATER BASINS. REVIEW OF BOOK BY YE. I. KRASNIKOV AND T. M. KLYUSHNIKOVA. KIEV, NAUK, DUMKA, 1981, 130 p

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 2, Mar-Apr 83, pp 108-109

ANTIPCHUK, A. F.

[Abstract] The book authors discuss different aspects of the vital activity of microorganisms utilizing hydrocarbons, drawing upon data in the literature and their own research. The discussion of pathways and consequences of oil pollution emphasizes the threat to man of buildup of hydrocarbons in plant and animal life of reservoirs. The book contains a discussion of some microorganisms (bacteria, yeasts, micellar fungi) which are capable of assimilating hydrocarbons as a source of carbohydrates and their prominent role in surface water purification. A description is presented of the intensity of degradation of hydrocarbons as a function of different biotic and abiotic factors; the use of associations of microorganisms to intensity degradation of hydrocarbons where needed, is stressed. The original material is reported concerning the numbers, species composition and physiological activity of yeasts of Naftus type mineral water and conclusions are drawn concerning the effect of silvering and electrofiltration on preserving the medical qualities of mineral waters.
[041-2791]

UDC 613.68:613.62](47+57)-17)

# EVALUATION OF HEALTH STATUS OF NORTHERN FLEET SAILORS

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 7, Jul 83 (manuscript received 13 Sep 82) pp 7-10

BYCHIKHIN, N. P., ORLOV, G. A., POPOV, V. A., PISARENKO, Ye. F. and VASIL'YEVA, T. V., Arkhangelsk Medical Institute; North Central Basin Clinical Hospital imeni N. A. Semashko, Arhangelsk

[Abstract] The importance of the Soviet Northern Fleet to the national economy has resulted in particular attention being paid to the health and welfare of the sailors in that fleet, particularly as they are required to work under adverse climatic conditions. Evaulation of the health status has revealed that the cardiovascular system is particularly labile, especially in the younger crew members before adaptive mechanisms have become fully operational. In general, young sailors with less than five years experience show a higher pulse rate (by 1-15 beats/min) and elevated arterial blood pressure (by 5-10 mmHg). A convenient approach to work fitness evaluation consists of assessment of the vascular tonus in the extremities on the basis of thermograms and infrared scanning, since the extremities are particularly susceptible to cold exposure. A review of medical statistics for the years 1978-1981 has shown that 38% of the morbidity among sailors of the Northern Fleet involved respiratory organs, 32% of the diseases involved the gastrointestinal system, and trauma accounted for 30% of the morbidity.
[069-12172]

UDC 615.214.036.8.076.9

# COMPARATIVE EXPERIMENTAL EVALUATION OF PSYCHOTROPIC EFFECT OF ATYPICAL TRANQUILIZERS

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 46, No 3, May-Jun 83 (manuscript received 10 Nov 82) pp 26-29

RUDENKO, G. M., CHEMESOV, Yu. V., GARIBOVA, T. L. and VORONINA, T. A., Institute of Pharmacology, USSR Academy of Medical Sciences; Central Scientific Research Institute of General and Forensic Psychiatry imeni V. P. Serbskiy, Moscow

[Abstract] Comparative studies were conducted on the psychotropic effects of classical (diazepam, phenazepam, bromazepam) and atypical (nitrazepam, flunitrazepam, clobasam, tacitin, clonazepam, depakin) tranquilizers in rats employing a conflict situation. Marked differences became evident between the classical and atypical tranquilizers, in that the former produced anti-aggressive and anxiolytic effects at equivalent dosages, whereas the latter agents required administration of much greater doses for antiaggressive effects than for anxiolytic effects. In addition, tacitin, depakin, flunitrazepam and clobasam failed to show specificity in terms of anti-aggressive action and are potent inhibitors of conditioned response. These differences underline the need for further studies on the atypical tranquilizers to define their scope of action and differences from the classical tranquilizers. Figures 1; references 13: 6 Russian, 7 Western.
[032-12172]

UDC 615.216.2.03:[617-001.17-06:616-001.28

TIME-DEPENDENT PHARMACOLOGIC EVALUATION OF NOVOCAIN AND TRIMECAINE AFTER THERMAL, MECHANICAL, RADIATION AND COMBINED INJURY

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 46, No 3, May-Jun 83 (manuscript received 7 Sep 82) pp 37-41

IL'YUCHENOK, T. Yu., BRITUN, A. I., SHADURSKIY, K. S. (deceased), RASULEV, B. K., MATVEYEVA, I. A. and MOISEYEVA, L. A., Scientific Research Institute of Medical Radiology, USSR Academy of Medical Sciences, Obinsk, Kaluga Oblast

[Abstract] Pharmacological and toxicological studies were conducted on Novocain, lidocaine, and trimecaine at various periods of time after thermal, mechanical, radiation or combined trauma in outbred mice and rabbits. Novocain and trimecaine showed enhanced toxicity in mice subjected to the various forms of trauma in that their administration often led to shock terminating in death in doses that were without toxic consequence in healthy control animals. Determinations of $LD_{50}$ values also showed that control and traumatized mice were 1.4-times as sensitive to lidocaine than to Novocain and trimecaine. Following trauma, both Novocain and trimecaine were effective as local anesthetics for up to 30 days after mechanical trauma and combined mechanical-gamma irradiation exposure. However, trimecaine was a more potent analgesic than Novocain in intact animals subjected to combined mechanical-radiation trauma. Figures 1; references 7 (Russian).
[032-12172]

UDC 615.273.53:582.273].036.8+615.322:582.273].017:615.273.53].36.8

COMPARATIVE EVALUATION OF ANTICOAGULANT ACTIVITIES OF SULFATES POLYSACCHARIDES DERIVED FROM RED MARINE ALGAE

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 46, No 3, May-Jun 83 (manuscript received 15 Nov 82) pp 61-67

YEFIMOV, V. S., USOV, A. I., OL'SKAYA, T. S., BALYUNIS, A. I. and ROZKIN, M. Ya., 2nd Moscow Medical Institute imeni N. I. Pirogov; Institute of Organic Chemistry imeni N. D. Zelinskiy, Moscow

[Abstract] Thromboelastography was employed in the evaluation of heparin-like activities of 18 samples of sulfated polysaccharides derived from a variety of red marine algae. Polysaccharides derived from Trichocarpus crinitus, Turnerella mertensiana, Grateloupia turuturu, Phyllophora brodiaei, and Furcellaria fastigiata possessed the highest activities on the order of 83, 71, 80, 71 and 71% of that shown by heparin, respectively. The active polysaccharides were highly sulfated molecules, although there was no correlation between the degree of sulfation and anticoagulant activity, indicating that the nature of the carbohydrate moiety itself was of key importance. Figures 2; references 15: 7 Russian, 8 Western.
[032-12172]

UDC 577.322.53:591.145.2-812.6:543.422.23

# $^1$H NMR STUDY OF NEUROTOXIN II OF NAJA NAJA OXIANA AND ITS SPIN-LABELED DERIVATIVES. CONFORMATION OF "SHORT" NEUROTOXINS

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 9, No 9, Sep 83
(manuscript received 14 Mar 83) pp 1181-1219

PASHKOV, V. S., PLUZHNIKOV, K. A., UTKIN, Yu. N., KHINCHE, R., ARSEN'YEV, A. S., TSETLIN, V. I., IVANOV, V. T. and BYSTROV, V. F., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] The present study continued earlier work at the tital institute on neurotoxin spatial structure and reactions with acetylcholine receptors. Previously, N. n. oxiana neurotoxin derivatives were marked at $Lys^{26}$ and $Lys^{27}$ in order to determine the central loop and the orientation of spin markers. Here the labeling was extended to $Lys^{45}$ and $Lys^{47}$, and the NMR signal range from methyl group protons, $C^{\epsilon}H$-groups of lysine residue. $C^{\zeta}H$-groups in a weak field and NH-groups of peptide bonds studied. Results were compared with similar assessments of erabutoxin b Laticauda semifasciata. Previous studies were compared in assessing locations of molecule attachments to receptors. Discussion of NMR signals shows the role of spin labels and the pH-dependency of the chemical shifts in protons, resulting from varying microenvironments of side chains in $Lys^{15}$ and $Lys^{26}$ in these toxins. Weak field signals of $C^{\lambda}$ protons in the 5.3-6.3 range are attributed to serine residues. Amide protons, side chain exposure, reverse denaturation, and the Overhauser nuclear effect are discussed. Paramagnetic signal expansion from a few to 40 Hz was observed for aromatic CH- and weak field $C^{\alpha}H$-protons, while for methyl-group signals a qualitative expansion was noted. Additional structural factors for N. N. oxiana, b L. semifasciata and N. m. mossambica are presented to illustrate "short" neurotoxin structures. Figures 20; references 52: 6 Russian, 46 Western.
[051-12131]

UDC 612.821

## PSYCHOPHYSIOLOGICAL ASPECTS OF MONOTONOUS HUMAN ACTIVITY

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 7, Jul 83 (manuscript received 19 Jul 82) pp 102-111

KOLODYNSKIY, A. A. and KOLODYNSKA, V. V., Institute of Philosophy and Jurisprudence, Latvian SSR Academy of Sciences; Latvian Scientific Research Institute of Experimental and Clinical Medicine, LaSSR Ministry of Health

[Abstract] A review is presented of the current understanding of the psychophysiological correlates of monotonous mental and physical activity as it affects human performance. The basic mechanisms underlying the negative consequences (boredom, drowsiness, mental fatigue, disinterest, etc.) of such sensory monotony appear to involve activation of the right cerebral hemisphere with simultaneous deactivation of the left hemisphere and motor asymmetry. The activation of the right hemisphere, particularly the posterior temporal area, and the concomitant inverse change in the left one may be key factors leading to perturbation of interhemispheric neurodynamics and suboptimal selfregulation in the brain, finding somatic manifestations as less efficent task performance. Consequently, on the assumption that this hypothesis is correct, improvement of performance under such conditions may rest on the selective stimulation of the right and left hemispheres to ensure a near physiological functional balance. Figures 3; references 43: 31 Russian, 12 Western.
[009-12172]

## PROBLEMS OF PROPAGANDA PSYCHOLOGY

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 4, No 5, Sep-Oct 83 pp 81-82

YERASTOV, N. P.

[Abstract] Referring to Yu. V. Andropov's speech on the occasion of the 60th anniversary of the USSR, the author points out that Soviet propaganda must be perfected to be (in Andropov's words) "truthful, realistic, interesting and accessible, and thereby more effective." Contrasting bourgeois principles of a purely psychological approach, the author stresses that Soviet propaganda

must be built on true development of consciousness and high motives of mass activities as explicated by social scientists to further set sociopolitical aims, objectives and principles. Specialists led by A. K. Uledov are developing comprehensive psychological guidelines for propaganda. Organizational matters such as the eclecticism of different schools of psychological thought also require rectification. K. U. Chernenko has stressed a need for progress in this area at the June 1983 party plenum.
[079-12131]

SPATIAL ORGANIZATION OF BIOPOTENTIALS OF HUMAN NEUCORTEX AND ITS INFORMATIONAL ANALYSIS

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 4, No 5, Sep-Oct 83 (manuscript received 19 Mar 81) pp 142-146

KIROY, V. N. and PETROSOVA, T. A.

