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SCIENCE & TECHNOLOGY

USSR; LIFE SCIENCES

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## AEROSPACE MEDICINE

### PROLONGED HYPOKINESIS EXPERIMENT

Moscow TASS in Russian 10 Apr 87

[Text] An unprecedented experiment on prolonged hypokinesia (relative lack of movement) has been conducted at the institute of Biomedical Problems USSR Ministry of Health, writes the newspaper 'Nedelya' today. Volunteers have remained in special laboratories in a supine position for a period of one year.

They washed, shaved, dined, and trained in this position. They took baths and were taken for check-ups lying down. For reasons of scientific purity during the experiment, the volunteers were not even able to lift up their heads. In this way a model of certain physiological effects of prolonged weightlessness in space was created.

In the course of an earlier analogous experiment which took place in the USSR 11 years ago, the subjects remained in conditions of hypokinesia for 180 days. Despite the extensive scientific data which was obtained at that time and the research results of the physiological condition of dozens of cosmonauts in the following years, medical scientists still have quite a few questions concerning the creation of effective means for combating the effect of weightlessness on man. The one year experiment which has just been completed should provide answers to a number of these questions.

An analysis of the results will not be fully completed until the end of the year--so great is the volume of information received.

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HOMEOSTASIS OF BONE TISSUE UNDER NORMAL AND EXTREME CONDITIONS

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian Vol 32, No 1, Jan-Feb 86  
pp 138-139

[Review by Professor B. A. Kasavina, Moscow, of book by A. A. Prokhonchukov, N. A. Zhizhina and R. A. Tigranyan, "Gomeostaz kostnoy tkani v norme i pri ekstremalnom vozdeystvii", Moscow, Nauka Press, 1984, 200 pp]

[Abstract] The book here reviewed outlines contemporary concepts concerning the composition, structure and nature of formation of the organic and mineral phases of bones and teeth. The monograph discusses problems relating to the nature of the mineral phase, mechanism of deposition of mineral salts in the tissues, and the interconnections among the individual components forming calcified tissues. The question of the reaction of bone tissue to space flight conditions is considered very important in space medicine. Studies are made of the homeostasis of bone tissue in both animals and man under normal conditions and following exposure to such extreme factors as weightlessness, hypokinesia, ionizing and nonionizing radiation. Emphasis is placed on the importance of biological experiments performed on the specialized biosatellites of the cosmos series, which examined many important aspects of changes in metabolic processes, particularly calcium metabolism, under space flight conditions. Interesting, perhaps unique, is the section on studies in an orbital station, indicating that after 24 days of space flight there are no reliable indications of resorption of human bone tissue. The book is said to be the first specialized study on the influence of space flight factors on bone tissue metabolism in the world literature.

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RYE SEED BACTERIOSIS AGENTS UNDER CONDITIONS EXISTING IN UKRAINE SSR

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 6, Nov-Dec 86  
(manuscript received 12 Jun 85) pp 8-12

[Article by L. A. Lasichnik and I. B. Koroleva, Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] Pathogenic bacteria were isolated from rye seeds from the UkSSR; their biological properties were studied and the isolates were identified. Materials studied included seeds of 60 rye varieties obtained from 26 points in the UkSSR in 1983-1984. Phytopathological and bacteriological analysis of affected samples revealed bacteriosis agents of the seeds. The seeds studied were affected within limits of 1 percent to 13 percent regardless of the variety involved or the place of procurement of the grain. Signs of affection of the seeds were discussed. Comparison of results of the studies with data obtained previously, in studies of bacterioses of wheat and rye in the UkSSR, showed the pathogens isolated from the rye seeds to be *P. atrofaciens*, *P. fluorescens*, *E. herbicola* and *E. caratovora*. *P. atrofaciens* was the most prevalent and most harmful bacteriosis agent for the rye. Figures 3; references 17: 12 Russian, 5 Western.

2791/12947

CSO: 1840/533

STUDY OF INTERCONNECTIONS BETWEEN QUANTITATIVE AND POLYMORPHOUS CHARACTERISTICS BASED ON METHOD OF MAIN COMPONENTS (USING TWO VARIETY POPULATIONS OF SPRING BARLEY CHERNIGOVSKY 5 AS EXAMPLE)

Moscow GENETIKA in Russian Vol 22, No 3, Mar 86 (manuscript received 8 Jul 85) pp 481-492

[Article by L. A. Zhivotovskiy, R. M. Biyashev, S. A. Zilberman, A. A. Pomortsev, T. V. Malinina and Yu. P. Altukhov, Institute of General Genetics imeni N. I. Vavilov, USSR Academy of Sciences, Moscow]

[Abstract] The need to search for nonrandom associations between quantitative and polymorphous characteristics results primarily from problems related to selection in plants and animals. Previous studies of population genetics and selective breeding have suggested an approach based on "average," "small," "large" and "disproportional" individuals and have developed a mathematical method for its implementation. This article presents the results of application of an approach involving the use of more than one main component in genetic analysis to the study of the joint variability of a set of characteristics on the example of two populations of Chernigovsky five spring barley based on six polymorphous protein loci and nine morphologic characteristics. Figures illustrate the distribution of "variant" individuals. Application of the method of main components reveals nonrandom associations between characteristics of main stem internodes and electrophoretic esterase, cathodic peroxidase and hordein variants. Figures 4; references 25: 15 Russian, 10 Western.

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CSO: 1840/639

UDC 575.12:631.523:633.11:578.087

STUDY OF INHERITANCE OF CERTAIN CHARACTERISTICS IN  $F_1$  AND  $F_3$  PROGENY OF TRITICUM PALEOCOLCHICUM MEN. HYBRIDS WITH INCOMPLETE WHEAT-RYE (ELYMUS) AMPHYPLOID. PART 2: CHARACTERISTICS OF GRAIN PRODUCTIVITY

Moscow GENETIKA in Russian Vol 22, No 3, Mar 86 (manuscript received 15 Apr 85; final version received 27 May 85) pp 493-499

[Article by M. A. Maslova and V. I. Semenov, Main Botanical Garden, USSR Academy of Sciences, Moscow]

[Abstract] Results are presented from a study of the heredity of grain productivity in the first five generations of hybrid Georgian wheat and incomplete wheat-rye amphyploid. In generation  $F_1$ , some characteristics (plant height, number of grains per ear, mass of 1000 grains) show positive or negative superdominance (heterosis) while others (number of productive stems, length of main ear, number of grains in ear, mass of grain per ear,

mass of grain per plant) show complete or almost complete dominance of one parent, and still others (total number of stems, number of spikelets in an ear, ear density) show intermediate heredity. Statistical probing of the recombination process in hybrid progeny can monitor the genetic mechanism of variety-formation and help to plan selective breeding, showing the extent to which genetic material of the parents is mixed or recombined in subsequent hybrid generations, and whether repeated crossing is necessary to improve a characteristic. References 3 (Russian).

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#### GENETIC CONTROL OF PLANT HEIGHT IN WHEAT

Moscow GENETIKA in Russian Vol 22, No 5, May 86 (manuscript received 21 Jan 85; final version received 23 Aug 85) pp 725-732

[Article by A. F. Merezko, L. A. Pisareva and L. V. Prilyuk, All-Union Scientific Research Institute of the Plant Industry imeni N. I. Vavilov, Leningrad]

[Abstract] Plant height is a convenient quantitative characteristic for genetic analysis, varying little within strains. Height is controlled by a large number of genes with varying types of allele and nonallele interactions. Height depends on both genotype and environment. Major genes which are responsible for the achievement of short-stem varieties of wheat, one of the greatest achievements of the century, are identified. The interaction of short-stem genes with each other and with genes controlling other characteristics is described. References 58: 28 Russian, 30 Western.

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UDC 631.523.4:633:15

#### GENETIC CONTROL OF QUANTITATIVE CHARACTERISTICS IN CORN. PART 2. MASS OF 1000 KERNELS

Moscow GENETIKA in Russian Vol 22, No 5, May 86 (manuscript received 14 Feb 85; final version received 29 May 85) pp 801-808

[Article by G.I. Vedeneyev and V. I. Zhuzhukin, Scientific Research Institute of Southeastern Agriculture; "Elita Povolzhya" Scientific-Production Association, Saratov]

[Abstract] This work presents a study of the genetic system which controls the characteristic "mass of 1000 kernels" in corn under various growing conditions.

In many of the lines studied, genetic control of the characteristic in question is by genes which have additive effects. In those lines in which dominance occurs, the significance of the parameter is generally negative, indicating absence of dominant positive genes controlling the characteristic. The direction of dominance, contribution of dominant and recessive genes in the development of the characteristic in hybrids vary significantly as a function of the experimental conditions. The nature of manifestation and heredity of the characteristic are determined by the genotype of the forms as well as growing conditions. Development of the characteristic in corn is controlled by the additive-dominant gene system. The degree of dominance varies from incomplete, directed toward large-kernel forms, to superdominance. Figures 2; references 22: 20 Russian, 2 Western.

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#### MUTAGENIC ACTION OF N-NITROSOETHYLENEUREA IN CORN

Moscow GENETIKA in Russian Vol 22, No 5, May 86 (manuscript received 27 May 85; final version received 16 Sep 85) pp 838-842

[Article by Ye. A. Larchenko, V. V. Morgun, L. V. Tkachenko and T. A. Levchenkov, Institute of Molecular Biology and Genetics, UkSSR Academy of Sciences, Kiev]

[Abstract] Results are presented from a study of the mutagenic activity of a cyclic derivative of N-nitroso-N-alkylurea — N-nitrosoethyleneurea (NETM), a part of a continuing search for highly active mutagens and study of their effects. Experiments were performed on a constantly inbred line of corn. Field experiments were performed in 1982-1984 in an isolated sector with self pollination under permanent isolators. NETM is found to be less toxic than other N-nitroso-N-alkylureas, causing no long-term plant death. It induces dominant mutations and mutations in genes which mutate rarely. It is equal in mutating effect to N-nitrosoethyleneurea and causes less damage to chromosome structures. Figure 1, references 9: 8 Russian, 1 Western.

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STUDY OF ADAPTIVE AND SELECTION VALUE OF ALLELES OF GLIADIN-CODING LOCUS OF CHROMOSOME 1D IN SPRING SOFT WHEAT BY ANALYSIS OF HYBRID POPULATION AND THE COLLECTION SET OF VARIETIES

Moscow GENETIKA in Russian Vol 22, No 5, May 86 (manuscript received 21 Mar 85; final version received 3 Oct 85) pp 843-850

[Article by Ye. V. Metakovskiy, S. F. Koval, A. Yu. Novoselskaya and A. A. Sozinov, Institute of Cytology and Genetics imeni N. I. Vavilov, USSR Academy of Sciences, Moscow; Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] Analysis of wheat grain reserve protein heredity has revealed multiple allelism of genetic loci controlling the synthesis of the proteins. Each of six complex loci participating in the synthesis of gliadin in soft winter wheat is known to have at least 9 different allele states. The presence or absence of various alleles correlates with variability of grain quality, frost resistance, productivity and disease resistance. This article studies the relative adaptive value of several alleles in the gliadin-coding locus of chromosome 1D by analyzing changes in the frequency of the alleles in an artificial hybrid population of soft spring wheat and the occurrence of the alleles among regional varieties of spring wheat. It is found that presence of some alleles in the genotype decrease the resistance of the plant to the experimental conditions and the harvest, thus decreasing the frequency of occurrence of the alleles in subsequent generations. Figures 2; references 16: 9 Russian, 7 Western.

6508/12947  
CSO: 1840/641

IMPROVED POTATO YIELDS IN ESTONIA

Moscow IZOBRETATEL I RATSIONALIZATOR in Russian No 3, Mar 87 p 18

[Article by L. Krentovskaya]

[Abstract] Since 1966, microbiologists of the Estonian Institute of Agriculture and Land Reclamation have been working to improve the health of seed potatoes. The laboratory headed by V. R. Rozenberg has discovered a new method for producing potato-planting materials, protected by USSR author's certificate number 1 025 373. Specially-selected plants are grown in a greenhouse in which humidity, temperature and light conditions are controlled, with the temperature five to six degrees lower around the roots of the plant than around the stem. The tips of the sprouts are then liberated from leaves under sterile conditions and meristem sections 0.2-0.3 mm in length are removed under a microscope, the sections are placed in a test tube of nutrient medium, each meristem producing six to twenty sprouts, which are once again grown under the controlled temperature conditions. The sprouts yield virus-free potatoes which are reproduced by microscopic bud grafting, finally

yielding the potatoes of the first generation. This method of producing seed potatoes yields a healthy seed potato much more rapidly than previous methods and achieves a harvest of 50-100 cw of potatoes more per hectare than previously, a 35% increase in the harvest. Figures 2.

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#### SELECTION-GENETIC ANALYSIS OF PRODUCTIVITY OF BARLEY HYBRIDS

Moscow GENETIKA in Russian Vol 22, No 7, Jul 86 (manuscript received 13 Sep 85)  
pp 1155-1162

[Article by N. A. Kalashnik and Ya. E. Smyalovskaya, Siberian Scientific Research Institute of Agriculture, Omsk]

[Abstract] Previous studies have indicated low effectiveness of selection in hybrids in early generations, particularly when the characteristic is determined by nonadditive genetic effects. This article studies the variability, nature of heredity and combination capability of varieties and hybrids with respect to grain weight. The weight of grain was found to be determined largely by weather conditions during the vegetation season and by peculiarities of the variety. A heterosis effect was characteristic for  $F_1$  hybrids, decreasing in subsequent generations, while the number of combinations with intermediate heredity and depression of the characteristic increased. The decrease in the heterosis effect reduced the group means of the hybrid, particularly in  $F_2$ . In order to increase the effectiveness of selection, it should be performed in later hybrid generations ( $F_4$ - $F_6$ ), when most genotypes will be in the homozygote state. Figure 1; references 18: 16 Russian, 2 Western.

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UDC 575.1

#### PREDICTION OF LEVELS AND SIGNS OF ECOLOGIC CORRELATION COEFFICIENTS

Moscow GENETIKA in Russian Vol 22, No 4, Apr 86 (manuscript received 13 Jun 85) pp 616-623

[Article by N. N. Nechiporenko and V. A. Dragavtsev, Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] A theoretical approach was developed for the prediction of ecologic correlation coefficients (ECC) applicable to crops, based on the concept of environmental and genetic control of quantitative traits. The theory assumes that the value of the genotypic correlation coefficient

between two traits depends on adaptive genetic systems and environmentally limiting factors. In a situation in which a given limiting factor affects the plant during formation of both traits, the genotypic correlation between these traits will be high and positive, since the same system of loci will determine their development. However, if the traits were subjected to different limiting factors, correlation will suffer due to changes in the genetic formulae that determine the intensity and genetic variability of the trait under different environmental conditions. Studies with soft spring wheat in Novosibirsk in 1982 and 1983 confirmed the assumption of ecologic-genetic control of quantitative traits. This theory overcomes the disadvantages of ECC based on assumption of an additive genetic and ecologic effect. Figures 2; references 8: 7 Russian, 1 Western.

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UDC 581.134.4:633.11

#### USE OF DITELOSOMIC LINES IN ANALYSIS OF GLIADIN GENES IN THREE UNRELATED WHEAT VARIETIES

Moscow GENETIKA in Russian Vol 22, No 4, Apr 86 (manuscript received 28 Mar 85)  
pp 633-641

[Article by O. I. Maystrenko, S. Ye. Peltek and T. A. Pshenichnikova, Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] An analysis was conducted on gliadin genes in newly constructed ditelosomic lines of wheat prepared from Saratovskaya 29 (S29) and Diamant 1 (D1), for comparison with Chinese Spring (CS) wheat. Analysis of the gliadin patterns, obtained with one-dimensional polyacrylamide gel electrophoresis, demonstrated that the patterns differed in terms of the number of gliadin components in the individual fractions and in terms of mobility. S29, CS and D1 components with identical mobilities were either under the control of identical chromosomes of the first homeological group, or different chromosomes. Each of the 1A and 1B chromosomes was shown to control a different number of gliadin components in the three varieties. This phenomenon was evidently due to the nature of interaction of the structural genes within a given genotype, and not to differences in the number of such genes. Figures 3; references 21: 10 Russian, 11 Western.

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CSO: 1840/640

## GENETIC CONTROL OF QUANTITATIVE TRAITS IN CORN. PART 1. CONCENTRATION OF DRY MATTER IN EARS AT HARVEST TIME

Moscow GENETIKA in Russian Vol 22, No 4, Apr 86 (manuscript received 14 Feb 85; in final form 29 May 85) pp 642-650

[Article by G. I. Vedeneyev and N. A. Pankova, Scientific Research Institute of Agriculture of the Southeast; "Elita Povolzhya" Scientific Production Association, Saratov]

[Abstract] A study was conducted on the percentage level of dry matter in corn ears at harvest time in self-pollinated lines and their diallelic hybrids, to assess this parameter in relation to rate of maturity. Growth conditions were found to exert a significant influence on the dry matter content, with the highest level observed in the rapidly maturing varieties. This trait is relatively stable, with the coefficient of correlation for 1982 and 1983 for the self-pollinated lines calculated at 0.83 ( $P > 0.001$ ). For the hybrids, the coefficient of correlation was calculated at 0.94 ( $P > 0.001$ ). The groups of genes controlling the dry matter level ranged from one to five. The trait appears to be under the control of genes exerting an additive effect, as well as genes showing allelic interactions (incomplete dominance). Figures 2; references 12: 6 Russian, 6 Western.

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## HETEROCHROMATIC KNOB REGIONS IN CORN CHROMOSOMES. PART 4. CORRELATION BETWEEN KNOB POLYMORPHISM AND POLLINATION SYSTEMS

Moscow GENETIKA in Russian Vol 22, No 4, Apr 86 (manuscript received 11 Jun 85) pp 660-667

[Article by G. A. Pokhmelnykh and V. K. Shumnyy, Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] An analysis was conducted on the nature of inbred depression in variety 41 corn, carrying heterochromatic knobs on all chromosomes except 9, as well as an abnormal chromosome 10, to define the relationship between knob polymorphism and pollination system. For the majority of cross-pollinated strain 41 plants, the time of stigma maturation ranges from four to 12 days. However, with artificial selection achieved with self-pollination of plants for early stigma maturation and delayed anther development, a significant loss of viability was seen of the inbred plants, along with depression of their reproductive organs. In the inbred generations  $I_2-I_4$  the fraction of male plants increased sharply from 4.4 to 29.3%. In addition, a large percentage of plants evidence nonoverlapping times for tassel and ear flowering. The

latter phenomenon resulted in a loss of 67% of the plants in the  $I_4$  generation due to impossibility of self-pollination. High elimination of female plants was noted in generations  $I_3$ ,  $I_5$  and  $I_6$ . In conjunction with previously reported alterations and polymorphism in the heterochromatic knobs, it appears that such alterations in the knobs underlie hormonal changes in the inbred plants reported on here. Figures 1; references 17: 12 Russian, 5 Western.

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USE OF LYOPHILIZED MEMBRANE PREPARATIONS FOR RADIO RECEPTOR ANALYSIS OF OPIATES AND OPIOID PEPTIDES

Yerevan NEYROKHIMIYA in Russian, Vol 5, No 1, Jan-Mar 86 (manuscript received 4 Sep 85) pp 11-19

[Article by M. G. Sergeeva, I. N. Kurochkin, O. A. Sklyankina, S. V. Zaytsev and S. D. Varfolomeyev, Interfaculty Problem Scientific Research Laboratory of Molecular Biology and Biorganic Chemistry imeni A. N. Belozerskiy, Moscow State University, Moscow]

[Abstract] Radio receptor analysis using fresh or frozen animal brain membrane preparations containing opiate receptors has low stability due to the use of nonstandard membrane preparations. Lyophilization of rat brain membranes can yield preparations retaining good specific ligand bonding capability of opiate receptors and high stability. This article reports studies of the influence of membrane lyophilization conditions on opiate receptor properties and analyzes means for optimization of radio receptor analysis of opiates and opioid peptides using lyophilized membranes. The optimal analysis conditions are found to be low concentration of labeled ligand, use of sodium-free medium for determination of  $\mu$  and  $\delta$  agonists of the medium containing  $\text{Na}^+$  to determine antagonists, with  $\text{Mn}^{2+}$  or  $\text{Ni}^{2+}$  present in the analysis medium during determination of  $\mu$ -agonists. Optimum conditions for production of lyophilized membrane preparations are lyophilization in water, short incubation time in water before lyophilization, regeneration of membranes in buffer A for production of the modified preparation. Figures 4; references 9: 5 Russian, 4 Western.

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## PROCEDURE FOR REMOVING ACTINOMYCES 771 FROM TRYPSIN-LIKE THROMBOLYTIC ENZYME

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 22, No 5, Sep-Oct 86 (manuscript received 5 Nov 84) pp 652-654

[Article by I. P. Belyayuskayte, V. I. Palubinskas, R. K. Firantene and V. S. Vesa, Scientific Production Association "Ferment" Vilnyus]

[Abstract] A new, simplified procedure for removing Actinomyces 771 from a trypsin-like enzyme was described and discussed. Actinomyces 771 was removed by use of a carboxyl cationite exchange resin, Soloze K, and DEAE-cellulose. Soloze K is a new type of carboxylic cationite consisting of a hydrophobic component, methacrylic acid, a hydrophilic component, butylmethacrylate, and a cross-linking agent. Use of the procedure produced an electrophoretically homogeneous trypsin-like enzyme with specific trypsin activity of 1.4 units/mg and a high yield (53 percent). The procedure eliminates intermediate stages of the purification process which is quite important in large-scale production. Figure 1; references 9: 5 Russian, 4 Western.