[Abstract] Study of neurophysiological mechanisms of mental processes have recently been closely tied to optimization of human behavior in complex problem-solving. The present study examines correlations between neocortex EEGs and the type of mental problems being solved, including processing of semantic information, solving anagrams and arithmetic problems, etc. The 10 subjects examined were of both sexes, aged from 20 to 35, and were advanced students and staff at Rostov University. Problems were presented on slides in a relaxed environment. Three stages of considering EEG correlation were statistical verification of all EEG correlation coefficients, calculation of individual values and establishing average values. Results showed the relative invariability of the spatial topography of EEG correlation coefficients from selected electrogram parameters. There was a decline in the level of spatial synchronization of biopotentials of frontal, parietal and occipital regions of the neocortex during problem solving. Informational analysis led to the conclusion that the frontal, left parietal and right occipital regions of the brain are most active in solving the test problems. References 24: 18 Russian, 6 Western.
[079-12131]

## RESPONSE TIME BY AMBULANCES IN MOSCOW EMERGENCY SERVICE

Moscow MOSKOVSKAYA PRAVDA in Russian 9 Oct 83 p 2

[Article by I. Margolina: "Wait, the Ambulance Will Come--Problems of Health Service"]

> [Text] "What is happening with our 'emergency help'? Is there really nothing that can be done for it to come faster?
>
> My wife and I are no longer young. She has had asthma for many years. She recently had a severe attack. I immediately called for an ambulance. Twenty to 30 minutes went by, and it was still not here. Finally, help came after another 15 minutes. It all turned out well. At present my wife is out of danger. But what would have happened if the ambulance had been another 20 minutes late?" L. Stepanov.

I went to the central dispatch service of "Emergency and Immediate Care" with the reader's letter. It is a large bright room separated into two parts by a hall. On the right is the communication console. The minute you dial "03" a lamp will light up on the console. The person on duty picks up the receiver. He enters the address, reason for call, name and surname of the patient on a call-registry card. He collects these cards and takes them to the left half of the room where the dispatcher of calls is located. In the city we now have 43 emergency substations that are distributed in different rayons. The dispatcher is connected to only one substation. He receives only the registry cards, the call address on which is in the range of operations of his substation. He contacts the person on duty, transmits information about the patient to him and, when there is an available vehicle, it leaves immediately.

Seconds go by to fill out the cards and counted minutes also pass to transmit the card and contact the substation. Now the vehicle is en route. Why then, does one have to sometimes wait 40 minutes, and even more for it? What prevents the "quick one" [Russian term for ambulance] from being really quick?

In order to find out, I asked the chief of the central substation, Igor' Gennadiyevich Vaulin, to allow me to respond to a call together with one of the medical brigades. He sent me to brigade No 14, which consisted of physician A. Kurganskiy, feldshers O. Basov and Ye. Popov. I went on two calls with them and had planned to go on others, but I realized that I could

not take any more, I was tired. Yet the brigades make 10-12 such trips per shift. In the winter there are considerably more of them. "In the winter, we come 'home,' to the substation, only to change syringes," confessed the feldshers, "we are in the vehicle all day long. As soon as we phone the dispatcher after a call and report that the brigade is free, we immediately get the next assignment."

I ask: "How do you communicate with your substation?" I learned that this is not always simple. When a call is received from an apartment or institution where there is a telephone, it can be used. But what if the occurrence is on the street? It would seem quite obvious that there must be communication equipment in the ambulance proper. After all, when picking up a patient it is necessary to request a bed for him at a hospital or to consult with the on-duty physician, check the address with the dispatcher. What is to be done in such cases? It is considered that communications exist: there is a radio set installed in each vehicle, but the brigades are not pleased with it. The radio sets break constantly and audibility is poor. And, since radio sets are not repaired, 25% of the ambulances have none at all. The brigade has to stock up on 2-kopek coins and run to the closest telephone booth. All is well if the booth is not occupied and the phone is working. But the patients are waiting in the meantime.... In accordance with a statute approved by the USSR Ministry of Health, ambulances should respond to emergency calls with working radios. The contract between the ambulance service station and the emergency station stipulates that a nonfunctional radio is cause for removing the vehicle from the line. Perhaps it is time now not to coax the service station each time, but to implement the sanctions stipulated in the statute.

Our conversation was interrupted by the command: "Brigade 14 to go out." The time is 1125 hours. The call is to an 83-year-old woman with a heart problem.

1135 hours: We depart. We do not have far to go, from Kolkhoz Square to Novoslobodskaya. The flashing light is turned on. We drove on to the bridge and ... got stuck. A traffic jam. I noticed that not a single driver slowed down to let the ambulance with its flashing light go through. It turns out that no one cares that somewhere, perhaps, a person is dying. Our vehicle was crowded off, drivers would cut by it, as if it was a truck, rather than an ambulance. On the streets, in the dense traffic, the ambulance was equated to ordinary transport.

"But why not turn on the siren, move out on the divider line and take advantage of the right to break the law in emergency situations?"

They explain to me that rights are rights, but ambulance drivers try to take advantage of them as little as possible. Often, at peak traffic hours, it would be easy to create an accident situation otherwise. It would be much more useful if drivers were more considerate on the streets of vehicles with a red cross on them.

1150 hours: We have arrived. We are lucky, we found the house right away. The front hall is dark. The elevator is not working. We have to go to the

fifth floor. It is good that it is not the ninth. We took our kits and toted them. Incidentally, sometimes physicians have to take cases with them that weigh up to 20 kg. Elevators that do not work are a bane. It is a good thing that today we do not have to carry the patient to the ambulance. The brigades consist essentially of women, and they do not have the strength for this. One has to go to neighbors' apartments and ask for their help. This is particularly inconvenient in the middle of the night. Yet it is expressly at night that one has to ask for help the most often; in many buildings, elevators are turned off at that time. Even when they are working, unfortunately they are of little help. The stretchers fit only into freight elevators and only when both of their doors are disassembled. And this is really rare. So that it is usually necessary to carry a patient down the stairs, whatever floor he is on. It is absolutely mandatory for elevators to be operating in buildings around the clock; it is absolute mandatory to finally design stretchers that can be converted into wheel chairs, so that they could go in any elevator.

In the apartment, they were waiting for the ambulance with impatience.

1210 hours: We report to the central dispatcher's station that the brigade is free. Our patient feels well. We learned that shehad been washing the floor, bent over, became dizzy and fell. Her pressure rose and she got a stabbing pain in the heart. Her daughter called for an ambulance. The physician in our brigade, A. Kurganskiy, took her pressure, gave her an injection and calmed her down. Everything was simple. But if the district physician had come instead of us, he would be able only to write out a prescription. However, we have the necessary medication with us and can immediately render all the necessary care. Isn't this the reason why people prefer to call the "03" number rather than the polyclinic? Is such a situation justified?

1220 hours: We are at the substation. A few minutes of rest. How do the brigades rest? Unfortunately, poorly. The constant extreme situations and enormous stress constitute the conditions under which they work. After this, one wants to relax, simply speaking, to stretch one's legs out and, perhaps, lie down for a bit. But on what? On the hard trestle-beds, with which the lounges are now being equipped? I learned that there were, in the past, some comfortable recliners. But virtually all of them became worn out, and there was nothing to replace them with. Last year, the furniture combine stopped manufacturing them. This is why they have to content themselves with the cots and hard chairs. True, it was possible to get 200 recliners, but 700 are needed!

1230 hours: Another call. This time, for an 8-month infant. An intestinal disease. The call was from the polyclinic. The infant has to be taken to the hospital.

1233 hours: We take off. The address is Sadovaya-Kudrinskaya. It is close by. If only we can find the building quickly. How often this is the reason for delay in medical care. Many times, it has been written that many house numbers are barely readable, while the new white and blue plates [with the numbers] are found only on the main thoroughfares. Unfortunately, the situation has never changed. Moreover, one can find out the name of a street only by driving up

to an intersection. Only there can one find the necessary signs. These "trivia" take up much time, and any delay in such situations could be fatal. My companions tell me how they once responded to a call on 13 Iskra Street, but they found three buildings with this address. There was no unit number either. They had to contact the dispatcher and identify the house according to its "appearance." And this, unfortunately, was not an isolated case.

1245 hours: We have arrived. We took the mother and infant. Now to the hospital, at the other end of the city.

1305 hours: Our tiny patient was received immediately at the hospital, we virtually did not have to wait. Yet, not infrequently, there is an enormous line of vehicles with patients in front of the receiving department. And it is not a matter of quantity of accidents, there is a shortage of gurneys, and the vehicles wait, the patients wait, and new emergency calls wait.

New emergency calls. Emergencies. There are no others for an ambulance. And such calls require immediate responses. Yet there are only 43 substations in the city. Moscow is growing constantly. And, of course, there are plans for new substations. Unfortunately these plans are being fulfilled to only 15-20%. As a result, there are 11 microregions with no substations at all. For this reason, the range of operation of existing ones is expanding. At the present time it usually constitutes 8-10 km and sometimes more. Although it has been estimated and confirmed by experience that the optimum range is 3-4 km. It is not difficult to comprehend how many valuable minutes the ambulance has to lose in the heavy traffic on the streets of Moscow. And the cost of these minutes to the patient and his family.

1340 hours: The brigade is free. It has phoned in. There are no calls yet. This means that we can go "home," have lunch and rest a bit. But the end of the shift is still far away. There remains some very difficult time on the shift, which demands mental, physical and emotional stress.

... None of us can be sure that he will never need the services of an ambulance. No one has such a guarantee. For this reason, obviously, no one has the right to shy away from the problems of this service. Of course, our report has not covered all of them by far. Only what is on the very surface. But if we solve them, we could help achieve faster responses.

10,657
CSO: 1840/098

## BRIEFS

RIGHTS OF BLOOD DONORS--"What privileges and guarantees have been established for workers who donate blood?" asks M. Pavlenko from Donetsk Oblast. The administration of an enterprise, establishment, or organization is obliged to give workers and employees a free day to go to the health establishment on the day of examination and on the day of giving blood for transfusion, as well as saving for them their usual earnings for these days. Workers and employees who become donors are permitted to take a paid day for recuperation immediately following each day of giving blood for transfusion. If the workers desires, this day can be added to the yearly vacation (article 114 of the RSFSR Labor Code). The next vacation will include only the recuperation day, not the day of giving blood. If blood is given during a vacation or on a nonworking day (a day off or a holidary), then the vacation is extended one day with payment of the usual earnings. On the day of giving blood, the donor is released from work regardless of what shift he is working and also what time (working or nonworking hours) he is giving blood. The administration is not required to allow employees to work who do not wish to take the day off on the day of giving blood and come to work. The certification necessary for releasing donors from work on the days of examination and giving blood, and paying them their wages on these days and the following vacation days is a summons and certificate from the health establishment attesting to the donor's presence at the examination or giving of blood. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 19 Jul 83 p 4] 12255

PROVIDING POPULATION WITH GLASSES--The USSR Council of Ministers, examining the question of providing the population with eye-glasses, observed in their decree that the Ministry of Medical Industry, Ministry of Chemical Industry, Ministry of Construction of Heavy Industry Enterprises, and Ministry of Health have not taken the necessary measures to implement the instructions of the party and government on the necessity of more quickly meeting the population's need for glasses. The USSR Council of Ministers instructed the Ministry of Medical Industry to provide for the production of 500,000 glasses frames in addition to the plan this year, to raise the output of frames to 28 million in 1985, to increase the output of bifocal lenses in 1985 to at least double the number of 1983, and to expand the capacity for lens manufacture to 100 million per year in 1985. The decree establishes targets for raising the technical production level of optical goods, improving the selection and quality of these goods, organizing new specialized optics stores and optical departments in drugstores, and allocating transportation resources for transferring optical-ophthalmological offices. The USSR Ministry of Health is instructed to ensure systematic monitoring of carrying out the decree. [Text] [Minsk SEL'SKAYA GAZETA in Russian 8 Sep 83 p 2] 12255

PROVIDING POPULATION WITH MEDICINE--In connection with the publication in No 201/202 of the article "Give the Dzhigit Medicine," the USSR Ministry of Health has made a thorough investigation, jointly with the RSFSR Ministry of Health, of the situation with regard to providing the population of Chechen-Ingush, Kabardino-Balkar, and North Osetian ASSR with medicine.