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## IMMOBILIZATION OF ENZYMES ON FIBROUS SUPPORTS

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 22, No 5, Sep-Oct 86 (manuscript received 25 Oct 84) pp 664-668

[Article by L. A. Volf, I. I. Shamolina, N. A. Goncharova, A. B. Lobova and V. P. Gavrilova, Institute of Textile and Light Industry, Leningrad]

[Abstract] The possibility of immobilizing an enzyme of plant origin, papain and a complex of redox enzymes, on different types of fibrous supports is discussed. Papain was immobilized from pure solutions of the enzyme while a filtrate of culture liquid of the higher basidial fungus *Coriolus hirsutus* was used with the complex of oxyreductases. The enzymes were immobilized on modified polyvinyl alcohol (PVA), polycaproamide (PKA) and hydrated cellulose fibers (TsL) by an ion exchange mechanism and by covalent coupling. Immobilization of the enzymes was carried out during direct contact of the enzymic solutions and the fibrous carriers with a constant tank modulus of 100. Fixation of the enzymes by fibers during maximum preservation of enzymic activity after immobilization ranged from 10 percent to 90 percent, depending upon the kind of fibrous support involved. Covalent coupling of phenoloxidases with aldehyde-containing PVA fibers produced specific extraction of these enzymes from culture liquid filtrate solutions. Use of proteolytic enzymes, immobilized on fibers, in treatment of purulent wounds is discussed briefly. References 9: 6 Russian, 3 Western.

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IMMOBILIZATION OF ENZYMES OF BACTERIAL BIOLUMINESCENT SYSTEM ON EPOXY-ACTIVATED AGAROSE

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 22, No 5, Sep-Oct 86 (manuscript received 5 Oct 84) pp 669-674

[Article by O. V. Lebedeva, I. G. Frumkina and N. N. Ogarova, Moscow State University]

[Abstract] Immobilization of extracts of bioluminescent bacteria *Beneckea harveyi* on epoxy-sepharose was performed, optimal conditions of the process were found and the possibility of use of preparations obtained for analytical purposes was demonstrated. Flavin mononucleotide reductase activity of the extracts was determined spectrophotometrically. Immobilization of *Beneckea harveyi* extracts on epoxy-sepharose produced preparations possessing both luciferase and oxidoreductase activity. Different conditions of immobilization (temperature, time, pH, presence of different additives in the reaction medium) were checked in order to produce samples with maximal specific activity. Optimal temperature for immobilization of extracts on epoxy-sepharose was 20-22 degrees. Best results were obtained by conducting immobilization for 18-20 hours. Optimum pH was 8.0. A method of bioluminescent assessment of immobilized enzymes is presented. Calibration curves for determining NADH, flavin mononucleotide and decanal in picomolar amounts are presented. Figures 2; references 21: 8 Russian, 13 Western.

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USE OF IMMOBILIZED GLUCOSE OXIDASE AND URICASE IN ANALYTICAL SYSTEMS

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 22, No 5, Sep-Oct 86 (manuscript received 25 Oct 84) pp 675-678

[Article by A. L. Simonyan, G. E. Khachatryan and S. Sh. Tatikyan, Yerevan Institute of Physics]

[Abstract] Immobilization of glucose oxidase and uricase was performed in order to use them in analytical systems for determining glucose concentrations and uric acid concentrations in different media. Glucose oxidase and uricase were covalently cross-linked, by use of glutaric aldehyde, to aminated silica gel and used in a flow-type reactor to determine beta-D-glucose and uric acid concentrations in multi-component solutions. The linear range of concentrations determined for glucose was 0.55-22.0 mM and for uric acid 0.06-5.0 mM. Response time of the system was 10-30 seconds and total analysis time was not more than 5 minutes. Glucose oxidase immobilized on silica gel under these conditions retained >80 percent of its activity for more than 7 months

and uricase retained its activity for more than 8 months. Examples of the use of a glucose analyzer to determine glucose utilization by unidentified thermophilic microorganisms were presented. Use of a glucose analyzer to determine the inner volume of liposomes and use of a uric acid analyzer to determine uric acid levels in biological liquids were described. The system may be used for scientific research and in clinical practice. Figures 3; references 6: 4 Russian, 2 Western.

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#### POLYSACCHARIDES FORMED BY SOME CRYPTOCOCCUS SPECIES

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 22, No 5, Sep-Oct 86 (manuscript received 28 Sep 84) pp 684-689

[Article by Ye. P. Ananyeva, G. A. Vitovskaya, N. P. Yelinov, G. M. Samarkina and I. A. Sinitskaya, Leningrad Chemical and Pharmaceutical Institute]

[Abstract] Recently the *Cryptococcus* genus underwent essential changes with appearance of new species which prompted this study of polysaccharides formed by *Cryptococci* previously unstudied in this respect. Species studies included: *Cr. amylolentus*, *Cr. dimennae*, *Cr. gastricus*, *Cr. humicolus*, *Cr. kuetzingii*, *Cr. marinus*, *Cr. skinneri* and *Cr. terreus*. Polymers isolated from cells of some of these species were also studied. Quantitative differences were found in the ratio of basic polysaccharides. Paper chromatography showed that the polysaccharides contain mannose, xylose and a uronic component while many samples contain galactose but the polysaccharides contained no glucose or other monosaccharides. Mannose was the predominant component in most of the polymers. Xylose level (61 percent) was highest in *Cr. skinneri* heteropolysaccharide. Gluconic acid content varied from 2.4 to 36.2 percent. Galactose (2.9 to 19.4 percent) was found in all samples except *Cr. dimennae* polysaccharide. Preparations of extracellular heteropolysaccharides treated by ion-exchange resin Ku-2 ( $H^+$ ) contained 1.4-6.5 percent of O-acetyl groups. The O-acetyl groups level in *Cryptococcus* polysaccharides depended essentially on the method of polymer purification. Electron microscopy revealed cell surface changes during polysaccharide production. Figures 2; references 22: 15 Russian, 7 Western.

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831.4

STUDY OF CHLOROQUINE METABOLISM IN MICROSOMAL MONOOXYGENASE SYSTEM OF MICE  
LIVER TISSUE

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian Vol 32, No 6, Nov-Dec 86  
(manuscript received 3 Jun 85) pp 55-57

[Article by O. D. Zakharova, T. V. Chekhonadskikh, N. I. Komarova, T. G. Pankova and R. I. Salganik, Institute of Cytology and Genetics, Siberian Department of USSR Academy of Sciences, Novosibirsk; Novosibirsk Institute of Bioorganic Chemistry]

[Abstract] Appearance and spread of new Plasmodium falciparum strains resistant to chloroquine (CQ) is the sole reason for a sharp rise of malaria in many countries during the recent past. One of the possible reasons for this resistance is intensified enzymatic metabolism of CQ leading to its inactivation and excretion from the organisms. Thin layer chromatography and reverse phase high efficiency liquid chromatography on microcolumns were used in the investigation of CQ metabolism in the microsomal monooxygenase system of mice liver tissue. Several metabolites of CQ were identified showing that in this system oxidation of the side chain takes place along with that of the aminoquinone ring itself. In cases of high enzymatic activity of the liver, CQ will be of little value and enzyme inhibitors should be used as adjuvants to CQ. With low level of this enzymatic activity, normal doses of CQ may be toxic. Thus it was shown that this metabolic pathway is responsible for the resistance of malaria parasites to CQ therapy. Figures 2; references 8: 3 Russian, 5 Western.

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CSO: 1840/591

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CHANGE IN ACTIVITY OF LIPOXYGENASE IN AREAS OF GRANULATION TISSUE FORMATION  
DURING HEALING OF ASEPTIC RAT WOUNDS

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian Vol 32, No 6, Nov-Dec 86  
(manuscript received 23 Jul 85) pp 82-83

[Article by L. A. Mamedov, N. Yu. Kosaganova, G. T. Rikhireva, A. V. Nikolayev, D. A. Kuznetsov, A. B. Shekhter and V. V. Zhkharov, First Moscow Medical Institute; Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] Lipoxygenases oxidize polyunsaturated fatty acids. An attempt was made to determine whether activation of lipoxygenases occurs during formation of tissue filling a healing wound. Experiments were carried out on white male Wistar rats. Lipoxygenase activity was determined by analysis of oxidation products identified by high pressure liquid chromatography and mass

spectroscopy. Relative content of active forms of lipoxygenases was determined by EPR spectroscopy. It was shown that activation of lipoxygenases at an early stage of wound healing is connected with an inflammatory process and in the later period it is required as an energy supply to the proliferative and differentiation process of fibroblasts (biosynthesis of DNA, restructuring of cellular membranes, etc.) during formation of the granulation tissue. After six days, the pool of active forms of lipoxygenase became diminished. Figure 1; references 9: 5 Russian, 4 Western.

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CSO: 1840/591

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#### LIMITING FACTOR OF GLYCOLYSIS IN BONE AND CALLUS

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian Vol 32, No 6, Nov-Dec 86  
(manuscript received 1 Jul 85) pp 73-75

[Article by B. Ya. Vlasov, Biochemistry Laboratory of Scientific Research Institute of Traumatology and Orthopedics, Irkutsk]

[Abstract] Glycolysis plays an important role in metabolism of mineralized tissue. To control anaerobic conversion of glucose, affecting bone metabolism and reparative processes, it is necessary to identify the limiting activity of the enzymatic system. The goal of this study was to identify enzymic link determining the rate of glycolysis and to affect the regeneration process in bone tissue. Experiments were done on rats whose femur was fractured under anesthesia. At certain times after the fracture animals were decapitated and the callus was homogenized; anaerobic glycolysis was determined by increased levels of lactates. The data showed that the limiting factor of glycolysis in bone tissue is phosphofructokinase reaction. Stimulation of glycolysis at early stages of consolidation by injection of fructoso-1, 6-diphosphate activates the biosynthesis of the organic matrix which results in formation of a more mature regenerated callus. References 15: 11 Russian, 4 Western.

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#### PRIMARY STRUCTURE AND SPECIES SPECIFICITY OF IMMUNOPOIETINS

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian Vol 32, No 2, Mar-Apr 86  
(manuscript received 28 Nov 84) pp 59-64

[Article by G. I. Chipens, P. P. Zarinsh, L. P. Osis and Ye. Ye. Antsans, Institute of Organic Synthesis, Latvian SSR Academy of Sciences, Riga]

[Abstract] The demonstration that tuftsin and rigin are immunoregulatory peptides representing short segments of IgG has led to identification of

additional factors, designated 'immunopoiētins'. The immunopoiētins were identified using quasicyclization, in which limited proteolysis of IgG chains resulted in the preparation of small peptides with free amino and carboxylic terminals. As a result of reaction with side groups on the peptide novel spatial structures were obtained with new potential activities. Studies with the human IgG human sequence 345-349 led to the detection of a novel active site in the C<sub>H</sub>3/C<sub>H</sub>4 domains. Amino acid sequencing studies demonstrated similar homologous regions in the immunoglobulin classes IgG, IgM, IgA and IgE in certain other species (dog, chicken, mice, rabbit, hare, guinea pig). Several sequences were synthesized (e.g., Glu-Pro-Gln-Val-Tyr, Arg-Pro-Asp-Val-Tyr, Arg-Pro-Glu-Val-His, Ala-Ala-Pro-Glu-Val-Tyr) for biological testing. In vitro studies on the effects on spontaneous E-rosette formation by human T-lymphocytes showed that the peptides normalized the activities of lymphocytes hypo- and hyperfunctional cells, but had no effect on normally functional lymphocytes. Figures 2; references 21: 10 Russian, 11 Western.

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UDC 577.31+577.15.031

#### DYNAMICS OF NITROGEN FIXATION BY AZOTOBACTER VINELANDII CELLS IMMOBILIZED IN Ca-ALGINATE

Tbilisi SOOBSHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian Vol 124, No 3, Dec 86 (manuscript received 14 Mar 85) pp 601-604

[Article by E. G. Chitanava, O. V. Abashidze and N. N. Nutsbidze, corresponding member, Georgian SSR Academy of Sciences, Institute of Plant Biochemistry, GSSR AS]

[Abstract] Azotobacter vinelandii UW-OP cells were immobilized in Ca-alginate for a study of the efficiency of such preparations in nitrogen fixation. For immobilization, a suspension of the cells in 3% Na-alginate was pipetted from a height of 50-60 mm into a 3% CaCl<sub>2</sub> solution from a Ø 3 mm pipette. The entire operation was carried out at 20-22°C to give a cell concentration of 10<sup>8</sup> per gram of the carrier. This concentration was determined to result in optimum nitrogen fixation in a columnar system. Maximum intensity of nitrogen fixation was evident after 3 days, and continued for a total of 6 days. Figures 4; references 5: 4 Russian, 1 Western.

12172/12947  
CSO: 1840/602

SYNTHESIS OF HEXAPEPTIDE-FRAGMENT (92-97) OF RABBIT LIVER PROTEIN CHAIN  
CYTOCHROME  $b_5$

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 57, No 1, Jan 87 (manuscript received 1 Nov 85) pp 222-226

[Article by Khvan Khen Gvi, V. V. Tolstikov, Ye. N. Zvonkova and R. P. Yevstigneyeva, Moscow Institute of Precision Chemical Technology imeni M. V. Lomonosov]

[Abstract] Cytochrome  $b_5$  transfers electrons in cell respiration. Fragment 92-96 of cytochrome  $b_5$  from various sources differs in the nature of the amino acid groups in positions 92 and 95. The authors have established that changes in the amino acid sequence significantly influence the effectiveness of synthesis of the key peptide Lys-Pro bond in positions 93-94. The authors have previously shown that synthesis of fragment 92-96 is successfully performed by fragment condensation 2+3 using diphenylphosphorazide. On this basis, in the present work during synthesis of a longer sequence, the authors undertook comparison of multistage and fragmented methods of synthesis of the tetrapeptide (94-97) with subsequent condensation (2+4) using diphenylphosphorazide. The optimal plan of production of the tetrapeptide (94-97) of cytochrome  $b_5$  from the rat liver was found. The possibility was confirmed of using diphenylphosphorazide in fragment condensations. References 4: 3 Russian, 1 Western.

6508/12947

CSO: 1840/635

UDC 547.963.32.057:577.113.6

AUTOMATIC SYNTHESIS OF OLIGODEOXYRIBONUCLEOTIDES BY PHOSPHITEAMIDE METHOD ON VICTORIA-4M DEVICE

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKIYE NAUKI in Russian Vol 2, No 1, Jan 87 (manuscript received 18 Mar 86) pp 119-123

[Article by S. M. Gryaznov, V. V. Gorn, V. F. Zarytova, V. P. Kumarev, A. S. Levina, A. S. Polishchuk, V. K. Potapov, G. A. Potemkin, Yu. G. Sredin and Z. A. Shabarova, Novosibirsk Institute of Bioorganic Chemistry, Siberian Department, USSR Academy of Sciences; Moscow State University imeni M. V. Lomonosov; Special Design and Technological Office of Special Electronics and Analytic Instrument Building, Siberian Department, USSR Academy of Sciences, Novosibirsk; Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] The purpose of this work was to demonstrate the possibility of using the "Victoria-4M" synthesizer for automatic synthesis of oligodeoxyribonucleotides by the phosphiteamide method. The work utilized 5'-O-dimethoxytrityl N-acyl deoxynucleotides. Synthesis of oligonucleotides was performed

on the automatic device, developed jointly by the authors' institutes. Ten oligonucleotides were automatically synthesized, suitable for chemical and molecular biological studies. Characteristic elution profiles of the reaction mixtures obtained are presented. 95-98% Yields were combined with rapid operation (12 minutes for the full cycle of attachment of one link) and moderate consumption of solvents (18 ml per stage). Figures 1; references 9: 4 Russian, 5 Western.

6508/12947  
CSO: 1840/634

UDC 661.185.1+547.96+541.128.135+542.98

#### INACTIVATION OF HORSERADISH PEROXIDASE IN INVERTED Micelles OF SURFACE-ACTIVE AGENTS IN HEPTANE

Minsk VESTSI AKADEMII NAUK BSSR: SERIYA KHIMICHNYKH NAUK in Russian No 1, Jan-Feb 87 (manuscript received 15 Apr 85) pp 63-70

[Article by A. N. Yeremin and D. I. Metelitsa, Institute of Bioorganic Chemistry, BSSR Academy of Sciences]

[Abstract] The purpose of this work was to compare the stability of horseradish peroxidase in inverted micelles of various compositions and in aqueous solutions. It was shown that in a broad interval of temperatures, 26-66°C, the stability of horseradish peroxidase, in aerosol OT micelles and mixed micelles of aerosol OT and triton X-45, was less than the thermal stability of the enzyme in pH 7 buffer solutions. The rate of inactivation of peroxidase in micelles was strongly influenced by the molarity of the buffer, its pH and the presence of various additives in the system. In all cases, the inactivation of horseradish peroxidase was characterized by first-order rate-constants. The stability of solubilized micelles of enzymes and their catalytic activity depended on the composition of the micelles, their physical-chemical properties and the nature of the enzymes themselves. For many parameters of the complex system it is characteristic that there is a clear optimum. By changing the number and relationship of surfactants, water and buffer content, pH of the polar nucleus of the micelles and concentration of stabilizing additives, it is possible to achieve significant stabilization of proteins and enzymes in inverted micelles. Figures 3; references 16: 12 Russian, 4 Western.

6508/12947  
CSO: 1840/630

EFFECT OF CYTOCHROME C ON BIOENERGY PROCESSES IN LIVER IN SEVERE COMPRESSION TRAUMA

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian, Vol 32, No 1, Jan-Feb 86  
(manuscript received 21 Sep 84) pp 34-36

[Article by I. V. Zarubina and B. I. Krivoruchko, Military-Medical Academy  
imeni S. M. Kirov, Leningrad]

[Abstract] A study was made of the influence of cytochrome c on bioenergy processes in the rat liver in cases of severe mechanical trauma caused by soft tissue compression. The bioenergy processes were evaluated based on the content of ATP, ADP, AMP and inorganic phosphate in the liver and the "energy charge" of the adenine nucleotide system. Severe compression trauma was found to cause a decrease in the concentration of ATP, the sum of adenine nucleotides and the energy charge of the adenine nucleotide system, and an increase in the concentrations of ADP, AMP and inorganic phosphate. The results indicate that normalization of bioenergy processes in the liver upon parenteral administration of cytochrome c occurred as a result of its penetration to the liver and interaction with the hepatocyte ultrastructure. Cytochrome c is capable of penetrating damaged hepatocyte membranes and can be used as a bioenergy process regulator in compression trauma. References 14: 9 Russian, 5 Western.

6508/12947

CSO: 1840/587

LOW TEMPERATURE FIXATION OF STATES AS METHOD TO STUDY ELECTRON-CONFORMATIONAL TRANSITIONS IN MOLECULAR COMPLEXES OF PHOTOSYNTHETIC REACTION CENTERS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 4, Jul-Aug 86  
(manuscript received 5 Aug 85) pp 994-1001

[Article by V. N. Kharkyanen, N. L. Khristoforov, P. P. Noks\* and A. A. Kononenko\*, Institute of Theoretical Physics, UkSSR Academy of Sciences, Kiev; \*Department of Biology, Moscow State University imeni M. V. Lomonosov]

[Abstract] Effectiveness of direct electron transfer in a system of quinone cofactors of photosynthetic reaction center (RC) of purple bacteria is controlled by transition between contact and non-contact states. In the contact state of the RC an effective electron transfer occurs with stabilization of the electron; in the non-contact state the process is blocked. Such a mechanism could also apply at the level of the reaction of high potential cytochrome ( $C_h$ ) with RC. It could be assumed that this complex of  $C_h$  with RC may exist in at least two conformations between which activation transitions are possible. A method was proposed for the determination of kinetic parameters of activation conformation transitions based on non-quasistatic cooling of the sample. This method is applicable most effectively to transitions occurring in darkness in systems with marked population of upper states because of the differences in their entropies often found in biosystems. Marked differences in functional activity were found between samples exposed to different cooling programs which related to population differences in non-contact conformational states of the RC. The following values were obtained for the conformational movement parameters in the RC: frequency factor  $1.6 \cdot 10^{-7} \text{ s}^{-1}$  and barrier height  $4.4 \cdot 10^3 \text{ K}$ . Figures 5; references 9: 6 Russian, 3 Western (1 by Russian authors).

7813/12947  
CSO: 1840/570

## RESEARCH IN SOLAR ENERGY BIOCONVERSION

Moscow PRAVDA in Russian 2 Mar 87 p 4

[Article by E. Knorre]

[Abstract] Scientists believe that there may be phototrophic microorganisms, capable of directly utilizing solar radiation. Corresponding Member of the Academy of Sciences Ye. Kondratyev of Moscow State University reports that there are bacteria which perform photosynthesis using chlorophyl-like pigments, but do not liberate oxygen. M. Ostropskiy of the Institute of Physical Chemistry, USSR Academy of Sciences, is working on decoding the evolution of the molecular-chemical mechanism of vision, since an understanding of the mechanism of vision will open the secrets of perception of light, as well as taste and odor, through a chain of hormones which greatly strengthens the weak input signal. The study of the processes of conversion of solar energy in living matter will open broad new prospects to technology. These will include new photocells with high efficiency, electric power generators, high-speed computers capable of reproducing visual images, and basically new photographic materials based on the enzyme chain used in vision, as well as new methods of phototherapy of severe diseases.

6508/12947

CSO; 1840/649

## ELECTROSTIMULATION IN FATIGUE REDUCTION

Vilnyus SOVETSKAYA LITVA in Russian 25 Mar 87 p 4

[Article by S. Gurchinas, director, Scientific Research Institute of Epidemiology, Microbiology and Hygiene, Lithuanian SSR]

[Abstract] In a new research trend for the Institute, research has begun on the use of electrostimulation of selected muscles and muscle groups in reducing fatigue. The efficacy of this approach to fatigue reduction has been tested under actual work conditions, and is now being expanded to other industrial settings. In addition, studies have begun on the construction of a laser apparatus suitable for the stimulation of acupoints as a modality for fatigue reduction and other therapeutic applications. These direct measures are being supplemented by a careful evaluation of other work factors--dust, heat, moisture, etc.--that affect work performance, in order to provide a well-rounded basis for improving working conditions.

12172/12947

CSO: 1840/654

## BIOTECHNOLOGY

### BIOTECHNOLOGY PLANT TO PERFECT PHARMACEUTICAL PRODUCTION

Moscow MOSKOVSKAYA PRAVDA in Russian 1 Apr 87 p 3

[Excerpt] A unique production facility that utilizes biotechnology was turned over for operation yesterday.

This enterprise for production of biotechnological preparations is the first of its kind to be created both in our country and in Europe. It is located on the edge of Moscow's Kuntsevo Rayon, next to the USSR Academy of Medical Sciences' All-Union Cardiology Research Center. There is a good reason that it has such a neighbor. The production facility was created precisely at this center, where a considerable number of promising drugs are under development. The path of a new drug from the researcher's laboratory to series production is sometimes a very long one, taking years. The new plant, which will operate on the basis of flexible technology, is the place where all the fine details of production processes will be worked out, test lots of drugs produced, and perfected methods for producing them subsequently turned over to other pharmaceutical plants.

The biotechnology plant's distinctive features are indicated by its name. Its technology is based on biosynthesis of substances. The first ones which will be tried out at the plant are dalargin, which is highly effective in healing ulcerous lesions; urokinaza, which dissolves blood clots; and peptide compounds which have an analgesic effect.

Before our country had such a unique industrial facility at its disposal, we were forced to sell licenses for many new types of drugs, which then came back to our pharmacies as drugs in commercial forms, in exchange for currency.

The plant-laboratory will have an unusual affiliate of its own: a special livestock-raising section which will provide raw materials. The most sterile section of the facility is a vivarium, where mice completely deprived of immunity are to be bred.

The plant-laboratory will produce its first lots of drugs this year.

FTD/SNAP  
/12947  
CSO: 1840/690

UDC 633.18

DEVELOPMENT OF MODULE AND ALGORITHM FOR OPTIMAL CALCULATION OF SEPARATION-OF-BIOSUSPENSION STAGE FOR BIOCHEMICAL PRODUCTION

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 60, No 2, Feb 87  
(manuscript received 28 Feb 85) pp 325-331

[Article by A. Yu. Vinarov, R. F. Baum, Ye. A. Semenova and I. Ya. Tsipenyuk]

[Abstract] A previous article analyzed a multilevel biotechnological system, distinguishing two major structural subsystems: fermentation and separation of the biosuspension. This article analyzes the second, or separation, subsystem on the example of the operation of typical technological elements of biochemical production--centrifugal separators. A relationship is obtained between the output stream of a thickened yeast suspension from the separation stage and the internal parameters of the stage. One peculiarity of the algorithm is that it can be used for operational decision-making concerning the desirability of connecting an additional separator as the productivity of an existing separator decreases due to increasing carryover. Figures 4; references 7 (Russian).

6508/12947  
CSO: 1840/633

## EPIDEMIOLOGY

### VENEREAL DISEASES AND INSUFFICIENT SEX EDUCATION

Moscow KOMSOMOLSKAYA PRAVDA in Russian 11 Mar 87 p 4

[Article based on interview with Yu. Ashmarin, honored physician of the RSFSR]

[Abstract] The current rapid increase in AIDS cases, as well as in 18 other sexually-transmitted diseases, is largely due to inadequate sex education and, particularly in the capitalist West, a loosening of moral values. The two primary venereal diseases that were previously a scourge in Tsarist times were overcome and controlled by the public health efforts of the Soviet government in the thirties. Today, the populations primarily at risk are individuals engaging in amoral lifestyles, substance abusers, and alcoholics. Many of those afflicted are in a latent phase or unaware of their condition and of the risk that they pose to members of their family and to society at large. This is particularly true of the younger generation and in many respects reflects inadequate sex education.

12172/12955

CSO: 1840/653

UDC 616.36-002-022:578.891]-07:616.153.962.4-097-078.73(575.1)

### EXAMINATION RESULTS OF VIRAL HEPATITIS PATIENTS FOR PRESENCE OF HBsAg IN KASHKADARYA OBLAST OF UZBEK SSR

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 10, Oct 86 (manuscript received 9 Dec 85) pp 39-42

[Article by N. A. Kurbanov, E. N. Lipatova, A. Ya. Burtsev, S. R. Safarova and R. T. Turdikulov, Kashkadarya Oblast Sanitation-Epidemiological Station, Karshi]

[Abstract] A total of 2208 sera specimens obtained from 3293 patients hospitalized in Karshi for symptoms of viral hepatitis (VH) were examined. Three rural rayons of Kashkadarya Oblast, differing by population density, climatic conditions and disease incidence were covered: Guzar, Dekhkanabad and Ulyanovsk. HBsAg was determined by reverse passive hemagglutination reaction. On the average HBsAg was detected in  $28.4 \pm 0.95\%$  of all cases,

reaching a level of  $42.8 \pm 4.18\%$  among infants less than one year old. Seasonal variations were noted; the highest level was seen during the second quarter of the year ( $33.3 \pm 2.3\%$ ) followed by a low of  $22.7 \pm 2.4\%$  during the third quarter. On the basis of reverse passive hemagglutination reaction, hepatitis B accounted for 20% of all VH cases. References 5 (Russian).

7813/12955  
CSO: 1840/621

UDC 576.895.771.097.22

SUPPRESSION OF PLASMODIUM BERGHEI RESISTANCE TO CHLOROQUINE BY MEANS OF  
INHIBITORS OF MICROSOMAL MONOOXYGENASES

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian  
No 4, Jul-Aug 86 (manuscript received 24 Feb 86) pp 7-10

[Article by S. A. Rabinovich, I. M. Kulikovskaya, Ye. V. Maksakovskaya, T. V. Chekhonadskikh, T. G. Pankova and R. I. Salganik, Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow, Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] Monooxygenase (MO) activity was noted in *P. berghei*; it was two to three times higher in strains resistant to chloroquine (CQ) than in the sensitive strains. A hypothesis was proposed that the use of MO inhibitors along with CQ should reduce the resistance of parasites to CQ. In present work combined use of CQ and  $\text{Cu}(\text{Lys})_2$  complex was studied in a model of rodent malaria resistant to CQ (pathogen: *P. berghei*). It was shown that adjuvant use of MO inhibitor  $\text{Cu}(\text{Lys})_2$  along with CQ decreased the level of parasitemia in mice inflected with *P. berghei*. Either of these agents alone was not effective against malaria. An extrapolated conclusion was reached that various enzyme inhibitors metabolizing drug preparations could act as effective agents for overcoming drug resistance. Figure 1; references 21: 12 Russian, 9 Western (1 by Russian authors).

7813/12955  
CSO: 1840/599

UDC 576.895.771.097.22:615.283.926:547.831.4

STUDY OF IN VIVO SENSITIVITY OF PLASMODIUM FALCIPARUM TO CHLOROQUINE IN BAMAKO  
(REPUBLIC OF MALI)

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4,  
Jul-Aug 86 (manuscript received 5 Mar 86) pp 19-21

[Article by V. V. Karzin and V. F. Bespyatov, Institute of Medical  
Parazitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry  
of Health, Moscow]

[Abstract] 39 Malaria patients in Bamako (Mali) were studied (23 women and  
16 men, 15-48 years old, all black). Analysis of the results showed absence  
of resistance of *P. falciparum* to chloroquine. All patients showed rapid  
improvement after administration of 25 mg/kg of chloroquine sulfate for three  
days. It was concluded that further studies were necessary on non-immune  
population using both in vivo and invitro testing. Figure 1; references 18:  
4 Russian, 14 Western.

7813/12955  
CSO: 1840/599

UDC 576.895.771.095.18:615.285.7(47+57)

RESISTANCE LEVEL CHANGES IN MALARIA MOSQUITOES TOWARDS DDT ON USSR TERRITORY

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4,  
Jul-Aug 86 (manuscript received 14 Oct 85) pp 25-27

[Article by N. I. Bondareva, V. P. Sergiyeva, V. I. Bezukladnikova, F. N.  
Guley, Z. A. Korsunova, A. G. Khristiyeva and N. A. Shokotko, Institute of  
Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR  
Ministry of Health, Moscow]

[Abstract] In light of continued case reporting of malaria in southern USSR  
a survey was performed at 11 locations of the tendencies to any changes in  
the resistance of mosquitoes to DDT: at nine points there was apparent re-  
sistance to varying degrees and at two points the populations of mosquitoes  
appeared to be sensitive to DDT. No uniform trend was observed. Mosquitoes  
which showed no resistance to DDT in late 70's (when DDT applications were  
stopped) still were sensitive to it. Those with low resistance showed either  
further drop or total conversion to sensitivity. And finally those with  
considerable resistance to DDT in late 70's showed no reversal to sensitivity.  
The reversal of sensitivity observed for the first time lends itself to  
speculation that renewed use of DDT could be effective in controlling these  
mosquitoes. References 6 (Russian).

7813/12955  
CSO: 1840/599

EPIDEMIOLOGY OF SALMONELLOSIS IN ANDIZHAN OBLAST

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian  
No 6, Jun 86 (manuscript received 4 Nov 85) pp 114-115

[Article by V. F. Rozina, R. A. Babayants, A. Kh. Khozhimirzayev, N. I. Pletneva and S. P. Sinnikova, Andizhan Medical Institute imeni M. I. Kalinin; Andizhan Oblast Sanitary Epidemiologic Station]

[Abstract] Statistical data for the period 1979-1983 were analyzed to assess the epidemiologic pattern of salmonellosis in the Andizhan Oblast. In the period in question, peak cycles were generally seen in February and March, accounting for 18.1% of the morbidity, and in July-September, with the latter peak accounting for 51.6% of the total disease incidence. Age breakdown revealed that 71.4% of the cases involved children 14 and under, with 61.3% of the cases ascribed to children three-years-old and under. On an overall basis, the incidence in urban areas was 5- to 6-fold higher than in the rural areas. Most of the pediatric cases involved children outside of day-care centers. Beginning with 1980, prophylactic use of salmonella bacteriophage in the day-care centers led to a 2-fold reduction in the incidence of salmonellosis in the Oblast in 1983 in comparison with 1979.

12172/12955  
CSO: 1840/615

UDC 616.24-002.5-06:616.89-008.441.13].084.4

EPIDEMIC RISK PRESENTED BY TREATMENT-EVADING ALCOHOLICS WITH PULMONARY TUBERCULOSIS

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian  
No 12, Dec 86 (manuscript received 25 Feb 86) pp 47-49

[Article by N. M. Rudoy and O. S. Yemelyanov, Central Scientific Research Institute of Tuberculosis, USSR Ministry of Health, Moscow]

[Abstract] An analysis was conducted on the epidemic risk presented by treatment-evading alcoholics with pulmonary tuberculosis in comparison with a cohort undergoing treatment on a voluntary basis. The former category consisted of 133 patients, and the latter of 162 subjects. Evaluation of close family relations demonstrated that infectivity of the former class of patients exceeded 4.9-fold that of the close relations of the latter group. For adult relatives, the rate of infectivity was 3.4-fold greater, and for children and adolescents 2-fold higher. These observations underscore the health risk that untreated tuberculosis patients present to the environment, in particular to persons in close contact with them, and the need for compulsory treatment and hospitalization of alcoholics with tuberculosis refusing treatment. References 13 (Russian).

12172/12955  
CSO: 1840/623

INCIDENCE OF HB-VIRAL INFECTION MARKERS IN CHRONIC ALCOHOLICS

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian  
No 12, Dec 86 (manuscript received 17 Mar 86) pp 49-52

[Article by V. I. Vasilyeva, A. A. Asratyan, M. Yu. Ivanova, I. L. Miliyevskaya, R. F. Marina-Fedorova, G. A. Danilina and T. O. Slepushkina, Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] A cohort of 707 males with chronic alcoholism were monitored for the presence of the HBsAg antigen, as well as anti-HBs and anti-HBc antibodies, in comparison with data derived for 447 nonalcoholic control males. The patients and controls were selected from across the USSR to represent a full range of localities. The incidence of HBsAg positive cases among the alcoholics in Moscow, Tashkent, Frunze and Uzhgorod was, respectively, 4.4, 13.8, 10.3 and 7.5%, with corresponding figures of 1.9, 4.4, 6.9 and 2.2% for the control donors. The incidence of anti-HBs positives in the Moscow, Tashkent, Frunze and Uzhgorod alcoholics was 17.6, 34.9, 41.9 and 12.9%, respectively; the respective figures for the controls in those cities were 10.6, 24.8, 29.7 and 10.0%. In addition, the anti-HBc positives for the respective cities for the control and alcoholic groups were, respectively, 12.5 and 22.0%, 29.2 and 48.6%, 36.6 and 52.2%, and 12.2 and 20.4%. The high incidence of HB markers in chronic alcoholics, in conjunction with lack of previous surgical interventions or anamnestic evidence of jaundice, point to the risk of this group for clinically inapparent hepatitis B infections. Figures 2; references 9: 4 Russian, 5 Western.

12172/12955  
CSO: 1840/623

## NEW FIGURES ON AIDS CASES

Moscow IZVESTIYA in Russian 19 Mar 87 p 3

[Article by V. Zhdanov, member of the USSR Academy of Medical Sciences]

[Abstract] The author, who is identified in a preface to the article as a leading specialist on acquired immune deficiency syndrome, reviews scientific findings about the nature of the AIDS disease and the ways that it is communicated. He cites data on the history of the spread of the disease and on its incidence in different parts of the world, and he reports figures for the Soviet Union.\* He states:

"...The total number of cases of the disease that have been detected in the USSR to date does not exceed 30, of which more than two-thirds involve foreigners who are living in the Soviet Union, and less than one-third involve the native population. Naturally, the number of healthy carriers of AIDS who have been detected exceeds the number of patients. I should point out the falseness of claims in some Western newspapers that the AIDS disease supposedly appeared in our country as early as the 1970s. The first confirmed case of AIDS was recorded in the USSR only in 1986."

The author goes on to say that although the Soviet Union is not threatened by the same kind of 'explosion' of the disease that is taking place in the USA and Western Europe, the Soviet government and science are working on preventive measures. Tests have been developed for identifying carriers of the virus in its latent period, and they are being put into production. The author reports that in the near future the tests will be used for millions of blood donors in order to cut off this channel of infection.

The author stresses that a 'healthy family' is the biggest factor in the prevention of AIDS, saying that every citizen must be aware that sexual deviance not only is immoral but also dangerous. He acknowledges that unfortunately, the country has drug addicts and other 'risk groups,' and that these groups should be systematically tested for AIDS, observing rules of medical ethics. The author remarks that it is important to say these things, because often the public is subjected to rumors instead of scientific information.

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\*See also the Daily SNAP, March 4, 1987, p. 2, col. 2

## GENETICS

### MEIOSIS IN INTERSPECIES PENTAPLOID AND TETRAPLOID WHEAT HYBRIDS F

Kiev TSITOLOGIYA I GENETIKA in Russian Vol 20, No 5, Sep-Oct 86  
(manuscript received 24 Jul 85) pp 327-330

[Article by T. M. Shnayder, Institute of Experimental Biology, ESSR Academy of Sciences, Tallin]

[Abstract] Cytogenetic analysis of meiosis in hybrids  $F_1$ , obtained from crossing soft wheat with *T. timopheevii* and *T. militinae* was performed in order to determine the nature of conjugation and the chromosome homology of the crossed species. Crossing soft wheat *Triticum aestivum* with tetraploid species of *Triticum timopheevii* Zhuk. and *Triticum militinae* Zhuk. et Migusch produced an average of about seven bivalents in pentaploid hybrids  $F_1$  in the first division of meiosis, with participation of chromosomes of genomes A of the soft wheat and tetraploid species. Chromosomes of genome B, G and D remained in a univalent state or were included in multivalent associations. The high percentage of meiocytes with multivalents in these hybrids (58-62 percent) indicated heterozygotic reciprocal exchanges between chromosomes of the crossed species. Tetraploid hybrid  $F_1$  obtained from crossing of *T. timopheevii* and *T. militinae* species produced 1-2 closed type transvalents in the first division of meiosis in 37 percent of the pollen mother cells, suggesting that 1-2 chromosomes are involved in reciprocal translocation in these species. The combination of the high rate of multivalent associations in hybrid  $F_1$  of *T. timopheevii* X *T. militinae* was attributed to the type of centromere orientation. Four tetrad cells are formed with alternate orientation of a ring quadrivalent. References: 3 Russian, 6 Western.

2791/12955

CSO: 1840/542

## CYTOGENETIC ACTIVITY OF MUTAGENIC FACTORS AS FUNCTION OF LINE GENOTYPE

Kiev TSITOLOGIYA I GENETIKA in Russian Vol 20, No 5, Sep-Oct 86  
(manuscript received 17 Dec 85) pp 369-372

[Article by A. I. Tyutyun, V. V. Morgun and V. F. Logvinenko, Institute of Molecular Biology and Genetics, UkSSR Academy of Sciences, Kiev]

[Abstract] A study of the cytogenetic activity of chemical and physical mutagenic factors in their effect on Kiyanka, Chayka and Donskaya semi-dwarf winter wheat seeds involved exposure of seeds to N-nitrosomethylurea, N-nitrosoethylurea, N-nitrosodimethylurea, 1,4-bis-diazoacetylbutane and gamma rays for 14 hours. The chromosomal aberration frequency depended more upon the mutagenic factor than upon the variety genotype. Reliable differences in frequency of chromosomal aberration, induced by the same mutagenic factor on different varieties, indicated the important role of the genotype in determining mutagenic variability of the chromosomes. A chromosome aberrations test showed the Donskaya semi-dwarf variety to be most subject to mutation. References 3: 2 Russian, 1 Western.

2791/12955  
CSO: 1840/542

UDC 631.11:577.112.826:575.116

## INHERITANCE AND MAPPING OF GENES CODING STORAGE PROTEINS SYNTHESIS IN CHROMOSOME 1A OF SOFT WHEAT

Kiev TSITOLOGIYA I GENETIKA in Russian Vol 20, No 5, Sep-Oct 86  
(manuscript received 4 Jun 85) pp 372-376

[Article by T. A. Sobko, F. A. Poperelya, A. I. Rybalka and A. A. Sozinov, All-Union Selection and Genetics Institute, Odessa]

[Abstract] Data on mapping of chromosome 1A by loci, coding synthesis of storage proteins (glutenin-Glt1A and gliadin-Gld1A and Gld2-1A) were obtained by studying the component composition of gliadin and glutenin in hybrids F from crossing Beostaya 1XFelix and Bezostaya 1XGernot. A locus responsible for synthesis of X<sub>1</sub> and X<sub>2</sub> components in the short arm of chromosome 1A proximal to the centromere at an average distance of 31.9±2.2 percent of crossing over from Gld1A and 27.3±2.7 percent of crossing over from glutenin coding locus Glt1A on the long arm of this chromosome was identified as Gld2-1A. In addition to the two identified allele variants of the protein identified, additional studies revealed a third allele suggesting that locus Gld2-1A consists of a series of allele protein variants. Locus Gld2-1A may have practical value as a chromosome 1A marker and as a factor in determining genetically-caused commercial properties of flour. Figures 4, references 19: 8 Russian, 11 Western.

2791/12955  
CSO: 1840/542

GENETIC MAPPING OF REGULATOR GENE DETERMINING SYNTHESIS OF ENTEROTOXIN IN  
VIBRIO CHOLERAЕ

Moscow GENETIKA in Russian Vol 22, No 3, Mar 86 (manuscript received 6 May 85)  
pp 399-405

[Article by N. I. Smironva, L. F. Livanova, I. A. Shaginyan and V. L. Motin,  
All-Union Scientific Research Anti-Plague Institute "Microbe," Saratov;  
Scientific Research Institute of Epidemiology and Microbiology imeni  
N. F. Gamaleya, Moscow]

[Abstract] Study of the genetic control and regulation of toxin synthesis  
is among the most important trends in genetic studies of the cholera vibrio.  
This article presents data on genetic mapping of the tox regulator gene  
by means of conjugation crossings. Significant linkage of the tox-7 and  
tur-63 genes is established. The following sequence of genes is determined  
in this section of the genetic map of the cholerae vibrio chromosome: asp-  
cys-nal-pur 61-trp-his-pur-63-tox-7-ile. The data explain the possibility  
of producing Pur-non-virulent cholerae mutants, due to the linkage of these  
two genes. Figures 2, references 22: 5 Russian, 17 Western.

6508/12955  
CSO: 1840/639

UDC 575:579.842.24

MOLECULAR CLONING OF PECTATELYASE GENES OF ERWINIA CAROTOVORA

Moscow GENETIKA in Russian Vol 22, No 12, Dec 86 (manuscript received  
7 Mar 86; final version received 12 May 86) pp 2758-2767

[Article by N. O. Bukanov, M. Yu. Donshteyn, A. N. Lebedev, N. K. Yankovskiy  
and V. G. Debabov, All-Union Scientific Research Institute of Genetics and  
Selection of Industrial Microorganisms, Moscow]

[Abstract] Pectatelyase, secreted by bacteria of the genus Erwinia, decom-  
poses the primary walls of plant cells. Pectatelyase genes can be used  
as a convenient model system for the study of mechanisms of secretion of  
protein into extracellular space by gram-negative bacteria. These genes  
serve as a basis for the construction of secreting vectors. This article  
presents the results of deletion and transcription analysis of the cloned  
gene pt1A and describes molecular cloning and the study of the second  
structural gene of pectatelyase (pt1B) of E. carotovora strain ENA49. The  
genes are located on the chromosome next to each other, and there are no  
other loci with pectatelyase genes on the chromosome of ENA49 capable of  
being expressed in E. coli. Figures 5; references 18: 3 Russian, 15 Western.