Additional serious shortcomings and violations have come to light in the work of drugstores, treatment-preventive establishments, drug administrations, and ministries of health of these autonomous republics. The materials of the article and results of investigations have been examined at a board of the USSR Ministry of Health, with the participation of leaders of the RSFSR Ministry of Health, and ministers of health and drug administration chiefs of the autonomous republics under investigation. The board confirmed the facts set forth in the article.

The board instructed RSFSR Ministry of Health, N. Trubilin and ministers of health and drug administration chiefs of these autonomous republics to take immediate measures to eliminate the shortcomings described in the article and uncovered as the result of investigations in the work of providing the population with medicine.

Ministries of health of the union republics were advised to discuss the article "Give the Dzhigit Medicine" at board meetings, to conduct additional investigation of providing the population with medicine, and to take steps to eliminate the shortcomings found.

The board instructed USSR Ministry of Health Main Drug Administration Chief M. Klyuyev to work out additional measures to perfect the system of supplying the population with medicines, and to make fuller use of computer technology in the work of drug administrations to improve planning of demand, distribution, and allocation of medicine, and raise the effectiveness of the information-inquiry service.

The board gave a firm warning to board members and chiefs of main drug administrations of the USSR and RSFSR ministries of health M. Klyuyev and A. Apazov about their personal responsibility for the serious existing shortcomings and for putting into operation a drug network for supplying the population with medicine; they reprimanded RSFSR Ministry of Health Main Drug Administration Deputy Chief N. Barannikov and Kabardino-Balkar Council of Ministers Drug Administration Chief N. Shomakhov. Kabardino-Balkar Minister of Health M. Berov was firmly alerted to the inadequate organizational work and poor monitoring of the activities of departmental drug and treatment-preventative institutions. It was brought to the attention of RSFSR Minister of Health G. Sergeyev that the monitoring of the work of the Main Drug Administration and republic drug administrations is inadequate.

Based on the materials of the article and the results of investigations made by presidiums of the councils of ministers of Chechen-Ingush and North Osetian ASSR, special decrees were issued which call for measures to eliminate shortcomings in supplying the population with medicine and improve the material base of the drug network, as well as holding all guilty parties accountable to strict disciplinary responsibility.

The board entrusted USSR Ministry of Health Deputy Minister N. Shmakov and USSR Ministry of Health Main Drug Administration Chief M. Klyuyev to make an investigation in April 1984, with the participation of the RSFSR Ministry of Health, of the work of drug administrations, drugstores, and treatment-preventive institutions of Kabardino-Balkar, North Osetian, and Chechen-Ingush autonomous republics to eliminate the shortcomings discovered in supplying the population with medicine. The results of the investigation are to be examined at a board of the USSR Ministry of Health. [By USSR Minister of Health S. Burenkov] [Text] [Moscow IZVESTIYA in Russian 30 Aug 83 p 2] 12255

BRIEF

EPIDEMIOLOGISTS' CONGRESS IN YEREVAN--Medical statistics can tell a great deal--how much medical aid has been given, how many people have regained their health, how many lives have been saved. But there is something they cannot do--answer the question of how many people did not get sick again, did not lose that most priceless gift--the ability to live and work. And while the representatives of practical medicine struggle every hour in their daily work for the life and health of each person in isolation, there is a service, the sanitary-epidemiological service, which, like a solider at the advance front beyond our sight, upholds the general line of our public health--prevention. Thanks to its daily and often unnotived work, many serious illnesses have been eliminated. Relatively recently, four decades ago, nearly every other inhabitant of the Ararat Valley suffered from Malaria. Now medical students study this disease, so terrible in the past, only as an artificial model. Infectious diseases caused by parasitic viruses and intestinal infections have dropped sharply. For many years now, the selfless and sometimes life-endangering work of epidemiologists, infectious diseases experts and parasitologists has been ensuring conditions of stable sanitary-epidemiological well-being in the republic. Today, the organs of the sanitary-epidemiological service are faced with new, important tasks--preserving the borders already attained, building up preventive and on-going surveillance of the state of the environment, implementing natural conservation measures, and strictly observing sanitary-technological and hygienic conditions at enterprises of the food industry and places of public eating and commerce. These and many other scientific and practical tasks have become the main topic at the Third Republic Congress of Epidemiologists, Microbiologists and Parasitologists, which opened yesterday in Yerevan. U. Pogosyan, chief sanitary physician of the republic and deputy ministry of the Armenian SSR Ministry of Health opened the congress with an introductory speech. "Against the background of the overall decline in infectious diseases, and even elimination of certain contagious illnesses, interest in epidemiology, whose task it is to learn the nature of the start and spread of disease among the population, and to control it, has grown significantly," she said. "The reason is, not simply because there are still a number of important unsolved epidemiological problems, but also because, in epidemiology itself, there have arisen new lines of investigation involving advances of microbiology, virology, parasitology, molecular biology, and demography. Therefore, epidemiology today has taken on a synthesizing nature. Infectious diseases still continue to have a considerable harmful effect on the population's health. Thus, our service is faced with great and responsible tasks which must be resolved by practical epidemiology. Ever greater importance

pertains to the struggle against virus infections, and combatting severe intestinal infections still remains a problem. With the development of large-scale foreign tourism, questions of preventing diseases transmission are acquiring particular urgency. There is a real possibility of imported cases of malaria coming from tropical countries, and, therefore, preventing a flare-up of local cases of this disease is one of the important areas of work of physicians-epidemiologists. Epidemiological problems have a special place among the multi-faceted and extremely important medical problems. After all, the main thing is the preventive aspects in medicine, and the sources of this must be found in epidemiology, the science which has been the basis of the preventive effort, like a guarantee of good public health. The strong foundation for resolving tasks in the field of public health is the program for strengthening disease prevention and building up the population's health which will be implemented in the period up to 1990. The guarantee of successful resolution of these tasks is the selfless labor of physicians in the direction of prevention." Then the congress set about carrying out its work program at the plenary session. [Armenpress report] [Text] [Yerevan KOMMUNIST in Russian 8 Jul 83 p 2] 12255

## BRIEFS

REPORT ON GOOD WORK AT KIRGHIZ HOSPITAL--I have been working for 15 years at the Kalininskiy Central Rayon Hospital, where I came after graduating from Frunze Medical Institute. I was an obstetrician-gynecologist, then department head, and now I am the deputy chief physician. Even before, much attention had been given to medical care of the public in this rayon, but still, when I look back, I can notice great changes. At the present time, there are 695 beds at the central hospital, which is almost twice as much as 10 years ago. There are 140 physicians and 470 specialists with secondary education at work in the rayon. Most are highly qualified. M. Demchenko, Kh. Bakhavatdinov and A. Nazarenko have had the high title of Honored Physician of the Republic bestowed upon them, doctors G. Onishchenko and Sh. Achekeyev have the highest classification and there are 10 with first-class rating. Today, the rural resident has the opportunity to receive the same medical care as the urban one. Thus, physicians have office hours in 20 specialties. We can render the needed care around the clock. To satisfy the wishes of rural workers, a cardiological and neurological department were opened recently. While radiculitis, for example, previously had to be treated mainly in the home, it can now be administered in a hospital. We have good contact with the Scientific Research Institute of Cardiology. At present, a special telephone is being installed, which will be used at the institute to interpret electrocardiograms (of our patients) transmitted over it. The resuscitation department of the rayon hospital has the title of collective of communist labor. This important sector is headed by an experienced physician, O. Prudnikov. The department is outfitted with the most refined apparatus and equipment. For example, there is a high-speed laboratory which can deliver the needed analyses within a few minutes. A new type of anesthesia has begun to be used. Today, our objective is to change over to full coverage of the public with dispensary supervision. Patients come to see physicians at the polyclinic daily. Working on a new schedule, we can now see up to 800 people. In brief, no one leaves the polyclinic without receiving the necessary care. The specialists at the central rayon hospital often travel to see field workers and livestock farmers. They have at their disposal a mobile gynecological consultation office, stomatological and dental prosthetic offices. [By T. Karabekova, deputy chief physician, Kalininskiy Central Rayon Hospital] [Text] [Frunze SOVETSKAYA KIRGIZIYA in Russian 23 Oct 83 p 2] 10,657

FRENCH-SOVIET COLLABORATION IN DEVELOPMENT OF MEDICAL INSTRUMENTS--The third Soviet-French symposium on "Use of Physical and Mathematical Methods and Computers to Develop Medical Equipment and Systems" finished its work in Tashkent on 28 October. The symposium was organized by the USSR Ministry of the Medical Industry and French National Institute of Health and Medical Research. "We are pleased with the results of the Tashkent meetings," said Yves Mosquetto, director of the Biomedical Technological Center in Lille. "Collaboration in the field of medical instrument-making is developing quite well. We are constantly exchanging new ideas with our Soviet colleagues, who have achieved outstanding results in this direction." Professor V. A. Viktorov, doctor of engineering sciences, recipient of the USSR State prize, director of the All-Union Scientific Research Institute of Medical Instrument Making, also expressed his opinion: "It is very important," he said, "that there are high achievements in development of medical engineering, not only in Moscow and other cities, but in the national republics, in particular Uzbekistan, where we spent a few days that were beneficial and interesting. For example, several interesting projects were developed at the Uzbek Cybernetics Scientific Production Association, which include an automated system for interpreting electroencephalograms that has found wide application. This was reported at the symposium, the proceedings of which will unquestionably serve for further refinement of medical instrument making in the Soviet Union and France." [From Uzbek News Agency] [Text] [Tashkent PRAVDA VOSTOKA in Russian 29 Oct 83 p 2] 10,657

CSO: 1840/105

UDC 612.664.191.452:018

FEATURES OF LACTOGENESIS IN NEW MOTHERS WHEN RESIDING WITH INFANT IN A LYING-IN HOME

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR. SERIYA BIOLOGICHESKAYA in Russian No 4, Jul-Aug 83 pp 65-66

KONKABAYEVA, A. Ye. and KHAKIMZHANOVA, G. D., Institute of Physiology, KaSSR Academy of Sciences, Alma-Ata

[Abstract] The role of emotional factors in hypolactia has long been known. The authors studied the effects of living together with the new-born at lying-in homes where normal birth, involving few tensions or pain that had been shown to increase catecholamines in the blood, had occurred. The study, in Alma-Ata, considered mothers from 20-35 in two groups, one with a history of septic complications and the other with no such inflammations. Colostrum was gathered from all subjects for 6 days and fat and lactose content measured. Both groups showed declines in adrenalin and noradrenilin by 6 days after giving birth. Those with no history of infections showed earlier declines. The lying-in environment reduced tension but also brought a temporary reduction in chemical composition of breast milk, with lactose content dropping for a period. References 5 (Russian).
[37-12131]

UDC 616-056.253-053.31-071.2

DIFFERENTIAL EVALUATION OF NEONATES WITH LOW BIRTH WEIGHT

Moscow MEDITSINSKAYA SESTRA in Russian No 7, Jul 83 pp 18-20

DEMENT'YEVA, G. M., candidate of medical sciences, Department of Neonate Physiology and Pathology, Moscow Scientific Research Institute of Pediatrics and Pediatric Surgery, RSFSR Ministry of Health

[Abstract] Data of recent years have led to reevaluation of the criterion of weight as an indicator of full-term or premature birth. The previous watershed of 2500 gm body weight has been refuted by several studies showing that gynecological, inflammatory, endocrine and cardiovascular maladies can determine low body weight, particularly in pregnancies following miscarriages or

abortions and pregnancies other than the first. Birth complications and the need for Caesarean section delivery are also more common with low birth weights. Various factors causing retarded intra-uterine development are discussed. The special qualifications needed by today's nurses to deal with the problem of low-birth-weight babies include understanding of their special needs and special risks.
[036-12131]

UDC 616-053.31-02:614.7]-07

EFFECT OF ENVIRONMENT ON NEW-BORN BABIES

Moscow MEDITSINSKAYA SESTRA in Russian No 7, Jul 83 pp 20-22

SUSLOVA, G. F., candidate of biological sciences, Scientific Research Pediatric Institute, USSR Academy of Medical Sciences, Moscow

[Abstract] The environment affects most human functions, including the neuro-endocrine and humoral regulatory systems and the cardiovascular, respiratory and digestive systems. Modern knowledge of normal body functions and mathematical calculations of cytochemical parameters are applied in the present study to assess height and weight progress and other growth factors as related to the human environment. Sun activity effects have been studied by A. L. Chizhevskiy, and his results indicate a close tie between helio-geomagnetic activities and bronchial, digestive and coagulative functions. As non-specific irritants, these activities have particular impact on children under one year of age and, especially, on premature infants. Other factors which affect the health of infants include pathology of pregnancy, heredity and birth difficulties. Some beneficial remediation has been achieved through prolonged nursing, physical exercise and massage.
[36-12131]

UDC 616-053.32-083.2

FEEDING PREMATURE NEWBORN BABIES

Moscow MEDITSINSKAYA SESTRA in Russian No 7, Jul 83 pp 22-26

YATSYK, G. V., doctor of medical sciences, Scientific Research Pediatric Institute, USSR Academy of Medical Sciences, Moscow

[Abstract] Care for premature neonates remains a critical problem, partly because of the low tolerance of immature digestive systems to food. The author discusses initial feeding related to birth weight, vitamin, mineral and caloric needs, the breakdown into protein, fats and carbohydrates, and daily frequency of feedings. He notes that breast-fed babies require less protein, with 2.2-2.5 gm per kilogram recommended. With formula feeding, 3.5-4.9 gm are

needed. Other specific recommendations of dietary components are also suggested, with the note that individual differences must be monitored. The tie between nitrogen balance and protein intake, and required fat intake, are discussed. Breast feeding is preferred, but where the new mother has difficulty in providing sufficient milk, either wet-nurse milk, donors or powdered formula are to be used. In the former instances, hygiene in obtaining human milk must be strictly maintained. Vegetables are recommended to prevent anemia and rickets early, while liver can be offered at 5 months, followed by chopped meat at 7 months.
[36-12131]

UDC 616.053.32.036.882-08

INTENSIVE CARE UNIT WORK IN SPECIALIZED HOSPITAL FOR PREMATURE INFANTS

Moscow MEDITSINSKAYA SESTRA in Russian No 7, Jul 83 pp 26-28

MARCHENKO, Z. M., MACHINSKAYA, L. A., MININA, G. I. and FROLOVA, M. I., Moscow Scientific Research Institute for Pediatrics and Pediatric Surgery, RSFSR Ministry of Health

[Abstract] Since some 30% of premature infants require some intensive resuscitative aid, the Moscow City Clinical Hospital No 12 established such a facility in 1979. Located in an isolated section of the hospital, it is equipped for express diagnosis and blood testing and has constant oxygen supply, X-ray and presurgical prep facilities. About half of the admitted babies have body weight below 1500 gm, and also about half have infectious or inflammatory conditions. Comprehensive diagnosis and thorough care by trained nurses are the hallmarks of the intensive care unit. Vaporized treatment with alkalies, alcohols, antibiotics and interferon is provided. The modern facilities, careful records and thorough care offered at the hospital have resulted in high recovery rates and low mortality at the unit.
[36-12131]

UDC 613.22:[613.953.4+613.954.4

NUTRITION AT PRESCHOOL INSTITUTIONS

Moscow MEDITSINSKAYA SESTRA in Russian No 7, Jul 83 pp 37-41

GURVICH, D. B., candidate of medical sciences, Moscow Scientific Research Institute for Pediatrics and Pediatric Surgery, RSFSR Ministry of Health

[Abstract] Discussing nutritional needs of preschool children (1-7 years of age), the author notes the need for a protein balance with some 65% animal and 35% vegetable protein, the role of carbohydrates in utilization of protein, and the importance of minerals and vitamins for good health. Differing needs

of 1-3 year and 3-7 year age-groups are delineated, as are the needs of children with appetite irregularities that require more frequent meals. Their needs for familiar foods as well as new eating experiences, and of varied diets planned through the week, are stressed. General suggestions for planning balanced, interesting menus that will encourage good eating habits at various ages, suitable portions for different ages, and other factors in child nutrition are discussed.
[36-12131]

UDC 614:374]:613.953

EFFECTIVENESS OF SANITARY EDUCATION OF PARENTS OF YOUNG CHILDREN

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 9, Sep 83 (manuscript received 26 Apr 83) pp 10-11

DERYUGINA, M. P., Belorussian Scientific Research Institute of Motherhood and Childhood Protection

[Abstract] A questionnaire study was conducted on 434 families in Belorussia to determine the effectiveness of sanitary and hygienic education of the parents of young children in relation to the health status of the children. As expected, the answers revealed that major factors having an adverse effect on child health were inappropriate nutrition, daytime routines (playing, taking walks, etc.), and ineffective physical fitness training. By and large, most parents responsible for such shortcoming were in the younger age bracket and those with unfinished secondary education. Pediatric services at polyclinics should pay particular attention to training parents for proper treatment of their children, in light of the shortcomings revealed by this study.
[029-12172]

UDC 616-053.2:614

CHILD MORBIDITY IN RELATION TO SOCIOHYGIENIC FACTORS

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 9, Sep 83 (manuscript received 10 Jun 83) pp 12-13

ZUBRITSKIY, M. K., Chair of Social Hygiene and Public Health Organization, Minsk Medical Institute

[Abstract] An evaluation was made of the morbidity of 20,869 children up to 14 years of age in Minsk in relation to various sociohygienic factors and medical and social status of the families. The mean annual morbidity analysis revealed 1984.3 cases per 1000 subjects; the highest incidence occurred in the 0-3 years age group (3138.6%), which was 1.3-, 1.9-, and 2.7-fold greater than the incidence of the 4-6 years, 7-9 years, and 10-14 years age groups, respectively.

Most of the illnesses involved the respiratory organs, followed by infectious and parasitic diseases; neurologic and sensory problems ranked third in the morbidity pattern. A statistically significant correlation prevailed between morbidity and the home conditions of the children and the educational level of the mother, with the morbidity figures confirming the negative effects of inappropriate family hygiene on child health. There was no correlation between maternal social status and family income per individual in the family and the pediatric morbidity pattern, which fact emphasized the social homogeneity of the socialist countries with respect to health. References 12 (Russian).
[029-12172]

UDC 616.5-022.1:576.851.252]-053.31

IMPORTANCE OF CONTACT TRANSMISSION IN STAPHYLOCOCCAL COLONIZATION OF SKIN OF NEONATES

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 9, Sep 83 (manuscript received 6 Oct 82) pp 26-28

RIMZHA, M. I., Chair of Epidemiology and Microbiology, Belorussian Institute for the Advanced Training of Physicians

[Abstract] An analysis was made of the factor responsible for colonization of the skin of neonates by staphylococci. The data showed that the leading factor responsible for such colonization was contact transmission from the medical personnel during diapering. Other factors are also of importance, such as settling of staphylococci from air, but account for less than a third of the cases of colonization. Disinfection of the hands of the medical personnel prior to changing diapers led to a four-fold decrease in the incidence of pyogenic infections of the infants over a 30 month period of observation in Minsk. This was an important factor in reducing the overall morbidity of neonates and infants, as well as in reducing the percentage of cases requiring hospitalization from 20.1 to 8.2% ($P < 0.001$). Figures 1; references 11: 8 Russian, 3 Western.
[029-12172]

UDC 618.4

AGE-RELATED DURATION OF LABOR

Kazan KAZANSKIY MEDITSINSKIY ZHURNAL in Russian Vol 44, No 4, Jul-Aug 83 p 305

BAYTERYAK, I. K. and YARULLIN, A. Kh., Kazan

[Abstract] A study was conducted on the duration of labor in primi- and multigravidas as a function of age. The survey of 8445 cases showed that for women 20 year or less in age the duration for the primigravidas and multigravidas was 11 h 31 min and 11 h 33 min, respectively, a statistically insignificant difference. For the other age groups the differences were statistically significant ($P < 0.001$) for the primi- and multigravidas: 21-24 years, 13 h 42 min and 7 h 00 min; 25-29 years, 11 h 36 min and 6 h 42 min; 30-34, years 13 h 6 min and 7 h 48 min, and 35 years and over, 21 h 00 min and 8 h 48 min.
[021-12172]

UDC 362.172+362.7

ADMINISTRATIVE AND MEDICAL ASPECTS OF ANTENATAL FETAL CARE

Moscow VOPROSY OKHRANY MATERINSTVA I DETSTVA in Russian No 8, Aug 83 pp 3-5

SAVEL'YEVA, G. M., CHERVAKOVA, T. V. and TOKHIAN, A. A., Chair of Obstetrics and Gynecology, Pediatrics Faculty, 2nd Moscow Medical Institute imeni N. I. Pirogov; All-Union Scientific Research Center for Mother and Child Protection, USSR Ministry of Health, Moscow

[Abstract] Protection of the health of the mother and child and their welfare has always been in the center of attention of the government and the Communist Party of the Soviet Union, and the legal basis for such concern was established by V. I. Lenin in the decrees he promulgated. The Soviet scientists have made significant contributions to fetal and perinatal medicine by a thorough study of embryogenesis and fetal physiology which provided the essential factual substrate for fetal and perinatal medicine. Administratively, the concern for the welfare of the mother and child finds manifestation in the extensive network of hospitals and clinics specializing in maternal and pediatric care, and the mobile maternity services in the northern regions of the USSR. Antenatal fetal medicine is a relatively new specialty which is growing rapidly, and its significance has already been expressed in the reduction of perinatal morbidity and mortality.
[022-12172]