6508/12955  
CSO: 1840/648

## ORGANIZATION AND EXPRESSION OF ColD-CA23 PLASMID GENES ASSOCIATED WITH COLICIN SYNTHESIS

Moscow GENETIKA in Russian Vol 22, No 5, May 86 (manuscript received 15 Aug 85; final version received 31 Oct 85) pp 733-740

[Article by Ye. S. Pshennikova, V. A. Lipasova, M. N. Kolot and I. A. Khmel, Institute of Molecular Genetics, USSR Academy of Sciences, Moscow]

[Abstract] The ColD-CA23 plasmid is a member of the group of small multi-copy colicinogenic plasmids including ColE1, many derivatives of which are widely used as vectors in gene engineering. Vectors are now being developed from other plasmids of this group, such as ColE3, ColDF13 and ColD. This article studies the ColD plasmid, determining the location and studying the regulation of functioning of the genes of this plasmid responsible for the synthesis of colicin, its export [sic], and cell immunity to its effect. A genetic map of the plasmid is constructed. The data obtained indicate that the ColD plasmid is in the second group of colicinogenic plasmids. Figures 3, references 17: 2 Russian, 15 Western.

6508/12955  
CSO: 1840/641

UDC 575:582.282.23

## GENETIC LINES OF THE YEAST HANSENULA POLYMORPHA. PART 1. PRODUCTION AND CHARACTERISTICS OF GENETIC LINES

Moscow GENETIKA in Russian Vol 22, No 5, May 86 (manuscript received 23 Apr 84; final version received 24 Jan 85) pp 741-747

[Article by Ye. N. Bodunova, V. N. Donich, G. F. Nesterova and Ya. O. Soom, All Union Scientific Research Institute of Hydrolysis of Plant Materials, Leningrad]

[Abstract] *H. polymorpha* is heat tolerant, making it a convenient object for gene selection work, though the genetics of the yeast have not been studied. Such studies require the creation of genetic lines with stable ploidy, marked with various mutations and capable of hybridization with subsequent regular meiosis and spore formation. The purpose of this work was to create such lines. Haploid genetic lines were obtained by successive intratetrad inbreeding and selection of multiple-spore progeny of the regular tetrads. One distinguishing feature of the genetic lines obtained was the capability of some meiotic segregants to sporulate. Another characteristic is the low frequency of recombination in the second division of meiosis, leading to a decrease in the frequency of tetratypes. The lines can be used to study the genetics and life cycle of *H. polymorpha*.  
References 17: 5 Russian, 12 Western.

6508/12955  
CSO: 1840/641

## CLONED HUMAN ALPHOID DNA FRAGMENT--MOLECULAR MARKER OF PERICENTROMERIC REGION OF CHROMOSOME 18

Moscow GENETIKA in Russian Vol 22, No 5, May 86 (manuscript received 2 Aug 85; final version received 11 Sep 85) pp 868-876

[Article by I. A. Aleksandrov, Yu. B. Yurov, S. P. Mitkevich and V. M. Gindilis, All-Union Science Center of Mental Health, USSR Academy of Medical Sciences, Moscow]

[Abstract] Unique DNA sequences are successfully used as molecular-genetic markers in the mapping of eukaryotic genomes. The possibility of using repeating DNA sequences for genetic mapping has been little studied, although certain types of DNA repeaters can be used to create molecular-genetic markers, particularly tandem-repeating nucleotide sequences in the regions of pericentromeric heterochromatin. The authors' laboratory has used pericentromeric DNA repeaters to obtain molecular markers for human chromosomes. Alphoid DNA found in the genomes of most primates, including man, tandem elementary sequence repeaters 167-172 pn in length, have been found to be restriction repeaters for electrophoretic fractionation of EcoRI-hydrolysate of total nuclear DNA in the form of discrete bands containing fragments measuring 340, 510, 680 and more nucleotide pairs. Detailed studies of the chromosome location of individual cloned alphoid DNA fragments have practically never been performed. The authors' laboratory undertook cloning of human DNA fragments containing repeating nucleotide sequences of this type. Two recombinant plasmids were isolated, both of which hybridized primarily with the region of pericentromeric heterochromatin of chromosome 18, less so with the pericentromeric regions of chromosomes 2, 9 and 20, and manifested polymorphism in terms of the number of copies in homologous chromosomes. The sequences may be useful for cytogenetic analysis of chromosome restructuring and the study of polymorphism of pericentromeric heterochromatin regions in human chromosomes. Figures 4; references 27: 7 Russian, 20 Western.

6508/12955

CSO: 1840/641

## CLONING AND PHYSICAL MAPPING OF ADEL GENE OF SACCHAROMYCES CEREVISIAE

Moscow GENETIKA in Russian Vol 22, No 4, Apr 86 (manuscript received 8 Jul 85) pp 549-556

[Article by K. V. Sasnauskas, G. K. Gedminene, A. I. Markyavichyus, V. I. Naktinis and A. A. Yanulaytis, "Ferment" Scientific Production Association, Vilnyus]

[Abstract] Technical details are provided on the cloning of the ADEL gene of *Saccharomyces cerevisiae* in selected *E. coli* strains, using plasmid pYE1. The ADEL gene was cloned within a HindIII 4.0 kb DNA fragment in the shuttle vector using complementation of the adel mutation in the yeast. In the *E. coli* host expression analysis of ADEL demonstrated that it did not complement purC mutation. However, cultivation of the clones on selective media led to appearance of prototrophic colonies with a frequency of  $10^{-7}$  to  $10^{-8}$ . Furthermore, the plasmid DNA isolated from such colonies complemented *E. coli* purC mutation and *S. cerevisiae* adel mutation. Structural evaluation of the pYE(ADEL) plasmid demonstrated bacterial DNA insertions in the yeast DNA fragment, with the bacterial insertion identified as IS1 element. It appears, therefore, that the ADEL gene in the yeasts operates under the control of its own promoter, while in *E. coli* the promoter is located within the IS1 element. Figures 6; references 22: 2 Russian, 20 Western.

12172/12955  
CSO: 1840/640

UDC 577.212.3

## NUCLEOTIDE SEQUENCE AND FUNCTIONAL MAP OF KANAMYCIN-RESISTANT PLASMID pUB110 FROM STAPHYLOCOCCUS AUREUS

Moscow GENETIKA in Russian Vol 22, No 7, Jul 86 (manuscript received 8 Jan 86) pp 1081-1092

[Article by V. I. Bashkirov, N. V. Milshina and A. A. Prozorov, Institute of General Genetics, imeni N. I. Vavilov, USSR Academy of Sciences, Moscow]

[Abstract] The plasmid pUB110 was first isolated from *Staphylococcus aureus* cells; this plasmid gives *Bac. subtilis* cells resistance to kanamycin and neomycin. The full nucleotide map of the plasmid is unknown, though this would allow more precise location of mutations and construction of more convenient vectors for cloning. The present work determines the full nucleotide sequence of the plasmid and undertakes a computer analysis of the sequence, revealing four open counting frames capable of coding polypeptides A, B, C, and D with molecular masses of 49.5, 38.8, 28.8 and 9.5 kD. The proton-coding sequences are presented in the article. The full nucleotide sequence of the plasmid consists of 4545 bp, with 64% A-T and 36% G-C pairs. Figures 4; references 34: 3 Russian, 31 Western.

6508/12955  
CSO: 1840/643

## BEHAVIOR OF AUTONOMOUS PLASMID AND PLASMIDS INTEGRATED INTO CHROMOSOME UPON SPORULATION OF BACILLUS SUBTILIS CELLS

Moscow GENETIKA in Russian Vol 22, No 7, Jul 86 (manuscript received 26 Jun 85; final version received 5 Dec 85) pp 1099-1103

[Article by Ye. F. Glumova and A. A. Prozorov, Institute of General Genetics imeni, N. I. Vavilov, USSR Academy of Sciences, Moscow]

[Abstract] *Bac. subtilis* is one of the most promising models in gene engineering work. Gene engineering of bacilli usually utilizes plasmids first isolated from the cells of *Staphylococcus*, frequently with various fragments inserted from *E. coli*. The way these foreign plasmids act upon sporulation is still unknown. This work therefore has attempted to study certain peculiarities of their behavior upon spore formation by *Bac. subtilis*. The results indicate that the plasmids used are not included in the genome of the host cell upon sporulation in the overwhelming majority of cases, but remain in the autonomous state. However, inclusion in the host chromosome upon sporulation may occur in about one case in a thousand. The transforming activity of both plasmid and chromosomal DNA isolated from the spores is significantly reduced, possibly because the DNA obtained from the spores is not fully methylated, leading to a decrease in the transforming activity of the DNA. Studies of plasmids preliminarily integrated in the chromosome indicated the possibility in the process of sporulation and growth of spores of excision of the integrated plasmid from the chromosome or amplification of the inserted plasmid within the host genome. These clones developed approximately twice as frequently as in the life cycle of vegetative cells with plasmids integrated in the chromosome. References 15: 5 Russian, 10 Western.

6508/12955  
CSO: 1840/643

## PRODUCTION AND CHARACTERISTICS OF SACCHAROMYCES CEREVISIAE YEAST STRAINS WITH INCREASED SENSITIVITY TO DETERGENTS

Moscow GENETIKA in Russian Vol 22, No 7, Jul 86 (manuscript received 22 Oct 85) pp 1104-1111

[Article by S. Zh. Sarsenova, M. Kh. Shigayeva and Yu. I. Pavlov, Department of Microbiology, Kazakh State University, imeni S. M. Kirov, Alma-Ata; Department of Genetics and Selection, Leningrad State University, imeni A. A. Zhdanov]

[Abstract] Strains with altered membrane permeability are used in the Ames test for mutagens, in which mutants with lypopolysaccharide membrane layer disorders have increased mutagen sensitivity. Intestinal bacilli with

membrane defects have also been suggested as safe recipients in gene engineering experiments. *Saccharomyces* yeasts are popular objects for genetic toxicology studies. The search for yeast strains with genetically determined permeability defects is a promising area. This work has produced *Sacch. cerevisiae* mutants with elevated sensitivity to detergents, tested their cross sensitivity to dyes and antibiotics, and established the regularities of induced mutagenesis in these strains. The major result of the work is the production of a set of strains with genetically determined sensitivity to detergents. The system of selection of mutants on the basis of sensitivity to cetyl-3-methyl-ammonium chloride was found to be successful, revealing recessive mutants with detergent, dye and antibiotic sensitivity with good frequency. Cationic detergent solutions inhibited the growth of both wild and mutant strains, while sodium deoxycholate was toxic only for some of the mutants. The increased sensitivity of the mutants to detergents can be explained by disorders in cell wall structure. The mutants probably contain various cell wall defects. There are at least three groups of mutants, differing in sensitivity to detergents, dyes and antibiotics. Strains with detergent sensitivity were found to be supersensitive to the mutagenic effect of ethidium bromide. Figures 2; references 20: 6 Russian, 14 Western.

6508/12955  
CSO: 1840/643

IMMUNOLOGICAL STUDY OF ISOLATED COMPONENTS OF COMPLEMENT SYSTEM

Moscow GUDOK in Russian 6 Mar 87 p 4

[Article by Ye. Druzhinina]

[Excerpt] Using methods of biotechnology, specialists of the All-Union Scientific Research Institute of Extra-Pure Biological Preparations, Leningrad, have isolated, in pure form, a number of protein substances which are vitally important for the human body.

A group of immunologists of the institute's laboratory for isolating and purifying biologically active substances is studying the complement system. This is the name of a group of proteins consisting of 20 components which circulate in the blood. They keep watch for the appearance of bacteria and viruses.

"The protein complement system is very important for the vital activity of an organism," related Candidate of Biological Sciences Aleksandr Ishchenko. "It serves as a kind of 'dispatcher' and it issues an alarm when each focus of infection appears and sends immune system cells there to suppress the disease. These proteins themselves sometimes rush to fight an infection. The complement system is an extremely delicate instrument which the body uses to remain healthy."

Each protein has its own strictly defined place in the system. But it is not a hierarchical system. There are no primary and secondary proteins; all are important. Some proteins, such as the C-3, are fairly numerous whioe others such as protein D, are present in scanty amounts. Scientists already have a sizable list of diseases which result from disruption of the normal content of complement components in the body.

The Leningrad immunologists performed thousands of experiments, isolating individual components of the system from blood, 'setting' them against numerous bacteria, and testing components on experimental animals.

The complement's bactericidal capabilities were thus tested on guinea pigs. They were infected with conjunctivitis, and factor D which was first from their blood isolated and then administered to them. The disease yielded in an appreciably shorter time than usual.

A basic set of 15 reagents -- purified components of the system -- has now been created. The researchers' ultimate goal is to introduce their products into health-care practice.

Generally good prospects have opened up for diagnosis with the aid of human proteins. From a few drops of human blood mixed with a reagent in a test tube, it will be possible to determine not only the condition of an organism at a given moment, but also its predisposition to particular diseases.

FTD/SNAP

/12955

CSO: 1840/690

UDC 579.843.1:615.919].083.34

IMMUNOFLUORESCENT DETECTION OF CHOLERA ENTEROTOXIN

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian  
No 12, Dec 86 (manuscript received 27 Jan 86) pp 62-65

[Article by I. V. Vladimtseva, V. I. Yefremenko, V. G. Pushkar, Yu. A. Goloseyev and ye. N. Trofimov, Volgograd Scientific Research Antiplauge Institute]

[Abstract] A slide method for the detection of cholera toxin in various preparations has been devised, employing a ganglioside-based DASS system and fluorescent-labeled antiserum. The method utilized selective adsorption of the toxin from impure preparations by the gangliosides immobilized on spherical polyacrylamide microgranules, and subsequent detection with the labeled antiserum. Pretreatment of the ganglioside preparation with neuraminidase increased the sensitivity of the method 3-fold, permitting detection of 20 ng of the toxin. Figures 1; references 15: 9 Russian, 6 Western.

12172/12955  
CSO: 1840/623

UDC 616.98:579.852.13]-092.19-055.5/.7

INHERITANCE OF RESISTANCE TO ANTHRAX INFECTION AND SUSCEPTIBILITY TO ANTHRAX TOXIN IN MICE

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian  
No 5, May 86 (manuscript received 28 May 85) pp 45-49

[Article by V. A. Abalakin and B. L. Cherkassiy, Central Scientific Research Institute of Epidemiology, USSR Ministry of Health, Moscow]

[Abstract] Nine inbred lines of mice were employed in a study designed to evaluate genetic aspects of resistance to anthrax infection and susceptibility to anthrax toxin. The resultant data demonstrated a direct relationship between resistance to infection by encapsulated and nonencapsulated *Bacillus anthracis* strains and susceptibility of the mice to edematous and

immunosuppressive effects of the toxin. A 100- to a 1000-fold difference in resistance to B. anthracis infection was noted among the different inbred strains. However, the lack of correlation with capsule formation demonstrated that the latter was not a factor in resistance. In addition, susceptibility to infection was correlated with marked resistance to the lethal effects of the toxin, while resistance to infection was correlated with susceptibility to the lethal effects of the toxin. Resistance of the mice to infection by B. anthracis was attributable to either a single dominant gene or a locus of closely linked genes unrelated to the H-2 locus. In addition, no correlation was established between the gene responsible for resistance and the HC<sup>1</sup>/HC<sup>0</sup> alleles at the C<sup>1</sup> locus on chromosome 2, reflected in serum C5 component of complement. Figures 3; references 13: 5 Russian, 8 Western.

12172/12955  
CSO: 1840/614

UDC 616.98:578.833.26]-078.73

SOLID-PHASE IMMUNOENZYME METHOD FOR DETECTION OF TICK-BORNE ENCEPHALITIS VIRUS

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian  
No 6, Jun 86 (manuscript received 26 Nov 85) pp 103-104

[Article by S. Ya. Gaydamovich, L. S. Subbotina, O. V. Navolokin, N. A. Lavrova and L. N. Tarasevich, Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow; Scientific Research Institute of Endemic Infections, Omsk]

[Abstract] Standard solid-phase immunoenzyme methods were applied to the detection of TBEV antigens in 10% pooled suspensions of Ixodes ricinus ticks, using experimentally-infected ticks and ticks collected under natural conditions in Omsk Oblast and Krasnoyarsk Kray. The results of the immunoenzyme method were compared with those obtained by inoculation of suckling albino mice with the suspensions. The resultant data demonstrated that the solid-phase immunoenzyme assay may be recommended for rapid screening of suspected material for the presence of TBEV, although the sensitivity was slightly less than that obtained with the suckling mice test, i.e., 12.1% positive pools with the mice test vs. 10.6% with the immunoenzyme test. However, since the immunoenzyme method yields results within 4-5 hours, it may be used with confidence for preliminary screening and, with further development, may be applicable for analysis of blood samples.

12172/12955  
CSO: 1840/615

## SOME PHYSICAL CHEMICAL CHARACTERISTICS OF PSEUDOMONAS AERUGINOSA ANATOXIN

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 6, Nov-Dec 86  
(manuscript received 13 Aug 86) pp 29-31

[Article by A. A. Shinkarenko, L. G. Podgornaya, V. N. Shchetinina, V. F. Dyachenko and N. F. Dzyuban, Kharkov Scientific Research Institute of Microbiology, Vaccines and Serums]

[Abstract] A study of Pseudomonas aeruginosa anatoxin by gel-chromatography, electrophoresis in PAAG and immunoelectrophoresis methods showed it consists of substances of glycoprotein and protein nature, differing in electrophoretic mobility. Gel-filtration separated the anatoxin into two fractions. The rapidly eluting fraction (I) is heterogeneous and contains the same components found in the whole anatoxin. The slowly eluting fraction (II) is homogeneous and contains the most electrophoretically-mobile component. Fraction I contains two antigens and fraction II is not antigenic. Fraction II contains 16 amino acids. Figures 2; references 7: 6 Russian, 1 Western.

2791/12955  
CSO: 1840/533

UDC 616.98:579.861.2]-06:616-001.36-078.73

## STAPHYLOCOCCAL TOXIC SHOCK EXOTOXIN (ISOLATION AND CHARACTERIZATION)

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOLOGII in Russian No 10, Oct 86 (manuscript received 20 Feb 86) pp 15-20

[Article by A. K. Akatov, F. S. Fluyer, G. L. Ratgauz and I. V. Kushko, Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] The goal of this work was to isolate and characterize a homogeneous preparation of toxic shock exotoxin (TSE) and to obtain monospecific antiserum. The methodology developed for this included: sorption of toxin from culture liquid on amberlite CG-50, elution, dialysis, gel chromatography on a column of biogel P-2, isoelectric focusing and gel chromatography on G-75 sephadex column. TSE is a rather thermally-stable protein with molecular weight of 24,000 and isoelectric point 7.2. Monospecific antiserum against TSE which, by physical-chemical and immunological properties was identical with the reference serum, was obtained with a titer of precipitating antibodies of 1:16. It did not give any cross reactions with homogeneous preparations of staphylococcal enterotoxins. Figures 7; references 15: 3 Russian, 12 Western.

7813/12955  
CSO: 1840/621

PREVENTION OF VIRAL HEPATITIS IN CHILDREN USING CONCENTRATED HUMAN LEUCOCYTIC INTERFERON

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian  
No 10, Oct 86 (manuscript received 18 Jan 86) pp 63-65

[Article by L. K. Bryukhanova, S. A. Dvoretzkaya and V. P. Kuznetsov,  
Kuybyshev Medical Institute imeni D. I. Ulyanov]

[Abstract] The goal of this study was to evaluate the effectiveness of prophylactic administration of concentrated human leucocytic interferon (IF) to children who were in close contact with viral hepatitis (VH) patients. Clinical studies were undertaken for three schools in Kuybyshev. IF was administered electrophoretically in small doses at the hip. This prophylactic use decreased the incidence of VH six-fold. An assumption was expressed that introduction of IF results in antiviral rather than immunomodulating effect: there were no statistically significant differences in a number of immunologic tests prior to and after administration of IF. References 8: 7 Russian, 1 Western (by Russian authors).

7813/12955  
CSO: 1840/621

LASER BIOEFFECTS

LASER-PUNCTURE METHODS FOR TREATING EFFECTS OF BRAIN INJURIES

Moscow MEDITSINSKAYA GAZETA in Russian 4 Mar 87 p 3

[Article by G. Anishchenko, candidate of medical sciences, head of a laboratory of the USSR Ministry of Health's Central Scientific Research Institute of Acupuncture Zone Therapy; O. Speranskaya, candidate of medical sciences, senior science associate of the institute; and A. Potapov, candidate of medical sciences, head of a department of the USSR Academy of Medical Sciences Institute of Neurosurgery imeni Burdenko]

[Abstract] The article reports results of clinical testing of acupuncture zone therapy methods employing a laser which the authors developed for treating nervous and mental impairments resulting from head injuries. These methods reportedly were developed on the basis of experience were neurological therapy employing helium-neon lasers to produce effects on skin receptors.\*

The new methods reportedly were tested on more than 90 patients recovering from severe head injuries. The therapy was conducted at City Clinical Hospital No. 52 in Moscow, which serves as a clinical base for the USSR Ministry of Health's Central Scientific Research Institute of Acupuncture Zone Therapy. Brief descriptions are given of three procedures which were employed. The first is used to alleviate spasms and promote recovery following pareses. The second reportedly has proved effective in correcting post-traumatic asthenoneurotic disorders. The third, a sedative method, is recommended for treatment of quasi-psychopathic phenomena and vegetovascular impairments. Laser power parameters and times of treatment sessions (individual and total) are described in each case.

Substantial improvement reportedly was noted in 78-80 percent of the patients. This proportion was 35 percent higher than in a control group which was treated by methods not involving laser therapy.