UDC 612.55-053.2([47+57]-17)

HEAT BALANCE AND EXCHANGE IN CHILDREN OF INDIGENOUS GROUPS IN SOVIET FAR NORTH

Moscow GIGIYENA I SANITARIYA in Russian No 9, Sep 83 (manuscript received 13 Apr 83) pp 35-39

DEDENKO, I. I., ROMANENKO, O. I., USTYUSHIN, B. V. and SHUSHKOVA, T. S., Moscow Scientific Research Institute of Hygiene imeni F. F. Erisman

[Abstract] Studies were conducted on heat balance and exchange in 120 children of indigenous groups (Koryaks in Kamchatka; Ngasans, Dolgans, and Nentsy in Taymyr) and Russians living in the Far North during winter to determine their general state of health. Comparative thermal and cardiovascular data were obtained for Russian children in the intermediate climatic zone. The non-Russian children (7-8 years of age) were found to have lower skin temperature and greater loss of body heat via exaporation than the Russian residents of the Far North under room conditions. Exposure to outside ambient temperature for 1 h resulted in the reduction of skin temperature by 3-8°C and a two-fold increase of heat loss; concomitantly with an increase in body heat formation, heat loss by convection and radiation increased 1.5-fold and that expanded on warming inhaled air increased three-fold. In addition to racial differences among the different group, on an overall basis children in the Far North had higher heart (83-93) and respiratory (26) rates and in the Russian children the vertical electrical axis of the heart was deviated to the right. References 15 (Russian).
[066-12172]

UDC 614.3/.4+616.9-036.2]:378.661

IMPORTANCE OF PRACTICAL TRAINING IN THE EDUCATION OF PHYSICIAN HYGIENISTS AND EPIDEMIOLOGISTS

Moscow GIGIYENA I SANITARIYA in Russian No 9, Sep 83 (manuscript received 7 Feb 83) pp 39-42

CHERNENKO, V. D., VORONTSOV, M. P. and KRIVONOSOV, M. V., Kharkov Medical Institute

[Abstract] Experience has shown that many physician hygienists and epidemiologists are familiar with the theoretical foundations of their professions, but quite incapable of practical application of such knowledge in their professional activity. This is frequently due to an inability to accurately and correctly analyze a given situation and make independent decisions. Consequently, details are provided of the educational measures taken to provide practical training in a variety of sanitary and epidemiologic settings employing a supervised problem-solving approach. The major advantage of such training is that it provides the trainee with habit-forming patterns of analysis and decision making that, in conjunction with continuing education, can be carried over into their professional activities.
[066-12172]

UDC 613.95:658.386.3

METHODOLOGICAL ASPECTS OF POSTGRADUATE EDUCATION OF PHYSICIANS IN CHILD AND ADOLESCENT HYGIENE

Moscow GIGIYENA I SANITARIYA in Russian No 9, Sep 83 (manuscript received 15 Feb 81) pp 42-44

SELIVANOV, A. P., SMOLENSKAYA, I. Ya. and TOMASH, V. V., Donetsk Medical Institute imeni M. Gorky

[Abstract] A description is provided of postgraduate training in child and adolescent hygiene at the Donetsk Medical Institute. In its essential features, the course of study consists of both theoretical and practical course work and involves participation at seminars and library training in the use of bibliographic sources. About 30% of the course work is devoted to review of familiar material for reinforcement, 40% is devoted to acquistion of new knowledge, and 30% to on-site training in kindergartens, schools, industrial day care centers, etc. For maximum effectiveness the training program is conducted in close contact with the sanitary, epidemiologic, pediatic, and adolescent services.
[066-12172]

UDC 616-053.3+618.439] 312.2(479.24)

DYNAMICS AND CAUSES OF PERINATAL INFANT MORTALITY IN AZERBAIJAN

Baku ZARBAYDZHANSKIY MEDITSINSKIY ZHURNAL in Russian No 3, Mar 83 pp 67-70

SULTANOV, B. B., Chair of Social Hygiene and Public Health Administration, Azerbaijan Order of the Red Banner of Labor State Medical Institute imeni N. Narimanov

[Abstract] A review of statistics on perinatal infant mortality in Azerbaijan for the period 1970-1978 has revealed a 5% decrease, with the rate of decrease much greater in the rural areas than in the urban setting. The mortality figures for preterm neonates was higher that for full-term infants and was inversely proportional to birth weight. The optimum range of birth weight for survival was in the 3000 to 3500 g range; above 4000 g the mortality again increased. Asphyxia was determined to be the major cause of infant death in Baku, the underlying causes of which were gestational toxicosis, developmental abnormalities, placental disorders, etc. References 7: 6 Russian, 1 Western.
[030-12172]

PROGRESS IN LOWERING INFANT MORTALITY IN TURKMENISTAN

Ashkhabad ZDRAVOOKHRANENIYE TURKMENISTANA in Russian No 7, Jul 82 pp 3-6

DER'YAYEV, I., Chair of Pediatric Diseases, Turkmen Order of People's Friendship State Medical Institute

[Abstract] Certain factors and facts pertaining to infant mortality in Turkmenistan are reviewed. Medical statistics show that from 1926 to 1980 infant mortality decreased six-fold in Turkmenistan; nevertheless, postneonatal mortality continues to fluctuate around 84-86%, which is two- to four-times as great as for the rest of the USSR. Factors which have the most influence on infant mortality have been identified as sex of the child, maternal age, and birth order. The male: female sex ratio in infant mortality is on the order of 100:131-135. Mortality is highest in the case of mothers less than 20 years of age, and lowest in the 30-34 years age group. The mortality for first born is twice as great as that of the 3rd or 4th child, and increases again (1.2-fold) with the 5th birth order and greater. During the last decade respiratory disorders accounted for 63.7-66.0% of infant mortality, and gastro-intestinal diseases for another 14.9-18.3%. Analysis of other contributing factors (late hospitalization, mis-diagnosis, inappropriate nutrition and care) point to the need for improvements in the infant health care services and parental education in Turkmenistan.
[034-12172]

UDC 616-007.1-053.31:313.3(470.54-25)

1956-1981 MORBIDITY STATISTICS IN SVERDLOVSK ON DEVELOPMENTAL ABNORMALITIES IN INFANTS

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 5, May 83 (manuscript received 10 Sep 82) pp 15-17

MALYSHEVA, R. A., professor, honored scientist of the RSFSR, and DROZDOVA, O. O., Sverdlovsk Scientific Research Institute of Mother and Child Protection, RSFSR Ministry of Health

[Abstract] A review of the morbidity statistics on developmental abnormalities in preterm and term infants in Sverdlovsk for the period 1956-1981 did not reveal any significant changes during that time interval. The mean figure for such cases in 1981 was 1.06% (vs. 1.25% reported by WHO), with territorial variations within the city ranging from 0.7 to 1.8% for which no apparent cause could be established. In order of frequency, the anomalies most often involved the cardiovascular, musculoskeletal, and central nervous systems, followed in fourth place by Down's syndrome, craniofacial lesions, and multiple abnormalities.
[076-12172]

UDC 614.253.58:658.387

FUNCTION OF FELDSHER-MIDWIFE STATIONS IN ROSTOV OBLAST

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 5, May 83
(manuscript received 12 Jul 82) pp 33-36

PAKHARIN, V. I., Rostov Oblast Department of Health

[Abstract] A brief overview is presented of the operational status of the 1125 feldsher and feldsher-midwife stations in the Rostov Oblast, which 40% of the rural population receives medical care. Such stations handle more than three million patient visits per year, and the staff makes more than a million home visits on an annual basis. Approximately 80% of the cases seen at such stations are for respiratory diseases, accident tauma, neurologic and sensory organ problems, and cardiovascular disorders. A positive trend is discernible in that fewer patients are seen for gynecologic problems, gastrointestinal disorders, and childhood diseases; the latter phenomenon is largely due to improved road conditions that make hospitals and medical outpatient services more accessible. Continuous efforts are being made to further improve and upgrade the facilities at such stations, and to provide the feldshers and midwifes with better educational opportunities.
[076-12172]

ALDASHEV, A. A., PITANIYE I VYSOKOGOR'YE [NUTRITION AND HIGH ALTITUDE], ALMA-ATA, KAZAKHSTAN, 1983

Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 9, Sep 83 pp 75-76

SAULEBEKOVA, M. S., Reviewer, Chief of Laboratory, Kazakh Branch, Institute of Nutrition, USSR Academy of Medical Sciences; Professor

[Abstract] Aldashev's book is said to be the first in the USSR and abroad to deal with the problem of nutrition under alpine conditions, and covers this problem from both the theoretical and practical aspects. Although nutrition is the main theme, the book of necessity deals extensively with hypoxic hypoxia. Particular attention is accorded to the metabolic variations at high altitudes due to altered enzyme activities and the consequences of such physiological changes on human health. The author suggests that diets with a balanced amino acid composition and high concentrations of easily assimilated carbohydrates (mono- and disaccharides) as well as supplementary use of vitamins with antioxidative action, may have beneficial effects at high altitudes.
[025-12172]

UDC 614.27:362.145(476)

CURRENT STATUS AND PERSPECTIVES FOR IMPROVEMENTS IN HOSPITAL PHARMACIES IN THE BELORUSSIAN SSR

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 7, Jul 83 (manuscript received 15 Dec 82) pp 10-11

GOREN'KOV, V. F. and MIRONOVA, G. M., Belorussian Institute for the Advanced Training of Physicians; Main Pharmacy Administration, Belorussian SSR Ministry of Health

[Abstract] A review is provided of the current status of hospital pharmacy services in Belorussia which encompass self-supporting pharmacie (including inter-hospital pharmacies) and fixed-budget pharmacies. As of January 1, 1982 the Belorussian SSR had 853 hospitals and clinics with a total capacity of 118,995 beds. The fixed-budget pharmacies served 35.9% of the beds, and the self-supporting pharmacies 64.1%. Over the past decade there has been a consistent pattern of transforming the fixed-budget pharmacies into self-supporting units to render them more efficient and cost-effective operations. This trend is expected to accelerate and is encouraged by the appropriate administrative bodies, following adequate material and financial preplanning.
[035-12172]

UDC 614.2(470)"1982"

DECISIONS OF THE NOVEMBER (1982) PLENUM OF THE CC CPSU AND PUBLIC HEALTH IN THE RSFSR

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 6, Jun 83 pp 3-9

TRUBILIN, N. T., RSFSR Minister of Health

[Abstract] Current status of health care in the RSFSR is discussed in light of the decisions of the November (1982) Plenum of the CC CPSU on "Additional Measures for Improving Public Health". In addition to the expansion of health care services in the RSFSR, which has led to the availability of 132 hospital or clinical beds per 10,000 population, there are certain shortcomings in the medical care and pharmaceutical services which need attention. Much of the difficulties are due to administrative errors, mismanagement, and lack of communist resolve in bringing the optimum in health care to the population. A key factor in bringing further improvements in health care requires instilling, in the medical and administrative personnel, a greater sense of responsibility and concern and, a more rational utilization of the extensive resources currently available for the welfare of the people.
[075-12172]

UDC 616-036.86(]47+57]-17)

## SOCIOHYGIENIC CHARACTERISTICS OF DISABILITY AMONG INDIGENOUS PEOPLE OF SOVIET FAR NORTH

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 9, Sep 83 (manuscript received 28 Dec 82) pp 21-24

KOROBOV, M. V., candidate of medical sciences, and KATS, E. I., Leningrad Scientific Research Institute of Work Fitness Expertise and Labor Organization of Invalids

[Abstract] Surveys on the health status of natives of the Soviet Far North have shown that their morbidity and disability patterns differ from the rest of the population, largely due to living habits and occupational predictions. Analysis of the statistical data for three such groups (Nentsy, Yamalo-Nentsy, Khanty-Mansiysk) showed a general disability figure of 88.8/10,000, in a total population of 50,235 in the regions covered. Group I invalids accounted for 10.8% of the morbidity, Group II 72/2%, and Group III 17.0%. This pattern differed markedly from that seen for the other residents in those regions, among whom Groups I and II accounted for 60.8% of the morbidity and Group III invalids for 39.2%. Among the natives, trauma was responsible for 20.$% of the disability, tuberculosis for 19.1%, mental disorders for 18.6%, cardiovascular problems for 11.7%, and neurologic conditions for 12.3%. These results underscore the need for more intensive health work among the natives of the Far North and the gradual redirection of their occupation efforts from deer husbandry, fishing, and hunting to generally more productive efforts. [077-12172]

## DIAGNOSTIC POTENTIAL OF ULTRASOUND RECORDING OF FETUS, PLACENTA AND CONTENT OF AMNIOTIC FLUIDS DURING BIRTH

Frunze ZDRAVOOKHRANENIYE KIRGHIZII in Russian No 3, May-Jun 83 pp 28-32

ABRAMCHENKO, V. V., AKKERMAN, L. I. and MURZAKMATOV, M. A., Institute of Obstetrics and Gynecology, USSR Academy of Sciences, Leningrad

[Abstract] This article is of a general didactic character. After a brief discussion of the introduction of ultrasound (US) techniques into OB-GYN practice, the possibilities of use of the two-dimensional method of US are presented. Diagnostic information yielded by this safe and simple technique includes definition of the position of the fetus and adjacent parts, clarification of the biometry of the fetus (particularly useful in high-risk patients), determination of the relative dimensions of the fetal head and maternal pelvis, numbers of fetuses, hydramnios, fetal anomalies, position of the placenta and functional, hydrodynamic anatomical information. [033-8586]

VETERINARY MEDICINE

UDC: 578.835.31(048.8)

# CALICIVIRUSES

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 7, Jul 83 (manuscript received 22 Oct 82) pp 13-22

[Article by S. G. Drozdov, Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow]

[Text] The increased attention being given in recent years to caliciviruses is attributable to a number of their distinctions and, first of all, their unique ecological plasticity: the caliciviruses of pinnipeds (sea lions, seals) introduced into terrestrial ecosystems were found to be pathogenic to domesticated swine, as the pathogens of specific vesicular exanthema, which rapidly became enzootic over vast territories. According to the data of Studdert [66], the ecological and epidemiological situation, in which it became possible for pinniped caliciviruses to induce vesicular exanthema of swine is similar to the situation in which Lassa and Marburg viruses induce hemorrhagic febrile diseases in man.

The morphology and monopolypeptide composition of the virionic capsid of calicivirus differ distinctly from all other viruses. The information that is being accumulated about the relationship of caliciviruses to human infectious pathology is the reason for their increasing significance in medical virology.

## History of Investigation

The study of caliciviruses began in 1932, after discovery of vesicular exanthema of swine [69] caused by them in California, which was very similar in symptomatology to foot and mouth disease. Feline calicivirus was discovered in 1957, concurrently by Bolin [10] and Fastier [22]. The first pinniped calicivirus, the virus of sea lions from San Miguel Island, which is in the Pacific Ocean near the California coast, was isolated in 1972 [57], and later similar viruses were found in fur seals and northern elephant seals on the Pribylov Islands near Alaska; they were also isolated from the opal-eyed sea perch, on which pinnipeds feed, as well as from the liver fluke that is a sea lion parasite [62].

Very recently, some comprehensive data were obtained as a result of the epidemiological and virological research of Smith et al. [58, 61], which indicated that the caliciviruses inducing vesicular exanthema of swine originate

from pinniped caliciviruses. In turn, this conclusion validates the opinion that it is impossible to eradicate swine vesicular exanthema (such a task was brought up by the U. S. Veterinary Service and the discontinuation of clinically marked disease among swine since 1956 was considered to be a confirmation of eradication of the disease).

In 1976, Madeley and Cosgrove [33], and later Flewett and Davies [23] reported the discovery of viral particles morphologically analogous to caliciviruses in excrements of children with acute gastroenteritis. Similar data were reported by Kjeldsberg [26], Chiba et al. [15, 16] and other researchers, and at the present time, the significance of caliciviruses in infectious human pathology is the subject of intensive investigation.

Thus, the caliciviruses known to date are divided into groups, in accordance with the host animals. Studdert [66] identifies these groups as follows: 1--swine caliciviruses (abbreviated as PoCV--porcine calicivirus); 2--pinniped caliciviruses (PiCV); 3--feline caliciviruses (FCV). It is expedient to add to these three groups (somewhat arbitrarily for the time being) human caliciviruses (HCV).

The results of studies pursued in recent years clearly indicate that the spectrum of natural hosts of caliciviruses differs from the one described above; however, the proposed grouping is quite suitable as a working classification.

## Taxonomy

Until recently, all known caliciviruses were referable to the genus Calicivirus (from the Greek, calyx or Latin, calyx--cup), family Picornaviridae [36], and described as small RNA-containing viruses [40]. However, as far back as 1974, Burroughs and Brown [12] suggested that caliciviruses be considered an independent family, on the basis of the significant morphological differences between caliciviruses and picornaviruses. After establishment of the differences between these viruses in genome strategy as well [17], the International Committee for Virus Taxonomy accepted the suggestion to distinguish caliciviruses as the Caliciviridae family [37, 52].

## Morphology and Morphogenesis

The results of morphological studies of caliciviruses [3, 44, 72, 78] revealed that their virions have a roughly spherical or polyhedral shape, with particle diameter of 32-40 nm (average 37 nm). In negatively contrasted preparations, deep cup-shaped depressions, about 10 nm in diameter, that are filled with contrast medium, are demonstrable on the surface of the virions; 12 of them are situated on the apices of the icosahedral capsid and 20 on its facets.

In electron microscopic preparations of ultrafine cell sections infected with caliciviruses, the diameter of their particle was about 35 nm. The center of the particle is occupied by an electron-dense core 20 nm in diameter, which is surrounded by layers of lesser density with an indistinct outer margin [66].

Zwillenberg and Burki [78] believed that the caliciviral particles have two capsids and that the outer capsid consists of 32 capsomeres. The difficulty in interpreting the electron microscopic immage of caliciviruses in studying the structure of the capsid layer is attributable to the fact that distinct margins of structural elements of the capsid are not demonstrable in negatively contrasted preparations. Almeida et al. [3] used the concepts of "posimer" and "negamer" to explain this vagueness. The former refers to a capsomere in the usual sense, with clearly circumscribed margins, and the latter, to a hollow or cup-shaped capsomere, the structure of which is the reason for its vague outline under an electron microscope. In the opinion of Almeida et al. [3], the caliciviral capsid has one layer and consists of 32 negamers.

According to the estimates of Mattern [35], in the case of icosahedral symmetry of the virion, 32 cavities (depressions) could be formed on its surface by 60 structural units. Burroughs et al. [14] submitted data to the effect that the caliciviral virion is made up of 180 polypeptides, probably combined into trimers. The subunits of caliciviral virion he recovered had a molecular mass of about 200,000 dalton, which corresponds to the molecular mass of three combined structural polypeptides. The conception of 180-polypeptide composition of caliciviral virions is consistent with the mass of the virion, 14.4-15.6$\cdot 10^6$ dalton, as determined on the basis of molecular mass of RNA (2.6-2.8$\cdot 10^6$ dalton) and its amount in the virion (18%).

Studies of morphogenesis of caliciviruses [29, 44, 57, 60, 76, 77] revealed the following distinctions. The viral particles are demonstrable only in the cytoplasm; they are arranged at random or linearly: chains of particles (numbering up to 55 virions) are situated along the cytoplasmic microfibrils, or else are given off the membranes of the cytoplasmic cisternae. Caliciviral particles can form pseudocrystals, in which the distance between adjacent viral particles is 35-45 nm.

An association of caliciviral particles with cytoplasmic microfibrils (such microfibrils, 5-6 nm in thickness, are demonstrable in both normal and infected cells) could represent a certain stage of morphogenesis, in which the virions acquire the orientation that determines their assembly during the maturation period. Zee et al. [76], as well as Love and Sabine [29], discovered chains of calicivirus linked to the membranes of cytoplasmic cisternae. In the opinion of Love and Sabine [29], these chains are situated within the cisternae, which reflects the mechanism of accumulation of free virus. Studdert [66] believes that the caliciviral chains are always located in the cytoplasm. In some preparations cut at a certain angle to the cisternal membrane, the bends in the membrane create the fallacious appearance of chains located in the cisternae; in actuality, the chains are in the cytoplasm on the membrane surface.

Reproduction of calicivirus in cells is associated with intensive formation of numerous vesicles in cytoplasm, among aggregations of which one often finds accumulations of viral particles in the form of pseudocrystals. While there is considerable similarity of changes in cells observed during reproduction of picornaviruses and caliciviruses, the process of the latter's replication differs in that particles aggregate into linear elements bound with the microfibrils and membranes of cytoplasmic cisternae.

## Physicochemical Properties

Caliciviral virions consist of single-stranded unsegmented RNA and protein. It is possible to extract infectious RNA [4, 28, 42, 72] from the particles of caliciviruses (representatives of porcine, pinniped and feline viruses). The RNA constitutes 18% of the virion mass [14]; its molecular mass, as determined in preparations of sea lion calicivirus, is $2.6 \cdot 10^6$ dalton [53], and it is $2.8 \cdot 10^6$ dalton [14] in preparations of porcine calicivirus.

The structural protein of caliciviruses is represented by one type of large polypeptide [4, 12, 54]. This is what essentially distinguishes caliciviruses from picornaviruses, which contain four structural proteins. The molecular mass of caliciviral polypeptide is 71,000 dalton [54]. The sedimentation coefficient of caliciviruses, which was determined by different researchers [41, 42, 44, 53, 54, 72] ranges from 154 to 207S. In the opinion of Schaffer [51], 183S, which was found for pinniped calicivirus [53], is the most accurate coefficient. Analogous values were obtained for representatives of porcine and feline caliciviruses [4].

The sedimentation coefficient of caliciviral RNA ranges from 30 to 38, according to different readings [41, 53]. According to the latest data of Ehresman cited by Schaffer [51], this coefficient is 36S. The index of buoyant density of caliciviral virions ranges from 1.36 to 1.38 g/mℓ [42, 53, 64].