\*See the Daily SNAP, September 14, 1984, p. 2, col. 2

FTD/SNAP  
/12955  
CSO: 1840/690

MEDICINE

HEART TRANSPLANT OPERATION IN MOSCOW

Moscow TASS in English 27 Mar 87

[Text] A heart transplant operation was carried out by a team of specialists under Valery Shumakov, corresponding member, USSR academy of medical sciences, in Moscow on March 12. The patient is Alexandra Shalkova, 27, from the Arkhangelsk region, who received the heart of a 26-year-old man. The operation lasted 4.5 hours. Pravda reports today that Alexandra Shalkova is doing well. She moves about without help and thinks that another month she is to spend in the clinic is too long.

It was the second heart transplant carried out by Soviet surgeons. The first one was done last autumn. The patient, however, developed a negative reaction to the drug which was used to suppress the graft-versus-host disease and died within a few days after the operation.

/12955

CSO: 1840/691-E

HEMATOLOGY INSTITUTE TREATMENT OF LIMB FROSTBITE VICTIMS

Moscow PRAVDA in Russian 19 Mar 87 p 6

[Article by O. Frantsen]

[Abstract] The article reports on treatment of severe frostbite cases at Moscow's City Clinical Hospital No. 81, where the Central Scientific Research Institute of Hematology and Blood Transfusion operates a ward for treatment of thermal trauma. The institute's research work in this field began about 10 years ago under the direction of Prof. R. Murazyan, a State Prize laureate. Since his death work has continued under Candidate of Medical Sciences S. Smirnov.

At the hospital ward, Doctor of Medical Sciences Nikolay Romanovich Panchenkov told the author of the article about one frostbite case in which the patient was brought to the hospital with all four limbs frozen solid. Panchenkov described the method of therapy. An insulating binding is applied to the limbs, and blood-thinning drugs are administered under pressure into the central vessels of the limbs. The idea of the method is explained as one of thawing from the inside out, so as to minimize damage and complications of frostbite. Panchenkov related that an infrared imager revealed in this case, as the therapy progressed, that the only difficulty might be with the fingers of one hand, which in fact had to be amputated, with the exception of the thumb.

Some background information on this particular case is related. While waiting between trains in Moscow, the patient accepted a stranger's invitation to share a bottle of liquor, and was later found unconscious in a courtyard. Panchenkov remarked that at the hospital ward, the number of frostbite cases linked with drunkenness are becoming fewer, but that at times the ward 'looks like a sobering-up station,' in his words.

In conclusion, the author of the article notes that the ward's equipment leaves much to be desired. To get the right pressure for intravenous administering of drugs, nurses have to mount droppers on the ceiling. The ward's infrared imager is a Swedish make, and is borrowed. Panchenkov said that the Soviet-made imager on the ward had broken down soon after it was acquired, and it has long been awaiting repairs.

FTD/SNAP

/12955

CSO: 1840/690

UDC 616.98:579.841.11]-085.332:577.182.75].015.2[615.371:579.841.1]

EXPERIMENTAL JUSTIFICATION FOR COMBINED USE OF TOBRAMYCIN AND  
IMMUNOPREPARATIONS IN TREATMENT OF ACUTE PYOCYANIC INFECTION

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian  
No 8, Aug 86 (manuscript received 16 Sep 85) pp 42-45

[Article by V. V. Minukhin and V. Ya. Tsyganenko, Kharkov Medical Institute]

[Abstract] Infectious complications caused by *Pseudomonas aeruginosa* has increased in recent years, reaching 27% in early wound healing cases, especially among burn cases where it jumped up to 50-60%. In the present work, combined therapy was evaluated in treating acute pyocyanic infection using Tobramycin (Tb) and polyvalent corpuscular *Ps. aeruginosa* vaccine (PCPV) or pyocyanic hyperimmune plasma (PHP). The work was done on white mice. Individually, Tb and PHP, when applied at the time of infection, showed statistically significant decrease in survival at high doses where some side reactions were expected. PCPV was not effective on parenteral administration. Use of combined therapy showed statistically significant increases in survival. Furthermore, it was possible to vary respective doses of the two agents used allowing lower dosage of the antibiotic. The Tb-PHP combination proved effective even when used in already-developed inflammations. References 13: 12 Russian, 1 Western.

7813/12955  
CSO: 1840/618

HEART TRANSPLANT ISSUES

Moscow MOSKOVSKAYA PRAVDA in Russian 5 Mar 87 p 3

[Article by V. Kobanov, academician, USSR Academy of Medical Sciences,  
Honored Activist of Science, RSFSR]

[Abstract] The third heart transplant operation in the USSR was performed on 27 Oct 86 at the Scientific Research Institute of Transplantology and Artificial Organs, USSR Ministry of Health. The operation was successful, but the patient soon died due to kidney problems related to the use of

immunosuppressant drugs. The problem of heart transplants, in spite of many successful operations around the world, has not been solved. Transplantation of both natural and artificial hearts has captured the imagination of the public and of scientists. Four surgical centers are presently being set up in Moscow for this type of operation, where trained personnel with the necessary experience in heart surgery are available. These teams of physicians must be treated with great respect and not be distracted by the requirement to work with numberless verification commissions. At one time, to avoid this sort of problem, the famous surgeon A. A. Vishnevskiy was forced to perform a heart transplant operation not at his own institute, but at a Military-Medical Academy clinic in Leningrad. Postoperative care of patients is also vital with this type of surgery, and will require organization of the proper support staff and facilities.

6508/12955  
CSO: 1840/650

UDC 616.155.1-055.5/.7-036.2(575.12/13)

ETHNOGEOGRAPHIC CHARACTERISTICS OF HEREDITARY ERYTHROCYTOPATHY INCIDENCE  
AMONG POPULATION OF FERGANA VALLEY

Moscow GEMATOLOGIYA IN TRANSFUZIOLOGIYA in Russian Vol 31, No 11, Nov 86  
(manuscript received 20 Jul 85) pp 7-10

[Article by K. K. Saliyev, Andizhan Medical Institute imeni M. I. Kalinin,  
Central Scientific Research Institute of Hematology and Blood Transfusion,  
USSR Ministry of Health, Moscow]

[Abstract] The goal of this study was to identify and screen prophylactically, individuals with various forms of erythrocytopathy in the Fergana valley located at the junction point of three republics: Uzbek, Tajik and Kirghiz SSR. In the past this population was in religious, national and geographic isolation. Individuals with thalassemia, anomalous hemoglobins (HbD, HbE), erythrocytic glucoso-6-phosphatedehydrogenase (G-6-PDH) deficiency, hereditary enzymopenic methemoglobinemia and various combinations were identified. Highest frequency of thalassemia was found in Andizhan Oblast probably connected with once-high incidence of malaria in this region. In general, analysis of the data indicated genetic heterogeneity of thalassemia and anomalous hemoglobins. Three groups were identified for intensive screening: infants, pregnant women and young children. The organization of a center for coordination of all necessary activities in this region related to hemoglobinopathy to include detection, screening, treatment and prevention effort was recommended. References 6 (Russian).

7813/12955  
CSO: 1840/685

DIFFERENTIAL DIAGNOSIS OF SICKLE CELL DISEASES AMONG FOREIGN STUDENTS RESIDING IN USSR

Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 31, No 11, Nov 86  
(manuscript received 18 Nov 85) pp 18-21

[Article by V. A. Kononyachenko, academician of USSR Academy of Medical Sciences, V. N. Orekhovich, O. V. Troitskaya, N. M. Yushkova, N. V. Volkova and Sashi Kanta, Institute of Biologic and Medical Chemistry, USSR Academy of Medical Sciences, University of People's Friendship imeni P. Lumumba, Moscow]

[Abstract] Sickie cell diseases include sickie cell anemia (HbSS), combination of HbSS with other hemoglobins (HbC, D, O<sub>Arab</sub>) and with thalassemia. Hemoglobin S-thalassemia is found in the Mediterranean area, Africa, Western Arabic States and in the USSR in the Transcaucasian republics. Clinically, the most important is HbS-beta-thalassemia. Clinical and laboratory data on 52 patients with HbS-thalassemia are reported. Many of them have shown the same clinical manifestation. Differential diagnosis should be based on electrophoretic data and quantitative determination of hemoglobin fractions. Treatment is basically symptomatic. Preventive measures (nutrition, treatment of infections, hydration) are very important. References 10: 6 Russian (1 by Eastern authors), 4 Western.

7813/12955  
CSO: 1840/685

UDC 579.843.95.083.13.04:615.33

VIRULENCE, VIABILITY AND ANTIBIOTIC RESISTANCE OF PLAGUE BACILLUS CULTIVATED ON SELECTED MEDIA AT 28 AND 37°C

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian  
No 5, May 86 (manuscript received 8 Jul 85) pp 53-56

[Article by O. V. Sheremet, V. N. Milyutin (dec.), Ya. N. Korganov and  
V. A. Kopylov, Rostov-on-Don Scientific Research Antiplague Institute]

[Abstract] *Yersinia pestis* bacilli were cultivated on different media at 28 and 37°C to test for retention of virulence and antibiotic resistance, in order to determine optimum conditions for sample preservation. The data demonstrated that media represented by yeast-casein preparations, yeast medium supplemented with Hottinger's pancreatic meat hydrolysate, and yeast medium supplemented with sunflower seed hydrolysate were equally effective for the purposes intended. In addition, a growth temperature of 28°C was preferred for preservation to assure strains with a lower LD<sub>50</sub> value for outbred white mice, while preservation of cultures grown at 37°C was optimum for assessment of antibiotic susceptibility (gentamycin, streptomycin, rifampicin, doxycycline, monomycin). References 5 (Russian).

12172/12955  
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ISOLATION OF UNCONVENTIONAL VIRUS AND ITS ETIOLOGIC IMPLICATION IN HUMAN  
AMYOTROPHIC LEUKOSPONGIOSIS

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian  
No 6, Jun 86 (manuscript received 18 Oct 85) pp 42-46

[Article by N. D. Kolomiyets, V. I. Votyakov and A. G. Kolomiyets, Belorussian  
Scientific Research Institute of Epidemiology and Microbiology, Belorussian  
SSR Ministry of Health, Minsk]

[Abstract] A novel disease entity has recently been identified in Belorussia,  
falling into the category of slow virus encephalopathies and designated  
as amyotrophic leukospongiosis (ALS). Isolation, transmission, and recovery  
studies conducted with brain tissue from deceased patients led to the  
tentative identification of an unconventional virus capable of propagation  
in human and animal brain cells as well as in HEp-2 cell culture. Adminis-  
tration by various routes led to development of spongiform encephalopathies  
in guinea pigs and squirrel monkeys. Preliminary analytical data have shown  
the virus to have a buoyant density of 1.18-1.19 g/cm<sup>3</sup> in 20-60% sucrose  
density gradient, and a MW of 32-37 kilodaltons on Sephadex G-100 chromato-  
graphy and 27-32 kilodaltons on polyacrylamide gel electrophoresis.  
Figures 1; references 18: 9 Russian, 9 Western.

12172/12955  
CSO: 1840/615

UDC 579.843.1

STUDY OF CHOLERA VIBRIO POPULATIONS WITH RESPECT TO VIRULENCE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 6, Nov-Dec 86  
(manuscript received 1 Aug 85) pp 13-17

[Article by A. G. Somova, I. A. Emdina, L. N. Lobanova, L. M. Smolikova,  
A. N. Gritsenko and N. R. Kuznetsova, Scientific Research Anti-plague  
Institute, Rostov-on-the-Don]

[Abstract] This study examines the composition of cholera vibrio populations  
with respect to virulence and its persistence in samples of river water  
and effluents, and involved examination of 7 strains of cholera vibrios:  
Vibrio eltor P-5879, P-3119, P-8860, 1310, P-12104, P-12106 and V. cholerae  
569B. Virulence of the studied cholera vibrios persisted for 1.5-2.5 years  
in autoclaved waters from the sources studied and there were no signs of  
abatement in most cases. At the end of observations, the live-cell count  
was 10<sup>5</sup>-10<sup>7</sup> and, in some cases, the count remained at the initial count  
of 10<sup>8</sup> in 1 ml. High concentrations of surfactants, fats and sulfates did  
not reduce the percentage survival of the cholera vibrios. The pH of all  
samples (7.0-10.0) was practically unchanged over the period of 2.5 years.

The persistence of cholinergic effect of highly cholinergic and moderately cholinergic strains was established with an infectious dose for suckling rabbits being set at  $10^2$ ,  $10^3$  for the highly cholinergic strains and  $10^1$  for the moderately cholinergic strains. Study of five to ten sub-cultures showed that highly cholinergic strains have a homogeneous population composition and moderately cholinergic strains have a nonhomogeneous composition. References 12 (Russian).

2791/12955  
CSO: 1840/533

UDC 582.288:620.193.8

#### SELECTION OF BIOCIDES TO PROTECT LUBRICANT-COOLANTS FROM CONTAMINATION BY FUNGI

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 6, Nov-Dec 86  
(manuscript received 22 Jul 85) pp 52-54

[Article by Z. M. Kartavtseva, E. Z. Koval and N. N. Smirnova, Lubricant-Coolant Laboratory, Kazan Motor Plant, Brezhnev, Institute of Microbiology and Virusology UkSSR Academy of Sciences, Kiev]

[Abstract] A study of fungicidal activity of domestic biocides Formacide 10, Camcide 2, Vasin and 15 E and imported biocides Dodigen MS, Dodigen MS-3, RY-5N from West Germany and Biocide from England was performed to select general purpose biocides which can protect various kinds of coolants from both bacteria and fungi. Test cultures included *Aspergillus niger* var, Tiegh, *Cephalosporium acremonium* Corda, *Fusarium moniloforme* Sheld., *Penicillium ochro-chloron* Biourge, *Trichoderma viride* Pers., *Cladosporium resinae* (Lindau) de Vrie and *Aspergillus clavatus* Desm. Fungicidal activity of the biocides was judged by the dynamics of fungi growth and depended upon their structure and upon the chemical composition of the coolant-lubricant and its resistance to fungi. *Aspergillae*, *fusariae* and *trichodermae* were most resistant to these biocides in coolant-lubricants. The permissible amount of infectious structures (conidia and hyphae) which does not hamper operational properties of the coolant-lubricant was assumed to be  $10^2$  cells/ml. If fungi survived in a medium with the biocide and began to grow, it continued to grow regardless of the biocide concentration in the medium. Biocides which were effective in a Chapek-Doks medium were sometimes ineffective in a coolant-lubricant. Selection of an effective biocide must take into account the chemical composition of the coolant-lubricant to be protected and the dominant fungi species and reliable control must be performed. References 7: 5 Russian, 2 Western.

2791/12955  
CSO: 1840/533

## DETECTION OF MODIFICATION-RESTRICTION SYSTEMS IN YERSINIA ENTEROCOLITICA

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian, No 10, Oct 86 (manuscript received 16 Dec 85) pp 20-22

[Article by V. M. Sorokin, G. V. Demidova, N. N. Novoseltsev and V. I. Marchenkov, Rostov-on-Don Scientific Research Antiplague Institute]

[Abstract] The modification-restriction (M-R) phenomenon is widely spread among microorganisms and yet some of them (e.g., *Y. enterocolitica*) have not been studied adequately in this respect. An attempt was made to find this M-R system in *Y. enterocolitica* using several approaches: phage infection, conjugation, transformation, transduction and bacteriophage testing. Four strains of *Y. enterocolitica* were studied: 10166, 10373, 2119 and 5513. Means of cross titration of bacteriophage T7 2, strains (10166 and 10373) were identified as containing M-R systems probably of type II. Concerning strains 2119 and 5513, it is possible that they have no host specificity or their M-R enzymes are of the I or III type or that there are no recognition sites in T7 phage DNA for endonuclease restriction of these strains. References 12: 6 Russian (1 by Western author), 6 Western.

7813/12955  
CSO: 1840/621

UDC 575.23:582.28

## LACK OF COMPLEMENTATION OF MUTATIONS WHICH IMPAIR BIOSYNTHESIS OF MELANIN IN HETEROKARYON OF PHYTOPATHOGENIC FUNGUS PYRICULARIA ORYZAE CAV

Moscow GENETIKA in Russian Vol 22, No 3, Mar 86 (manuscript received 5 Apr 85; final version received 7 Jun 85) pp 540-542 (16)

[Article by V. G. Dzhavkhiya, T. M. Voinova, G. D. Kazakevich and M. N. Shurov, All-Union Scientific Research Institute of Phytopathology, USSR Ministry of Agriculture, Moscow Oblast]

[Abstract] The development of effective means for controlling the rice pyriculariosis pathogen is difficult due to its phenomenal variability, resulting in part from the heterokaryous and parasexual process. This article analyzes the conidial progeny formed in the process of successive cultivation of the hybrid pathogen. The data presented indicate the great variety of possible reasons for differences in the degree of complementation in heterokaryons and diploids. Detailed study of the mechanisms limiting complementation of pigment mutations in the heterokaryon apparently requires the use of a broad range of mutants with genetic blocks in various links of the chain of biosynthesis of melanin, as well as parallel analysis of the corresponding enzyme systems. References 7: 2 Russian, 5 Western.

6508/12955  
CSO: 1840/639

## CLONING AND EXPRESSION OF HTLV-III VIRUS SURFACE PROTEIN GENE IN E. COLI

Moscow VOPROSY VIRUSOLOGII in Russian Vol 31, No 4, Jul-Aug 86  
(manuscript received 14 Mar 86) pp 485-489

[Article by A.A. Kovgan, S.A. Arakelov, E.V. Karamov and V.M. Zhdanov, Institute of Virology imeni D.I. Ivanovskiy, Academy of Medical Sciences of the USSR, Moscow: "Cloning and Expression of the HTLV-III Virus Surface Protein Gene in E. Coli"; submitted for publication 14 Aug 1986; the first paragraph is the English summary from the original]

[Text] A system has been developed for expression of surface protein [SP] of the virus of acquired immune deficiency syndrome [AIDS] in E. coli. For this purpose, cloning and substitution of a fragment of SP gene of HTLV-III virus under control of PL-promoter of phage  $\lambda$  was carried out using premodified plasmid vector pPL-lambda. In the constructed plasmid pL2 1950 paranucleotides, the PvuII fragment of HTLV-III virus DNA is built-in in such a way that the frames of transcription of phage  $\lambda$  protein N and SP of HTLV-III virus correspond to each other. As a result, plasmid pL2 codes for synthesis of a hybrid polypeptide consisting of phage  $\lambda$  protein N (59 amino acid residues [a.r.]) and SP of HTLV-III (569 a.r.). The presence of the hybrid polypeptide in lysates of E. coli strains (K-12 $\Delta$ H1Atrp/pL2, M5219/pL2 and N4830/pL2) was determined by solid-phase enzyme-immunoassay.

Epidemiological data indicate that acquired immune deficiency syndrome [AIDS] is transmitted by infective material contained in blood or sperm [7, 10]. It has also been demonstrated that the agent of AIDS is a new group of retroviruses [1, 11, 14]. By now, three variants of retroviruses associated with AIDS have been isolated and described: LAV, HTLV-III and ARV-2; their differences and similarities have been investigated. The studies included cloning, decoding of the nuclear DNA sequences of proviruses and a study of replication and morphogenesis of the viruses in host cells [13, 15, 16]. An investigation of AIDS patients' blood serum discovered the presence of antibodies capable of reacting with the proteins of these viruses [10]. The antibodies were found to interact with both internal and surface virion proteins, opening prospects for developing AIDS diagnostic factors by means of genetic engineering and the use of various types of producers of given polypeptides. In a number of publications, approaches have been described to the expression of these proteins by means of methods of recombination of E. coli DNA plasmids. As a result, producers of polypeptides were obtained

which are read out of a series of individual DNA fragments of HTLV-III provirus [5, 6]. Producers of AIDS agent proteins have also been prepared using yeast as the recipient system [2].

The purpose of the present study was to develop a system for expression of the surface protein of HTLV-III virus in *E. coli* bacteria. To this end, we performed a cloning and substitution of a fragment of surface protein gene of HTLV-III virus under the control of a promoter of phage  $\lambda$  ( $P_{\lambda}$ ). This paper reports the first results on the construction and properties of the recombinant plasmid intended for the expression of C-terminal fragment of the surface protein of HTLV-III virus, consisting of 569 amino acid residues [a.r.] in *E. coli* bacteria.

Table 1. Strains of Microorganisms Used in the Study

Strain of <i>E. coli</i>	Genetic markers	Source
C600( $\lambda$ )	F-, thr, leu, lac, thi, tonA21, hsdR, hsdM, supE44, $\lambda$	S.V. Mashko
N99/pL-lambda	cI+	V.V. Mesyanzhinov
N4830	cIts857	V.V. Mesyanzhinov
N99	cI+	V.V. Mesyanzhinov
M5219	M72, Sm <sup>+</sup> , lacZ, amtrp, am, $\lambda$ , bio252, cIts857 $\Delta$ HI	S.V. Mashko
K-12 $\Delta$ HI $\Delta$ trp	M72, Sm <sup>r</sup> , lacZ, am, $\Delta$ bio, $\Delta$ trp, EA2, $\lambda$ , Nam7-Nam53, cIts857, $\Delta$ HI	S.V. Mashko
HB101	F-, pro, leu, thi, lacY, hsdR <sub>K</sub> , hsdM <sub>K</sub> , EndoI, recA	W. Scheffner

#### Materials and Methods

The bacteria strains used in this study are listed in Table 1. *E. coli* bacteria for isolation of plasmid DNA were grown in L broth or 2.5% Hottinger broth with addition of 80  $\mu$ g/ml of ampicillin (Ap) on a rocker (270 rpm) at 37°C during 16-20 hr. The bacteria were collected by centrifuging at 5000 g for 15 min at 2°C and resuspended in one-fifth the initial volume. The cells were lysed according to the method of [4]. The residue, after reprecipita-

tion with isopropanolol, was resuspended in 9 ml of solution of 0.01 M of Tris-HCl (pH 8.0) and saturated with CsCl up to a density of 1.45 g/cm<sup>3</sup>; an ethidium bromide solution was then added to a concentration of 500 µg/ml. After equilibrium centrifuging for 36 hr at 46,000 rpm, a strip containing plasmid DNA was sampled. Plasmid DNA was separated from CsCl and ethidium bromide with the conventional technique. The method of alkaline lysis was used in the screening bacterial colonies containing recombinant plasmids [8]. The transformation of *E. coli* bacteria C600(λ) and HB101 with plasmid DNA preparations was done using the method of P. Humphries [9]. The transformation frequency in that case was 1-3 x 10<sup>5-6</sup> Ap<sup>7</sup> transformants per µg of DNA pBR322. The transformation of *E. coli* strains M5219, K-12ΔH1Δtrp and N4830 was done with Humphries' method, modified in that the bacteria were grown at 28-32 C. The selection of transformant colonies with rDNA was done with the in situ hybridization method [12]. The probe used was DNA preparation of cloned material labeled in vitro with <sup>32</sup>P [12] with specific radioactivity of 10<sup>7</sup>-10<sup>8</sup> pulses/min/µg.