Like other viruses without structural lipids in the virion, caliciviruses are not inactivated by fat solvents--ether, chloroform, etc. At 50°C, calicivirus is inactivated in 30 min; $MgCl_2$ in a monomolar concentration does not enhance its resistance to heating, which distinguishes caliciviruses from enteroviruses. Caliciviruses hold an intermediate place, between resistant enteroviruses and labile rhinoviruses in resistance to low pH levels. At pH 3.0, more than 99% of the caliciviral particles in suspension are inactivated; this applies to part of the virions at pH 4.0, whereas at pH>4.0 caliciviruses retain all of their biological activity [67, 72, 74].

## Biochemical Properties

Ehresman and Schaffer [21] demonstrated that the single-stranded RNA, which is synthesized mainly in a cell infected with calicivirus (molecular mass $2.6 \cdot 10^6$ dalton, sedimentation coefficient 36S) is genomal. In addition to it, there is also synthesis of RNA of a smaller size (molecular mass $1.1 \cdot 10^6$ dalton, sedimentation coefficient 22S). Both RNA's are polyadenylated, i.e., they are messenger RNA's. Black and Brown [8] failed to detect any large polypeptides in calicivirus-infected cells, which could be considered as proteins--precursors of structural and nonstructural virion polypeptides, similarly to the polyprotein that is a precursor of picornaviral polypeptides which is subject to posttranslation segregation. The largest polypeptide present in calicivirus-infected cells has a molecular mass close to that of the structural polypeptide of the caliciviral capsid. Ehresman and Schaffer [21] assumed that the smaller-sized mRNA (coefficient of sedimentation 22S) codes the synthesis of structural polypeptide (molecular mass $60\text{-}70 \cdot 10^3$ dalton), while the genomal RNA is an mRNA for synthesis of nonstructural polypeptides (molecular mass $15\text{-}19 \cdot 10^3$ dalton). This hypothesis has been largely confirmed by the experimental data of Black and Brown [9].

Biological Properties

Representatives of different groups of caliciviruses differ significantly in capacity to reproduce in cell cultures.

The viruses that are pathogens of porcine vesicular exanthema can multiply in primary cell cultures of this animal species [38], as well as in transferrable cells of green marmoset kidneys--Vero [4]. Attempts to cultivate the virus of swine exanthema in cultures of human, simian, cattle, sheep, goat, guinea pig, mouse, hamster, rat and chick cells yielded negative results. Some strains of this virus reproduce in equine kidney cells, as well as in cells originating from dogs and cats.

The pinniped (sea lion, fur seal) viruses multiply well in transferable Vero cells, which are generally used in attempts to isolate them. The studied representatives of this group of caliciviruses can also reproduce in transferable HeLa and Chang cells (cells of human conjunctiva) [64]. Smith et al. [57] demonstrated that the sea lion virus can reproduce in primary cultures of human embryo kidney cells and simian kidney cells, as well as transferable PK-15 cells of pig embryo kidneys and epithelial cells of human prepuce. In their subsequent studies, Smith et al. [59] demonstrated that 3 out of the 4 tested strains of pinniped viruses and 1 strain of porcine vesicular exanthema virus (A-48) were capable of reproducing in cells originating from cats.

Feline caliciviruses multiply well in cultures of feline origin--primary, secondary and transferable--that are generally used for isolation and investigation of these viruses. Lee et al. [27] demonstrated that there is also reproduction of feline caliciviruses in cell cultures from the kidneys of the sea lion and dolphin. Some strains of feline calicivirus reproduce in Vero cells [66].

In susceptible cells, reproduction of all animal caliciviruses is characterized by rapidity [57, 67, 72, 75]. Maximum accumulation in cells of feline calicivirus occurs within the first 6 h after infection, followed by a rapid decline of cells, and within 2 h the concentration of extracellular viruses reaches a peak. Studies of representatives of different groups of caliciviruses revealed that maximum accumulation of cellular virus occurred within 3 to 9 h, while maximum titers of extracellular virus were demonstrable 5-10 h after infecting the cultures.

Cytopathic changes in cells develop in accordance with the rate of reproduction of caliciviruses. After the first 5-6 h after infection (sometimes sooner), foci of shriveled, round cells appear in the cell layer. The number of foci increases rapidly. Pyknosis of nuclei and karyolysis are seen in the altered cells. The stage of chromatin breakdown coincides with cellular breakdown. Immunofluorescence studies of cells infected with the virus of porcine vesicular exanthema revealed accumulation of specific antigen within only 2 h after infection, while diffuse granular fluorescence was demonstrable in 6 h [75].

Human caliciviruses, which have been found in the excrements of patients with acute gastroenteritis could not be cultivated in cell systems thus far. All tested laboratory and domestic animals were also insusceptible to these viruses.

## Antigenic Properties

The group of porcine caliciviruses consists of viral agents that are heterogeneous in antigen composition. Distinct antigenic differences between strains of porcine caliciviruses can be demonstrated by means of the virus neutralization reaction in cell cultures and cross-immunity tests on pigs [5], as well as in the complement-fixation test [16]. The group of porcine caliciviruses is subdivided into 13 antigen types on the basis of these differences. At the same time, the complement-fixation test makes it possible to demonstrate a common antigen in all representatives of the group.

In the pinniped calicivirus group, a distinction can be made between eight antigenic types, although there is considerable antigenic similarity [51, 59].

Feline caliciviruses are characterized by considerable antigenic homogeneity and, in the opinion of many researchers, they belong to the same antigenic type [11, 25, 45, 46]. At the same time, there are reports of some antigenic differences between some strains contained in this group [25].

The significant antigenic homogeneity of strains of caliciviruses that are the pathogens of feline diseases made it possible to develop and make clinical use of a specific live viral vaccine [7, 46, 55].

Attempts to demonstrate antigenic links between caliciviruses referable to different groups by means of the neutralization and cross-immunity tests led to negative results [13, 60], which is indicative of the high specificity of these tests. It was possible to demonstrate antigenic relationship between porcine and pinniped caliciviruses by using immunodiffusion precipitation in gel [13], immunoelectron microscopy [62] and radioimmune precipitation of staphylococci, which are used as immunoadsorbent, the so-called StRIP test (staphylococcal radioimmune precipitin test) [63].

Antigenic correlations between feline caliciviruses and caliciviruses of swine and pinnipeds have not yet been sufficiently investigated. Burroughs et al. [13], who studied antigenic correlations between feline calicivirus and three different serotypes of porcine and pinniped caliciviruses by the method of immunodiffusion precipitation in gel, obtained negative results. Smith et al. [62], who used immunoelectron microscopy, discovered cross antigen relations between feline calicivirus and representatives of two serotypes of swine caliciviruses. In the StRIP test, serum immune to feline calicivirus reacted with two serotypes of pinniped caliciviruses [51].

## Diseases Induced by Caliciviruses

Porcine vesicular exanthema [6, 34] is an acute febrile disease characterized by vesicular eruptions on the snout, legs and in the mouth. The animal's body temperature rises to 42-42.5°C 18-72 h after infection, and this is associated with refusal of feed and listlessness. Concurrently, primary lesions are demonstrable in the form of cutaneous vesicles 0.5-3 cm in diameter and 1-2 cm in height. The primary vesicles develop at the site of infection, usually on the skin of the snout. They are whitish in color,

filled with serous fluid containing considerable amounts of virus. The vesicles break rapidly, leaving behind small bleeding ulcers, which then are covered with a yellowish fibrinous film. In the next 24-36 h there is development of secondary vesicles on the head, which is the consequence of infection from the primary lesions. Concurrently, as a consequence of developed viremia, secondary vesicles appear on the skin of areas between the hooves and on the boundary between the integument and hooves. These lesions cause lameness; the animals' gait becomes slow and cautious. In some cases, secondary vesicles appear on udder and nipples, probably due to direct infection. The secondary vesicles break on about the 5th-6th day of the disease, and in cases without complications the animals soon recover. Miscarriages are a serious complication in pregnant pigs. There have been recorded deaths among very young piglets; the cause is asphyxia due to obstruction of nasal cavities with vesicles formed on the mucous membranes. Porcine vesicular exanthema cannot be distinguished from foot and mouth disease, vesicular stomatitis or vesicular disease of swine with respect to symptoms. In the United States, when any of these diseases appeared, all stricken and potentially infected herds of pigs were destroyed for several years, as a measure to eradicate the infection.

Between 1932 and 1951, the spread of vesicular porcine exanthema was limited to California, where 1364 outbreaks of the disease were recorded involving more than 2.5 million pigs. In 1952, the disease spread to Wyoming, then to 42 other U. S. states. As a result of experiments and direct observations, it was established that, in addition to infection of healthy animals by the sick ones, feeding pigs food waste, which often contained infected pork in enzootic regions, was instrumental in the spread of the virus. Adoption in pig raising practice of the rigid regulation to use food waste only in boiled form led to rapid arrest of epizootics in the United States, and no cases of the disease have been recorded since 1956. In other countries porcine vesicular exanthema has not been found. No cases of human disease caused by the virus of porcine vesicular exanthema have been noted.

Several circumstances discovered in a study of epizootiology of porcine vesicular exanthema gave grounds to Madin [34] to formulate the hypothesis that this disease originates in the sea. After caliciviruses (four antigenically different types) were isolated from pinnipeds, it was possible to demonstrate experimentally that these viruses induce a disease in piglets that cannot be distinguished from vesicular exanthema. It was also learned that, in 1930, sea lion meat was periodically found in the food waste given as feed to pigs in California. Smith and Ackers [56] submitted additional information and views that corroborated Madin's hypothesis. The incidence of porcine vesicular exanthema was limited to California since it was discovered in 1932 and up to 1952. The islands in the Santa Barbara Channel, on one of which (San Miguel) sea lion calicivirus was first discovered, are situated in close proximity to the California coast of the Pacific Ocean (within 50 km). Tests of serum from wild boar and piglets inhabiting these islands revealed antibodies to pinniped caliciviruses in a significant part of the animals (26%). The wild piglets are trapped by amateur hunters; there have been recorded cases of shipping piglets from San Clemente Island to Californian hunting grounds. Smith and Ackers [56] also found that the meat of northern fur seals caught on the Pribylov Islands are shipped to Utah in frozen coarsely ground form to feed mink. Some farmers add this ground meat to swine feed. Smith and

Ackers [56] stress that the degree of antigenic differences between viruses in the vesicular exanthema group and pinniped virus group does not exceed the differences between representatives of these groups.

Confirming the hypothesis that the viruses of porcine vesicular exanthema are indeed pinniped viruses, Smith and Ackers [56] believe that the primary hosts of these viruses are not pinnipeds, but the more widespread inhabitants of the sea that are constantly in contact with pinnipeds, in particular, fish. Isolation of caliciviruses from the opal-eyed sea perch and liver fluke, which is a parasite of the sea lion [61, 62], reinforces this opinion. Serological studies demonstrated that pinniped caliciviruses infect not only sea lions, fur seals and elephant seals, but also Steller's sea lions and whales [2, 48].

The diseases caused by caliciviruses in pinnipeds have been little-studied. There are data to the effect that these viruses are the cause of miscarriages, which are observed in sea lions and fur seals, as well as vesicular exanthema, which develops on the flippers of these animals [50]. If caliciviruses, which are the pathogens of porcine vesicular exanthema, are pinniped caliciviruses (and increasing evidence of this is accumulating, as we have shown above), porcine vesicular exanthema is a unique example of occurrence of a complex ecological situation, in which the virus of a marine ecosystem was capable of rapidly adapting to the cardinally different terrestrial ecosystem with retention (and even development) of pathogenic properties for mammals.

The diseases that are caused by feline caliciviruses have been studied and described rather comprehensively [24]. Feline caliciviruses have been found in domestic cats in different parts of the world. Analogous viruses have been isolated from Australian cheetahs [48]. It can be assumed that this group of caliciviruses has a global distribution, and that it is pathogenic to all representatives of the cat family.

Caliciviruses are the principal etiological agents in respiratory diseases, which are encountered the most often in feline infectious pathology.

The incubation period is 3-5 days. The disease begins with elevation of the cat's body temperature to 39.5-40.5°C, which is associated with development of rhinitis, conjunctivitis, excessive salivation and refusal of feed. At first, the profuse secretions from the nose and eyes are serous, then mucous, and could become mucosuppurative on the 4th-5th day of the disease. During this period, vesicles are demonstrable within a short time on the buccal and lingual mucosa and external margins of the nostrils, with formation of small ulcers after they break. The lesions to the respiratory tract are manifested in the form of bronchitis, tracheitis and pneumonia. The death rate is 30%. Most often, a fatal outcome of the disease is observed among kittens up to 12 weeks of age. The disease lasts 5-7 days when there are no complications.

Sick animals, in which the virus is present in high concentrations in the nasopharyngeal secretions and lower ones in feces, are the source of infection. Infection occurs via the respiratory route or due to intake of raw infected food.

The existence of extensive and prolonged carriers of the virus among animals which have been sick is an important element of epizootiology of the disease [45, 70, 71]. The virus is found in nasopharyngeal secretions and saliva of carrier animals (up to $10^{4,5}$ $TCD_{50}$/mℓ). The carrier state could last for several years after the disease and probably over the animal's lifetime [47].

The great similarity of antigenic structure of all known feline caliciviruses made it possible to develop and make clinical use of universal preventive live viral vaccines. Bittle and Rubic [7] used F9 virus which they attenuated for this purpose, while Davis and Beckenhauer [20] prepared a vaccine from a naturally attenuated strain of feline calicivirus.

Human caliciviruses and the diseases they induce began to be investigated in the past few years. Madeley and Cosgrove [33], who discovered particles morphologically indistinguishible from known caliciviruses in the excrements of children suffering from acute nonbacterial gastroenteritis, were the first to mention the existence of human caliciviruses. Analogous particles had subsequently been demonstrated by Flewett and Davies [23] in the feces of children with the same disease. An experimental model could not be obtained for investigation because the discovered viruses could not multiply in cell cultures and tested species of laboratory animals were insusceptible to them. This circumstance, as well as the relative rarity of demonstrating calicivirus-like particles in excrements in cases of nonbacterial gastroenteritis, caused doubt as to the very existence of human caliciviruses and their etiological role in acute gastroenteritis. Schaffer [51] assumed that the small spherical viruses demonstrable in excrements and taken for caliciviruses were actually referable to astroviruses, which were first discovered by Madeley and Cosgrove in 1975 [31, 32] in excrements of children suffering from acute gastroenteritis. Astroviruses are similar in size to caliciviruses, while the stellar shape of the particles, for which they received their name (from the Greek, astron--star) is also inherent in caliciviruses with a specific spatial orientation. However, on the basis of comparative electron microscope studies, Madeley [30] demonstrated convincingly that it is possible to distinctly differentiate these two viruses.

The astroviral particles have an average size of 28-1.6 nm. On electron microscope preparations, the margin of the particle is well outlined and close to an even circumference. The figure formed by an astroviral particle resembles a five-point star (less often a star with six points), with a distinct bulge in the center. There are triangular depressions between the points. In preparations of feces, astroviruses often form collections with pseudocrystal arrangement.

In electron microscope preparations made from a suspension of excrements, caliciviral particles are 31-1.8 nm in size. The margins of the particle are vague, and they are similar to a hexagon or irregular serrrated circumference. The figure formed by a calicivirus particle may have the shape of a six-point star, but unlike astroviruses, the particles of caliciviruses do not form the likeness of a five-point star. There is a distinct cup-shaped depression in the center of the particle. The depressions between the points of the star are round or oval. The particles are arranged at random in caliciviral aggregates demonstrable in excrements.

In recent years, there have been several reports of finding caliciviruses in excrements of children of different ages and adults showing signs of acute gastroenteritis. Particles with the size and morphology of calicivirus were found in sick children of creche and preschool age by Kjeldsberg [26], Spratt et al. [65], McSwiggan et al. [39], Cubitt et al. [18], Chiba et al. [15, 16] and Suzuki et al. [68]. Analogous viruses were also demonstrated in a study of outbreaks of acute gastroenteritis among school children [18, 39, 43]. Oishi et al. [43] reported that cases of acute gastroenteritis were also observed among adults in the surroundings of sick school children, while Cubitt et al. [19] described an outbreak of caliciviral gastroenteritis in a home for the aged. Several authors conducted immunoelectron microscopic studies which gave them grounds to identify calicivirus demonstrated in excrements as the etiological agent of acute gastroenteritis [15, 18, 39, 43, 68].

The studies of Sakuma et al. [49] in Sapporo (Japan) give us an idea about the wide distribution of caliciviruses in human groups; they discovered antibodies to human calicivirus in 23% of the infants up to 5 months old, 30% between 6 and 23 months of age, 66% of the children 2-5 years of age and in 90% of school children and adults.

In view of the accumulating data indicative of the etiological role of caliciviruses in acute diarrhea, it is opportune to mention that Woode and Bridger [73] reported demonstration of viral particles in feces of calves with symptoms of diarrhea, which were similar in size and shape to caliciviruses. A filtrate of feces from these calves induced diarrhea in gnotobiont calves after taken by mouth.

The few reports about caliciviral gastroenteritis in man, as compared to the reports about acute intestinal diseases caused by rotaviruses, confirms the previously formulated thesis that rotaviruses are the principal pathogens of acute nonbacterial gastroenteritis [1]. It can be considered proven that caliciviruses, as well as some other viral agents (Norwalk virus and other similar viruses, astroviruses, adenoviruses), are capable of inducing acute gastroenteritis; however, their comparative epidemiological significance in these diseases requires further investigation.

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IMMUNOLOGICAL TOLERANCE IN CATTLE INFECTED WITH BRUCELLOSIS

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[Abstract] A variety of in-utero and neonatal studies were conducted on calves to determine the effects of early exposure to Brucella abortus on subsequent resistance to clinical infection with this agent and response to immunization with virulent and attenuated (vaccine) strains of this pathogen. These serologic studies demonstrated that early exposure to the microbial antigens resulted in complete or partial tolerance, and that the bacteria persisted in the organism for up to 2.5 years. Furthermore, immunization of these calves was ineffective in eliciting an effective antibody response and such animals remained at an increased risk to frank infection and posed an epidemiologic risk to other animals. For detection of immunologic tolerance, agglutination studies should be conducted during the 4-5th month of life; failure to show an adequate immune response within three weeks can be regarded as evidence of in-utero or early postnatal infection with Br. abortus. In distinction to the reports of most Western workers that immune tolerance develops only on exposure to soluble antigens, our studies have shown the effectiveness of whole bacterial cells in inducing such a state. References 6: 1 Russian, 5 Western.
[019-12172]

UDC 636.4:619:61-08

PURIFICATION AND PHYSICOCHEMICAL CHARACTERISTICS OF SWINE TRANSMISSIBLE GASTROENTERITIES VIRUS

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 4, Apr 83
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[Abstract] Details are presented on the purification and physico-chemical characterization of several strains of swine transmissible gastroenteritis virus

in linear density gradient certrifugation experiments. Growth in fetal porcine tissue culture results in viral preparations possessing high titers ($10^6$-$10^8$ $TCD_{50}$/ml); subsequent sedimentation in a sucrose gradient yielded peak activity at a density of 1.18 g/cm$^3$ for strains $V_{91}$ and at 1.24 g/cm$^3$ for strain Miller. In a cesium chloride gradient, peak activity was seen at 1.29 g/cm$^3$ for the Miller strain. Treatment of the viral particles enzymatically by the method of Compans et al. [Virology, 42:880, 1970] had no adverse effect on infectivity and yielded particles with a buoyant density of 1.15 g/cm$^3$. Figures 4; references 9: 1 Russian, 8 Western.
[019-12172]

## HEIGHTS OF SOVIET SCIENCE AND TECHNOLOGY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 7 Nov 83 p 2

[Article by TASS]

[Excerpt] Modern biological science is characterized by a rapid accumulation of information on the mechanisms of metabolism, structure of vital molecules, biological membranes, properties of heredity and changeability of organisms. It penetrates increasingly more deeply into processes which, determine the phenomenon of life, and explains them on an atomic-molecular level. Large scale investigations in a number of biological directions, capable of substantially enriching applied fields, are acknowledged by a high state reward.

Such investigations include the identification and study of a new class of animal genetic elements--so-called "jumping" genes. Their activating influence on the other genes of animals has been revealed, and this may become important for solving the practical problems of medicine.

Significant contributions to the physiology of the central nervous system, recognized by specialists, are studies that have uncovered the ion mechanisms of body excitability in the nerve cell where nerve impulses originate.

Medical genetics is undergoing a period of intensive development at this time. Its present day achievements are primarily related to diagnosis, therapy and prophylaxis of hereditary diseases. The latter are known to be caused by chromosome changes--the material carriers of heredity. The priority of Soviet researchers and the originality of their approach to chromosome research are recognized throughout the world. The personnel collective that carried out the basic investigations in this direction and promoted the outcome of their results into health care practice, received a large reward.

In the outstanding spectrum of scientific studies, worthy of State prizes this year, are also the investigations, many years of work, on the basis of which the study of magmatic and endogenic ore formations of Siberia has been developed: capital work, which has succeeded through the creation of a powerful UHF maser-generator for heating thermonuclear plasma.

Among the acknowledged works of the humanitarian sciences are the logically related monographs: "Formirovanie filosofii marksizma [Formation of Marxism

Philosophy], "Molodoy Marks" [Young Marx], and "Printsipy sistemnosti v teorii i metodologiya K. Marksa [Principles of Systematics in Theory and Methodology of K. Marx]. The latter is the result of detailed investigations of the emergence and development process of Marxist philosophy, formation regularities of the Marxist dialectic method, and principles of the theory of knowledge. The conclusions of the authors, pertaining to present day problems of communist building, are important in a theoretical and practical sense.

The list of State prize laureates includes the creators of principally new types of engineering and progressive technologies, and the prospectors of large mineral deposits. The technical solutions offered by many of them have effected a great saving of energy, fuel-energy resources, raw and other materials; they have promoted intensification of production processes and quality improvement of industrial goods.

An example of this type of work, marked by a prize, is the realization of progressive ideas that have resulted in the creation of the largest industrial production of high quality products containing chromium. A number of inventions, originated in the course of this work, have been sold abroad on a license basis.

The authors of textbooks for higher educational establishments, secondary schools and for the party training system, economic education have become laureates.

The works of the State prize laureates for this year indicate that Soviet scientists and specialists can take the most complicated, large scale problems of science and production in their stride. Their successful solution acts to advance many branches of the nation's economy to new heights of scientific-technical progress.

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