The preparations of specific endonucleases EcoRI, BamHI, PvuII and HindIII were kindly made available by B.A. Rebentish (All-Union Scientific Research Institute of Genetics [VNII Genetika]); preparation of HpaI by A.A. Shilov (The Institute of Virology Academy of Medical Sciences of the USSR). The ligase of phage T4 was obtained from the Institute of Biochemistry and Physiology of Microorganisms of the USSR Academy of Sciences (Pushchino-Oka).

The expression of a fragment of surface protein of HTLV-III virus was studied by solid-phase immune enzyme method, with a diagnostic system developed at the Institute of Virology imeni D.I. Ivanovskiy of the Academy of Medical Sciences of the USSR. For the solid phase we used Soviet-made polystyrol assays (All-Union Scientific Research Institute of Medical Technology, Moscow [VNII Meditsinskoy Tekhniki]). A specific polypeptide was defined by the method of sandwich reaction. On the solid phase we adsorbed a fraction of IgG from AIDS patient serum with the titre of specific antibodies of 1:20,000, according to the solid-phase enzyme-immunoassay made by Organon (Holland). The preparation of AIDS patient serum was made available by Electronucleonic (United States). Incubation with the tested material was conducted for 16 hr at room temperature. The specimens were then rinsed and the bonded antigen was detected by means of specific antibodies (IgG fraction from AIDS patient serum), conjugated with horseradish peroxidase. The substrate was orthophenylenediamine. The optical density of peroxidase reaction products was measured spectrophotometrically at a wavelength of 490 nm on an adsorbtion meter manufactured by Titertek Multiskan (Finland).

## Results and Discussion

The initial attempts at obtaining the expression of the surface protein of HTLV-III virus in *E. coli* by using powerful but poorly controllable bacterial promoters failed, which was apparently due to the capacity of this protein for interacting with bacterial membrane as a toxin for this bacteria. In view of this, we proceeded to construct a plasmid designed for expression of

the C-terminal fragment of the surface protein of HTLV-III virus in *E. coli* under the control of a powerful well-regulatable  $P_L$  promoter of the phage  $\lambda$  [3]. Figure 1 shows the scheme of construction of recombinant plasmid, allowing the synthesis of hybrid polypeptide, which consists of the N-terminal portion of N protein of the phage  $\lambda$  (59 a.r.) and the C-terminal fragment (569 a.r.) of the surface protein of HTLV-III virus. The source of DNA of HTLV-III provirus was the hybrid plasmid pEnvI, obtained by us earlier. Initially, the preparation of the plasmid vector pPL-lambda was obtained by processing it with specific endonucleases HpaI and PvuII in specimen amounts. By electroelution a fragment of  $\sim 2750$  nucleotide pairs

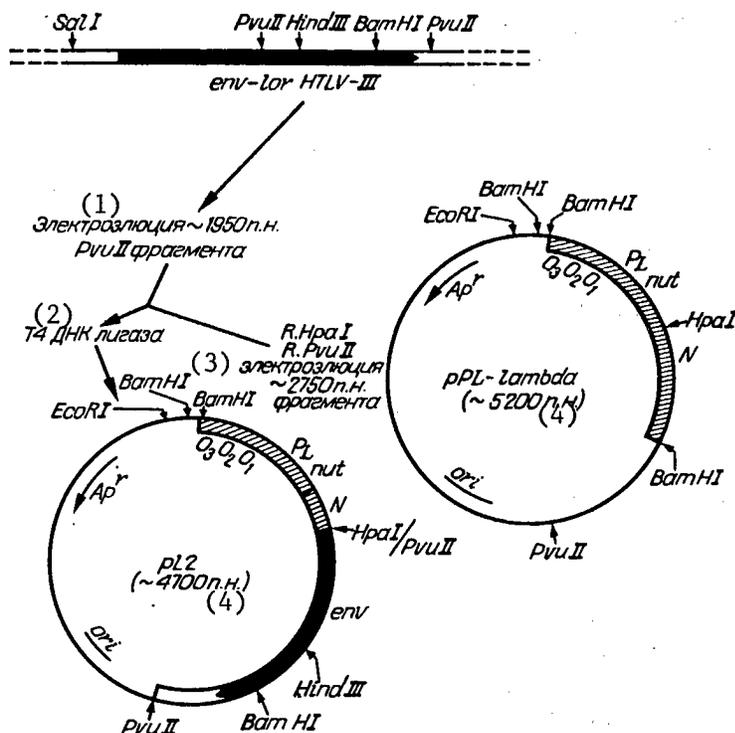


Figure 1. The scheme of construction of plasmid pL2 for expression of C-terminal fragment of surface protein of HTLV-III virus in the form of a hybrid polypeptide on the basis of N protein of the  $\lambda$  phage. In the plasmids, the portions of pBR322 vector are indicated by thin lines; the fragment encoding the gene of the surface protein of HTLV-III is solid black; the DNA segment of  $\lambda$  phage is hatched; Ap is ampicillin resistance gene;  $P_L$ ,  $O_1$ ,  $O_2$  and  $O_3$  are  $P_L$  promoters and operators of  $\lambda$  phage; ori is the "origin" of vector replication. Arrows indicate the portions of splitting of the respective restrictases.

Key:

1. Electroelution of  $\sim 1950$  n.p. of PvuII of the fragment
2. T4 DNA ligase
3. Electroelution of  $\sim 2750$  n.p. of the fragment
4. n.p.

(n.p.) was then isolated and mixed in a proportion of 1:5 with PvuII fragment of a size of ~1950 n.p. eluted from pEnv-1. This fragment of the DNA of HTLV-III provirus codes the C-terminal part of the surface protein of HTLV-III consisting of 569 a.r. The mix was treated with a preparation of T4 phage ligase DNA. After using the transformation of *E. coli* C600( $\lambda$ ) 0.01  $\mu$ g of ligated mix, 5000 clones were obtained. The clones containing hybrid plasmid with inserts were selected by the method of in situ hybridization with  $^{32}$ P-labeled DNA of ~1950 n.p. of PvuII fragment of HTLV-III virus. Of the clones selected, plasmid DNA was isolated and studied by restriction analysis, making use of specific endonucleases BamHI, EcoRT, Hind III and PvuIII in 0.8% agar gel. Based on the distribution of hydrolysis products of recombinant plasmids R.BamHI, the orientation of DNA fragments of HTLV-III was determined. Two plasmids were selected in which transcription frames of phage  $\lambda$  protein N and surface protein of HTLV-III virus corresponded to each other.

Table 2. Determination of the Contents of HTLV-III Surface Protein Fragment in Bacterial Lysates by the Method of Enzyme Immunoassay With the Use of IgG from AIDS Patient Serum

Material investigated	Optical density		
	a	b	a/b
<i>E. coli</i> K-12 $\Delta$ HIAtrp/pL2	0.237	0.051	4.6
<i>E. coli</i> M5219/pL2	0.421	0.046	9.1
<i>E. coli</i> N4830/pL2	0.347	0.046	7.5
<i>E. coli</i> C600( $\lambda$ )/pL2	0.068	0.065	1.0
<i>E. coli</i> K-12 $\Delta$ HIAtrp/pPL-lambda	0.047	0.045	1.0
<i>E. coli</i> M5219/pPL-lambda	0.037	0.038	0.9
<i>E. coli</i> N4830/pPL-lambda	0.045	0.045	1.0
<i>E. coli</i> C600( $\lambda$ )/pPL-lambda	0.059	0.049	1.3
HTLV-III	0.908	0.027	33.7

**Note.** The optical density of products of enzymatic reaction in the analysis of *E. coli* lysates (wavelength 490 nm): (a) without neutralization reaction; (b) with neutralization reaction. For analysis amounts of 100  $\mu$ l of lysate were taken, obtained from 750  $\mu$ l of bacterial culture existing in the late logarithmic growth phase ( $A_{550} = 1$ ); (a/b) the ratio of optical density of experimental specimens to controls with neutralization. HTLV-III = concentrated suspension of virus particles.

For studying the expression of hybrid protein the resulting plasmids were used to transform *E. coli* strains M5219, K-12 $\Delta$ H1 $\Delta$ trp and N4830. The transformant clones were grown in L broth at 28-32°C for the late logarithmic phase of growth. Subsequently, for the induction of P<sub>L</sub> promoter inactivation of its repressor was performed by incubating the *E. coli* cultures for 5 min at 45°C. The bacterial mass then was incubated for 1, 2 and 3 hr at 41-42°C on a rocker (270 rpm). After this, 1.5 ml of the culture was precipitated and the precipitate resuspended in 200  $\mu$ l of the following buffer: 100 mM Tris-HCl (pH 7.5), 10 mM EDTA, 8% saccharose and 0.2% Triton X-100. The resulting suspension was treated with ultrasound and centrifuged for 15 min at 12,000 g. The presence of surface protein of HTLV-III virus in bacterial lysates was determined by the method of solid-phase enzyme-immunoassay. The results of a typical test are shown in table 2. As is seen, in strains of *E. coli* K-12 $\Delta$ H1 $\Delta$ trp/pL2, M5219/pL2 and N4830/pL2 immunologically active fragment of surface protein of HTLV-III virus is produced, while in strain C600( $\lambda$ )/pL2 it is not produced. The amount of the polypeptide synthesized remains approximately at the same level after 1, 2 and 3 hr induction of P<sub>L</sub> promoter.

In estimating the results, the specimens that were identified as positives were those with an optical density higher by a factor of 2.1 than the level of negative controls, which were lysates of *E. coli* strains containing an active repressor of phage  $\lambda$  P<sub>L</sub> promoter and lysates of *E. coli* strains containing vector plasmid pPL-lambda. The neutralization reaction was performed by adding an AIDS patient serum containing a high titre of specific antibodies. All positive tests were confirmed by neutralization reaction.

Thus, the data obtained confirm that as a result of experiments a system has been developed for expression of the surface protein of the AIDS virus in *E. coli* bacteria. An optimal procedure is currently being developed for production of preparation size amounts of surface protein of HTLV-III virus, which may modify the approach to the creation of diagnostic tests for AIDS.

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CSO: 1840/610

UDC 578.828:578.224]:[577.212.3:575.222.75:]:579.842.11

GENERATION OF HTLV-III-SPECIFIC POLYPEPTIDES IN E. COLI CELLS

Moscow VOPROSY VIRUSOLOGII in Russian Vol 31, No 4, Jul-Aug 86  
(manuscript received 24 Apr 86) pp 489-493

[Article by M. I. Bukrinskiy, Y. V. Barsov and E. V. Karamov, Institute of Virology imeni D. I. Ivanovskiy, Academy of Medical Sciences of the USSR, Moscow: "Generation of HTLV-III-Specific Polypeptides in E. Coli Cells"; submitted for publication 24 Apr 1986; the first paragraph is the English summary from the original]

[Text] Cloning and expression of E. coli cells of a fragment of the env gene of HTLV-III virus is described. This fragment coding for from 294 to 757 amino acid residues of virus protein was cloned in plasmid pUC18. Conditions are described contributing to the regulated functioning of Lac-promoter allowing the expression of proteins toxic for E. coli. Solid-phase enzyme-immunoassay demonstrated a specific reaction of polypeptides synthesized in E. coli with an AIDS patient's serum. The sizes of these polypeptides were determined by the Western-blot method. They were found to be 18, 24 and 32 kilodaltons. The polypeptides synthesized in E. coli may apparently be used for preparation of test-systems for AIDS diagnosis.

HTLV-III virus is an etiologic agent of a new dangerous disease affecting the immune system: acquired immune deficiency syndrome [AIDS] [5]. This disease, spreading rather rapidly in the United States and the countries of Western Europe, at this point practically defies all treatment. Since HTLV-III belongs to the group of retroviruses and can integrate itself into the genome of the affected cells, it is hardly possible to achieve its complete elimination from the body. A more promising approach at this point would be the preventive effort of fighting this disease and especially the creation of antiviral vaccines. One stage in this effort is producing large quantities of immunogenic proteins of HTLV-III. In addition to production of vaccines, these proteins are necessary for producing diagnostic test systems.

The use of HTLV-III virus cultivated in cells to produce sufficient quantities of virionic proteins encounters serious difficulties. In particular, expensive media and reagents are necessary for virus cultures; the yield of virus in cell cultures is usually small. For this reason, genetic engineering techniques seem to be more promising for production of virus proteins.

The present study is concerned with the cloning and expression in *E. coli* of a fragment of the env gene, coding the synthesis of virus-specific polypeptide. For the vector we used pUC18 plasmid, selecting the conditions for regulated functioning of lac-promoter.

HTLV-III provirus has been recently cloned, and its full nucleotide sequence has been determined [10]. In addition to the common retrovirus genes gag, pol and env, the HTLV-III genome contains two additional transcription frames, sor and lor, whose functions have been the object of active study recently. The env gene encodes the envelope glycoprotease of the virion, which apparently is the best initial material for creation of vaccine and diagnostic preparations.

### Materials and Methods

Construction of recombinant plasmid pUCenv1. PvuII fragment of the env gene was obtained by treating with restrictive endonuclease PvuII the DNA of the plasmid pBH10 [10] (fig. 1). The restrictive mix was fractionated in 0.7% agar gel, and the necessary fraction was separated by electroelution [8]. 0.4 µg of purified DNA of the fragment was ligated with 1 µg of BamHI-linkers (CCGGATCCGG), pretreated with polynucleotide kinase in the presence of ATP. The kinase reaction was conducted in a buffer consisting of 0.05 M Tris-HCl (pH 9.5), 0.01 M MgCl<sub>2</sub>, 5 mM dithiothreitol, 1 mM spermidine, 3% glycerine at

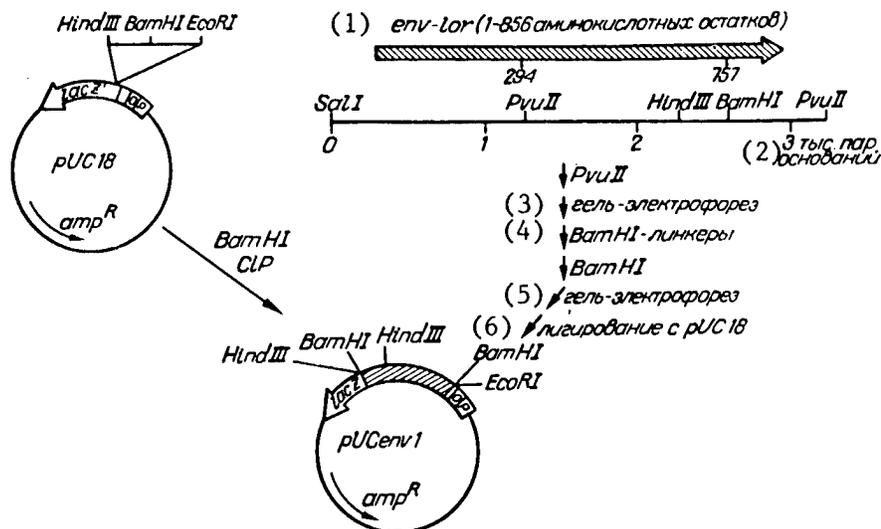


Figure 1. The scheme of production of recombinant plasmid pUCenv1.

Key:

1. env-lor (1-856 amino acid residues)
2. 3000 pairs of bases
3. Gel electrophoresis
4. BamHI-linkers
5. Gel electrophoresis
6. Ligation with pUC18

37°C for 15 min with  $\gamma$ - $^{32}\text{P}$ -ATP and 30 min with unlabeled ATP [8]. The effectiveness of the reaction was tested by thin-layer chromatography on PEI cellulose in 1 M  $\text{KH}_2\text{PO}_4$ , pH 3.5, with subsequent radioautography. The ligation of DNA fragment with linkers was performed in a buffer consisting of 0.07 M Tris-HCl (pH 7.5); 5 mM  $\text{MgCl}_2$ ; 5 mM dithiothreitol and 1 mM ATP at 4°C for 12 hr. The efficacy of the ligation of linkers was preverified with the use of electrophoresis in 12% polyacrylamide gel and radioautography.

The DNA of env gene fragment with BamHI-linkers were treated with restriction endonuclease BamHI and fractionated in 0.7% agar gel. DNA was extracted from the gel by electroelution. The resulting fragment codes from 294 to 757 the amino acid residue of env protein of HTLV-III virus (see fig. 1).

0.1  $\mu\text{g}$  of purified DNA of the fragment was ligated with 0.1  $\mu\text{g}$  of vector DNA of pUC18, pretreated with BamHI and alkaline phosphatase CIP (Boehringer-Mannheim). Ligation was conducted at 4°C for 12 hr. The ligase mix was used to transform competent cells of IM107 [4] prepared by  $\text{RbCl}$  and  $\text{CaCl}_2$  treatment [6]. The transformation efficacy was  $2 \times 10^7$  colonies per mg of DNA. The clones of the transformants were grown in conditions providing repression of lactose operon in the minimal medium A [9], containing 1% of glucose and 50  $\mu\text{g}/\text{ml}$  ampicillin. From the resulting clones plasmid DNA was extracted by boiling [7] and analyzed for the presence of the fragment and its orientation by means of restriction of HindIII and electrophoresis in 0.7% agar gel. The plasmids which contained the fragment in the correct orientation were denoted pUCenv1.

The expression of the fragment and the analysis of the polypeptides obtained. The expression in the clones with correct orientation of built-in fragment was induced by resuspending the cells in the LB medium (1% bactotrypton, 0.5% yeast extract and 0.5% NaCl) with 50  $\mu\text{g}$  ampicillin and 1 mM isopropyl- $\beta$ -thiogalactoside (IPTG). The induction was conducted for 2 hr at 37°C.

In order to determine env-specific RNA  $^3\text{H}$ -uridine (200  $\mu\text{Ci}$  per culture) was added to the cells at the beginning of the induction process and incubated for 2 min. RNA was extracted with hot phenol [11]. For this purpose, cells from 1 ml of culture ( $\text{OD}_{550} = 0.5-0.6$ ) were resuspended in 100  $\mu\text{l}$  of 0.1 M sodium acetate, pH 5.0, adding lysozyme to 1 mg/ml and sodium dodecylsulfate (SDS) to 1%. The suspension was placed on a water bath at 65°C and phenol with 0.1 M sodium acetate, pH 5.0, was added to it. After mixing, the material was put in an ice bath. This was followed by centrifuging, after which the water phase was precipitated with alcohol and RNA dissolved in 50  $\mu\text{l}$  of TE buffer (10 mM Tris-HCl, pH 8.0 and 1 mM EDTA) and utilized for hybridization with DNA of PvuII fragment of env gene immobilized on nitrocellulose filter. The hybridization was done as described earlier in [1]. Before hybridization, denaturated DNA of pUC18 was added to RNA solution. After rinsing, the filters were dried, placed in a scintillator and the counts were read on a Packard counter (United States).

For defining env-specific protein the cells after IPTG induction were lysed by boiling for 3 min in a buffer containing 80 mM Tris-HCl, 2% SDS, 2.5 M

urea, 2% glycerine, 5%  $\beta$ -mercaptoethanol and 0.02% bromphenol blue; lysate proteins were then separated by electrophoresis in 12.5% polyacrylamide gel with SDS [8]. Protein fractions were transferred from the gel onto nitrocellulose by electric blotting for 12 hr in a Tris-glycine buffer, pH 8.0. The fractions corresponding to env-specific polypeptides were detected by enzyme-immunoassay [13]. Nitrocellulose filters were washed in a solution containing 0.3% tween-20, 0.01 M phosphate buffer (PBS) (pH 7.4), 3 times 20 min each at room temperature, and then incubated for 1 hr at 37°C with AIDS patient serum diluted 2500 times with tween-20-PBS solution. It was then washed with a twin-20-PBS solution three times 20 min each at room temperature. The filters were incubated with antibodies to human immunoglobulines conjugated with peroxidase (Organon Technica). Staining was done in a substrate solution (0.1 M PBS, 0.05% 3,3,-diaminobenzidine and 0.003%  $H_2O_2$ ) for 2-5 min at room temperature. The reaction was stopped by washing the filters with distilled water.

Solid-phase enzyme-immunoassay was done with the method described previously in [4], with some modifications. 0.7 ml of the culture was lysed in a buffer containing 25% saccharose, 50 mM Tris-HCl (pH 8.0), 2.5 mg/ml lysozyme, 100 mM EDTA and 0.05% Triton X-100. The lysate was lightened by centrifuging and 100  $\mu$ l were placed into pits in panels with sorbed anti-HTLV-III immunoglobulins. The panels were incubated overnight at room temperature. After washing, antibodies to HTLV-III conjugated with peroxidase were added to the experimental pits, together with 2% normal human serum. Labeled antibodies to HTLV-III with 2% AIDS patient serum were added to control pits. The panels were incubated for 2 hr at 37°C, rinsed and stained with o-phenyldiamine.

## Results and Discussion

The constituent synthesis of eukaryotic proteins in prokaryotic cells is usually lethal for these cells [12]. In order to produce env-specific protein in E. coli cells it was first of all necessary to achieve controlled functioning of lac-promoter of the vector of pUC18: repression during the course of cloning and subsequent induction of selected clones. For repression of lac-promoter we used as the recipient of recombinant plasmid the JM107 strain, carrying mutation in the repressor gene  $lacI^q$ . This mutation provides an approximately 10-fold increase in the number of repressor molecules in the cell [9]. In addition, the transformed cells were grown on a minimal medium with glucose, providing for catabolic repression of lac-operon. To test the efficacy of repression, we analyzed the levels of synthesis of env-specific RNA in the cells before and after induction. The results of these experiments are given in table 1. As can be seen, the induction is accompanied by an approximately 10-fold increase in env-RNA synthesis. Limited synthesis of this RNA, however, occurs also without induction, indicating incomplete repression of lac-operon in this system.

Our attempts at achieving the expression of the cloned fragment SAlI/BamIII (fig. 1) were unsuccessful, apparently because of the high toxicity and low stability of the polypeptide that is formed. In order to reduce the toxic

Table 1. Analysis of env-Specific mRNA

Induction	No of JM107/pUCenv1 Clones							JM107/pUC18 (control)
	1	2	3	4	5	6	7	
-	95	120	90	175	150	85	105	45
+	150	950	1100	820	1800	480	190	55

Note. The numbers represent the quantities of mRNA (in pulses/min).

Table 2. Analysis of env-Specific Polypeptides by Means of Solid-Phase Enzyme-Immunoassay

Serum	No of IM107/pUCenv1 clones														IM107/pUC18 (control)	
	1		2		3		4		5		6		7		+	-
Control <sup>1</sup>	75	80	60	70	80	60	75	58	72	74	67	76	51	79	54	61
Experiment <sup>2</sup>	82	75	150	90	220	81	180	51	370	88	160	71	83	91	67	63

<sup>1</sup>Control = labeled antibodies with 2% of AIDS patient serum.

<sup>2</sup>Experiment = labeled antibody with 2% normal serum.

Note. - = noninduced cultures; + = cultures induced with IPTG.

effect of the synthesized proteins as much as possible, we cloned a fragment of env gene in which the sequences coding the hydrophobic segments of the protein were absent: N-terminal signal peptide and C-terminal transmembrane peptide. It turned out that a small constitutive synthesis of the protein encoded with this fragment was of a low toxicity for the host cell. Yet, the differences in the level of the synthesis of env-specific polypeptides in the clones carrying pUCenv1 (table 2) suggest modifications in the area of lac-promoter, weakening the transcription of the cloned gene. This, in turn, indicates a substantial pressure of selection which gives preference to the cells in which the gene transcription has a low efficacy. This is also supported by a correlation that was detected in the synthesis level of mRNA and env-specific protein. Obviously, increasing the repression efficacy offers a large reserve of enhancing the level of env protein synthesis.

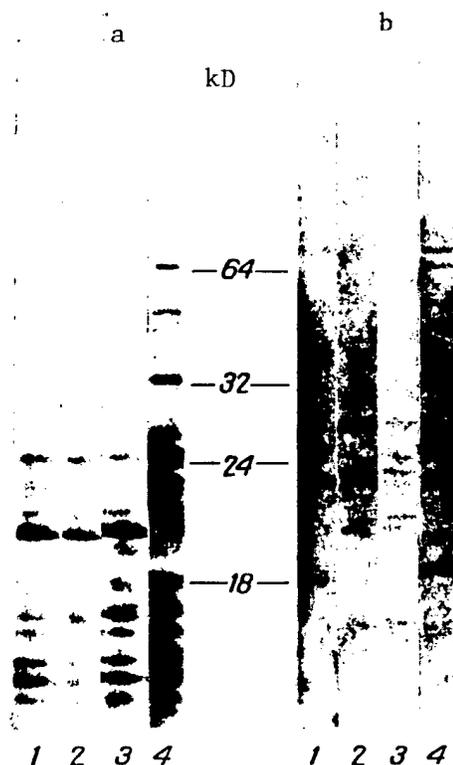


Figure 2. Analysis of polypeptides coded by pUCenv1: (a) gel was dyed with black amide; (1) JM107 cells; (2) JM107 cells transformed by pUC18; (3) JM107 cells transformed by pUCenv1 and dyed in conditions of lac-promoter repression; (4) same, but after IPTG induction; (b) proteins were transferred to nitrocellulose filter and identified by means of enzyme immunoassay; (1) JM107 cells transformed by pUC18; (2) JM107 cells transformed by pUCenv1 and grown in conditions where promoter was repressed; (3,4) same, after IPTG induction; (3) blood serum used in enzyme immunoassay was taken from a healthy donor; (4) serum taken from an AIDS patient.

As can be seen from fig. 2, in the course of induction, several polypeptides are synthesized which react specifically with the serum of an AIDS patient and have high antibody titres to antigens of the HTLV-III virus. These polypeptides are of the size of 32, 24 and 18 kilodaltons (kD). They are probably synthesized from internal codes of ATG, before which sequences have been detected similar to the Shine-Dalgarno sequences [2]. The clone fragment of env gene contains six internal ATG sites [10], from which translation can be initiated that leads to the synthesis of polypeptides with molecular weights 17, 21, 31, 31.5, 38 and 54 kD. Three of these have virtually identical molecular weight with the data of fig. 2b. The absence of antigenic properties in polypeptides with molecular weight 64 kD (see fig. 2), which

apparently is full-sized product of the merger of the cloned fragment and the fragment lacZpUC18, is attributed to the difference between the transcription frame of env and lacZ- $\alpha$ -polypeptide (fig. 3). Apparently, env gene is transcribed with the shift of the frame by one nucleotide.

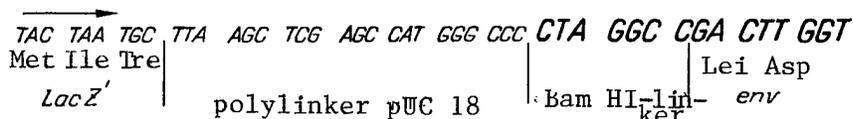


Figure 3. Nucleotide sequence of the site of connection of pUC18-env in pUCenv1 plasmid. The sequence of the cloned fragment (including the part of BamHI linker) is indicated by boldface. The arrow shows the direction of transcription.

The serologic specificity of the polypeptides synthesized was confirmed by means of solid-phase enzyme-immunoassay (see table 2). Thus, polypeptides of HTLV-III virus obtained by genetic engineering could be utilized for the production of diagnostic AIDS test systems. By the Western-blot method we determined that the specific reaction of AIDS patient serum with polypeptides synthesized in *E. coli* was substantially higher than the background reaction with *E. coli* proteins (see fig. 2). Yet, the reaction of serums with low antibody titres can apparently be masked by the background. For producing highly sensitive test systems it is desirable, therefore, to develop methods for purifying HTLV-III polypeptides produced by genetic engineering.

The authors thank V. Skovorodka and A. Yegorov, who took part in some of the experiments, and V. Baurin for help in discussions of the manuscripts. We are also thankful to V.M. Zhdanov, academician of the Academy of Medical Sciences of the USSR, for support and constant attention to this work.

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PHYSICAL SEQUENCE MAPPING OF IS281 SPECIES OF STREPTOMYCES

Moscow MOLEKUKYARNAYA BIOLOGIYA in Russian Vol 20, No 4, Jul-Aug 86  
(manuscript received 25 Oct 85) pp 1079-1083

[Article by I. A. Sladkova, All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow]

[Abstract] In previous work it was shown that phage descendants forming by spontaneous induction from lysogenic strain *S. lividans* 803 ( $\psi$  C43) consist of a non-homogeneous population. On the basis of a model it was proposed that  $\psi$  C43 prophage contains an IS element which causes formations of "supergenome" incapable of packing in phage nodules. The goal of this work was to investigate the structure of this prophage and some physical properties of the IS281 sequence. It was shown that IS281 sequence was similar to that found in IS bacteria: up to six copies were identified in chromosomes of *Streptomyces lividans* 800 ( $\psi$  C43) and one of them was actually found in the prophage. The IS281 insert is capable of generating deletions with high frequency; it is 1.4 kb long and is restricted by inverted repeats. IS281 contains unique restriction cleavage sites for Bam HI BgII and it is cleaved twice by SacII enzyme. The insertion sites for IS are characterized by increased content of AT pairs resembling integration sites in IS and Tn bacteria. Figures 3; references 16: 4 Russian, 12 Western.

7813/12955  
CSO: 1840/570

## STATISTICAL ASPECTS OF PRIMARY STRUCTURES OF FUNCTIONAL DOMAINS IN E. COLI GENOME. PART 2. NON-EQUIVALENT MARKOV MODELS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 4, Jul-Aug 86  
(manuscript received 27 Nov 85) pp 1024-1033

[Article by M. Yu. Borodovskiy, Yu. A. Sprizhitskiy, Ye. I. Golovanov and A. A. Aleksandrov, Institute of Molecular Genetics, USSR Academy of Sciences, Moscow]

[Abstract] In continuation of their work, analysis was performed on structural domains of E. coli obtained from EMBL nucleotide sequence bank. It was shown that in the process of calculating codon statistics, non-equivalent Markov models yield results closer to reality than the equivalent models. Based on the non-equivalent model of the second order, correlation parameters were determined for neighboring amino acid residues in primary protein structures of E. coli molecules; the values obtained indicated close order in polypeptide chains. It was stressed again that there exists no single model which could describe adequately the coding and non-coding domains: DNA text is not stationary and its various functional domains are described by different models. Figures 3; references 13: 5 Russian (1 by Western author), 8 Western.

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## EFFECT OF MERCURATION OF DOUBLE STRANDED DNA AND RNA ON OPTICAL ACTIVITY OF LIQUID CRYSTALLINE MICROPHASES FORMED BY THEM

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 4, Jul-Aug 86  
(manuscript received 15 Nov 85) pp 1138-1142

[Article by N. M. Akimenko, I. M. Yanovskaya\*, O. L. Lependina\*, A. T. Dembo\*\*, Ya. M. Varshavskiy, Institute of Molecular Biology, USSR Academy of Sciences, Moscow; \*Institute of Heteroorganic Compounds imeni A. N. Nesmeyanov, USSR Academy of Sciences, Moscow; \*\*Institute of Crystallography imeni A. V. Shubnikov, USSR Academy of Sciences, Moscow]

[Abstract] Double stranded DNA and RNA form liquid crystal microphases in aqueous salt solutions of polyethylene glycol which exhibit high optical activity. Even the slightest modification of their structure however results in loss of this optical activity. To gain more knowledge about this phenomenon, liquid crystal microphases formed from mercurated DNA and RNA molecules were studied by circular dichroism. Mercuration of C5 atoms of cytosine in DNA molecules and cytosine or uracil in RNA did produce liquid crystalline microphases but without high optical activity. Demercuration

of nucleic acids followed by formation of microphases produced material with high optical activity again. Appearance of this optical activity was explained by linear dichroism of chromophores located in the spiral phase; introduction of mercury atoms interfered with formation of the spiral and hence loss of the activity. Figures 3; references 14: 5 Russian, 9 Western (2 by Russian authors).

7813/12955  
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STATISTICAL ASPECTS OF PRIMARY STRUCTURES OF FUNCTIONAL DOMAINS IN E. COLI GENOME. 1 COMMUNICATION. FREQUENCY CHARACTERISTICS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 4, Jul-Aug 86  
(manuscript received 18 Sep 85) pp 1014-1023

[Article by M. Yu. Borodovskiy, Y. A. Sprizhitskiy, Ye. I. Golovanov and A. A. Aleksandrov; Institute of Molecular Genetics, USSR Academy of Sciences, Moscow.]

[Abstract] On the basis of a number of reports a concept was generated that there exist stable statistical regulations of nucleotide sequences in primary DNA structures which persist throughout the entire genome of each organism. In the present paper arguments were raised contradicting this concept. Non-crossing E. coli DNA fragments with 135,000 nucleotide length were computer-analyzed showing that statistical regulations of the nucleotide sequencing in coding and non-coding domains differed substantially. It was noted that in coding domain of E. coli DNA the correlation characteristics periodically depended on the position occupied by neighboring nucleotides in relationship to the initiating codon. It was hypothesized that these regularities reflect an evolutionary path in which various rules were selected for mutation fixation at specific functional sites. These concepts could be used in special models of nucleotide sequences required for development of computer recognition algorithms for genomic functional units. Figures 2; references 26: 2 Russian (1 by Western author), 24 Western.

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GENE EXPRESSION OF AMINOGLYCOSIDEPHOSPHOTRANSFERASE UNDER CONTROL OF  
rec A PROMOTOR

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 4, Jul-Aug 86  
(manuscript received 17 Sep 85) pp 1008-1013

[Article by V. I. Kiselev and Ye. I. Astashkin, All Union Scientific Research  
Institute of Applied Microbiology, Obolensk, Moscow Oblast]

[Abstract] There are two known functions of rec A protein: homologous recombination of DNA molecules and regulation of genes responsible for cellular repair processes (the so called SOS genes). There are practically no reports on regulation of SOS gene expression in bacilli cells; rec A gene could be assumed to be effectively expressed in such cells. The goal of this study was to create a genetic system capable of determining transcriptional activity of E. coli rec A gene in Bac. thuringiensis cells. The first stage of this project consisted of cloning the promotor of rec A gene of E. coli and studying its properties. Effectiveness of this promotor was evaluated by the activity of aminoglycosidephosphotransferase (APT). It was shown that it increased 8-10 fold after introduction of nalidixic acid [transliteration] to culture medium. This effect was observed only in rec A strains. Plasmids coding for synthesis of N-terminal segment impacted the E. coli with increased sensitivity towards UV radiation. The level of transcriptional activity of rec A gene may be used in evaluating potential mutagenicity of various factors. Figures 4; references 22: 2 Russian, 20 Western.

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CSO: 1840/570

UDC 613.863-07:616-008.939.633.2-074

RELATIONSHIP OF DNA TRANSCRIPTION AND REPAIR IN STRESS

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian, Vol 32, No 1, Jan-Feb 86  
(manuscript received 10 Nov 84) pp 107-110

[Article by F. Z. Meyerson and V. K. Vasilev, Institute of General Pathology  
and Pathologic Physiology, USSR Academy of Medical Sciences, Moscow]

[Abstract] The dynamics of RNA synthesis and DNA repair are compared under stress in order to determine the time relationships and interconnection of these processes. The study was performed on Wistar rats stressed by being held on their back for 1, 2 and 6 hours. It was found that 6 hours immobilization stress resulted in the appearance of DNA breaks causing decreased molecular mass and density of intranuclear packing. Stress activates RNA transcription in the liver, kidneys, heart and brain, but not the spleen. This activation of transcription develops in two phases, the first phase being strongly expressed in the brain and kidneys, clearly in the liver

and slightly in the heart and spleen. The second phase is strongest in the heart, clear in the liver and brain and weak in the spleen and kidneys. The phases of post-stress transcription activation lag behind the phases of repair synthesis, as is the case with radiation trauma. It is thought that breaks in the polynucleotide chain facilitate splitting of complementary DNA chains, thus facilitating bonding of RNA-polymerase molecules and its movement during transcription. Figures 3; references 15: 6 Russian, 9 Western.

6508/12955  
CSO: 1840/587

UDC 615.918:582.282].036.8:612.015.6:577.161.3

EFFECT OF VARIED AVAILABILITY OF VITAMIN E ON BIOCHEMICAL CHANGES DURING  
T-2 MYCOTOXICOSIS IN RATS

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian Vol 32, No 6, Nov-Dec 86  
(manuscript received 25 Dec 85) pp 99-103

[Article by L. V. Kravchenko, A. E. Kranauskas, L. M. Dzhaparidze, L. I. Avrenyeva, V. B. Spirichev and V. A. Tutelyan, Institute of Nutrition USSR Academy of Medical Sciences, Moscow]

[Abstract] The goal of this work was to study the effect of vitamin E consumption on development of toxicosis caused by mycotoxin T-2, the natural contaminant of food, a metabolite of widely-spread *Fusarium* fungi. The results obtained showed that maintenance of rats on a diet containing 6 mg/kg of vitamin E (low level) for 3 months did not lead to any significant changes of enzymatic activity in mitochondria, lysosomes nor in those enzymes metabolizing xenobiotics. Permeability of lysosomal and plasmatic membranes was not affected. Introduction of T-2 toxin during inadequate vitamin E consumption resulted in an increase of its toxic effect manifested by intensified clinical symptoms and development of a definite hemorrhagic syndrome. Subnormal consumption of vitamin E leads to destabilization of the structure of biological membranes, especially noted during stress conditions and could intensify their negative effect on the organism. Figures 2; references 35: 12 Russian (1 by Western authors) 23 Western.

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CSO: 1840/591

PHARMACOKINETIC ASPECTS OF COMBINING PYRIMETHAMINE WITH SULFANILAMIDES

Moscow MEDITSINSKAYA PARASITOLOGIYA I PARAZITARNYE BOLEZNI in Russian  
No 4, Jul-Aug 86 (manuscript received 9 Jul 85) pp 10-15

[Article by A. A. Lurye, A. M. Shcherbakov, Lyu Tkhi Van Tyuu, Nguyen Tkhi Nyu May and Le Dyk Dau, Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health; Institute of Malariology, Parasitology and Entomology, Republic of Viet Nam, Ministry of Health, Hanoi]

[Abstract] Comparative analysis of pharmacokinetic compatibility of sulfadoxime [SDO; N'-(5,6-dimethoxy-4-pyrimidinyl) sulfanilamide] and sulfalen [SL; N'-(3-methoxy-2-pyrazinyl)sulfanilamide] with pyrimethamine (PAM; 2,4-diamino-5-p-chlorophenyl-6-ethylpyrimidine) was performed on patients with non-complicated tropical malaria in Chorey hospital in Ho Chi Min, Viet Nam. The patients received 25 mg PMA and 500 mg SL or SDO for 3 consecutive days. The results led to a conclusion that PMA + SL combination was a more balanced and more protective combination with regards to their pharmacokinetic properties and possible development of drug resistance. The half-lives of PMA, SL and SDO were 90, 60 and 180 hrs respectively. A note of caution was expressed that these findings apply to chemopreventive work where conditions exist for development of resistance but not necessary to therapeutic procedures in individual cases. Figures 1; references 32: 8 Russian, 24 Western.

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CSO: 1840/599

UDC 616.89-008.441.13-085.246.9:547.496.2]-07:[616.153.1+616.153.441+616.153-262]-074

SERUM LEVELS OF ETHANOL, MALONIC DIALDEHYDE AND ETHANOL-OXIDIZING SYSTEM IN ALCOHOLICS TREATED WITH DISULFIRAM

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian Vol 32, No 2, Mar-Apr 86  
(manuscript received 27 Jun 85) pp 14-16

[Article by I. D. Mansurova and M. S. Istamkulov, Human and Animal Biochemistry Laboratory, Department of Nature Protection, Tajik SSR Academy of Sciences; Tajik Republic Narcology Department, Tajik SSR Ministry of Health, Dushanbe]

[Abstract] Blood chemistries were monitored for 222 alcoholics in various stages of the disease to determine the effects of treatment with the alcohol deterrent disulfiram. The patients were placed on 0.5 g/day (average dose) disulfiram for 4 months, a regimen that resulted in normalization of serum

ethanol and malonic dialdehyde concentrations, and reduction of ethanol-oxidizing system activity. On admission, ethanol and malonic dialdehyde levels were 26.7 and 65.8% above control baseline, respectively, while the activity of the oxidizing system was 100-fold greater than in control subjects. Beneficial effects of disulfiram in terms of the blood chemistries were evident within a week, with normal levels of ethanol and malonic dialdehyde evident thereafter. Reduction in the activity of the oxidizing system also became apparent within a week, and a ca. 4-fold reduction was seen after 4 months from the admission value. The beneficial effects of disulfiram have to be weighed against the reported cases of hepatotoxicity. References 8: 5 Russian, 3 Western.

12172/12955  
CSO: 1840/558

UDC 547.814.03

#### NEUROPHARMACOLOGIC ACTION OF CYCLIC 1,3-DIOXOLAN HEMIACETALS

Dushanbe DOKLADY AKADEMII NAUK TADZHIKSKOY SSR in Russian Vol 29, No 6, Jun 86 (manuscript received 29 Jan 86) pp 355-357

[Article by A. V. Gulin, Kh. I. Istatov and S. S. Sabirov, Tajik State Medical Institute imeni Abyali ibi-Sino]

[Abstract] The Department of Bioorganic and Biological Chemistry, Tajik State Medical Institute, has long worked on the synthesis and study of the pharmacologic properties of 1,3-dioxolan hemiacetals. This article studies the neupharmacologic properties of the new 1,3-dioxolans synthesized at the department to establish the variation in pharmacologic effects as a function of changes in structure. The substances studied are 2-methyl-2 (2-alkylthio) ethyl-1, 3-dioxolans, colorless liquids insoluble in water and quite soluble in organic solvents. All the substances studied were central nervous system depressants and hypnotics which potentiated barbiturates and had a muscle relaxant effect. They were considered quite promising physiologically-active compounds of interest for pharmacology and medical practice. References 6 (Russian).

6508/12955  
CSO: 1840/636

UDC 612.273.1:612.822.1:577.152.1.43

MAO ACTIVITY AND ULTRASTRUCTURE OF RAT BRAIN UNDER VARIOUS CONDITIONS OF HYPEROXIA

Yerevan NEYROKHIMIYA in Russian, Vol 5, No 1, Jan-Mar 86  
(manuscript received 19 Aug 85) pp 37-44

[Article by A. A. Krichevskaya, I. A. Goroshinskaya, G. M. Fedorenko and A. A. Khodakova, Rostov Order of Labor Red Banner State University imeni M. A. Suslov]

[Abstract] Strengthening of free-radical processes and increasing intensity of peroxidation of lipids are important universal initial mechanisms in the development of oxygen intoxication. This article compares the results of electron microscope studies of mid-brain and cerebral hemisphere structures with the activity of mitochondrial monoamine oxidase types A and B. The electron microscope studies showed that there were no changes in neuron ultrastructure of midbrain or hemispheres following exposure to 0.2 MPa O<sub>2</sub> for 1 hour in experiments on white rats. Two-hour exposure to 0.3 MPa O<sub>2</sub> caused significant changes in the ultrastructure of intracellular organoids. The greatest changes were observed upon analysis of brain preparations in the convulsive phase of oxygen intoxication, upon exposure to 0.7 MPa O<sub>2</sub>. Significant differences were observed in individual sensitivity of the animals to elevated oxygen pressure. The results of electron microscopy and studies of MAO activity were found to be comparable under all hyperoxia conditions. The data confirm absence of structural changes in the brain with low and moderate hyperoxia, both manifest changes in intracellular organoid ultrastructure and significant changes in MAO catalytic properties in the convulsive phase. Mid-brain structures were more sensitive to hyperoxia than cortical structures. Figure 1, references 25: 17 Russian, 8 Western.

6508/12955  
CSO: 1840/592

EFFECT OF NEUROHORMONE "C" ON SYNTHESIS UPTAKE AND RELEASE OF CATECHOLAMINES  
IN RAT BRAIN

Yerevan NEYROKHIMIYA in Russian, Vol 5, No 1, Jan-Mar 86 (manuscript received 10 Oct 85) pp 45-48

[Article by A. A. Galoyan, M. D. Chiflikyan, M. Sh. Muradyan, A. K. Yedigaryan and S. S. Abramyan, Institute of Biochemistry, Armenian SSR Academy of Sciences, Yerevan]

[Abstract] This reports a study of the formation and effect of a new group of organotropic neurohormones, neuropeptides produced in the magnocellular nuclei of the hypothalamus, demonstrating that cardiotropic neurohormone "C" influences cardiac circulation by inhibiting phosphodiesterase of cyclical nucleotides. Neurohormone "C" changes the affinity of a number of important enzymes and protons for calcium ions. Data are presented on the effect of neurohormone "C" on synthesis of  $^{14}\text{C}$ -dopamine and  $^{14}\text{C}$ -noradrenaline from  $^{14}\text{C}$ -tyrosine in hypothalamus sections and the corpus striatum of the rat brain as well as the uptake of  $^3\text{H}$ -dopamine and  $^3\text{H}$ -noradrenaline and  $\text{K}^+$ -stimulated release of  $^3\text{H}$ -dopamine. The results indicate that there are certain functional and biochemical interactions between neurohormone "C" and the biosynthesis of catecholamines in some brain structures, directed toward regulation of the functions of the endocrine and visceral organs. Strong stimulus of bio-synthesis of noradrenaline and dopamine is observed both in the corpus striatum and in hypothalamus sections, indicating that the rate of catecholamine renewal under the influence of neurohormone "C" and the biosynthesis of catecholamines in vivo require study. References 13: 3 Russian, 10 Western.

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CSO: 1840/592

UDC 612.822.1:577.175.823;615.212.7:547.95

CHANGE IN PROTEIN METABOLISM IN RAT BRAIN STRUCTURES UPON EXPOSURE TO  
TETRAPEPTIDE AMIDE (CYTOCHEMICAL STUDY)

Yerevan NEYROKHIMIYA in Russian, Vol 5, No 1, Jan-Mar 86 (manuscript received 27 Jun 85) pp 53-56

[Article by R. M. Khudoyerkov, Institute of the Brain, All-Union Science Center of Mental Health, USSR Academy of Medical Sciences, Moscow]

[Abstract] Comprehensive studies of the influence of opioid peptides on cerebral metabolism are needed in association with their possible clinical application for analgesia. This article studies the 30 minute effect of enkephalin-like tetrapeptide amide (TPA) on metabolism in functionally different neurons of the rat brain motor system by methods of autoradiography

and interferometry. 30 minutes after administration of TPA, the protein content was reliably increased by 17% in the cytoplasm of layer V neurons, with a reliable increase in the area of the cytoplasm itself by 11%, while the concentration of protein in the cytoplasm showed only a tendency to increase. In neurons of layer III and the caudate nucleus, there were no significant changes in these characteristics. A reliable 14% increase in uptake of <sup>3</sup>H-Leu was found only in the proteins of the caudate nucleus neurons. The metabolic index increased by 15 and 14% in neurons of layer V and the caudate nucleus, decreasing by 15% in the neurons of layer III. The work thus shows that TPA during its analgesic effect causes no significant change in the content and synthesis of protein, but some changes in protein metabolism do occur in different types of neurons, with some decrease in associative neurons of layer III and increase in the projection-efferent neurons of layer V of the senso-motor cortex and integrative neurons of the caudate nucleus, probably a reflection of secondary processes occurring in brain metabolism. References 10: 8 Russian, 2 Western.

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CSO: 1840/592

UDC 576.8.097.29+576.311.347:616.831.33

#### ULTRASTRUCTURAL FEATURES OF BIOLOGICAL EFFECT OF ENDOTOXIN ON SENSOMOTOR CORTEX NEURONS

Kiev TSITOLOGIYA I GENETIKA in Russian Vol 20, No 5, Sep-Oct 86  
(manuscript received 24 Jul 85) pp 323-326

[Article by P. E. Povilyaitite, E. A. Bardakhchyan and G. I. Vilkov, Rostov Medical Institute, Rostov-on-the Don]

[Abstract] Early ultrastructural changes of sensomotor cerebral cortex neurons after various methods of endotoxin administration were studied in experiments on ten adult Chinchilla rabbits, 23 mongrel dogs and 25 rats, subjected to intravenous (5 mg/kg) or intracisternal (4.5 mg/kg) injection of endotoxin (lipopolysaccharide) of B. coli. Control animals (two dogs, two rabbits, two rats) received equivalent doses of physiological solution. The animals died 30 minutes after injection by a lethal dose of nembutal. Intravenous injection of endotoxin produced adaptive and destructive changes of the energy apparatus of sensomotor neurons. Intracisternal injection of endotoxin produced only damage to mitochondria due to suppression of the intracellular compensatory reaction. Both methods of injection induced formation of numerous coated vesicles in sensomotor cortex neurons. Figures 3; references 16: 7 Russian, 9 Western.

2791/12955  
CSO: 1840/542

INFLUENCE OF ADAPTATION OF BODY TO SHORT-TERM STRESS EFFECTS ON STRESS REACTION, DISORDERS OF METABOLISM AND CONTRACTILE FUNCTION OF HEART, CAUSED BY LONG-TERM EMOTIONAL AND PAIN STRESS

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian, Vol 32, No 1, Jan-Feb 86  
(manuscript received 12 Oct 84) pp 76-81

[Article by F. Z. Meyerson, V. V. Malyshev, Ye. N. Yekimov, V. A. Petrova and V. I. Lifantsev, Laboratory of Cardiac Pathophysiology, Institute of General Pathology and Pathophysiology, USSR Academy of Medical Sciences, Moscow; Central Scientific Research Laboratory and Department of Pharmacology, Irkutsk Medical Institute]

[Abstract] Emotional and pain stress has been found to stimulate the adrenergic and hypophysis-adrenal system, activating peroxidation of lipids, lipase and phospholipase, consequently disrupting oxidation and phosphorylation in the cardiac mitochondria, depressing the contractile function. The prophylactic effect of adaptation to short-term stress has been little studied. This article compares parameters characterizing stimulation of the adrenergic and hypophysis-adrenal system and cardiac trauma after long-term emotional and pain stress on adapted and nonadapted male white rats. Adaptation to short-term stress was found to cause an increase in catecholamine content in the adrenal glands and heart. The corticosterone content in the blood and organs was not changed. Emotional and pain stress in nonadapted animals caused activation of the adrenergic and hypophysis-adrenal system, manifested as a two-to-three-fold increase in corticosterone content in the blood plasma, heart and adrenal glands, with a two-fold drop in noradrenaline in the heart, a three-fold decrease in the content of adrenaline in the adrenal glands, with primary eosinopenia with subsequent brief eosinophilia 45 hours after termination of stress. Preliminary adaptation was thus an effective means of preventing oxidation and phosphorylation disorders in cardiac mitochondria in response to emotional and pain stress. Adaptation of the animals to short-term stress, which did not cause significant changes in the functional status of the hypophysisadrenal system, did reduce the oxidation and phosphorylation parameters in the cardiac mitochondria somewhat, as well as the contractile function of the heart. The changes, though statistically insignificant, did express the "cost" of adaptation. References 22: 14 Russian, 8 Western.

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CSO: 1840/587

PUBLIC HEALTH

REPORT OF USSR HEALTH MINISTER ON MEDICAL CARE RESTRUCTURING

TELEVISION SERVICE in Russian 1700 GMT 6 Apr 87

[From the "Vremya" newscast; video interview with USSR Health Minister Ye. I. Chazov, by Correspondent Natalya Prokofyeva; Chazov and Prokofyeva identified from screen caption]

[Excerpt] Prokofyeva: Yevgeniy Ivanovich, we would like to take the opportunity of World Health Day to talk about the restructuring which is now beginning in our health service, unfortunately somewhat later than in other spheres.

Chazov: [video shows Chazov and Prokofyeva seated opposite each other] How do I see it. It should touch upon all aspects of the work of the Soviet health services, first and foremost, of course, there must be changes in financing, because for a certain period of time it has not been sufficient. It should touch upon planning, and, finally, it should touch upon the health services administrative system. We believe that it is necessary to move over to qualitative indices.

Prokofyeva: Probably the main link of the health services is the rayon health center. There have been a good deal of reprimands directed against the work of rayon health centers. Will there be any changes in their work?

Chazov: We believe, for example, that a doctor -- any doctor who we come across throughout our lives -- his work should not be determined by how many patients he receives, but by how many patients there are in his districts, how many disabled people there are; and whether or not there are complaints. In other words, he will be totally responsible for the health of the 1,800 people who are attached to him.

Prokofyeva: Yevgeniy Ivanovich, [could not a situation be created here] whereby it would be easier for a doctor to pronounce a patient healthy...

Chazov, interrupting: Well, you see, we are creating a whole group of indices which will monitor the work of the doctor...

Prokofyeva, interrupting: Objectively?

Chazov: Objectively, yes, but these are qualitative indices. It may be that these will be in certain health centers, and in an experimental sense, but we will even move on to a free choice of doctor. That means that a person will be able to select a doctor within the confines of his health center. However, we will be raising the salaries of those doctors who will be serving, treating, or rendering assistance to a greater number of people.

But now we are carrying out a great number of... (Chazov changes thought) In particular, we are studying new approaches in the work of health centers. For example, together with the AUCCTU we are carrying out an experiment whereby we allow a doctor to write out a patient's certificate for 10 days. It has to be said that under restructuring we are thinking of changing the actual work trend. We want to move over to intensive methods of health. What does this mean? Well, for example, we want to switch the (?root) of our work from hospital assistance to pre-hospital diagnosis. Our pre-hospital diagnosis system is in a very poor condition. We have to send a patient to the hospital for diagnosis on every pretext.

Prokofyeva: You and I know perfectly well that there is a shortage of equipment at health centers.

Chazov: Yes, and that is why we are creating a new form -- what are known as diagnostic centers. We believe that we will be able to create about 60-70 such large diagnostic centers in our country before 1995. Such centers would be able to receive about 800-1,000 people a day who do not need to go a hospital, and under these conditions they would be diagnosed for the most complex illnesses. (passage omitted)

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## ONCOLOGICAL SERVICE IN TURKMEN SSR

Ashkhabad TURKMENSAKAY ISKRA in Russian 6 Jan 87 p 3

[Article by V. Kuznetsov, director, Scientific Research Institute of Oncology, Turkmen SSR Ministry of Health]

[Abstract] At the Spring meeting of the All-Union Conference of Directors of Oncological, Roentgenology and Radiology Scientific Research institutes one of the key topics of discussion was the status of the oncological service in Turkmenia. Recent reorganization has placed considerably more responsibility on the rayon-level health care services. However, to date only 30 of the 44 rayons have a fully staffed oncological service with the required endoscopic and radiologic back-up. Currently, the Turkmen SSR Ministry of Health is organizing a mobile service for the Institute of Oncology to provide medical care to remote areas. In addition, a 250-bed oncological hospital is expected to be completed in 1988, and training of oncologists is being expanded.

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## CEMA COOPERATION IN PUBLIC

Moscow EKONOMICHESKOYE STRUDNICHESTVO STRAN-CHLENOV SEV in Russian  
No 1, Jan 87, pp 65-71

[Article by Yuriy Sinyakov, COMECON Secretariat]

[Abstract] The All-Union Scientific Research Institute of Medical Instrument Design and Construction represents the Soviet cornerstone of cooperative efforts with the other COMECON countries in creating new and novel medical instrumentation. The current emphasis of such joint efforts is on miniaturization and computerization. The All-Union institution with its 200 scientists and 1000 engineers has entered into special agreements with corresponding establishments in the other countries to harness microelectronics for medical purposes. The efforts of such cooperative efforts are already apparent in the improvements in medical care that they make possible. Of equal importance is the spirit of cooperation among the engineers,

scientists and physicians of the COMECON countries that makes such programs a resounding success. Much of the success is due to V. A. Viktorov, the director of the All-Union Institute and a State Prize laureate. It is through his perseverance, scientific acumen, and a systems approach that the All-Union Institute has acquired an international reputation in the field of medical technological innovations.

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SPEAKERS AT MEDICAL EQUIPMENT SOCIETY'S CONGRESS CRITICIZE LAGS

Moscow MEDITSINSKAYA GAZETA in Russian 27 Mar 87 p 3

[Article by N. Yefimova, T. Ivanova, and Yu. Ishmayev]

[Abstract] The article summarizes proceedings of the third congress of the All-Union Medical Technology Scientific Society (VNMTO), which took place recently in Moscow. Participants in the three-day congress discussed questions of improving medical technology, increasing the production of items in demand, and training equipment operators. Summaries are given of opening remarks by Academician Ye. I. Chazov, USSR health minister; of a report by N. M. Shmakov, USSR deputy minister of health, on medical equipment and tasks of health care in the 5-year-plan; of a speech by B. I. Leonov, director of the USSR Health Ministry's All-Union Scientific Research and Testing Institute of Medical Technology; and of reports and speeches by other participants.

Leonov noted that some medical services are suffering acute shortages of equipment. In particular, laboratory services do not have enough instruments and chemical reagents. Fiber-optic equipment is not widely available for endoscopic examinations. In computer tomography, Leonov noted that the only machines in production are limited to brain scans; a tomograph for scanning the whole body is under development, but certain features of it already are inferior to foreign models. Soviet artificial kidneys are also inferior to imported models, according to Leonov. He complained that industry is meeting only 3-5 percent of the demand for hemosorption apparatus, and that only half of the surgical and other medical instruments in production meet today's standards.

Shmakov called for more attention to quality assurance of products, particularly laboratory equipment for microanalysis and for automated diagnostic systems. He mentioned that a large-scale plan which is now being drafted calls for machine-building plants to produce modern x-ray apparatus, pressure chambers, units for radiological diagnosis, patient monitoring systems, and cryogenic and ultrasonic apparatus.

An editorial appendix to the article assesses the congress' results, focusing attention on tasks for improving cooperation between producers and users of medical equipment. Although coordination of developments in this field

is one of the functions of VNMT0, public health is said to lack a single agency which could take charge of all stages of the introduction process, determine users' current and future needs, and ensure that their requests are met. It is noted that industry needs stronger incentives for producing modern equipment, and that prospective users often cannot acquire it without financial assistance. The USSR State Planning Committee is urged to act on this problem.

Results of elections of officers by the congress are announced. B. I. Leonov was elected chairman of the central board of VNMT0.

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## MEDICAL PERSONNEL PROBLEMS AND NEED FOR PAY RAISES

Moscow EKONOMICHESKAYA GAZETA in Russian No 10, Mar 87, p 18

[Article by D. Manno, chief physician, Polyclinic, No 81 Moscow]

[Abstract] A recurrent and serious problem that affects the morale of medical personnel and the quality of care is the combination of low pay, long hours, out-of-date equipment and instruments, heavy paperwork, and poor administration. The time has come for more decentralized decision-making in order to introduce some degree of efficiency and fairness into the health care delivery system. This should involve pay and salary increases for physicians and allied medical personnel, on-site authority to make decisions on bonuses based on performance, and on reduction of paperwork. In addition, the time has also come for improvements in the design of architectural plans for clinics and hospitals to correspond to the unique needs of the medical profession and patients in accordance with sanitary and hygienic requirements. In the final analysis, all of these factors and decisions rest with the USSR Ministry of Health.

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## PHYSICIAN INDIFFERENCE TO POLYCLINIC PATIENTS

Moscow IZVESTIYA in Russian 26 Mar 87 p 2

[Article by E. Maksimova, special correspondent]

[Abstract] One of the more frequent complaints about Soviet medical care has to do with the indifferent attitude of physicians, who seem to view a patient more as a burden than as someone in need of care and consideration. While it is true that many physicians are overworked, there can be no excuse for blatant callousness, often finding expression in the "what-do-you-want" attitude. Rare is the physician who starts work an hour earlier than required and stays as long as necessary to take care of his patients. Most work with an eye on the clock and appear to be just marking time. The time has come for re-education of medical personnel in the tenets of the Hippocratic oath.

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## MORBIDITY AND MORTALITY STATISTICS MORASS

Moscow IZVESTIYA in Russian 27 Mar 87 p 3

[Article by E. Maksimova, special correspondent]

[Abstract] Beginning with the postwar years, the medical profession has come to be preoccupied with statistics as an indication of health care and the performance of individual physicians. Manipulation of statistics has now become a routine way of life for many physicians, with the statistical indicators of their performance and efficiency reaching astronomical figures. The problem is further complicated by the time spent on concocting such useless and misleading information, which threatens the credibility of the entire health delivery system. To date, nothing practical has been accomplished to deal with this situation.

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## PAPERWORK AVALANCHE CRISIS IN SOVIET MEDICAL CARE

Moscow IZVESTIYA in Russian 29 Mar 87 p 3

[Article by E. Maksimova, special correspondent]

[Abstract] A paperwork crisis has afflicted the Soviet medical system. Physicians have, in effect, been transformed into clerks spending a considerable portion of their working day filling out forms that were originally designed to make their lives easier. Studies have been conducted for decades to control the amount of paperwork in the world of medicine, but so far have only succeeded in generating more of the same. The clerical tasks with which the Soviet physician is inundated are by themselves stressful factors, and in part account for the fact that although the USSR enjoys two- or three-times more physicians per capita as some capitalist countries, the level of medical care is not any better.

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## MEDICAL SERVICE SHORTAGE AND HAPHAZARD CONSTRUCTION OF NEW HOUSING

Moscow IZVESTIYA in Russian 31 Mar 87 p 3

[Article by E. Maksimova, special correspondent]

[Abstract] Citing bussing of extra patients from a new housing complex, Verkhniye Pechory (in Gorky City), to a distant polyclinic, the author emphasizes the sorry state of disorganization in health care and city planning. New residential districts are being developed without medical facilities,

with the people assigned to already overcrowded facilities elsewhere. Such experience points to the need for retaining the localized nature of medical service, and for developing it further to meet changing needs. In many cases statistics are juggled to cover up and justify the existing status quo.

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MISCELLANEOUS

SPACE ECOLOGY AND NUTRITION STUDIED WITH SIMULATOR COMPLEX

Moscow MEDITSINSKAYA GAZETA in Russian 10 Apr 87 p 3

[Article by V. Vasilyev, correspondent (Krasnoyarsk)]

[Abstract] On the occasion of Cosmonautics Day, the article reports on the progress of experiments creating closed biological cycles and gardening on board manned spaceships and space stations.

These experiments are being conducted at the Institute of Biophysics of the USSR Academy of Sciences' Siberian Department, in line with a program called "Bios". Special units which simulate conditions on board spacecraft have been developed for this research. The first "Bios" unit went into operation in the spring of 1964. Galina Mikhaylovna Tereshkova, one of the first occupants of this unit, is now a candidate of sciences and associate of the institute. The experimenters are now using an improved complex, "Bios-3", which is said to incorporate 20 inventions. Plants which regenerate air and water, cereals, and other food plants are cultivated inside this complex. Human experimental subjects live inside it for periods as long as six months.

Doctor of Biological Sciences Genrikh Mikhaylovich Lisovskiy, director of the institute, showed the author of the article the "Bios-3", which he called a closed ecological system. Its chamber has a volume of 135 cubic meters. The complex includes three phytotrons (units for growing plants in controlled conditions) with a total sown area of 60 square meters, which is said to be sufficient to supply five people with oxygen. The phytotrons are capable of yielding six harvests a year, with a productivity of 100-130 centners per hectare for wheat, according to Lisovskiy.

Candidate of Medical Sciences Yuliy Nikolayevich Okladnikov, who is in charge of the medical part of the experiments, commented on the procedure for selecting and monitoring experimental subjects. Physiological parameters of 'crews' inside "Bios-3" are monitored constantly with the aid of a special system, and subjects' weights are maintained at a constant level. The complex's occupants obtain 75 percent of their food from the phytotrons; the rest is supplied through a special air lock. The occupants are provided

with equipment for baking bread and preparing meals from plants grown inside the complex.

The scientists reportedly are preparing a new experiment aimed at clarifying phenomena of man-plant interaction inside a closed space.

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